THE PATENTABILITY OF INVENTIONS

BY

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PREFACE.

THE present work is the result of an attempt to supply a great and increasing demand. It concerns the proper subject-matter of a patent, and the right to a patent as between rival or successive inventors. It does not deal with the fate or scope of a patent: the matters of Abandonment, Infringement, and Reissue are therefore excluded. The author is aware that the limit thus set is an arbitrary one; but he believes it to be justified by the importance and difficulty of the main topic which he has undertaken to discuss. In one instance he has departed from it; for in treating of cases involving a Principle, so-called, he has considered the scope of the patent in addition to its validity, — it being impossible entirely to separate the two subjects.

His aim has been to make the book essentially practical, and useful to patent solicitors and to inventors as well as to lawyers. He has avoided mere verbal rules or definitions of patentability, and has relied upon adjudicated illustrations. The work, in fact, consists mainly of Abstracts of Cases. In the Introduction, however, the author has ventured to state certain General Principles as to the nature of Invention and Discovery.

The authorities are carried down through the 13th volume of the "Federal Reporter" and the 106th volume of United States Reports. In the latter part of the book, moreover, many cases in the 14th and 15th volumes of the "Federal Reporter" are cited, and some of them — notably the Telephone cases — are set forth at length.

H. C. M.

BOSTON, June, 1883.

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TABLE OF CASES.

NOTE. — The number of the page in this book where a case is most fully presented, is given first. In a few instances where a case is treated with equal fulness in two different parts of the book, the numbers of the pages are connected by an *f*.

[1] Fullest Report.

[1] Misnamed Dane *v.* Chicago Mfg. Co.

[1] Fuller Report.

THE PATENTABILITY OF INVENTIONS.

PATENTABILITY OF INVENTIONS.

INTRODUCTION.

INVENTION AND DISCOVERY.

ACCORDING to the statute, he may have a patent "who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof;"[1] and certain further conditions follow, with which we are not now concerned.

It appears, then, that the subject of a patent must be not only new and useful, but also invented or discovered. The statute does not say simply that any one who has made or caused to be made a new and useful thing may have a patent. It requires that he shall have invented or discovered it.[2]

Before investigating what is meant by invention and discovery, it may be well to notice the two senses in which each of these words is used. "Invention" and "discovery" denote sometimes the mental process of the inventor or discoverer, and sometimes the thing in which that mental process results. Both of these meanings are useful, and indeed necessary; but they are distinctly different. Yet it often happens that a writer has one of these meanings in his mind, whereas the reader thinks of the other.

Sometimes, moreover, in the same argument or opinion, if not in the same sentence, the word "invention" is used, first to signify the act of invention, and then to signify the thing invented, without anything being said to indicate that the word

[1] Revised Statutes of the United States, § 4886.

[2] "Invention or discovery is required as the proper foundation of a patent, and where both are wanting, the applicant cannot legally secure the privilege." Mr. Justice Clifford, in Bray *v.* Hartshorn, 1 Cliff. 538.

was used in two senses. Hence arises infinite confusion, to avoid which we premise that in the following remarks the word "invention" is used to denote the mental act or process that it implies, unless it clearly appears from the context, or is expressly stated, that a different meaning is intended. And so of the word "discovery."

Another use of "invention" is less apt to be mistaken; namely, its use to denote the faculty of invention, or the quality of that intellectual act, as distinguished from the act itself, which results in a patentable thing.

Thus the courts say: "This improvement is not patentable, for there is no *invention* in it."

The word "discovery," however, has no meaning similar to this last-mentioned meaning of "invention,"—a fact not without significance, as we shall presently see.

There is, indeed, a third sense of which "discovery," and a fourth sense of which "invention," is capable, though it need not be insisted upon here. We mean that in which the words are used to indicate or to recall the fact that an invention (or a discovery) has been made; as, for instance, in this sentence: "The invention of gunpowder revolutionized the art of war."

Thus "invention" signifies (1) the mental act of inventing; (2) the thing invented; (3) the fact that an invention has been made; (4) the faculty or quality of invention. And so of "discovery," except that it has not the fourth meaning.

Inventions and Discoveries Contrasted.

It is important also to notice the distinction between inventions and discoveries in the objective, that is, the second, sense of those words. The mental process of invention is, in most cases, very similar to that of discovery, as we shall see further on. But a broad line can be drawn between things invented and things discovered. The distinction between them is almost always overlooked, and sometimes its existence is denied by the courts; but it is inherent in the nature of things.

Moreover, in ordinary speech, custom has made a valuable discrimination between the two words, according to which an invention is a thing newly created, whereas a discovery is a thing newly found.

This distinction, so far from being inapplicable in the patent law, is particularly valuable there.

Most patents are granted for inventions strictly. The patentee has invented or created a device, contrivance, or mechanism, which operates according to known laws, or depends upon familiar properties of matter. He has found out nothing new in nature; but he has created a new way of using or combining familiar materials, or he has caused a force in common use to operate in a new situation, or for a new purpose. It is not sufficient that the device, contrivance, or mechanism should be new. The law requires, also, that it should be the result of "invention." And what invention is we shall presently consider.

This is one, and by much the larger, class of patentable subjects. The remaining class consists of those that are based upon a newly discovered law of nature or property of matter, called in the patent law a *principle*.[1] These are cases of discovery.

The patentee has discovered a new principle, and if he makes some practical application thereof (a condition presently to be noticed), he may obtain a valid patent.

In the case of discovery, therefore, no inquiry need be made into the mental process by which a knowledge of the principle was attained. It is sufficient that the principle upon which the patent is based should be *new*, *i. e.* that it should not have been known till the patentee revealed it. And whether it is new or not is a question of fact.

Principle.

A leading case in which a new principle was the basis of a patent is the following: —

About the year 1828, James Neilson, in England, discovered that a hot blast of air thrown into a furnace was more effective than the cold blast previously used. It had been supposed that the colder the blast the hotter the fire, because the furnace fires

[1] It is possible that when we come to discuss the cases under this head it will be necessary to extend our definition by adding that a principle may be a scientific fact as to the relations or the capacity of a law of nature or property of matter already known, but not fully understood.

"A law of nature or property of matter" is, however, a definition sufficiently accurate for our present purpose, if, indeed, it be not absolutely so.

"Principle" has also other meanings in the patent law, which we shall presently consider.

were observed to burn better in winter than in summer. This supposition, however, was incorrect. In reality, the fires burned better in winter because the air is drier then, not because it is colder. Neilson, therefore, discovered a physical law or truth,[1] namely, that a hot blast is more effective than a cold blast in a furnace. And he described an apparatus for making use of this discovery by heating the air blast before it is directed into the furnace.[2]

It is this class of cases, then, to which the word "discovered" in the statute applies.[3]

It is true that a naked *principle*, as it is called, a law of nature or property of matter, cannot be patented. So long as it is, or from its nature must remain, a mere item of knowledge, no patent can be had.[4] But if a method or process of applying the discovery to practical use is described, that method or process is patentable.

Nevertheless, the means by which the principle is applied may be devoid of all invention, and such as any workman skilled in the art wherein the application is made might supply, when the discovery is told him.

These last two propositions, namely, that a principle by itself

[1] A truth rather than a law, being a specific instance or illustration of a general law. *Vide post*, page 539, n., chapter on Principle.

[2] Neilson *v.* Harford, Web. Pat. Cas. 273. *Vide post*, page 611.

[3] It is true that in the Constitution "invention" and "discovery" are used as if they were synonymous, for it is there provided that Congress may secure "to authors and inventors the exclusive right to their respective writings and discoveries."

It is, however, absurd to suppose that in this general provision the framers of the Constitution were using language with critical exactness, and that they meant to lay down the impossible proposition that inventions and discoveries are the same.

In the Patent Act of 1793, also, "discovery" and "invention" are used interchangeably.

[4] There is another class of cases similar to that in which a naked discovery is sought to be patented, — we mean cases in which an effect or function or abstract idea is claimed in the patent.

The statute, as we have seen, declares that a patentable subject must be either an art, or a machine, or a manufacture, or a composition of matter, or some improvement thereof. An applied principle is an art (process), but a naked principle cannot be called an art, being the mere announcement of a fact. So, also, an effect or function or abstract idea cannot be called an art, much less a machine, manufacture, or composition of matter. Therefore one may not patent an effect, function, or abstract idea, but only the device by which the effect is produced, or through which the function is discharged, or in which the abstract idea is embodied. The product of a process, however, is patentable. *Vide post*, page 79.

is not patentable, and that its application, though simple and obvious, is patentable, may be illustrated by the hot-blast case.

If Neilson had merely announced the principle that a hot blast is better than a cold blast for a furnace, he could have had no patent. But he described a means of applying the principle, by interposing a chamber or receptacle in which the blast was heated by a separate fire, before it was thrown into the furnace.

Now, it was proved not only that any workman of ordinary skill in the trade, once informed of the principle, would have been able to apply it, but also that Neilson did not describe the best apparatus for the purpose. He used a chamber, whereas the defendant in the suit upon his patent used a series of pipes, and the pipes or tubes were more effective than the chamber. The court, however, sustained Neilson's patent, and held that it was infringed by use of the defendant's improved apparatus.

In another case, the improvement related to the art of making lead pipe. The discovery was that lead, when its particles are heated, will reset at a certain temperature. The apparatus used for making lead pipe in accordance with this discovery was new for that purpose, but old in itself, having been used in the preparation of macaroni. The patent, however, for utilizing this newly discovered property of lead by means of the macaroni apparatus was held valid.[1] Here, then, as in the Neilson case, the real and entire value of the improvement lay in the principle discovered. And illustrations might be multiplied.[2] It is plain, therefore, that the merit of such patents, that on account of which the patent is granted, is the discovery.[3]

In these cases, then, no particular process of mind, no "inven-

[1] 14 How. 156, and 22 How. 132. *Vide post*, page 574.

[2] In the case of Colgate *v.* The W. U. Tel. Co. (*post*, page 359), the patent claimed a telegraph wire cased in gutta-percha, to be used in water as well as in air. Judge Blatchford said: —

"The gist of the invention is the discovery of the fact that gutta-percha is a non-conductor of electricity, and the application of that fact to practical use. . . . *The claim is valid, even though a metallic wire covered with gutta-percha existed before the plaintiff's invention, if it was not known that gutta-percha was a non-conductor of electricity, and could be used to insulate the wire.*"

[3] It might be well to notice that sometimes the discovery is of a hitherto unknown property in a manufactured article, itself, perhaps, the subject of a patent. *Vide post*, pages 379, 381. And sometimes it is the discovery that two or more substances will unite to make a third substance. In this case the discovery is of certain unknown capacities in the two substances, by virtue of which the third substance is formed.

tion," is called for by the statute; all that it requires is the finding out of a new principle, and a practical application of it.

There is another small, but very important, class of cases which are inventions rather than discoveries, though practically they are considered as discoveries. We mean those cases in which the patentee has made a useful application of a previously known, but unapplied principle. Here, the law or truth concerned was known before, but it had never been applied to a practical purpose, or at least to any purpose at all resembling that to which the patentee puts it; and usually it has not been applied to any practical purpose at all. So that here, as in the cases of discovery, the gist of the patent is not an apparatus, contrivance, or mechanism, but the operation of a principle.

The celebrated invention of Morse is an instance. Professor Morse discovered no new force or property in nature, but he invented a method of applying certain known forces to a particular purpose. It was known before his invention that electricity would pass over a wire, and that iron was magnetized by the passage of electricity through a coil of wire surrounding it. He invented a method of applying these forces to the production at a distance of intelligible signs or letters.

In these, as in all cases of patentability, other than those of discovery, it is requisite that "invention" be shown.

Thus, if Morse's application of electro-magnetism had not required invention to make it, he could have had no patent for it.

Neilson's patent furnishes a better illustration, for it was proved that the application of the law discovered by him did *not* require invention, it being such as any one skilled in the art concerned might have made, when informed of the principle.

If, therefore, in some scientific publication the statement had been made that a hot blast is better than a cold blast in an iron furnace, Neilson could have had no patent for the practical application of that principle.

He could, of course, have had a patent for the particular apparatus devised by him, if it showed invention; but such a patent would have been comparatively worthless, because, as we have seen, Neilson's apparatus was not the best for the purpose.

Practically, however, in cases like the Morse case, where the gist of the patent is the application of a known principle to some new purpose, the question of invention very rarely arises.

The existence of invention in such cases is commonly indisputable; and the controversy about the patent is as to its scope.

These cases, therefore, are allied to those in which a new principle has been discovered, and the two classes are always considered together, under the head of "principle."

In both classes the patent granted is usually for a process, and the scope of the patent is the bone of contention; the question being whether the patent shall cover every application of the principle involved, by whatever apparatus or means, to the end proposed by the patentee, or only such application and apparatus as he has described, with, of course, all colorable imitations thereof and substantial equivalents therefor. And in the first class of cases, where the principle itself is discovered, there is, sometimes, as we have seen, a further difficulty, namely, as to whether the patent claims a naked, abstract principle (which is not patentable), or the practical application of a principle. Of course this last difficulty cannot arise in the second case, where the very application itself is invented, the principle being known.

If, however, we left the matter here, the distinction made between cases of principle and all other cases would be open to misconception. In a sense, every invention involves a principle. That is, every patentable improvement is but a new way of applying some law of nature or property of matter, *i. e.* a principle. This is true of inventions as well as of discoveries; of a rat-trap as well as of Neilson's process.

But in the case of inventions strictly, the mechanism or device or apparatus through which the force or forces act is the invention, whereas when a new force or property in nature (a principle) is discovered, and becomes the basis of a patent, the mechanism, device, or apparatus whereby it operates is a mere vehicle, which, commonly, any one skilled in the art concerned could supply, when the discovery was told him.

In the case of inventions, the forces or properties employed are lost sight of. All that the mind of the inventor contemplates is the material wherein and the adjustment whereby they operate. Thus, in a machine, the forces or properties of gravitation, motion, inertia, or whatever they may be which operate in and through the mechanism, are not the objects to which the inventor's mind is directed. On the contrary, he does not think of them apart from their embodiment at all. His

efforts are spent, not to use certain forces or properties (principles), but to make a certain mechanism.

In fact, as we have already suggested, in cases of discovery the courts do not consider whether the mechanism, device, or apparatus through which the principle operates is new or old.

This is true also in those cases of invention which we have likened to cases of discovery. The reason is that in both classes of cases the operation of a principle is the gist of the patent.

It is true, indeed, that sometimes the new use of an old contrivance is patentable because it is a non-analogous use (though great authorities hold otherwise);[1] but it is only in cases of "principle" that the novelty of the contrivance employed is absolutely unimportant.

It should be added, however, that the contrivance may be in itself a subsidiary invention, and as such the subject of another patent.

Sometimes it is said that the difference between discovery and invention is one of degree simply; that a discovery is a great advance in the arts, an invention, a slight advance; and therefore, it is said, the patent for a discovery includes a great deal, but that for an invention very little.

This difference in scope certainly exists, but its existence is an accidental fact, not a fact essential to the nature of invention and of discovery.

The ground upon which it rests, however, comes nearer to furnishing a basis of classification. For the reason why a discoverer takes a great step in the arts, and an inventor a slight step, is that a discovery commonly results in a new process, whereas an invention is commonly but an improvement in some process. Thus Mr. Justice Grier said: "A new process is usually the result of a discovery; a machine, of invention."[2]

Even this distinction, however, does not obtain in all cases. A case in which it does not may be stated as follows: A new material, or a new property in an old material, is discovered, and this material, of which or in which the discovery was made, is substituted for another in some existing machine. This might be a patentable improvement upon a machine, but it would not be a process.

In concluding this subject, we may say that we have taken the

[1] *Vide post*, page 285.

[2] Corning *v.* Burden, 15 How. 252.

classification of cases under the head of "Principle," as we have found it in the courts and in the books. It is a classification which has made itself, as it were, and it is always convenient.

The reasons upon which we conceive it to rest we have stated; but should these, or should the classification itself, appear unsatisfactory to any reader; we must beg him to remember that they are but incidental to our subject and to our argument.

All that we insist upon is the distinction pointed out between a discovery and an invention. The topic "Principle" is discussed in the seventh chapter of this book, and we need not refer to it again in these remarks.

But before leaving the general subject of discoveries as contrasted with inventions, we shall venture to suggest one more consideration. The fact already mentioned, that the courts never speak of "discovery" as an intellectual quality discernible in certain improvements, is significant. There is, of course, an intellectual process of discovery, and principles or truths are discovered; but it is never said, "there is," or "there is not discovery in this improvement;" and the courts never contrast "discovery," as they do "invention," with "the skill of the workman."

This is an implicit, and therefore an important, recognition of the fact that when a new principle is discovered and becomes the gist of a patent, it is enough to show that the principle is new. No mental process corresponding to that of invention need be proved to have been concerned in making the discovery; whereas, in the case of all patentable improvements other than discoveries, not novelty only, but invention also, must be shown. This fact in regard to "discovery" is all the more significant, because, as we shall point out hereafter, the mental process of discovery is commonly similar to that of invention; and therefore it would not be incorrect, although it is always unnecessary, to say, there is, or there is not, as the case might be, discovery in this improvement.

We shall return to this subject toward the end of these remarks, in order to compare the mental process of discovery with that of invention. But before such a comparison can be made with profit, it is necessary that we should discuss the more difficult and more important subject of invention itself. To this we now proceed.

Invention.

All patents, other than those based upon a discovery, must be, in the language of the statute, for some thing invented. "Invention or discovery is required as the proper foundation of a patent, and where both are wanting, the applicant cannot legally secure the privilege."[1]

What process of mind is indicated by the word "invented"?

The phrases descriptive of it used by the courts are very few: "Inventive *genius*," "the *genius* of an inventor," "the inventive faculty," "invention as distinguished from mechanical or technical skill," "invention as distinguished from construction," "ingenuity contrasted with the judgment of a skilled workman."

In repeating these few expressions we have already exhausted very nearly all that have been used to define the term "invention;" and, as the reader will have observed, in each of them, save one, the very word to be defined is employed, so that they are not real definitions, but only phrases thrown out by way of description. Moreover, the word "ingenuity," used in the only one of these expressions wherein the word "invention" does not, in some form, occur, is rather a synonym than a definition.

"Invention" is thus difficult to define, because the idea expressed by it is a simple and elementary one. Invention, as we have already hinted, is that process of mind which *creates*. It is the giving birth to a new idea capable of physical embodiment.

Even to one who has spent no thought upon the subject, the word "invention" conveys a substantial idea, though often an ill-defined one. It means to him something that no other word means; and the idea which underlies that meaning is, the creating of something new.

New in this sense, that it is not a mere modification of an idea already existing, but an addition to the stock of ideas.

The verbal expression of a new idea not susceptible of, or rather not reducible to, physical form may be copyrighted; but a new idea which is so reducible becomes in its embodiment the subject of a patent.

[1] Mr. Justice Clifford, in Bray *v.* Hartshorn, 1 Cliff. 538.

The Mental Process.

Before proceeding to discuss further the meaning of the word "invention," we wish to notice a criticism which certain minds may make upon what we have already said.

It may be objected, then, that no light is thrown upon the matter by declaring that the process of mind involved is what the law looks to. This declaration may be true enough, the objector would continue; but inasmuch as the process of mind is revealed only by the tangible thing which results therefrom, why separate the two and go back to the mental process? Is it not simpler and as accurate to consider the thing itself sought to be patented, without making an investigation into the mental process of which it is the result? We shall answer this objection by following the course which it suggests, and in pursuing that course we shall prove, we trust, that, by a consideration of the tangible thing sought to be patented, we are inevitably referred to the mental process by which the idea of that thing was reached. The starting-point is different, but the goal is the same.

If, then, we regard the material world, wherein and whereby inventions take effect, we find that they depend upon the properties of matter; and by properties we mean not only the qualities belonging to matter, but also the forces, such as gravitation, and perhaps electricity, which reside in matter.

Inventions, in the sense of the things invented, are but combinations of these properties, — or, to speak more exactly, combinations of matter possessing these properties, or some of them, — for a particular purpose.

Man cannot add to or diminish the quantity of matter, or of the forces that reside in matter. All that he can do is to make various arrangements of matter, and consequently of the properties that belong to it. Every invented thing, taken as it appears to the senses, consists not only in the material parts of which it is composed, but also in the property or properties that give life to those parts. In steam, for instance, we distinguish between the tangible vapor and the force which it exerts.

An invention, then, in the objective sense of a thing invented, is an arrangement of matter in such a way that the property or properties residing in it shall do a certain work for the service

of man, the corresponding mental act of invention being the conception of that arrangement. Now, remembering that we have put aside the finding out of new properties, which are called discoveries, and confining ourselves to inventions strictly, we may proceed to state the matter a little differently, thus: inasmuch as the value of an invention[1] depends not on the matter made use of, but on the properties it possesses, we may say that every invention[1] is a new way of making use of properties of matter.

Does it follow that every new way of making use of the properties of matter is an invention?

By no means. What, then, is the distinction? What new way of using the properties of matter amounts to invention, and what does not?

The answer is, that the new way which implies invention must be such that it was not obviously open to any person instructed in the art to which it belongs to adopt it, if he should choose to.

In the contemplation of the patent law, not only any way which has already been employed, but also any way so like to some previous way that it must be presumed to be within the mental reach of any one skilled in the art or trade wherein it belongs, is not the subject of a patent.

So, then, from the very consideration of the thing invented, we are brought back to a consideration of the mental process concerned, that is, to invention in the true sense.

If that process be such that it was to be expected of the ordinary, instructed intellect, — expected in the sense that it might be counted upon, — then it is not invention.[2] Then it is merely "the skill of the workman," whereas the courts require "the genius of the inventor."[3]

[1] In the sense of invented thing.

[2] Slight but very valuable changes in form furnish a good illustration of the truth that the process of mind involved must be looked to in order to determine if a given improvement be patentable. *Vide post*, page 40.

[3] "Mechanical skill is one thing; invention is a different thing. Perfection of workmanship, however much it may increase the convenience, extend the use, or diminish expense, is not patentable. The distinction between mechanical skill with its convenience and advantages and inventive genius, is recognized in all the cases." The Supreme Court, in Reckendorfer *v.* Faber, 92 U. S. 347.

"Mere mechanical skill can never rise to the sphere of invention. The latter involves higher thought, and brings into activity a different faculty. Their domains are distinct. The line which

The whole object in investigating the patentability of the most complicated machine, process, or device is to arrive at the idea which is at the bottom of it, and then to decide if, in view of all prior knowledge upon the subject, that idea has been reached by a process of invention; and by "idea" we mean, of course, to include not only the main thought embodied in the alleged invention,[1] but the whole intellectual image of which the material thing sought to be patented is the copy and the embodiment.

In dealing with Patents we deal with Ideas.

It is to be observed that we have indicated two mental processes or states; and care must be taken not to confound them, for if they are confounded, the argument from this point will be mistaken. There is, first, the idea expressed by the invention, — the mental image which is given a physical form; and, second, the process of mind by which that idea is reached. If the process be an act of creation, then the thing which embodies the thought is patentable.

The first of these, the mental image of which the thing sought to be patented is the counterpart, is called by the courts the "character" or "principle"[2] or "idea" of the invention; and sometimes, more exactly, "embodied conception,"[3] and "material reflex and embodiment."[4]

Thus, where two machines are under consideration, the question being whether or not the second is a patentable improvement upon the first, we find the courts striving to discover what is the principle or the character or the idea of each machine, in order to decide whether the second machine has merely the same principle or character or idea as the first, though in a different form, or a new and substantial idea of its own; *i. e.*, whether the similarity between the machines is an identity in those qualities which constitute the essence, or only in unessential particulars.

denotes them is sometimes difficult to trace; nevertheless, in the eye of the law it always subsists." Mr. Justice Swayne, in Blandy *v.* Griffith, 3 Fish. 609.

[1] In the objective sense.

[2] We come now to another meaning of "principle" in the patent law.

[3] By Mr. Justice Bradley, for instance, in Bischoff *v.* Wethered, 9 Wall. 812.

[4] By Mr. Justice Swayne, in Smith *v.* Nichols, 21 Wall. p. 118.

These three words all refer to the mental image reflected in the machine. They are synonymous with the "embodied conception" of Mr. Justice Bradley. "Idea" can mean nothing else, as is too plain for argument. And we shall show briefly that character and principle also have that meaning, for; —

First. They do not refer to the mechanism, or to any distinct part of it. The mechanism is the machine itself. The character or principle is embodied in the mechanism, but lies back of it, and the very reason of looking for the character or principle of the machine is to explain the mechanism.

Secondly. They cannot refer to the result accomplished by the machine, or its function. That may not be in dispute. It is often agreed that the two machines accomplish the same result, the question being whether they accomplish it by the same means.

Now, there are but three things in a machine, — the idea, the mechanism embodying that idea, and the function or effect. If, then, character and principle cannot mean either the mechanism or the function, they must mean the thought or idea expressed by the machine.

It is not a matter of choice or convenience to make the idea of the invented thing, instead of the thing itself, the object of our thoughts. It is a mental necessity. The mind itself makes the translation of things into thoughts. This is apparent at once to any one who considers his own mental processes. In thinking of an invention,[1] we really think, not of the material thing, but of the thought which the thing embodies. We have seen that this is so in the case of complex contrivances like machines. Therefore it must be true also of simpler contrivances, for the obvious reason that the mental act of comparison must be the same in all cases. The mind cannot operate in different ways according to the nature of the things to be compared.

The truth upon which we are insisting is more apparent, indeed, with regard to machines, for instance, because in their case the mind is conscious of the separation that it makes between the idea and its embodiment. It is easy, in fact, to think of the idea of a machine as apart from its physical embodiment. The reason is, that the material parts which carry out the idea are many and diversified, — some essential, others unimportant. Moreover, the harmonizing and adjustment of the parts

[1] In the objective sense of the word.

are presented to the mind. The idea is carried out piecemeal, as it were. The idea is a unit, but its embodiment is manifold and complex.

Whereas, in the case of a more simple contrivance, as, for instance, a knife of peculiar shape, the mental conception and its embodiment are more closely associated. Given the idea, the physical form is present to the mind at once. Moreover, the unessential details of the physical form are entirely neglected by the mind. One forgets those parts of the material thing which are not essential to the carrying out of the idea, though they may be inseparable from the material thing.

Again, the fact that in comparing invented things we really compare the ideas embodied in them, may be proved in this way: Resemblance is not a thing, but a thought. It is not a quality residing in the things compared, but a mental relation between them, *i. e.* a perception that certain qualities are identical in each. The senses perceive the two things to be compared. The mind develops, as it were, the idea of resemblance. We see the things, we do not see their resemblance.[1]

From this it follows that when two things are compared, it is really the idea embodied in one that is compared with the idea enbodied in the other; because a mental relation (resemblance in this case), in other words, an idea, must connect ideas and not things.

This truth, that in thinking of invented things, as in comparing them, we think really of the ideas that they embody, is, as we have said, plain to any one who reflects upon the operation of his own mind. And the same thing appears when we put ourselves in the place of an inventor. A machine, for instance, is not made haphazard, or piece by piece as an idea strikes the inventor; but it is made after an image which exists complete in the mind of the inventor. He therefore thinks of that image when he thinks of the machine, of the real idea, rather than of its tangible copy.

If he be not the maker, but the critic or judge of the machine, the order of his thinking remains the same. He thinks of the machine only by thinking of the image after which it is made; in other words, of the idea which it embodies.

[1] *Vide* Ferrier's Lectures on the Early Greek Philosophers, chapter on Plato. And Herbert Spencer's Principles of Psychology, ch. viii. p. 182.

In dealing with patents, then, we are dealing with ideas, whether we will or not. Whatever our language, though we speak of the thing, we think of the thought. The real question, therefore, is as to the thought, Is it an inventive thought?[1] This, in turn, as we have seen, depends upon the process by which that thought is reached. If the process be a creation, a making, then the condition of patentability is fulfilled, there is invention. Sometimes, indeed, the courts look at the material thing itself of which the patentability is in question, rather than at the process of mind by which it was reached; and they inquire whether a new function or effect or result is produced. These inquiries are, as we shall see throughout this book, of great assistance in detecting the presence of invention. But a new function or effect is not proof of patentable merit: it is only evidence of that inventive process of mind which issues in patentable merit.

Moreover, it is a noteworthy fact that in the most difficult cases these criteria are of the least assistance. In such cases we are referred directly to the fundamental inquiry, — Is the improvement the result of inventive genius or not?

Certain judges do not even ask if a new function or effect has been produced. They assert that the statute requires only that the thing to be patented shall be new and useful. This language would seem to imply that no particular process of mind is requisite to an invention, and that anything, however simple, obvious, or similar to what already exists, is nevertheless patentable if it be new and useful.

Such unguarded statements of the law are, however, few; and by reference to other opinions of the same judges it becomes apparent that they meant by "new" not only what the word necessarily means, but also that sort of newness or uniqueness

[1] "A patentable invention is a mental result. It must be new, and shown to be of practical utility. Everything within the domain of the conception belongs to him who conceived it. The machine, process, or product is but its *material reflex and embodiment.*" Mr. Justice Swayne, in Smith *v.* Nichols, 21 Wall. p. 118.

"Indeed, the whole subject-matter of a patent is an embodied conception outside of the patent itself, which, to the mind of those expert in the art, stands out in clear and distinct relief, whilst it is often unperceived or but dimly perceived by the uninitiated. This outward embodiment of the terms contained in the patent is the thing invented, and is to be properly sought, like the explanation of all latent ambiguities arising from the description of external things by evidence *in pais.*" Mr. Justice Bradley, in Bischoff *v.* Wethered, 9 Wall. p. 815.

which we have described as the condition of patentability. If there be any of these judges whose meaning cannot thus be explained, it is sufficient to say that his construction of the statute is overborne by the weight of authority, and is contrary to reason.

We may add, that it is natural for those who look more at the thing produced than at the mental process behind it, to find the requirement of patentability, in the statute, in the word "new," not in the word "invented." The obvious reason is, that the word "invented" necessarily refers to a process of the mind, whereas the word "new" refers to the thing which is the object of that process.

Thus, we find so great a lawyer as Mr. Justice Curtis saying (to a jury), that any "new" combination [in this case of machinery] is patentable; but he goes on to show what he means by "new" as follows: "When I say it must be new, I do not refer to the materials out of which the parts are made, nor merely to the form or workmanship of the parts, or the use of one known equivalent for another. These may all be such as never existed before in such a combination, and yet the combination may not be new in the sense of the patent law. To be new in that sense, some new mode of operation must be introduced," [1] &c.

It is plainly, however, the correct reading of the statute to give to the words "invented or discovered" their ordinary meaning, rather than to import it into the word "new," thereby rendering the words "invented or discovered" superfluous. Whatever is invented or discovered must be new; but a thing may be new, and yet neither invented nor discovered.

Looking at the matter in another way, it may be said that the words "invented or discovered" define the kind of newness called for by the statute.

This, however, is a discussion about words merely. We leave it, in order to gather up the threads of our argument before proceeding to suggest two criteria for determining upon the presence or absence of that *invention* which is the test of patentability.

We have shown, then, that the statute demands a peculiar process of the mind as the characteristic of invention; that the statute is so interpreted by the courts; and, further, that it is impossible to arrive at the patentability of an improvement in any other way. This we proved by considering the physical

[1] Forbush *v.* Cook, 2 Fish. 668.

thing sought to be patented, and attempting to determine its patentability without regard to the process of mind by which it was reached, — a task which we found to be impossible.

We have also shown that in dealing with patented things we must, by the law of our minds, deal primarily with the ideas that they embody; and as an illustration of this truth, we have described the way in which the courts treat of machinery as the subject of a patent.

As to that process of mind itself which amounts to invention, we have repeated the phrases commonly used to describe it; and we have said that it was a creative process, the bringing forth of an addition to the stock of ideas, not the mere development of an old idea.

We shall now go a step further, and we shall propose two tests: one of what is not, and the other of what is, "invention."

A Test of what is not Invention.

An idea is not invention, if it be in the nature of an inference. It is true, of course, that what is a plain inference to one man is often a sealed book to another. But the inference here spoken of is that which is natural to a man of ordinary intellect, possessing the ordinary skill in and knowledge of the art in respect to which the inference may be drawn.

Whatever is a logical deduction from something else is not invention. In other words, whatever is a necessary conclusion from certain premises, supposing the mind to be directed to them,[1] and supposing the mind so directed to be that of the man whom we have described, is not invention. The same thing may be stated more shortly thus:[2] *reasoning is not invention.*

[1] For sometimes invention is shown in *calling together* the premises upon which the reasoning faculty operates. *Vide post*, page 32.

[2] By "reasoning," here and hereafter in these remarks, we mean the ordinary process of inference.

It is not necessary to enter into the controversy about the syllogism, and to consider whether or not the syllogism represents the process of mind which actually takes place in an act of reasoning. Mr. Spencer says: "Reasoning, whether exhibited in a simple inference, or in a long chain of such inferences, is the indirect establishment of a definite relation between two things; and the achievement of this is by one or many steps, each of which consists in the establishment of a definite relation between two definite relations." Principles of

The books are full of cases where the patent in litigation is for a thing or a process *inferred* from some other thing or process. And sometimes it is inferred, not from any one particular thing, but from such knowledge of things, or of the relations of things, as men in general possess. Of this last proposition a leading case in the Supreme Court of the United States furnishes an excellent illustration. It is that of Reckendorfer *v.* Faber.[1] In this case the patentee had combined a lead-pencil with a rubber eraser by sticking the handle-end of the pencil into a small tube of rubber, the diameter of which was a little less than the diameter of the pencil. It was a logical inference of the simplest kind, first, that these articles, being useful separately, would be useful together; and, secondly, that the pencil would stick in the hole prepared for it. The court, therefore, held that there was no invention in so bringing them together, and that the patent was invalid.[2] In this case the inference was drawn, not from any one thing, so much as from the known relations of things.

Perhaps cases of double use, as they are called, furnish the clearest illustration of this principle, that inference is not invention. In these cases, an old thing or process is made use of in some new situation, — the old process is applied to some new thing, or the old thing is made use of for a new purpose. If the new use of the old thing or process is *analogous* to its old use, then it is called a "double use," and it is not patentable. If, however, it is not an analogous use, — in other words, was not fairly to be inferred from the old use, — then it is a new use, strictly speaking, and it is patentable. Thus, if one observing that a certain kind of wheel works well on a wagon, concludes that it will also work well on a railway car, and obtains a patent for the car-wheel, his patent is not valid.[3] The intellectual process at the bottom of it was one of mere inference, of reasoning.

Again, given a device for the preservation of corpses, it is no invention to apply a device substantially the same to the preser-

Psychology, ch. vii. And Cardinal Newman, more shortly: "We reason when we hold this by virtue of that."

[1] 92 U. S. 347.

[2] We are bound to say that this decision is not unassailable; but it must be supported, if at all, on the ground here stated.

[3] Losh *v.* Hague, Web. p. 208.

vation of fish.[1] The mental act here performed is a legitimate inference. The last two illustrations are instances of double use; Reckendorfer *v.* Faber was a case of combination. A case of substitution is that of Hicks *v.* Kelsey,[2] in the Supreme Court.

In Hicks *v.* Kelsey, the patentee, knowing, as all men are supposed to know, the common properties of an iron bar, concluded that such properties would make it more useful in a wagon-reach than the wooden bar previously used for that purpose. He therefore substituted the iron for the wood. The mental act performed was a mere inference. Knowing the office of the wagon-reach, and the properties of an iron bar, the patentee inferred that the wagon-reach would be stronger if made of iron,—as any one might have inferred, at least any one skilled in the art of wagon-building. Therefore, the Supreme Court held that it was no invention thus to substitute iron for wood. In an earlier case in the same court, Hotchkiss *v.* Greenwood,[3] the patent was for a porcelain door-knob, composed of a knob proper and a shank inserted therein whereby the knob was fixed to a door. The knob itself was old and the shank was old. All that the patentee had done was to bring the porcelain knob and this particular shank together. By so doing he made a door-knob better than any in use before it; but the knob having been useful with other shanks, and the shank with other knobs, it was a legitimate inference that they would be useful together, and it was proved that no invention was required to adapt them to each other. It was therefore held that the substitution of the porcelain knob for the knob previously used with that particular shank was not an invention.

We take at random a few more cases to illustrate this principle, that inference is not invention.

Given a sounding-board of small size, it is no invention to make a larger sounding-board in the same combination, which gives forth a louder sound.[4] It was a direct inference that increasing the size of the sounding-board would increase the quantity of sound reverberated.

Given a deflecting plate in a saw-mill machine, it is no invention to make such a machine having two deflecting plates, which simply double the effect of the first one, introducing no new effect.[5]

[1] Brown *v.* Piper, 91 U. S. 37.
[2] 18 Wall. 670.
[3] 11 How. 248.
[4] Day *v.* Bankers', &c. Tel. Co., 9 Blatch. 345.
[5] Dunbar *v.* Myers, 94 U. S. 187.

Another leading case in the Supreme Court is that of the Milligan & Higgins Glue Company *v.* Upton.[1] The patentee made a powder of glue, and put it up for sale in that form, whereas before, it had always been sold in the form of loose pieces. In the new form the glue was more soluble and easier to handle. But these advantages had attended the comminution of similar substances; of sugar, for example. It was, therefore, a mere inference that the same effects would follow in the case of glue.

So, also, an improvement in degree is not invention.

If a certain quality, size, or shape produce a good effect, it is a mere inference that its aggravation, where that is possible, will increase the good effect.

A leading case on this point is that of Smith *v.* Nichols,[2] in the Supreme Court. The patent was for an elastic fabric, used for the gores of gaiter boots. The elasticity was imparted by narrow strips of rubber woven into the cloth. The patentee's fabric differed from one previously used for suspenders, only in that it was more tightly woven, and that the strips or cords of rubber were nearer together. By thus increasing the elasticity of the material, the patentee made it available for a new purpose, namely, the gores of gaiter boots. The improvement was a valuable one, but inasmuch as it was an improvement in degree simply, it was held to be no invention. The way to increase the elasticity of such corded fabrics was well known. It was to increase the proportion of elastic cords to that of the other cords used. It was, therefore, a mere inference that a fabric of great elasticity would be produced by multiplying the rubber cords.

Changing the position of the raker's seat on a reaping-machine, whereby no new function is introduced, but only the raker is enabled to rake more easily, is not invention. If he could rake in the old position, it is a natural inference that he could rake in the new position. The improvement in degree which attends the change is the result, not of a new idea, but of the qualification of an old idea. If the patentee in this case had discovered some new fact as to the physical limitations under which a man can rake, — in what position of the arms and body, — then the change in the situation of the seat, if made in accordance with his discovery, would have been patentable. In the actual

[1] 97 U. S. 3.

[2] 21 Wall. 112.

case there was no discovery, but only the inference that a man could rake more easily in the new position; an inference drawn from the known muscular capabilities of the man and the structure of the machine. Finally, aggregation is not invention. If a man collects devices from various stoves, and puts them into a new stove, where each discharges the office it had discharged before, and nothing else, so that there is a mere assemblage of separate known devices, the stove so produced is not patentable.

If the separate devices had worked well in one stove, it was a natural inference that they would work well in another; there was no invention in putting them together.

It appears, then, that the process of mind called for by the statute is not that of ordinary reasoning, or inference or deduction. Whenever the mind advances from the known to the unknown by a transition natural to the ordinary, instructed intellect, there is no invention. Inference, then, is a criterion of what is not invention.

The Test of what is Invention.

Invention is imagination; it is the very opposite of reasoning or inference; it is a single act of the mind; rather an instantaneous operation than a process. It has no stages; the essence of it is that it dispenses with them.

In the process of reasoning or inference the conclusion is reached both gradually and inevitably. The mind is led on from one point to another, until it reaches a conclusion from which there is no escape. Whereas, when the mind invents, it starts with the conclusion. The conclusion flashes, so to say, upon the mind. The conclusion, therefore, either carries conviction with it, or it has to be verified; for the mind does not perceive how it has been reached.

In every case the truth revealed by invention can be verified by reason; for this is but to say that nothing happens without a cause, and when, by an act of invention, a certain truth has been reached, the mind can work backward, as it were, and analyze the causes (reasons) upon which depends the existence of the material thing invented.

But reason would never lead one to the truths and ideas which are the objects of invention; in fact, most often it leads directly

away from them. And it is for this reason that invention is so difficult and comparatively so rare. It is not a sort of elevated reason; it is a faculty which differs in kind from reason,[1] which often, in truth, is free to act only when reason has been thrust aside, and its conclusions ignored, nay, denied.[2]

Invention, then, is in the nature of a guess. The mind leaps across a logical chasm. Instead of working out a conclusion, it imagines it.

We have suggested this at the outset in saying that inventing is creating. Now, the creative faculty is the imaginative, and invention is nothing more nor less than imagination exercised upon matter. The "genius of the inventor" is imagination. The use of that word "genius," which is so frequent in the mouths of the judges, proves that they hold this very idea of the nature of invention, namely, that it is an exercise of imagination.

Genius as thus used is a somewhat vague term, but if we analyze the meaning which it conveys to us we find that it implies an act of mind having two characteristics: first, the absence of conscious effort; second, instantaneousness of operation. These are the qualities of imagination,[3] and they are the very opposite of the qualities of reasoning, which follows only upon a distinct and often a laborious effort of the will, which also, so far from being instantaneous, is in its essence a gradual passage from one thing to another.

[1] "Mere mechanical skill can never rise to the sphere of invention. The latter involves higher thought, and brings into activity a different faculty." Mr. Justice Swayne, in Blandy *v.* Griffith, 3 Fish. 609.

[2] An excellent illustration of the difference between reasoning and invention here set forth is furnished by the case of Spill *v.* The Celluloid Manufacturing Company (18 Blatch. 190), where the patent sued on was for applying a well-known bleaching agent to xyloidine, a substance supposed to be unbleachable. It was proved in evidence that the knowledge and judgment of one skilled in the art concerned, in other words, his reason, would lead him to conclude that the bleaching agent could not thus be applied, because it was supposed to be applicable to fibrous material only, and xyloidine is not fibrous. "It is my opinion," said an expert, whose testimony is quoted in the opinion of the court, "that a chemist would exhaust all other theories before he would think of ordinary bleaching agents for the purpose." This new use of the bleaching agent was therefore held to be patentable. It was a result the very opposite of that to which reason would have led. Invention was, therefore, required to attain it. Very similar is the English case of Steiner *v.* Heald, 6 Ex. 607. Both of these cases are set out at length in Chapter IV., at pages 292, 293.

[3] Maudsley, Physiology and Pathology of the Mind, ch. ix.

We have seen that reasoning is not invention; if reasoning be not invention, then imagination[1] must be it, for these two are the

[1] Imagination is a faculty recognized by all psychologists, though they differ somewhat as to its limitations. Instead of "imagination," it is sometimes called "invention," sometimes "conception," and, again, "constructive association." Reid calls it "the invention of proofs."

It would manifestly be improper in a practical work like the present to enter into an analysis of the imaginative faculty. We are here concerned only with its superficial and relative nature; in other words, with imagination as it appears to us in its operation and in its results. We attempt to describe rather than to analyze it. And whether imagination is unconscious reasoning or absolute intuition is of no importance to our argument. It can be, and commonly is, distinguished superficially, relatively, practically, from other acts and processes of mind; and that is sufficient for our purpose.

We may indicate, however, what we believe to be the rationale of the matter as follows: —

Reason (rather than reasoning), according to some philosophers, enters into all mental acts. Reason in this sense means, not that process of inference which we have described, but simply *classification*. Every mental act, whatever else it may be, is a classification. But a classification may be intuitive, and not inferential. According to other writers, *perception* does not imply classification. However this may be, it is undenied that knowledge may and must be either mediate or immediate. In other words, we may know something from itself, or from something else. It may be an intuition or an inference. An intuition is a "single, indecomposable mental act;" an inference is a mental passage from one thing to another.

A perception of external objects is an intuition; and so is a perception of certain elementary truths or laws of the mind. "Relations that are equal to the same relation are equal to each other," is the example given by Mr. Spencer.

Facts which are not thus known by intuitions, which, in other words, do not at once present and recommend themselves to the mind, are *inferred* from that which does thus present and recommend itself.

This drawing of inferences is reasoning; and perfect reasoning is drawing from the facts in hand those inferences, *and those only*, which the facts logically imply.

Now, if invention were reasoning, we should find that the best reasoning would be the best inventing; but the fact is that invention begins only where reasoning leaves off. This is easily seen. The weakest form of reasoning is that by analogy; but an improvement analogous even to what was known before is not invention. Invention does not begin until it appears that there is no analogy between what was known and what is invented, or an analogy too faint to justify a logical inference.

The essence of invention, therefore, is the perception of a likeness, which true reasoning denies, because the premises do not justify it. It is reasoning from insufficient premises, — and something more.

But, it may be said, it is easy enough to reason from insufficient premises, and to draw all sorts of unwarranted conclusions therefrom. Granted; *but to seize upon the true, though extra-logical, conclusion* is not so easy, and that is what imagination does.

It will not do to say that the true conclusion and the false conclusions were already in the mind, and that by

only ways by which the mind develops or creates new ideas.[1] We have said also that invention is characterized by an absence of conscious effort and by instantaneousness of operation. These processes of inference the mind rejects the false conclusions, and thus comes to the true conclusion.

For, without stopping to ask *how came the true and the false conclusions into the mind* (a pertinent inquiry), we have only to point out the fact that the process described would be like that of hunting for a needle in a hay-mow. The number of possible false conclusions is indefinite; the true conclusion, therefore, cannot depend upon their rejection. The imagination conceives of its existence.

Whether the act of imagination is an intuition or an inference unconsciously performed, it is not necessary here to inquire. It has the character that we have indicated, and it is practically distinguishable and distinguished from inference. It may contain unconscious reasoning.

But if so, it is not that sort of reasoning in which the whole process is unconscious. Thus, we reason in sleep; and habitual inferences are made unconsciously at last.

In such cases the whole process is unconscious. The mind is not conscious of the premises, or of the arrival, so to say, of the conclusion; whereas, in a case of real imagination, the perception of the conclusion is always in the nature of a surprise. The mind is conscious of the premises, and conscious of the conclusion flashing upon it; but it is unconscious of the steps, if any exist, by which it passed from one to the other.

Thus we see that, according to a familiar law, the extremes of thought meet. The simplest cognitions are intuitive, the more difficult ones are inferential, and the most difficult are, again, intuitive, — intuitive practically, — though perhaps unconsciously inferential.

Finally, it may be said that, in the last analysis, reasoning and imagination are both *perceptions of likeness*, and that reasoning shades off into imagination. This is true; and if it were not true, the question of "invention" would give rise to no difficulty. The task of the courts in cases of patentability is to draw the line between reasoning and imagination. The fact that both are perceptions of likeness does not invalidate the superficial and relative, but practical and valuable, distinction between reasoning, a perception of likeness justified by the rules of logic, and imagination, a perception of likeness not so justified. Every mental act is a classification; but we do not therefore refrain from dividing mental acts into different classes. Such a division is valuable, because it is that which naturally suggests itself. It is the apparent division, — the division which makes itself.

The same may be said of the division between imagination and reasoning; and this also may be said, that its reality is proved by the familiar fact that he who reasons well is seldom he who imagines well. Moreover, a man reasoning is conscious of an experience different from that of a man imagining.

From this note many considerations have intentionally been omitted, for the sake of brevity. On some future occasion, however, the author hopes to recur to the subject of imagination as it is exhibited in art and in the arts.

[1] There are three ways in which it may be said that the mind *arrives* at a new idea, — reasoning, imagination, and perception or observation. But the new ideas attained by perception or observation are, as we have explained, the subjects of discovery, not of invention.

qualities necessarily belong to it from the very fact that it is an act of imagination, — of vision. There is no invention until this act is performed; but no effort can insure its performance, and the performance is instantaneous, and unaccompanied by conscious effort, though that may precede it; but the statement, to repeat it, that invention is characterized by absence of conscious effort and by instantaneousness of operation, is open to misconception. The reader must bear in mind that we are describing, not the whole mental process by which a patentable thing is produced, but only the inventive part of that process. We do not mean that every invented thing is produced easily, without care, thought, or experiment; but that the vital idea of the invented thing, that which makes it an invented thing, comes instantaneously and without effort. The inventive thought may have been preceded by months and years of thinking and experiment, and it may require months and years more to embody it in a tangible form; but the patent is not granted for the labor and thought that preceded the invention, nor for the labor and thought that reduced it to practical form. These last are necessary for the granting of a patent; but the patent is not granted for them. The patent is granted on account of the invention,[1] and the invention is the grasping of a truth, not attained by reasoning, and not perceived to be a truth until the mind of the inventor imagined it. However long or extensive the preparatory thought and labor may have been, the inventive idea is not gradually developed thereby, or evolved therefrom. When it comes, it does not come as a necessary consequence of what has gone before. Until the last step was taken, the inventive thought was as much unknown as it was before the first step was taken.

This shows very clearly the difference between reasoning and invention. In a process of reasoning every step is not only valuable, but necessary; each step is an advance; each step brings us nearer to the conclusion, and at last the conclusion follows inevitably. It was latent, so to say, in the premises, and needed but a process of reasoning to evoke it. Hence it was within the reach of all men capable of conducting the ordinary process of reasoning. But the thought or experiments which precede an invention are only gropings in the dark. However accumulated,

[1] But not *for* the invention; the patent is granted for the embodiment of the inventive idea.

they prove nothing, and they do not necessarily lead to anything. The inventive thought does not depend upon them, and cannot be verified by them. In a certain sense they may have been necessary; they may have cleared the ground, prepared the way for the arrival of the inventive thought; in fact, they may have rendered its arrival possible. Nevertheless, they have not caused its arrival. Reasoning is unravelling, and invention weaving, of thought. Reasoning is an analytic, invention a synthetic, process. In one case a truth is drawn out; in the other it is constructed.[1]

We have been speaking of cases where an invention crowns a long course of thought and labor. At other times such a course is required to reduce the invention to a practical form, — to fit material things to the niceties of thought.[2] In such case the invention may be supplemented by a process of reasoning, the inventive idea furnishing the starting-point for such a process. And the value of the improvement finally reached may depend upon this development of the inventive thought, but the original conception, not the working out thereof, is the gist of the improvement and makes it patentable.[3]

There are obviously three kinds of inventions.

1. Those where the inventive conception comes without previous conscious thought or experiment, and also carries with it

[1] Bain calls imagination (invention) "constructive association." — "The Senses and the Intellect."

[2] ". . . The invention itself is an intellectual process or operation, and, like other expressions of thought, can in many cases scarcely be made known except by speech. The invention may be consummated and perfect, and may be susceptible of complete description in words, a month or even a year before it can be embodied in any visible form, machine, or composition of matter." The Philadelphia & Trenton R. R. Co. *v.* Stimpson, 14 Peters, p. 462.

[3] "The law means by invention, not maturity. It must be the idea struck out, the brilliant thought obtained, the great improvement in embryo; he must have that; but if he have that, he may be years improving it, maturing it. It may require half a life. But in that time he must have devoted himself to it as much as circumstances would allow. But the period when he strikes out the plan which he afterwards patents, that is the time of the invention, that is the time when the discovery occurs." Judge Woodbury, in Adams *v.* Edwards, 1 Fish. 1.

So, also, Mr. Justice Swayne, in showing that an invention belongs to the originator of the inventive idea, and not to the mechanic who has given it a body, said: "As long as the root of the original conception remains in its completeness, the outgrowth, whatever shape it may take, belongs to him with whom the conception originated." Blandy *v.* Griffith, 3 Fish. 609.

the necessary physical form. This is the simplest case. An instance is the barbed wire fence. It occurred to the inventor thereof that he might string upon an ordinary wire fence, spurs, prongs, and other disagreeable things, whereby beasts should be repelled. This was an invention, but probably it was not, and certainly it may not have been, preceded by thought or by experiment, and its reduction to tangible form was simply the work of the mechanic.

2. Cases where, again, the inventive thought is easily reduced to practice, but it was not arrived at without previous labor and pains. Many improvements in machinery belong to this class. For instance, an inventor sets out to render automatic a certain operation requiring an attendant. He may expend years of labor and thought before hitting upon the inventive idea which solves the difficulty. His unsuccessful experiments have shown him how the thing could not be done, not how it could be done. They may have amounted to more than this. Through them all there may have run an imperfect anticipation of that inventive thought which was to solve the difficulty, but being incomplete, they were without practical value.

In making an invention, the inventor may strike out a hundred inventive thoughts, but the law gives him a patent only for such as are embodied in some practical form.[1] The unsuccessful inventive ideas, however brilliant or difficult as intellectual achievements, confer no benefit upon the public. The consideration for the granting of a patent is, therefore, wanting. But our inventor having once conceived the idea of his automatic

[1] "If it is an experiment only, and ends in experiment, and is laid aside as unsuccessful, however far it may have been advanced, however many ideas may have been combined in it which subsequently taken up might, when perfected, make a good machine, still, not being perfected, it has not come before the public as a useful thing, and is therefore entirely inoperative as affecting the rights of those coming afterwards. . . . It may often happen that a person in pursuit of an invention goes a certain distance, makes certain parts of an invention, but fails of arriving at any practically useful result, and the whole falls to the ground. Somebody else comes afterward and takes up the invention, and may incorporate into his invention something found by somebody before; but if that somebody has never perfected that part in the eye of the law as I have explained to you, the second is not to be prevented from having the benefit of that which has been left without practical fruit." Sprague, J., in Howe *v.* Underwood, 1 Fish. p. 166.

movement, a few changes in the mechanism may accomplish it. Or, we may suppose that it was difficult to embody the conception. Much thought and experiment were necessary to adapt the physical means which are to carry out the idea. Then we shall have an instance of class number

3. Where the inventive thought is both preceded by labor and experiment, and also requires labor and experiment to embody it properly in physical form. A disregard of this distinction between the original thought which is the kernel of the patentable idea, and the process of reasoning, experiment, and labor which may have preceded its conception or attended its reduction to practice, breeds infinite confusion of language. We are told again and again by the courts that the law does not regard the process of mind involved, and the reason given for the statement is this: the law does not inquire whether the patentable improvement was reached by a flash of thought, or only by years of thought and experiment. We have seen in what sense this is true, and how little it justifies the general statement that the law does not look to the process of mind involved. A certain process (or act) it always requires, — that of invention. Whether the other process, that of reasoning, precedes it or follows it, the law does not inquire. So, also, the law does not regard the *quantity* of thought involved, or the value of the contrivance embodying it. A slight invention [1] is patentable, as well as a great one, provided it be a real invention.[1] The *quality* of the thought, not the quantity, is what the law looks to.

Objections Anticipated.

We have still to deal with certain possible objections to this theory, that the genius, in other words, the imagination, of an inventor, as shown in the result, is the condition of patentability.[2]

We proceed to state them, as follows: —

"True it is that many, perhaps most, inventions are characterized throughout, or at some stage of them, by the exercise of imagination, — at some point the mind of the inventor has, so to say, leaped across a logical chasm.

"But it is true, also, that other patentable improvements are

[1] In the objective sense.

[2] Discoveries, we remind the reader, being set aside.

reached by a process of reasoning, pure and simple, — a difficult process often, requiring an accurate intellect and a store of knowledge for its performance.

"Nevertheless, it is a true process of reasoning, whereby the mind, starting with the defect which the invention is to remedy, in other words, with the problem in hand, proceeds step by step from adequate premises to a necessary conclusion. That this must be so," the argument would continue, "is apparent from the fact that different inventors set about their work and perform it in different ways.

"Many, if not most of them, do indeed invent by a process of unreasoning imagination, and they cannot state how their results are obtained. In fact, as those familiar with the mental habits of inventors well know, they often have a scorn of reason and of knowledge both, and they are disinclined to inform themselves of what others have accomplished, lest they should injure their own originality.

"There are, however, inventors of a different class, whose minds, though commonly no more acute or imaginative, are yet better trained and informed, than those of the former class. These inventors proceed step by step, by a series of inferences rather than by intuitions. They set themselves, not to receive impressions, but to work out results. They reason from known premises to inevitable conclusions. In short," it might be said, "there is between the operations of these two classes of inventors the very difference that you have described as existing between the faculties of invention (imagination) and of reason.

"Thus, supposing that an inventor of this class attempts to remedy the defect in some machine. He first sets before his mind the result to be accomplished. Then he says to himself: this material or device or arrangement, as the case may be, will work in such and such a way; this other element or adjustment will accomplish this or that; and so the desired result will be brought about.

"The reasoning may be more simple or less simple than this. A single inference only may be required, or the process by which the final result is reached may consist of a series of inferences, each step being inferred from the preceding step; but in either case" (the argument would conclude) "the process is essentially a logical one."

No stronger argument than this, we believe, can be directed

against the position that invention is imagination exercised upon matter; and we have tried to state it with all the force of which it is capable. At first sight, it is, perhaps, almost convincing, but, as the reader will perceive upon reflection, it conceals a profound fallacy.

In the class of cases under consideration, reasoning is indeed the faculty most conspicuously used; but imagination must be employed before the reasoning begins, and in order that it may begin. For in these cases invention (imagination) is exercised either (1) in selecting out of a great many possible elements the particular elements to accomplish the result desired, an infrequent case; or (2) in associating, and applying to the subject under investigation, isolated facts or laws which, though separately known, have not so been associated before, and could not so be associated except by the exercise of imagination, as we have defined it. In other words (in the second case), invention consists in supplying or correlating the premises from which reason draws the necessary conclusion. This second case is a common and a deceptive one.

In both cases, the essence of the invention consists in striking out a fruitful line of reasoning, or in getting a new point of view, and not in the reasoning itself which follows. The difficulty is that the reasoning is often such as to obscure the real nature of the process; so easy is it, where we are given only a new point of view from which to regard old facts, to imagine that *nothing* new has been given. Our attention is diverted from the inventive act of the mind to the reasoning which follows it. The invention, however, does not consist in drawing correct inferences, which is comparatively easy, but in finding the right premises to draw inferences from.

We will now consider separately the two classes that we have indicated. Of the first class, an instance is found in the case of Williams *v.* The Rome, &c. R. R. Co. (15 Blatch. 201), where the inventor had made a lamp, described in the opinion of the court as "the first one which successfully burned kerosene oil in a locomotive headlight;" and this he had done by combining several devices, all of which had previously been used in other lamps and in other collocations.

Taking each device by itself, it might be a matter of reasoning that, having performed its function well in the old situation, it

would continue to do so in the new combination; and, good devices having been selected from various lamps, it might be inferred that the resulting lamp would be a good lamp.

But invention lay in selecting these particular devices out of the many that might have been selected; and perhaps, also, in this case, though the fact is not stated, in the manner of adjusting and combining the several devices.

The second class. This class is a numerous one, and the act of imagination in it is often overlooked. For instance: several important but isolated facts are well known to scientific men. It is known that the force or substance A has certain functions, and that the force or substance B has certain other functions. Scientific men have long been in search of a beneficial result, C. It is a matter of reasoning, when A and B are brought together that the result C will follow.

Here, then, apparently, is a case of invention that is only reasoning. The conclusion is not imagined. There is no flashing upon the mind of the conclusion sought. There is a deliberate process of reasoning issuing in an improvement which it would be absurd to call unpatentable.

In this case, we answer, invention *lies in associating* the facts or laws which constitute the premises, or one of them; in bringing A and B together.

Scientific men were familiar with A and B separately, and they were seeking to produce the effect that the union of A and B produced. Moreover, had the union of A and B been suggested to them, they would have been able by a process of pure reasoning to conclude that C must follow from the conjunction of A and B.

In such a case, therefore, the process of mind which combines the elements of the invention [1] into the result desired is indeed a process of reasoning; but the process of mind which associates those elements is an imaginative or inventive process.[2]

Given the materials, reason can arrange, and, so to say, manipulate them. The fallacy which we combat lies in the assumption that the materials, *i. e.* the facts or laws from which the desired result can be inferred, are given. But in every case of this sort it is necessary to ascertain how the facts or laws were associated.

[1] In the objective sense.

[2] "Imagination is the correlative conception of imperfect component parts." Ruskin, Modern Painters.

If this was done for the patentee, that is, if the state of the art supplied him not only with the truth of his premises, but with their association as well, then the improvement is not patentable.

We might now go on to inquire when it is that the state of the art supplies the facts so that nothing but reasoning is needed to produce the result. This inquiry may be answered by saying, that to preclude invention, not only must all the facts involved be known, but they must be so known in relation to the subject in hand that they would presumably be present to the mind of any instructed person, so soon as he directed his attention to the subject. The simplest illustration is furnished by those cases where one material is substituted for another. In the case of any machine, for instance, the properties of matter manifested in it are necessarily present to the mind of every one who contemplates it. The size, weight, strength, rigidity, elasticity, &c., of the several parts (so far as these properties are availed of in the machine), are necessarily present to the mind so soon as one thinks of changing any of them. It is therefore not a new association of ideas to introduce some element which has the same characteristics, though in a different degree, as the element displaced. The idea of the new element is already in the machine. To put iron in the place of wood, for instance, in any part, for the sake of greater strength, is no invention; for the improvement is an inference from facts which are not only known, but known, so to say, in this connection. That is, the elements of the improvement are supplied by a mere contemplation of the machine; or, in the language of the courts, they are furnished by the "state of the art." It is understood, of course, that by "state of the art" is included such knowledge of the properties of matter in ordinary relations as men in general possess, and not those facts only which are peculiar to the particular art in question.

Thus, in the case supposed, the office which the iron is to fulfil one may gather from a contemplation of the machine; but the existence of iron and of its principal properties is a part of that practical knowledge which men in general possess.

If, instead of "state of the art," we were to say "existing knowledge," the limitation intended would, perhaps, be indicated more correctly.

In a case of substitution, such as we are considering, it is said

that no "new function" is fulfilled. If a "new function" were fulfilled the case would be one of invention, because the thing done would not be a simple inference from the facts of the old machine and the properties of matter manifested in it. Other properties of matter not necessarily called up in thought by the mere contemplation of the machine would have been associated with it. Facts from the outside would have been brought into association with those manifested in the old machine.

So in the case of an improvement in any art, if the change made only involves the application of facts or laws known and associated with that particular art in previous practice, the change is not a patentable improvement; for no act of imagination is required. The result in such a case is merely a conclusion the premises of which are present to the mind of an instructed person, whenever he thinks of the subject. On the other hand, if the facts or laws of nature involved in the improvement, though known generally and separately, have not before jointly been availed of in that particular art, or in one strictly analogous thereto, and therefore are not necessarily present to the mind of any one who intelligently considers the subject, then the importation of such facts into the new association requires an act of imagination, and is therefore patentable.

The objection which we have been considering might be put somewhat differently. It might be said that the distinction which we have made between imagination and reasoning, as processes of mind, is arbitrary and unreal. "It is impossible" (the contention would be) "to draw a hard and fast line between the two, and to say that this idea was reached by a reasoning process, and that other by an imaginative. The mind uses both processes in the development of a single idea. The two are inextricably mixed. In fact, the mind never, or very rarely, proceeds by a purely logical process. That exercise of imagination whereby the mind leaps across a logical chasm is found in all of its operations that have for their object the attainment of new ideas."

Much of what has been said in the preceding pages applies to the objection put in this form, but we wish to present a few considerations rather by way of suggestion than of argument bearing upon the point.

In the first place, then, as we have already shown, reason and imagination may operate successively in the construction of a

material thing. The result is a unit, but the mental process by which it was reached may have been manifold and complex. Reasoning may have been at work at one stage, and imagination at another. But if there was no imagination in the process, then invention is excluded. It is absurd to say that the mental acts of reasoning and of imagination mingle in any other sense than this, namely, that they take place successively and in furtherance of a single and a common object. They are distinct processes, and the recognition of them as such is an elementary principle of psychology.

It should be remembered that all intuition is not imagination. Thus, the intuition or perception of external objects, and the intuition of a law of the mind, as that relations which are equal to the same relation are equal to each other, are not acts of imagination. They are mere recognitions of a fact or truth already existent. Whereas imagination is the act of constructing, so to say, a new truth.

Again, inferences which are habitual, or which are nearly identical with habitual inferences, are made almost, sometimes quite, unconsciously.[1] But these, when they relate to material things, can never be mistaken for acts of imagination (invention), because, when reduced to language, they are at once seen to be inferences of the most obvious kind. The only acts of the mind which can ever be mistaken for acts of imagination (invention) are strict inferences consciously drawn.[2]

Furthermore, when the act of imagination is confused with the more common and more simple process of reasoning, it is often because the person who confuses the two assumes that all reasoning is syllogistic; whereas, as the reader hardly needs to be reminded, in an ordinary process of reasoning most of the premises and many of the syllogisms are suppressed. Nevertheless, the process is a series of *stages*, gradually conducting the mind to an inevitable conclusion. What we really mean, therefore, — what reasoning really amounts to, in fact, — is a process of inference whereby the mind, by a transition natural to all intellects, passes from one thing to another. Each step is an in-

[1] Mr. Spencer speaks of "the familiar fact that in reasoning we constantly skip the intermediate steps of an habitual argument, and pass at once from the premises to a remotely involved conclusion." Principles of Psychology, Part II. ch. ix. p. 189.

[2] *Vide* foot-note to page 24.

ference, though it may depend upon a suppressed premise or syllogism.

Every conclusion depends upon previous conclusions, and usually upon a great many. Each premise may be in itself the conclusion of a preceding (implied) argument.[1]

When, therefore, we say that in an invention the mind starts with the conclusion, imagines it, we do not mean that the conclusion so imagined is in all cases the final conclusion. Sometimes, very often, it is so. An instance is the case of the barbed wire fence, an illustration which we have already used. But at other times the conclusion imagined is that on which one of the premises depends, or that by virtue of which the premises are brought together. We will not, however, extend this discussion.

We have already explained that invention comes in sometimes at one, sometimes at another, stage of the intellectual process which results in a patentable improvement.

In that intellectual process there is commonly one difficult point, a stumbling-block which reason cannot surmount; otherwise anybody instructed in the art could make the improvement in question. And when once the stumbling-block has been surmounted, its existence begins to be doubted; for after imagination has shown the way, reason easily explains and verifies the steps.

We may add, though the remark is obvious, that the patentability of a given improvement must be determined by the manner in which it would ordinarily be arrived at, without regard to the manner in which it has actually been arrived at in a particular case. The criterion, in other words, is the action of minds in general, not the idiosyncrasy of a particular mind. Thus, in a given case, the improvement may be such as a person having the ordinary skill in, and knowledge of, the art to which it belongs could reason out; whereas, in fact, imagination may have been exercised by the alleged inventor, — and this because he was ignorant, or because he had not the normal reasoning faculty, or because he had the imaginative faculty in excess, or from all these causes combined. In such a case the improvement would not be patentable.

[1] This subject is elucidated in Cardinal Newman's "Grammar of Assent," ch. viii.

Application of the Rule.

Of course, it is often difficult to apply the principle upon which we insist; otherwise, upon the subject of "invention" there would be no judicial decisions, and no law, save the statute; but the final criterion of patentability is obtained by putting ourselves in the place of the alleged inventor, and then deciding if he arrived at his improvement by a process of pure reasoning, or if an act of imagination constituted the process or a step in the process.

We do not mean, however, that whoever seeks to decide upon the patentability of an improvement follows, and must follow, this method in every case. It is not necessary that he should do so, because many causes have already been decided upon this principle (whether it has been announced in them or not), and any one familiar with them has in his mind one group of cases which illustrates patentability, and another group which illustrates non-patentability. When, therefore, a new case comes up, he may decide it, partly or wholly, by considering to which group, on the whole, it bears the closer resemblance.

With this matter, however, we have no concern. We are discussing patentability itself, not the manner in which individual minds may decide upon its existence in a given case. In fact, however, the two things are often confused; and because it is impossible to lay down a rule which, having regard to the material thing, and not to the mental process by which it was reached, shall separate patentable from non-patentable improvements, and because, in proportion to the difficulty of the case in hand, the various tests of invention (such as the production of a new function, &c.) fail to be of assistance, — for these reasons it is sometimes assumed that there is no ultimate criterion of invention.

The very use of the word admits that there is something to be defined, but the contention is, not only that it has not been, but that it cannot be defined. According to this view, it is a mysterious, occult faculty. Its presence can be perceived, but its nature cannot be analyzed. And yet it scarcely requires argument to prove that some rule of patentability there must be, though not necessarily a rule of which those who apply it are conscious.

We have shown that the rule cannot be drawn from a consideration of the material things concerned; and we might add that

even if a rule could be framed so as to cover all existing cases, it does not follow that it would cover all combinations of matter hereafter to be invented, for we cannot tell in what new forms, or for what new objects, matter may be combined.

Bearing in mind, then, that patentability cannot be determined by considering the material things concerned, let us rehearse the facts in the case.

We find the statute defining patentable matters as the products of invention or of discovery. We find the courts holding that a peculiar process of mind is the essence of invention; and they describe this process as one requiring the genius of the inventor, distinguished from the knowledge and skill of the workman.

Now, it is obvious, as we have reminded the reader already, that (setting aside perception or observation, by which discoveries are made) there are but two ways of arriving at new ideas: by reasoning and by imagination. Of these, reasoning is excluded, for, as we have shown, that is what is meant by "the judgment and skill" of the workman or mechanic. It follows that imagination is what is meant by invention.

It is curious to observe the manner in which the courts have felt about, as it were, for a phrase to describe an improvement not patentably different from that to which it is referred. In the early cases, "principle," a term adopted by Judge Story, was commonly employed; and it was held that a second improvement was not patentable, if it embodied the same "principle" as the first.

About the year 1850, the phrase "mode of operation," a favorite though not original expression of Mr. Justice Curtis, came into judicial use, and it was held that the introduction of a new "mode of operation" distinguished a patentable from a non-patentable improvement. More recently the word "substantially," a term much used by Mr. Justice Clifford, has played an important part. Thus the difficulty has been shifted about from word to word, with no other gain than that of variety in expression.

What lay in the minds of those who used these phrases was this: that the second improvement, to be patentable, must contain a new idea, created or imagined by the inventor, and not merely inferred or deduced from that which was already known.

The "genius of the inventor," then, is a strictly scientific phrase; the genius of the poet works in the world of ideas;

the genius of the inventor works in the world of matter. The quantity of matter, to repeat the truism, can neither be added to nor diminished by man. But he can arrange it in new combinations. When these new combinations are so connected with others previously existing that they are logically to be inferred from their predecessors, then, though they evince judgment, taste, or skill, they are not inventions.

But when there is no such connection, and the new combinations have been imagined by the mind, and thus first introduced into the world, then they are inventions. All men may make logical deductions and inductions, and that which all men might do, if they would, is not invention. The inventor alone perceives or creates an idea which is not thus within the reach of all men. In other words, invention is the action of a single mind, where a class of minds would fail to act; it is the individuality of mental action.

Utility Evidence of Invention.

Here we cannot refrain from noticing the scientific basis thus afforded for the doctrine of utility, as evidence of invention under the patent law.

If by a slight change an improvement is made that amounts to a decided advance in some art or industry, the courts look upon it with favor, and they find invention in it if they can; especially is this so if the improvement effect a result which has long been desired, which many minds have striven for without success. In such a case, the great utility of the improvement, coupled with the difficulty which has attended its production, raises a presumption that invention was required to bring it forth. This is a fair conclusion; for if the improvement required only "mechanical skill," why was it not made before? When once the change is made, it seems indeed a perfectly obvious one, — a natural inference; but the fact that many minds have been directed to the subject and have not drawn the inference is strong evidence, at least, that it was not a natural inference; that invention was required to make it.[1]

[1] "The history of invention presents many instances of very important results produced by changes apparently trifling and insignificant. The steam printing-machine was on the point of being abandoned from a defect which was entirely obviated by setting the inking rollers in a slightly oblique position. The immersing cloth in hot water and the

This argument, however, must not be pushed too far. The mere fact that an improvement has not been hit upon before, although it would have been useful before, is not enough;[1] for this is true of almost all improvements, whether due to the skill of the workman or to the genius of the inventor. In order to raise the presumption of invention, it must be shown, not only that the defect supplied, or the difficulty removed, had an actual existence, but also that those (or some of those) familiar with the art in which it existed were conscious of it; and, again, not only that they were conscious of it, but also that they had striven unsuccessfully to remedy it.

If these three conditions are fulfilled, there is a presumption, if not a conclusive presumption, that the improvement was the work of inventive genius. An instance is furnished by the case of Pearl *v.* The Ocean Mills.[2] Pearl, the patentee, had made slight changes in the form of the bobbins and spindles of cotton machinery, whereby their weight was much reduced, and a corresponding economy of power effected. In upholding the patent, Judge Shepley said: —

"No more difficult task is imposed upon the court in patent cases than that of determining what constitutes invention, and of drawing the line of distinction between the work of the inventor and the constructor.

"The change from the old structure to the new . . . may be one which, viewed in the light of the accomplished result, may seem so simple as to be obvious almost to an unskilled operative, and yet the proof may show that this apparently simple and obvious change has produced a result which has for years baffled the skill of the mechanical expert, eluded the search of the discoverer, and set at defiance the speculations of inventive genius. . . . Without a knowledge of the results accomplished by these changes [those made by Pearl] they might at first glance appear to be merely structural changes. Nothing has a greater tendency to prove that these changes involve some functional difference beyond mere mechanical perfection and adjustment, than the greatly improved result attending the change, — when viewed in connection with the failure of the many experiments previously made to accomplish similar results by mere structural changes, like these, for example, of diminishing the weight of the spindle in all its parts."

shearing it in one direction, as from list to list, instead of from end to end, increased very greatly the value of the cloth so dealt with." Webster, p. 86, note (*b*).

[1] See page 208.

[2] 11 O. G. 2.

Discovery and Invention compared.

We may now return to the subject of discovery, and compare the mental process of discovery with that of invention. We have seen that, in deciding upon the patentability of a discovery,[1] it is not necessary to consider the process of mind by which it is reached, because the question whether or not a discovery has been made is one of fact, not of opinion. But if we examine the process of discovery, we find that in most cases it closely resembles that of invention; indeed, commonly, the difference between invention and discovery lies in the subjects upon which they are exercised, not in the processes themselves, and it is for this reason that discoveries and inventions are so often confounded.

Sometimes, however, there is no relation between them; for sometimes a discovery is the result of mere observation unaccompanied by reasoning, much less by imagination. In fact, discoveries[1] may be divided into three classes, as follows:—

1. Where the discovery is merely a matter of observation. Here, all that the mind has to do is to receive a fact forced upon its attention. Discoveries of this class are often accidental. Chance reveals to the discoverer a principle of which he was not in search. They might perhaps be called passive discoveries, because in making them the mind merely apprehends a fact without reasoning upon it. An instance is the following: A manufacturer of liquid nitroglycerine once, by accident, spilled some of it upon the ground, where it was absorbed by sand; and he was surprised to find that when so absorbed, upon the application of flame it exploded, instead of burning. Upon this discovery he founded a valuable patent.

Many chemical discoveries are of this kind. For instance, some years ago a chemist, knowing that a certain metal had a peculiar action upon aniline dyes, tested the action upon them of every other known metal; and in so doing he discovered that a particular metal had the same action to a highly valuable degree. In this case there may, indeed, have been invention in starting upon the course of experiments (an unimportant consideration in this place), but the discovery made, although not an accident, required merely trained observation, and neither reasoning nor invention.

[1] In the sense of the thing discovered.

2. Where a fact is perceived, but its bearing is not obvious. The mind has to operate upon it either by way of reasoning or of invention, in order that there may be a practical application of it. The following is an instance, taken from Webster on Letters-Patent, p. 54, note: —

"Many years ago, ladies wore flowered tabbies. The method of working the flower was discovered by mere accident; a man having spat upon the floor, placed his hot iron on it, and observed that it spread out into a kind of flower. He afterwards tried the experiment upon linen, and found it produced the same effect. He then obtained a patent, and lived to make a considerable fortune."

Another instance is furnished by the case of McClurg *v.* Kingsland,[1] where the discovery was as follows: —

"A workman in a foundry observed, in pumping water into a bucket, that the water entering at a tangent to the circle of the bucket acquired a circular motion, diminishing when it approached the centre, where bits of straw and other lighter materials would be concentrated. In casting iron rolls, the method required this rotary motion for the same purpose. The thought all at one struck the mind of this observer that the application of this principle or law of nature might be beneficially made to the casting of rolls by merely introducing the metal at the bottom of this mould at a tangent." [2]

The discovery of Sir Isaac Newton (who is commonly said to have conceived of the law of gravitation while watching the fall of an apple) was of this character, though, of course, in Newton's case, the distance from the particular instance perceived to the general law discovered was indefinitely greater than it was in the other cases that we have cited.

3. Where the mind, acting upon some hint, forms a more or less distinct image of that which it expects to discover, and thus arrives at the fact discovered. In these cases, we commonly find that the discovery originates from the perception of some deficiency in the material world of man's creation. The discoverer casts about in his mind, and uses experiments perhaps, in order to invent a mode of supplying that deficiency, and in so doing he makes a discovery that furnishes him with the

[1] 1 How. 202.

[2] Quoted from the opinion of Mr. Justice Grier, in Burr *v.* Duryee, 1 Wall. 531.

means of supplying it; or else it is an intellectual problem, which, in the attempt to solve it, is found to rest upon a principle, guessed at, and so discovered by the inquirer.

In this class of cases, therefore, a discovery is also an invention. Before the discovery is made, and in order to its making, the mind imagines in some degree the thing to be discovered. It runs ahead, so to say, of its actual knowledge, and thus constructs some notion of the fact afterward discovered. Now, this process is of the essence of invention. Most physical discoveries are arrived at in this way; the mind having the knowledge of certain facts jumps at a conclusion, or imagines an hypothesis which being tested is found to be correct.

It is not necessary, however, to dwell upon the distinction between this class and the second class of discoveries; and we need not be curious to distinguish the mental processes which they severally imply.

The vital fact is that in both of them the mind operates upon certain facts presented to it and thus makes the discovery. The idea of the discovery is reached by a process of reasoning or by a process of imagination, and the idea so arrived at is verified by experiment; whereas in cases like those which we have called passive discoveries (Class 1), the mind simply apprehends or perceives, and neither reasons nor imagines.

The imaginative process is, as we have seen, of the essence of invention. Discoveries of the third class, therefore, are inventions as well as discoveries. As to discoveries of the second class, it is difficult to say whether the transition in them from a particular instance to a general law is an act of reasoning merely or of imagination. For the reasons we have stated, it is unnecessary to enter into that question, but in so far as discoveries of the second class require imagination to reach them, they also are inventions as well as discoveries.

We may add that discoveries of the second class sometimes involve both a discovery and an invention, — the invention following upon the discovery, whereas in cases of the third class the discovery is the invention.

Thus, in the case of McClurg *v.* Kingsland, there was first a discovery, concerning the movement of water under the circumstances stated; and, secondly, an invention, namely, directing

liquid metal into its mould in such a manner as to take advantage of the law discovered in the case of water.

The patent, therefore, might have been supported on either ground, — on account of the discovery [1] or on account of the invention.

If the law of nature involved had been known before, and the patentee had merely made use of that law for the object and in the manner stated by his patent, the patent, we apprehend, would still have been valid.

On the other hand,[2] if the practical application of the law discovered had been something different from what it was, something perfectly obvious, still it would have been patentable, just as the practical but obvious application of Neilson's law was patentable. In this case, therefore, in the English case of the flower tabbies, and in other cases like them, the patentee both discovered a principle and invented an application of the principle.

A Seeming Exception.

It remains to notice an apparent exception to the rule that in all cases of alleged invention a certain process of mind is the condition of patentability. For sometimes, in cases of invention as well as in cases of discovery, not mind at all, but chance, has revealed the patentable thing. It is true, of course, that a law of nature or property of matter (which is the subject of a discovery) is much more likely to be disclosed by accident than are the complex arrangements of matter which form the subjects of invention. Nevertheless, a patentable invention might be the result of mere accident. We do not remember any actual case of this sort; but we recollect an illustration furnished by the case of Hartshorn *v.* Tripp (7 Blatch. 120).

The patent sued on was for a carriage curtain-fixture. The merit of it was that the curtain, once started, ran up of itself, without a continuous pull upon the cord. It was proved that, thirty-five years before the date of the patent, a witness had seen upon a carriage sent to his shop for repair, a curtain-fixture which acted in the same way, — not by the intention of its maker, but

[1] We assume that the fact discovered was not known before.

[2] Here, again, we assume that the law discovered was not known before.

because, being constructed with a pawl and ratchet-wheel, the teeth upon the wheel had become so worn by use that the pawl, once started, would slip over them, instead of engaging with them.

The witness thought no more of the old curtain-fixture until it was recalled to his memory by the similar curtain-fixture of the patentee, so that his evidence did not invalidate the patent.

But if, perceiving the utility of the ratchet-wheel with teeth worn down, he had patented one made with teeth of the same size and shape, his patent, doubtless, would have been valid.

In such a case the invention would be the result of accident, but none the less it would have the quality of inventive thought; chance would have thrown together the elements of a patentable thing, which, if not so presented to the mind, would have required inventive thought to combine them.

It is plain that the law cannot undertake to decide whether chance or thought has withdrawn an invention from its hiding-place. But the law does require that the thing to be patented shall be of such a character that, *supposing it to have been thought out*, and not chanced upon, it must be the result of inventive thought. These cases, therefore, confirm the general principle that inventive thought (imagination), as distinguished from the ordinary process of reasoning, is the criterion of patentability.

Conclusion.

These remarks upon the characteristics of invention and of discovery we offer as, we believe, the first attempt to analyze the meaning of those words, and of the terms used by the courts to describe that meaning. We are far from thinking that our suggestions are equal to the difficulty of the subject; neither do we fancy that the most thorough and correct analysis of invention would render it easy thenceforth to decide upon the presence or absence of it in any given case.

The chief difficulty in the administration of the patent law is, not to ascertain the principles which govern it, but to apply them. The principles are few, and comparatively simple; but the infinite and complex forms of matter which the human mind can invent or infer are difficult to classify. Nevertheless, the first step should be to ascertain as exactly as may be the nature and scope

of the principles according to which the classification must be made. This we have attempted, with regard to invention and to discovery.

In conclusion, should it be objected that some of the discriminations here proposed are too fine drawn to be applied safely and successfully in practical matters, the answer is obvious and twofold. In the first place, no metaphysical distinctions that can be conceived by the mind, much less expressed in language, will approach in number or in fineness the actual differences between similar arts, machines, manufactures, and compositions of matter. In order to do justice between rival or successive inventors it is necessary carefully to examine and to discriminate the mental processes which the things produced severally presuppose, as well as to consider the things themselves, in order to determine precisely what has been done, what physical change has been wrought in each case. Secondly, the fact that just decisions in difficult questions of invention really proceed upon fine metaphysical distinctions does not imply that those distinctions are *consciously* present even to the mind of the judge who acts upon them. In such matters, that "broad common-sense view of things," so insisted upon by those who have a dread of subtleties, is nothing more nor less than a view which must be substantiated and supported by those very subtleties; but it is arrived at spontaneously, instinctively, or however otherwise we may describe the action of that faculty of the mind which grasps a subject as a whole, unconsciously estimating the bearing and the weight of each detail. So true is it that the powers of right judgment and of right reasoning are thus separate and distinct, that instances are not uncommon of great judges who decide intricate and difficult cases wisely and justly, and yet are unable satisfactorily to explain the grounds of their decisions. They have the power to construct, but not to analyze.

CHAPTER I.

THE STATUTE.

1. THE object of this book is, first, to show what is in itself patentable in the United States; and, secondly, to set forth the circumstances and conditions which affect the right of an original inventor to a patent *at the time that his invention is completed.*[1]

This object we shall endeavor to accomplish chiefly by abstracts of all the important cases on the subject in the Federal courts, and of the leading cases in the English courts. We shall preface them, however, by an attempt to state and to explain the principles which they illustrate.

2. The common law does not provide a patent system. It is created by statute only, and in the United States by virtue of that clause in the Constitution which confers upon Congress power "to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

The motive thus indicated for the establishment of a patent system is of practical importance. It shows that by the intendment of the Constitution a patent is not a free grant from the government to an individual, but a contract between them for the protection of the individual's discovery, in consideration of a benefit which he has conferred upon the public through the advancement of science or of the arts.

This view is but a just recognition of the fact that a patentee gives a *quid pro quo* when he receives his patent; and the practical consequence of it is, that the patent is construed liberally, as amounting to a contract, and not grudgingly, as stating the terms of a gratuity.

It is in such a spirit that the courts of this country have

[1] We do not treat of abandonment or of public use or sale.

always dealt with patents,[1] and so have the English courts for many years; but in the last century, and in the first quarter of this century, by a false association of ideas, the judges in England confounded patents for inventions with patents for other monopolies, and they were ingenious to upset them.[2]

3. Moreover, this fact that a benefit to the public is the consideration upon which the granting of a patent depends has a bearing upon the case of rival inventors, of whom one may first have conceived the idea of the invention in question, but afterward have failed to prosecute it with diligence, so that his rival has anticipated him in reducing the invention to practice. In such a case the courts take note of the fact that the second inventor was the first to confer upon the public the benefit in question.

Again, the same fact is of weight when an inventor seeks to patent an improvement which, though once invented before, was not given to the world by the first inventor, and has been abandoned and forgotten by him. In other connections, also, the consideration for which a patent issues becomes important; but it need not be dwelt upon here; the reader will frequently be reminded of it in the course of our investigations.

4. The first act of Congress creating a patent system was passed in 1790.[3] Since then there have been various statutes,

[1] Ames *v.* Howard, 1 Sumner, p. 485.

[2] Neilson *v.* Harford, Webster, p. 310.

[3] We quote here so much of the act of 1790 (repealed by that of 1793) as relates to our subject: —

"SECT. 1. Be it enacted," &c., "that upon the petition of any person or persons, . . . setting forth that he, she, or they hath or have invented or discovered any useful art, manufacture, engine, machine, or device, or any improvement therein, not before known or used, and praying that a patent may be granted therefor, it shall and may be lawful to and for the said Secretary of State, the Secretary for the Department of War, and the Attorney-General, or any two of them, if they shall deem the invention or discovery sufficiently useful and important, to cause letters-patent to be made out, . . . reciting the allegations and suggestions of the said petition, and describing the said invention or discovery clearly, truly, and fully, and thereupon granting to such petitioner or petitioners, . . . for any term not exceeding fourteen years, the sole and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said invention or discovery."

"SECT. 2. . . . The grantee or grantees of each patent shall, at the time of granting the same, deliver to the Secretary of State a specification in writing, containing a description accompanied with drafts or models, and explanations and models (if the nature of the invention or discovery

repealing, establishing, and amending the patent law. But there has been no substantial change in the conditions of patentability, and no change at all since July 8, 1870, when the act now in force was passed.

We proceed to set forth those sections of the Patent Act, taking them in their order, with which this book is concerned.[1]

5. Section 4886 provides that —

"Any person who has invented or discovered[2] any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, not known or used by others in this country,[3] and not patented or described in any printed publication in this or any foreign country[4] before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceedings had, obtain a patent therefor."[5]

will admit of a model), of the thing or things by him or them invented or discovered, and described as aforesaid in the said patents; which specification shall be so particular, and said models so exact, as not only to distinguish the invention or discovery from other things before known and used, but also to enable a workman or other person skilled in the art of manufacture, whereof it is a branch, or wherewith it may be nearest connected, to make, construct, or use the same, to the end that the public may have the full benefit thereof, after the expiration of the patent term."

"SECT. 5. . . . Upon oath or affirmation made before the judge of the District Court where the defendant resides, that any patent which shall be issued in pursuance of this act was obtained surreptitiously by, or upon false suggestion, and motion made to the said court, within one year after issuing the said patent, but not afterwards, it shall and may be lawful to and for the judge of the said District Court, if the matter alleged shall appear to him to be sufficient, to grant a rule that the patentee or patentees, &c., show cause why process should not issue . . . to repeal such patents; and if sufficient cause shall not be shown to the contrary, the rule shall be made absolute. . . . And in case no sufficient cause shall be shown to the contrary, or if it shall appear that the patentee was not the first and true inventor or discoverer, judgment shall be rendered by such court for the repeal of such patent or patents."

[1] Patents for designs are treated of in an Appendix to this book.

There was no act making designs patentable until the year 1842.

[2] The words "or discovered" were not used in the act of 1793. In the act of 1836 the statute ran, "discovered or invented."

[3] In the act of 1793 this was, "not known or used before the *application*." The act of 1836 altered it to, "not known or used BY OTHERS before [the] *invention or discovery* thereof." The present restriction to domestic use was introduced by the act of 1870.

[4] This clause was first adopted by the act of 1870.

[5] In the act of 1793 there was also

The clauses concerning public use, or sale, and abandonment, relate to the conduct of the inventor after his invention is complete. They lie, therefore, outside of our subject, which regards only the invention itself, and the circumstances, past or present, affecting its patentability at the time of its completion.

6. Section 4887 says: —

"No person shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid, by reason of its having been first patented, or caused to be patented, in a foreign country,[1] unless the same has been introduced into public use in the United States for more than two years prior to the application. But every patent granted for an invention which has been previously patented in a foreign country shall be so limited as to expire at the same time with the foreign patent," &c.

7. The section which follows is no part of the subject treated by this book; but inasmuch as it might be thought to throw some light upon the nature of a patentable thing, by showing that it must be strictly, as the statute says, an art, machine, manufacture, composition of matter, or some improvement thereof, and not an abstract idea, or result, &c., we quote the section here: —

SECT. 4888. "Before any inventor or discoverer shall receive a patent for his invention or discovery, he shall make application therefor, in

the following provision: "Simply changing the form or the proportions of any machine, or composition of matter, in any degree, shall not be deemed a discovery." The act of 1793 was repealed by that of 1836.

[1] A similar provision was first adopted by the act of 1836, as follows (in sect. 8): —

"But nothing in this act contained shall be construed to deprive an original and true inventor of the right to a patent for his invention, by reason of his having previously taken out letters-patent therefor in a foreign country, and the same having been published, at any time within six months next preceding the filing of his specifications and drawings."

This provision was repealed, and the following enacted in 1839 (sect. 6): —

"*And be it further enacted*, That no person shall be debarred from receiving a patent for any invention or discovery, as provided in the act approved on the 4th day of July, 1836, to which this is additional, by reason of the same having been patented in a foreign country more than six months prior to his application: *Provided*, That the same shall not have been introduced into public and common use in the United States prior to the application for such patent: *And provided, also*, That in all cases every such patent shall be limited to the term of fourteen years from the date or [?] publication of such foreign letters-patent."

The present provision was adopted by the act of 1870.

writing, to the Commissioner of Patents, and shall file in the Patent Office a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery," &c.

8. SECT. 4892. "The applicant shall make oath that he does verily believe himself to be the original and first inventor or discoverer of the art, machine, manufacture, composition, or improvement for which he solicits a patent; that he does not know and does not believe that the same was ever before known or used,"[1] &c.

This section is to be considered in connection with section 4923, *infra*.

9. Section 4920 provides that, —

"In any action for infringement the defendant may plead the general issue, and having given notice in writing to the plaintiff or his attorney, thirty days before, may prove on trial any one or more of the following special matters: —

"*First.* That for the purpose of deceiving the public, the description and specification filed by the patentee in the Patent Office was made to contain less than the whole truth relative to his invention or discovery, or more than is necessary to produce the desired effect; or,

"*Second.*[2] That he had surreptitiously or unjustly obtained the patent

[1] This provision has been the law since the act of 1836, when it was enacted in substantially the same terms as those now on the statute-book. In the act of 1793 the corresponding provision ran thus: "Every inventor, before he can receive a patent, shall swear or affirm that he does verily believe that he is the true inventor or discoverer of the art, machine, or improvement for which he solicits a patent."

[2] In the act of 1793, the section, from this point, runs as follows (in sect. 6): —

"That the thing . . . secured by patent was not originally discovered by the patentee, but had been in use, or had been described in some public work, anterior to the supposed discovery of the patentee, or that he had surreptitiously obtained a patent for the discovery of another person."

In the act of 1836, so much of this section as concerns our subject ran as follows (sect. 15): —

"That the patentee was not the original and first inventor or discoverer of the thing patented, or of a substantial and material part thereof

for that which was in fact invented by another, who was using reasonable diligence in adapting and perfecting the same; or,

"*Third.* That it [the invention] had been patented or described in some printed publication prior to his supposed invention or discovery thereof; or,

"*Fourth.* That he was not the original and first inventor or discoverer of any material and substantial part of the thing patented; or,

"*Fifth.* That it had been in public use or on sale in this country for more than two years before his application for a patent, or had been abandoned to the public."

It will be observed that in section 4920 the first clause relates to the sufficiency and correctness of the specification without regard to the nature of the subject-matter, and is, therefore, foreign to our subject. The third clause repeats a provision already made in section 4886; and the fifth clause, again, is but a repetition of the last two provisions in section 4886, with which, as has been said, we have no concern.

The second and fourth clauses, therefore, are the only ones which add anything to section 4886 as a test of patentability.

Numerous cases arise under the second clause, — very few, indeed, under the first branch of it, that which is qualified by the word "surreptitiously," but many under the second branch of it, where the defence is that the patent sued on was "unjustly" obtained. These cases are characterized as occurring in the "race of diligence." Often, by accident or under the pressure of commercial necessity, several persons conceive of or complete an invention; perhaps both conceive of it and complete it at about the same time. In such cases, the rule is that he who conceives first, if he uses due, that is, reasonable, diligence, to reduce his invention to practice, shall obtain the patent, although

claimed as new, or that it had been described in some public work anterior to the supposed discovery thereof by the patentee, . . . or that he had surreptitiously or unjustly obtained the patent for that which was in fact invented or discovered by another, who was using reasonable diligence in adopting and perfecting the same . . . *Provided, however*, That whenever it shall satisfactorily appear that the patentee, at the time of making his application for the patent, believed himself to be the first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discovery, or any part thereof, having been before known or used in any foreign country, it not appearing that the same, or any substantial part thereof, had before been patented or described in any printed publication."

another person who struck out the idea later has reduced it to practice earlier.

Strictly speaking, therefore, there is no such thing as a race of diligence. At least, the second inventor or conceiver is so handicapped that he wins only by want of due diligence on the part of the first inventor. He cannot win by excess of diligence on his own part.

These cases are discussed in the ninth chapter of this book, under the head of "Prior Invention."

10. The fourth clause of section 4920, if it adds anything to section 4886, as a test of patentability, does so by virtue of the word "first" inventor or discoverer; for the word "original," prefixed to "inventor," is meaningless.

Every inventor is an "original" inventor. That is, a man does not invent unless he creates something himself. An inventor who was not an original inventor would be a mere imitator,—not an inventor at all. The expression "original" inventor is therefore tautological. An inventor may not be the "first" inventor. Some other person may have anticipated him, and produced the same thing which he, without knowledge of his predecessor's invention, afterward struck out by himself. A similar criticism applies to the phrase "original discoverer."

It might be said that even this clause of section 4920 is substantially contained in section 4886, by the words "not known or used by others." This is probably so. At any rate, this provision of section 4920 is always construed as confirming or amplifying the words we have quoted from section 4886.

11. Sect. 4923. "Whenever it appears that a patentee, at the time of making his application for the patent, believed himself to be the original and first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discovery, or any part thereof, having been known or used in a foreign country, before his invention or discovery thereof, if it had not been patented or described in a printed publication."

12. We find, then, that section 4886 (barring the last two provisions), section 4887, section 4892, section 4920 (barring the first and fifth clauses), and section 4923, contain all that the statute says upon the subject-matter of a patent. In fact, they contain more; for, besides declaring what is in its nature patentable,

they also state certain further conditions, under which only the otherwise patentable matter can be patented. Patentability in this wider sense is included by this book, which is intended to be commensurate with those portions of the statute that we have designated.

According to these further conditions, (1) the inventor or discoverer must, at the time of making his application for a patent, believe himself to be the original and first inventor or discoverer of that which he seeks to patent; and it must also appear that the patentable thing, before its invention or discovery, was (2) not known or used by others in this country [the inventor being the first and original inventor]; (3) not patented or described in any printed publication in this or any foreign country. Finally, (4) a patent is not valid if it has been surreptitiously or unjustly obtained for that which was in fact invented by another, who was using due diligence in perfecting it.

Each of these conditions, except the first, has given rise to much litigation, and each has been the subject of frequent judicial construction. The second, particularly, has required great ingenuity of explanation in order to prevent its shutting out patents granted for the rediscovery of a lost art. We refer to those cases where an invention was once practised, but has been given up and forgotten, so that the public have lost the benefit of it. Roughly speaking, the rediscovery is patentable.

As to the third and fourth conditions, their meaning is now well settled, and it was at no time difficult to get at. Most of the points which have arisen in regard to their construction were ingenious sophisms, set up for the purpose of bending the language of the act to fit the sinuosities of a particular case. More numerous, of course, are those cases where the contention was, not so much as to the meaning of the statute, but as to whether the facts in question came within that meaning. All of these cases, when they are not too trivial or too complicated for our purpose, we shall set forth, inasmuch as they may throw light upon causes hereafter to occur.

Discovery.

13. Having now finished these indispensable, if uninteresting, remarks upon the statute provisions in regard to patentability, we turn to consider the nature of invention and of discovery.[1]

According to the statute, he may have a patent "who has *invented* or *discovered* any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof," &c.

The reader will have observed that the statute says not simply that the patentee must have made, or caused to be made, a new and useful thing; it requires that he shall have *invented* or *discovered* it.

14. The first and most obvious remark to be made upon these words is that they do not have the same meaning. In common speech, when we say that a man has invented something, we mean that he has made or created something that did not exist before; whereas, when we say that he has discovered something, or has made a discovery, we mean that he has found out something which existed before, but was not known to exist before.

This distinction clearly obtains in regard to patentable subjects.

Most patents are granted for things created or invented,—machines, for instance. Other patents, however, rest upon a discovery of some new law of nature or property of matter, or, perhaps, upon a discovery in regard to the capacity or relations of a law of nature or property of matter. Such patents are said to involve a *principle;* though this is but one of several meanings which that word has in the patent law. A principle, then, in this sense, is a law of nature or property of matter, or (perhaps) a scientific fact in regard to such law of nature or property of matter.

If the discoverer of a principle makes a practical application of it, and describes the application, he may obtain a valid patent. For instance, the discoverer of a new metal or of some new, that is, unknown, property in a known metal, would be entitled to a patent if he made a practical application of his discovery.

[1] In the remarks that follow, much is repeated from the Introduction. This is necessary in order to present to the general reader a more easy view of invention and of discovery than is afforded by the radical treatment of the subject in the Introduction.

15. Some years ago the discovery was made that when lead is melted its particles will, at a certain temperature, reset. This discovery was turned to account in making lead pipe by a new and greatly improved process, and the process was held patentable, although the machinery through which the newly discovered principle operated was old.[1]

[Another instance of discovery is the following:[2] About the year 1828, James Neilson, in England, discovered that a hot blast of air thrown into a furnace for melting iron was more effective than the cold blast previously used. It had been supposed that the colder the blast the hotter the fire, because the furnace fires were observed to burn better in winter than in summer. This supposition, however, was incorrect. In reality, the fires burned better in winter because the air is drier then, not because it is colder. Neilson, therefore, discovered a physical law or truth, namely, that a hot blast is more effective than a cold blast in a furnace. And he described an apparatus for making use of this discovery by heating the air-blast before it is directed into the furnace.]

16. It is true that a mere *principle*, a naked principle, cannot be patented. So long as it is, or from its nature must remain, a mere item of knowledge, no patent can be had. But if a method of applying the discovery to practical use is described, that method is patentable. Nevertheless, the apparatus or other means whereby the principle is applied may be in itself devoid of all invention, and such as any workman skilled in the art concerned might supply, when the discovery was told him.[3]

These last two propositions—namely, that a principle by itself is not patentable, and that its application, though simple and obvious, is patentable — may be illustrated by the hot-blast case. If Neilson had merely announced the principle that a hot blast is better than a cold blast in an iron furnace, he could have had no patent. He described, however, a method of applying that prin-

[1] Le Roy *v.* Tatham, 14 How. 156; 22 How. 132.

[2] Neilson *v.* Harford, Web. 295.

[3] Of course it may, and sometimes does, happen that the apparatus itself is new, and is the result of invention. In such case there are both a discovery and an invention, — a discovery of a principle coupled with an application thereof, in other words, of a process, and an invention of a particular apparatus; and the inventor may have one patent for his process and another for his apparatus. But if a process is simply the operation of a machine, it cannot be patented separately. *Vide post*, page 77.

ciple by interposing a heated receptacle between the air blast and the furnace.

Now, it was proved at the trial that any workman skilled in the art would have been able to apply the principle as soon as he was informed of it; so that there was no invention in the application, — that was perfectly obvious. Moreover, the patentee did not describe the best form of apparatus for the purpose. He used a chamber for heating the air, whereas the defendants in the suit upon his patent used a series of pipes or tubes; and it was proved that their apparatus was much more effective than his. None the less, Neilson's patent was sustained, and it was held to be infringed by use of the defendants' superior apparatus. It is plain, therefore, that the merit of such patents, that on account of which the patent is granted, is the discovery.[1]

17. There is also a small but important class of cases in which the patent is for an invention, though practically it is considered as being for a discovery. We mean those cases in which the patentee has made a useful application of a previously known but unapplied principle, — and a principle, moreover, the application of which was not obvious, as was that of the principle in the Neilson case.

An instance is the celebrated invention of Professor Morse. He discovered no new force or property of matter, but he invented a method of applying certain known forces to a particular purpose. It was known before his invention that electricity would pass over a wire, and that iron was magnetized by the passage of electricity through a coil of wire surrounding it. He invented a method of applying those forces to the production at a distance of intelligible signs or letters.

When a known principle is applied to some useful end, it is

[1] It might be well to notice that sometimes the discovery is of a hitherto unknown property in a manufactured article, itself perhaps the subject of a patent. In such case, the granting of a valid patent depends upon the same conditions as when the discovery is of the kind that we have been discussing. This note, however, should not be offered without an apology to the reader, inasmuch as it is perfectly clear that the discovery of a new property in a manufactured article is, according to the terms of our definition, the discovery of a new principle, as much as when the principle discovered resides in a natural substance, or is a substance or force by itself.

So, also, the discovery might be that the union of two substances produced, by virtue of certain hitherto unknown capacities in them, a third and new substance.

of course essential that the application should require invention; but practically the question of invention does not come up in those cases of invention which, as we have said, are considered as cases of discovery. At least, we recall no instance in which it did. The real controversy that arises is not as to the validity of the patent, but as to its scope.[1]

In each case, *i. e.* when a principle is discovered, and when the application of a known principle is invented, the difficulty is to decide whether the patent shall cover every application (by whatever apparatus or other means) of the principle involved, to the end proposed by the patentee, or only such application and apparatus as he has described, with, of course, all colorable imitations thereof and substantial equivalents therefor. And in the first case, where the principle itself is discovered, there is sometimes, as we have seen, a further difficulty; namely, as to whether the patent claims a naked, abstract principle (which is not patentable), or the practical application of a principle. This difficulty, of course, cannot arise in the second case, where the application is the very thing invented.

18. Strictly speaking, then, principle, in this sense of the word, is to be defined as we have stated. But the term is commonly used to indicate processes founded upon a principle, or consisting in the application of a principle, to the exclusion of those principles the discovery of which does not lead to a process; and, in fact, cases where a new principle is made use of otherwise than in a process give rise to little difficulty. The subject of "principle" in this restricted sense of the word is discussed in Chapter VII. of this book.

Whether the classification it denotes is a scientific one or not, it has become established in the law, and, to say the least in its favor, it affords a convenient method of treating the more important of the patents for a process.

19. The only point upon which we insist is that of the distinction between invention and discovery, or rather between things invented and things discovered. Sometimes there is an invention founded upon a discovery, so that the patentee has both discovered and invented.[2] It is true also that the mental process of discovery is often very similar to, if not identical with,

[1] *Vide* Introduction, pages 7, 8, 9.

[2] *Vide* Introduction, page 43.

that of invention, at least when the discovery is not the result of pure accident.[1] This is clearly seen when the discovery and the invention compared are both of a high order. But a broad line can be drawn between things invented and things discovered. We have seen what is the actual difference between them. The practical consequence of it is that in cases of discovery (except when it is contended that a naked principle is patented) the only question of patentability is that of novelty; whereas, in the case of all patentable improvements other than discoveries, there is a further and far more difficult question, namely, that of invention.

Invention.

20. What is "invention"? The courts say that a thing is invented when it is produced by a faculty of the mind, which they call "the inventive faculty," "the genius of the inventor," "inventive genius." Improvements which fall short of being inventions they describe as effected by the judgment or skill of one instructed in the art wherein the improvement is made. Thus, improvements in degree simply, as in the fineness of texture of a cloth, are not patentable.[2]

And so of improvements which consist in a mere change of form. In a leading case, the patentee, starting with a wagon which had a curved reach (or pole connecting the axles), increased the curve thereof sufficiently to allow the fore-wheels to turn under the reach. It was held that this improvement was not patentable; that, given a curved reach, any wagon-builder might naturally think of a greater curve under which the fore-wheels could pass, and that the improvement was therefore not invention.[3]

So, also, a mere change of situation involving no new function is not patentable. Thus, a patent for shifting the raker's seat from one side of a reaping-machine to the other, though the change enabled the raker to work more easily, was held to be invalid.[4]

Again, it is not invention to apply an old process or device to a new but analogous purpose. In an early case, it was held that the application of a process to palm-leaf, in order to curl it for

[1] *Vide* Introduction, pages 41, 43, 44.

[2] Smith *v.* Nichols, 21 Wall. 112.

[3] Flood *v.* Hicks, 2 Biss. 169.

[4] Marsh *v.* Dodge, &c. Co., 6 Fish. 562.

mattresses, the same process having been used to prepare hair for mattresses, was not patentable.[1]

In an English case, it was held to be no invention to use for spinning flax, which had been macerated so that its fibres were shortened, an arrangement of rollers borrowed from cotton-spinning machinery.[2]

Neither is it invention to substitute one well-known material or device for another, when no new function is introduced thereby. The substitution of a known porcelain door-knob for a clay knob, in combination with a particular shank, was held by the Supreme Court to be no invention.[3]

Finally, it is not invention to group together two or more things or devices, which, when united, act just as they did separately, — one not affecting the other; so that there is a mere juxtaposition of separate elements, and not such a union as forms a homogeneous whole, — a new entity. In a leading case in the Supreme Court, the patentee had taken a fire-pot from one stove, a flue from another, and a coal-reservoir from a third, and had put them into a new stove, where each fulfilled the office it had fulfilled in its old situation, and nothing more. The aggregation was held not patentable.[4] In another case, the patentee had tied a lighter to a bundle of kindling-wood. Both lighter and kindling-wood were old, and it was no invention, though a convenience to make one bundle of them.[5]

In all these instances, and they might be multiplied at great length, the improvement was the result simply of the skill and judgment of one versed in the art wherein the improvement was made.

21. On the other hand, the following are examples of improvements which required the genius of the inventor to produce them: —

In the case of Smith *v.* The Goodyear Dental Vulcanite Co.,[6] a leading case in the Supreme Court of the United States, the patentee was the first to use hard rubber as a plate for false teeth. Cement and other substances had been used before, but they had all been defective, inasmuch as they allowed crevices

[1] Howe *v.* Abbott, 2 Story, 190.
[2] Kay *v.* Marshall, 8 Cl. & Fin. 245.
[3] Hotchkiss *v.* Greenwood, 11 How. 248.
[4] Hailes *v.* Van Wormer, 20 Wall. 353.
[5] Alcott *v.* Young, 16 Blatch. 134.
[6] 93 U. S. 486.

between the teeth and the plate. But in the hard-rubber plate the teeth could be inserted without leaving crevices. It was, moreover, light, flexible, and not susceptible to decay from the secretions in the mouth. Here, then, was something more than substitution of one known material for another: there was the introduction of a new effect.

Again, a new and greatly improved roller for a wringing-machine was constructed by surrounding the shaft with a fabric made of fibrous cloth and rubber. This material had been sold before, in the form of a tube, to customers, who cut it into sections or rings for stuffing-boxes. But it required inventive genius to discover its usefulness for the very different purpose of the wringing-machine.[1]

So, also, it was held that the use, for collars, of linen faced with paper was a patentable invention, although substantially the same material had been used previously for maps.[2]

In another case, the patent was for engraving glass by means of sand, thrown by a jet of steam or water against the glass while it revolved. This was held to be an invention, the former way of engraving glass being by the use of a brush, with which sand and water were applied.[3]

In these cases, the reader will have observed, there was an exercise of that inventive genius which the courts require as the condition of patentability. In other words, the improvement in each case was not such as the skill or judgment of an intelligent artisan or mechanic could be relied upon to effect. It was something more than that.

22. Sometimes, indeed, the courts appear to consider merely whether an alleged invention is "new" and "useful." But when such language is used, they mean by "new" that sort of newness or uniqueness which inventive genius produces. It is plainly, however, the correct reading of the statute to give to the words "invented or discovered" their ordinary meaning, rather than to import it into the word "new."

Any improvement, indeed, is, or may be, new, in the sense that the identical thing in which the improvement results was never made before. But if it be so like to some former thing,

[1] Forsyth *v.* Clapp, 6 Fish. 528.
[2] Union Paper Collar Co. *v.* White, 7 O. G. 698.
[3] Tilghman *v.* Morse, 9 Blatch. 421.

that any one who was familiar with its predecessor might have made it, then it is substantially an old thing. There is no new idea in it. And invention, as a learned judge very happily said, consists, not in making a modification of an old idea, but in making an addition to the stock of ideas.

It is in the power of a skilled artisan to modify an old idea which has taken shape in his art, but for the production of a new idea we must look to the genius of the inventor.

Utility, Evidence of Invention.

23. It is for this reason that utility is often high evidence of invention. Thus, if a man makes some change, though apparently a very slight one, in well known and much used machinery, and this change constitutes a valuable improvement, there is a presumption that inventive genius was required to make it.

This argument, however, must not be pushed too far. The mere fact that an improvement has not been hit upon before, although it would have been useful before, is not enough; for this is true of almost all improvements, whether due to the skill of the workman or to the genius of the inventor. In order to raise the presumption of invention, it must be shown, not only that the defect supplied or the difficulty removed had an actual existence, but also that those, or some of those, familiar with the art in which it existed were conscious of it; and, again, not only that they were conscious of it, but also that they had striven unsuccessfully to remedy it.

If these three conditions are fulfilled, there is a presumption, if not a conclusive presumption, that the improvement was the work of inventive genius. Just such a case is that of Pearl *v.* The Ocean Mills,[1] where a slight change in the form of the bobbins and spindles of cotton machinery effected a long-sought saving of power. It was, therefore, held patentable, although the actual, material change was very slight, and *after it had been made* it seemed obvious.[2]

24. An improvement, however, may be of great utility, and

[1] 11 O. G. 2.

[2] See also Smith *v.* The Goodyear Dent. Vul. Co., 93 U. S. 486; Hoe *v.* Cottrell, 17 Blatch. 546; Penn *v.* Bibby, 2 Ch. App. Cas. p. 136; Washburn, &c. Co. *v.* Haish, 4 Fed. Rep. 900; U. S. Stamping Co. *v.* King, 17 Blatch. 55.

yet not be an invention. This fact is illustrated by cases of mere substitution, such as the case of Hotchkiss *v.* Greenwood, already stated. In another case decided by the Supreme Court (Hicks *v.* Kelsey[1]), the substitution in a wagon-reach of an iron bar for a bar made of wood and iron bolted together, though the wagon-reach was strengthened and greatly improved thereby, was held to be not patentable.[2]

On the other hand, every useful exercise of inventive genius is patentable. However slight the change and its consequent improvement, if it has any value at all, though the least in the world, it is patentable.

State of the Art.

25. Here it might be well to notice, what is implied in the foregoing remarks, that when the patentability of an improvement is asserted, the state of the art to which the improvement relates must be taken into consideration. The inventor is presumed to know the state of the art, and any improvement which is not such an advance upon that state as to be an invention is not patentable. In reality the inventor may not have been familiar with the state of the art, so that his improvement, considered merely as the achievement of his own mind, is an invention; but if it be of such a character that one who was familiar with the state of the art might have produced it without the exercise of inventive genius, it is not patentable.

Equivalents.

26. The doctrine of equivalents falls under this head. That doctrine is, that the substitution, in an existing contrivance or process, of an element commonly known as an equivalent for the element displaced, is not invention. In the arts, and in mechanics especially, many contrivances have their equivalents. Thus, a cam is often an equivalent for a simple lever, and a toggle-joint or wedge for a cam.

[1] 18 Wall. 670. See also page 208.

[2] In a recent case, the Supreme Court said: "It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result never attained before, it is evidence of invention." Loom Co. *v.* Higgins, 105 U. S. p. 591.

If we were to state the matter more exactly, we might say, perhaps, that *by equivalent in the patent law is meant something commonly known by those skilled in the art to which it belongs as capable of being used interchangeably with that of which it is said to be the equivalent.*

In this definition the only word, we conceive, at all ambiguous is the word "skilled," and by that term we mean to designate those possessing the ordinary ability in and knowledge of the art which they follow, and which is in question. It is hardly necessary to add, that we here intend not the subordinate workmen, but those upon whom the direction of the work devolves. Thus, if the asserted equivalent relates to a locomotive, the fact of its equivalency depends upon its being commonly known as an equivalent by those who direct the building of locomotives, not upon the knowledge possessed by an ordinary workman in the machine-shop. Or, if it be contended that, for a certain purpose in machinery generally, without regard to any particular machine, a wedge is an equivalent for a cam, then the fact of equivalency must be determined by the knowledge of wedges and cams commonly possessed by those who design machinery, or construct it, wherein wedges and cams are employed.

27. Thus it appears, also, that equivalents are decided to be such, according to the practical knowledge of those who are conversant with the art or trade to which they belong.

They are not restricted to such as are laid down in treatises, as, for instance, in books upon mechanics or chemistry. In Foster *v.* Moore,[1] Mr. Justice Curtis said: —

"I do not think the doctrine respecting the use of mechanical equivalents is confined by the patent law to those elements which are strictly known as such in the science of mechanics. In the present advanced state of that science there are different well-known devices, any one of which may be adopted to effect a given result, according to the judgment of the constructor. And the mere substitution of one of these for another cannot be treated as an invention. It does not belong to the subject of invention, but of construction. One constructor may adopt a spring-catch, another a catch and spring; but whether he takes one or the other is matter of judgment in construction, as long as both are designed to accomplish the same end, and both are in common use to accomplish it."

[1] 1 Curtis C. C. R. p. 291.

28. On the other hand, they do not include such as would be equivalents to men of science only, and not to practical men. Thus, in the case of Carr *v.* Rice,[1] where the patent sued on was for a machine which rebolted and dusted bran, Betts, J., in speaking of the machine of one Ashby, alleged to anticipate the patentee's, said: —

"The question of fact for the jury to decide . . . is whether the plaintiff's machine contained substantially the principle, and the like means for carrying it out, with what is embodied in Ashby's contrivance. . . . The difference to the eye is palpable and great, and a similarity in substance is only made out on theoretical notions, or the idea of mathematical equivalents, as, for instance, that the ends of arms projecting at equal distances from a central shaft in Ashby's plan may, in a mathematical sense, be taken for the periphery of a wheel or the circumference of a cylinder; but if a description of that arrangement, laid before a mechanic skilled in building machines, would not enable him, without invention, to build a cylinder nearly filling a sifting case, it would not amount to that kind of public notice and knowledge which could interfere with this after patent."

29. Chemical equivalents are to be recognized with caution. In fact, there are certain *dicta* by the courts presently to be quoted, according to which the ordinary doctrine of equivalents does not apply to chemical compositions.

It is plain, however, that in chemistry, as well as in mechanics, certain things are commonly known as equivalents for certain other things; and the substitution of known equivalents in chemical compositions is not patentable any more than such substitution in machines, or in other contrivances.

The difference is, that mechanical equivalents[2] are commonly contrivances made by men, and therefore are commonly known as equivalents; whereas chemical equivalents[2] are commonly such as exist in nature, and therefore they are not known to be equivalents until experiments are made with them.

Thus, in the case of Tyler *v.* Boston,[3] Mr. Justice Grier said: —

"This term '*equivalent*' [meaning apparently 'equivalent in fact'], when speaking of machines, has a certain definite meaning; but when

[1] 1 Fish. 198.
[2] Here we mean equivalents *in fact*, whether known to be such or not.
[3] 7 Wall. p. 330.

used with regard to the chemical action of such fluids as can be discovered only by experiment, it only means *equally good*."

30. It is true, also, that when one element is substituted for another in a chemical composition, it is likely to change the identity of the composition, and therefore to prove itself something more than a mere equivalent for the element displaced; whereas the substitution of one element for another in a machine is not so apt to produce a change of corresponding importance. And this, we conceive, is all that is meant by the following *dicta* of the Supreme Court in the case of Hicks *v.* Kelsey:[1] —

"In Crane *v.* Price, it is true, the use of anthracite instead of bituminous coal with the hot blast in smelting iron-ore was held to be a good invention, inasmuch as it produced a better article of iron at a less expense. But that was a process of manufacture, and in such processes a *different article replacing another article in the combination often produces different results.* The latter case is more analogous to the cases of composition of matter than it is to those of machinery; and in compositions of matter a different ingredient changes the identity of the compound, whereas an iron bar in place of a wooden one, and subserving the same purpose, does not change the identity of a machine."

Judge Nixon, however, in the case of Rumford Chemical Works *v.* Hecker,[2] said: —

"Since the leading case of Crane *v.* Price (Web. Pat. Cas. 409), it has not been considered safe to invoke the ordinary doctrine of equivalents in construing patents for new manufactures or compositions of matter."

And he refers to the *dicta* already quoted from the case of Hicks *v.* Kelsey, as supporting the decision in Crane *v.* Price.

We may add, that the case of Crane *v.* Price is much discredited in England (*vide* page 378), and that in the case of Rumford Chemical Works *v.* Lauer,[3] Judge Blatchford applied the ordinary doctrine of equivalents to a chemical composition. In the subsequent suit of the same plaintiff against Hecker, Judge Nixon, following the rule of comity, adopted Judge Blatchford's decision, but with the protest which we have quoted.

[1] 18 Wall. 670. [2] 10 O. G. p. 291. [3] 10 Blatch. 122.

31. Judge Sawyer thus described a mechanical equivalent:—

"When in mechanics one device does a particular thing, or accomplishes a particular result, every other device *known* and *used* in mechanics which skilful and experienced workmen know will produce the same result, or do the same particular thing, is a known mechanical substitute for the first device mentioned, for doing the same thing or accomplishing the same result, although the first device may never have been detached from its work, and the second one put in its place.

"It is sufficient to constitute a known mechanical substitute, that when a skilful mechanic sees one device doing a particular thing, that (*sic*) he knows the other devices, whose uses he is acquainted with, will do the same thing." [1]

32. It is plain, of course, that two equivalents not being identical must differ in some way, either in themselves or in their effects, or in both, and therefore one would be more useful in some situations than the other.

The substitution of the more useful for the less useful in such a case, though a new effect was produced thereby, could not, we should say, be invention; because, according to the very meaning of "equivalent," when one device is suggested to the mind of a person skilled in the art where it belongs, he naturally thinks of its equivalent device.

If, then, the substitution of an "equivalent," instead of producing the same effect, produces a different effect, it is not therefore patentable. The substitution was no more difficult than it would have been had it produced no new effect.

In the case of Cross *v.* MacKinnon,[2] however, Wheeler, D. J., appears to have thought otherwise, for he sustained the patent, which was for a pen, on the ground that the substitution of a spring for a weight in the pen (the spring acting more quickly) was, in connection with another change, a patentable improvement.

33. Equivalents in a process follow the same rule, and, as the reader will have observed, they are included by the terms of our definition. A step in a process stands upon the same footing in this respect with the devices of a machine.

34. The question of equivalency arises more often in cases

[1] Carter *v.* Baker, 1 Sawyer, p. 516.

[2] 11 Fed. Rep. 601.

of infringement than in any other. But it arises also in cases of patentability, when the contention is that the improvement alleged to be patentable is in reality the mere substitution of an equivalent, and therefore no invention. These last cases, but not those of infringement, are set forth in this book.

In concluding this subject of equivalency, we cannot do better than to repeat the admirable language of Judge Sprague, in a charge to the jury.[1] It runs as follows: —

"The term 'equivalent,' gentlemen, has two meanings as used in this class of cases. The one relates to the results that are produced, and the other to the mechanism by which those results are produced. Two things may be equivalent, that is, the one equivalent to the other, as producing the same result, when they are not the same mechanical means. Mechanical equivalents are spoken of as different from equivalents that merely produce the same result.

"A mechanical equivalent, I suppose, as generally understood, is where the one may be adopted instead of the other, by a person skilled in the art, from his knowledge of the art. Thus, an instrumentality is used in a mechanism; you wish to produce a pressure downward; it can be done by a spring, or it can be done by a weight. A machine is presented to a person conversant with machines. He sees that the force applied downward in the one before him is by a weight; from the knowledge of his art, he can pass at once to another force, the spring, to press it downward; and those are mechanical equivalents.

"But, gentlemen, there may be equivalents in producing the same results, each of which is an independent matter of invention, and in that sense they are not mechanical equivalents. To illustrate my meaning: Suppose, in early days, the problem was to get water from a well to the surface of the earth. One man takes a rope made of grass, and draws up a pail of water; another would see that, as a mechanical equivalent, a rope of hemp would accomplish the same result. But suppose another person comes, and for the first time invents a pump. That is equivalent in the result of bringing the water to the surface of the ground; in that respect it is equivalent, in producing that result, to hauling it up by a rope; but is not mechanically equivalent; it brings into operation, as you know, very different powers and forces, and would require invention to introduce it."

[1] Johnson *v.* Root, 1 Fish. p. 363.

Patentable and Non-Patentable Improvements.

35. The "state of the art" [1] has also a wider application.

Every existing machine or contrivance of any sort has what may be called its horizon; and this horizon embraces many improvements which are not patentable, because they are but modifications of the old contrivance, or of the use of the old contrivance. Such improvements, therefore, are referable to mechanical skill. We do not get within the range of invention, as we have seen, until a new idea is struck out. If we go a step further, and inquire what is a "new idea," the only answer is that it must be such as does not naturally follow from what is already known.

A patentable improvement is one which would not naturally be inferred from the state of the art by one who was familiar with it. The state of the art [2] may be regarded as the premises, and the improvement as the conclusion. If the conclusion follows naturally, that is, if the improvement is such as any one instructed in the art might be expected to make, then it is not invention. But if there is a logical gap between the premises and the conclusion, then the improvement is patentable; for invention was required to bridge the gap, — to perceive a conclusion not warranted by the premises, — although *after the conclusion has been reached* the connection between it and the premises becomes apparent, and, indeed, often seems obvious.

It is for this reason that invention is always in the nature of a surprise (as is frequently said) both to the inventor and to the spectator. Inventive genius, which partly guesses, so to say, at a conclusion, is the unusual, the unexpected, exercise of the mind. Whereas mechanical skill, which merely draws natural inferences, is the ordinary, the expected, exercise of the mind. It can be counted upon. Mechanical skill, or technical skill of any sort, is the possession of minds as a class. Inventive genius is the action of a single mind, where the class of minds fails to act. It is the individuality of mental action.

Every mind can reason, and every instructed mind can be re-

[1] By this phrase we mean to include not only the knowledge peculiar to the art in question, but also such knowledge of things and of the relations of things as men in general possess.

[2] The art in question, or one strictly analogous thereto.

lied upon to put two and two together in its own trade or art. This is precisely what is meant by mechanical skill or judgment. Thus, a man says, this wheel works well here, therefore it will work well in this other different but analogous situation. The act of inference here performed results in an improvement, but not in a patentable improvement.[1]

Or he says, sugar is more soluble and easier to handle if powdered or granulated than it is when in lumps; *therefore* these advantages will attend the comminution of glue also; and he puts up glue in a powdered form. Here, again, the mental act was merely to draw a natural inference.[2]

36. But he who first used a stream of sand to engrave glass was guided to the idea of his invention by no such process of inference. He knew, of course, that gritty substances, when rubbed against glass, polish it; and it *occurred* to him to bring sand and glass into contact by means of a stream of sand thrown against the revolving glass. The conviction that glass might be engraved in this manner flashed upon him.

It was in the nature of a guess. He imagined the process. In a suit upon his patent, the defendants alleged that his process was not patentable, because prior to it a stream of sand, with a jet of steam, had been thrown from locomotives upon cows, to drive them off the track. This somewhat humorous defence is an illustration of the difference between a process of ordinary inference and an act of invention. The use of the sand-stream for engraving glass did not follow, as a natural inference, from its use to scare the cow. One who beheld its use from the locomotive hardly would have said: "The sand-stream drives away the cow, therefore it will engrave glass." And yet, as an expert witness for the defendants gravely remarked, the only difference between the two uses was that in one case the sand came in contact with cows, and in the other case it came in contact with glass.[3]

37. Another simple example of invention is as follows:—

In an old corn-shelling machine, beaters or wings were employed to force into the throat of the machine all misplaced or hesitating ears, in order to prevent the passage from clogging. These beaters were fixed to a shaft, and they revolved in a direction opposite to that taken by the ears. They did not

[1] Web. p. 207.
[2] Glue Co. *v.* Upton, 97 U. S. 3.
[3] Tilghman *v.* Morse, 9 Blatch. 421.

operate successfully, however, until an inventor reversed their motion, and made them follow the direction of the ears of corn; and he obtained a valid patent for the improvement.[1] This was a simple change; but no one could say hat it was obvious, or that any one familiar with the old machine might have *inferred* that reversing the motion of the beaters would accomplish the desired result. The inventor imagined that such would be the effect, and he found by experiment that it was so.

38. In making an invention, therefore, the mind leaps to a conclusion instead of working it out. This is not to say that all patentable things are produced without effort, or care, or experiment. The inventive thought, which is the kernel of the patentable thing, is indeed, as we have said, in the nature of a guess, a flash of thought;[2] but it may be preceded by a long course of thought and of experiments. The inventor may have groped about for a long time before hitting upon the inventive thought.

Or, again, it may be difficult to reduce the invention to practice. Care and experiment may be required to work out the inventive idea. This is often the case with machinery, — one thing has to be adapted to another, this and that have to be changed and modified, before the inventor's idea is successfully embodied in a physical form.[3]

The Mental Process.

39. The fact, that certain inventions require a process of reasoning, also, at some stage of them, whereas others do not, gives rise to the frequent saying, that the law does not consider the process of mind involved in an invention.

It is true that the law does not inquire whether the inventive idea was reached at once, without labor, or only after a course of thought and experiment; neither does the law inquire whether the original conception was easily reduced to practice, as in the case of the corn-sheller, or required labor and experiment to embody it.

[1] Adams *v.* Joliet Mfg. Co., 12 O. G. 93.

[2] *Vide* Introduction, page 2[illegible], note.

[3] The relation which the inventive thought bears, or may bear, to the whole mental process by which a patentable thing is produced, is explained in the Introduction. *Vide* pp. 26–29.

But the law does demand that the idea which is the kernel of the improvement shall be an inventive idea, — something struck out by the genius of the inventor, not arrived at by a process of inference.[1]

40. We do not mean, of course, that the courts inquire how the particular patentee has reached his alleged invention, but they inquire how it would naturally and ordinarily be reached.

The criterion, in other words, is the action of minds in general, not the idiosyncrasy of a particular mind. Thus, in a given case, the improvement may be such as a person having the ordinary skill in, and knowledge of, the art to which it belongs could reason out; whereas, in fact, invention may have been exercised by the patentee, — and this because he was ignorant, or because he had not the normal reasoning faculty, or because he had the inventive faculty in excess, or from all these causes combined. In such a case the patent would, of course, be held invalid.

Invention always the Criterion.

41. It remains to notice an apparent exception to the rule that patentable improvements are the result of inventive genius only. A case might occur in which accident had thrown together the elements of an invention, so that the patentee found it made ready to his hand. In such a case the law cannot undertake to inquire whether chance or thought has withdrawn an invention from its hiding-place; but it does demand that the improvement shall be of such a character that, supposing it to have been thought out, and not chanced upon, it must be the result of *inventive* thought.[2] Even in such cases, therefore, inventive genius is the criterion of patentability.

Function, Effect, &c.

42. Before passing from the general subject of invention, it is necessary to consider a class of cases analogous to one already mentioned.

[1] Cases which, at first sight, might seem to involve nothing more than inference or reasoning, are examined in the Introduction, pp. 20–34.

[2] *Vide* Introduction, page 44, for an illustration. Discoveries, of course, are often made by accident. *Vide* page 41.

A naked principle, as we have seen, is not patentable. So, also, an effect, or result, or function, or abstract idea, is not patentable. But the product of a described process, if the product be a new one, is, of course, patentable. The matter of process and product will be considered shortly.

The statute, as we have seen, declares that a patentable subject must be either an art, or a machine, or a manufacture, or a composition of matter, or some improvement thereof. An applied principle is an art (process), but a naked principle cannot be called an art, being the mere announcement of a fact. So, also, an effect, or function, or abstract idea, cannot be called an art, much less a machine, manufacture, or composition of matter. Therefore, one may not patent an effect, a function, or an abstract idea; but only the device by which the effect is produced, or through which the function is discharged, or in which the abstract idea is carried out.

In a very early case,[1] Judge Story said:—

"A patent can in no case be for an effect only, but for an effect produced in a given manner, or by a peculiar operation. For instance, no patent can be obtained for the admeasurement of time, or the expansive operations of steam; but only for a new mode, or new application of machinery, to produce these effects."

In another case,[2] before the same judge, the patent claimed an improvement in looms, consisting in the communication of motion from the reed to the yard-beam, "*which may be done as above specified.*" If the patent had been held to claim every mode of communicating this motion, it would, of course, have been invalid, as claiming a function; but the court laid hold of the words italicized, and construed the patent to intend only the particular mode of communicating motion from the reed to the yard-beam devised and described by the patentee.

43. In a Supreme Court case,[3] the patent was for an improvement in seed-planters. It consisted in a combination of devices by which the seed was dropped simultaneously from the hopper into a tube, and from the tube to the ground.

At the trial below, before a jury, the patentee asked the court for an instruction to the effect that he might claim *any* mode of

[1] Whittemore *v.* Cutter, 1 Gall. 429 (1813).

[2] Stone *v.* Sprague, 1 Story, 270.

[3] Case *v.* Brown, 2 Wall. 320.

combining the same devices which would produce the same effect, namely, simultaneous or double dropping. This instruction, the Supreme Court held, was rightly refused, inasmuch as the claim sought to be established by means of it was for a result or an effect.

In another case,[1] where a stove was the subject of the patent, one claim was for a combination of a hopper with a circulating current of air. The court said: —

"The circulating current of air, being a result, cannot be patented; but as it is said to be produced substantially *in the manner described* in the specifications, the chamber *g*, with the inlet *i*, set forth in the specifications, by which this result was produced, must be regarded as the thing patented."

Another instructive case is that of McComb *v.* Brodie.[2] The patent was for an "improvement in metallic ties for cotton-bales."

The third claim was for—

"The slot cut through one bar of the clasp or buckle, as shown in the diagram, which enables the end of the tie or hoop to be slipped sidewise underneath the bar in the clasp or buckle, so as to effect the fastening with greater rapidity than by passing the end of the tie through endwise."

The court, Woods, J., said: —

"A patent cannot be granted for a principle or an idea, or for any abstraction whatever; for instance, for the naked idea of a slit, slot, or aperture, disconnected from any application. But when the idea is applied to a material thing, so as to produce a new and useful effect or result, it ceases to be abstract, and becomes a proper subject to be covered by a patent. For instance, the idea of bending the end of a cotton-tie in a particular manner would not be the subject of a patent; but when the idea is applied to the fastening of the tie to a clasp or buckle, so as to produce a new and useful result, then it becomes patentable. So, the abstract idea of a slot in a buckle is not of itself patentable; but when the idea is applied to a buckle, so that the result is new and useful, or so that an end is accomplished in a novel and useful manner, then the idea ceases to be abstract, and becomes the proper subject of a patent."

44. We may dismiss this important but not difficult subject with the following remark: When an effect or function is claimed

[1] Henderson *v.* The Cleveland Co-operative Stove Co., 12 O. G. 4.
[2] 1 Woods, 153.

in a patent, the courts commonly construe the claim as being for the means, when any are described, by which such result is reached, or by which such function is discharged; and thus limited the patent is sustained.

This, as we have seen, was the course pursued by the court in Stone *v.* Sprague, *supra*, and in Henderson *v.* The Cleveland Co-operative Stove Co., *supra*, and other instances will be found amongst the cases on this subject. They are collected in the seventh chapter of this book, page 616.

New and Useful.

45. It remains to consider the concluding words in the chief clause of the statute upon the subject-matter of a patent. We repeat it: Any person may have a patent "who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof." We have seen what invention and discovery are; and that "new" means simply *new*, or else expresses that sort of newness or uniqueness which results from inventions or from discoveries. The other words, excepting the term "art," will give us very little trouble, for there is no controversy about them, and no doubt as to their meaning.

As to the term "useful," the courts have construed the condition expressed by it so liberally that it almost never serves to defeat a patent.[1] The following rules are clearly established: 1. Anything is useful which is not entirely frivolous or worthless, and not detrimental to the well-being, or injurious to the morality of the public, or of a character to mislead the public to its disadvantage.[2] 2. The subject of a patent need not be the best or the most useful of its kind. It is necessary only that it should be use-

[1] But *vide* Deusmore *v.* Scofield, 102 U. S. 375; *post*, page 258.

[2] Lowell *v.* Lewis, 1 Mas. p. 186; Hoffheims *v.* Brandt, 3 Fish. 218; Cox *v.* Griggs, 1 Biss. 362; Tilghman *v.* Werk, 1 Bond, 511; Westlake *v.* Cartter, 6 Fish. 519. In a case where the patent was for a process of making cast-iron car-wheels, Sprague, J., said to the jury: "I have been requested to instruct you that an article cannot be considered useful if it endangers human life, or is so expensive that manufacturers would not be induced to make it. These may be very important considerations for you to take into view, but they are not necessarily conclusive; and you will determine, from a consideration of all the evidence, whether the invention is, upon the whole, a useful one." Many *v.* Sizer, 1 Fish. 17.

ful in some degree.[1] 3. It need not possess all the usefulness, or the degree of usefulness, claimed for it in the patent.[2] 4. In a suit for infringement, if the defendants are proved to use the invention described in the patent sued on, they are estopped to deny its utility.[3]

Concerning utility as evidence of invention we have already treated.

An Art or Process.

46. I. *An art* is a process, a method of doing something, distinct from the mechanical, chemical, or other tangible means whereby it is done.[4]

"A machine," said Mr. Justice Bradley, "is a thing. A process is an act, or a mode of acting. The one is visible to the eye, — an object of perpetual observation. The other is a conception of the mind, seen only by its effects when being executed or performed." [5]

In another case [6] the same judge said: —

"That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. If one of the steps of a process be that a certain substance is to be reduced to a powder, it may not be at all material what instrument or machinery is used to effect that object, whether a hammer, a pestle and mortar, or a mill. Either may be pointed out; but if the patent is not confined to that particular tool or machine, the use of the others would be an infringement, the general process being the same.

"A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery. In the language of the patent law, it is an art. The machinery pointed out as suitable to perform the process may or may not be new

[1] Many *v.* Jagger, 1 Blatch. 372; Wilbur *v.* Beecher, 2 Blatch. p. 137; Shaw *v.* Colwell Lead Co., 11 Fed. Rep. 711.

[2] Robertson *v.* Hill, 6 Fish. 465; Haworth *v.* Hardcastle, Web. p. 484; Lewis *v.* Marling, Web. 490; Morgan *v.* Seaward, Web. 187.

[3] Simpson *v.* Mad River R. R. Co., 6 McLean, 603; Vance *v.* Campbell, 1 Fish. 483; McComb *v.* Ernest, 1 Woods, 195.

[4] Processes involving a "principle" are discussed in the chapter upon that subject. *Vide post*, page 527; and they embrace almost all of those which present any difficulty.

[5] Tilghman *v.* Proctor, 102 U. S. p. 728.

[6] Cochrane *v.* Deener, 94 U. S. p. 787.

or patentable; whilst the process itself may be altogether new, and produce an entirely new result. The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence."[1]

47. It should be remarked, however, that when the invention is not of "certain things to be done with certain substances, and in a certain order," but of a machine operating in a certain way for a certain purpose (and not suggested by any discovery, or involving the application of a previously unapplied principle), then the mere operation of the machine cannot separately be patented as a process. But it might be very difficult to draw the line between a real process and the mere operation of a machine. An inventor might invent a process, and also a machine for carrying out that process. Thus, supposing a man to invent a process of sewing together the "uppers" and the soles of shoes by means of a new stitch, capable of being made by hand; and assuming also that at the same time he invents a machine which will make the stitch. Clearly, he would be entitled to one patent for his process, and to another for his machine. But let us suppose that the process invented (as alleged) by him was that of applying a stitch, which had previously been used in sewing plain surfaces, to the new purpose of sewing together the soles and uppers; and let us assume that he invents a machine whereby the stitch can thus be applied, — such use of the stitch not being possible by hand, because the sewing must be done from the inside of the shoe, where, of course, the hand of the operator could not work. It is true that the process becomes possible only by the invention of the machine; and a description of the machine would be a description of the process, although a description of the process would not necessarily be a description of the machine. On the other hand, it might be said, the inventor must first have conceived the idea of applying the stitch in the new situation, and then have invented a machine by which such application may be made. In other words, he invented a process, capable of various applications *in posse*, and also a machine.

48. The case just stated is an actual one.[2] It was decided by Wheeler, J., against the patentee. He said: —

[1] See also Wood Paper Patent, 23 Wall. 566.

[2] McKay *v.* Jackman, 12 Fed. Rep. 615.

"A boot or shoe might be the subject of a patent as an article of manufacture, but there would have to be something new about it as such, in the sense of the patent laws. Blake [the patentee] did not invent a boot or shoe, nor a sewed boot or shoe, nor a boot or shoe sewed with this kind of stitches. All these were known and in use before. He invented a machine by which boots and shoes could be sewed with this kind of stitches, in parts where they could not be so sewed before. The new effect was due to the operation of the machine. The patentability belonged to the machine, and not to the boot or shoe, as appeared before. . . . Further, this machine, the process it went through with, and the work it wrought, were so intimately connected that the machine could not be conceived of as an operative thing without involving the rest. The specification of the machine, and its use in the machine patent, included also a description of the process and product."

The point is a nice one, and it has not, so far as we know, arisen before.[1]

49. In the case of Corning *v.* Burden (15 How. p. 267), Mr. Justice Grier said:—

"A process, *eo nomine*, is not made the subject of a patent in our act of Congress. It is included under the general term 'useful art.' An art may require one or more processes or machines in order to produce a certain result or manufacture. The term 'machine' includes every mechanical device, or combination of mechanical powers and devices, to perform some function and produce a certain effect or result. But where the result or effect is produced by chemical action, by the operation or application of some element or power of nature, or of one substance to another, such modes, methods, or operations are called processes. A new process is usually the result of discovery; a machine, of invention.

"The arts of tanning, dyeing, making water-proof cloth, vulcanizing india-rubber, smelting ores, and numerous others, are usually carried on by processes, as distinguished from machines. . . . It is for the discovery or invention of some practicable method or means of producing a beneficial result or effect, that a patent is granted, and not for the result or effect itself. It is when the term 'process' is used to represent the means or method of producing a result that it is patentable, and it will include all methods or means which are not effected by mechanism or mechanical combinations. But the term 'process' is often used in a

[1] It will be decided, we understand, having been taken from the decision by the Supreme Court, an appeal of Judge Wheeler.

more vague sense, in which it cannot be the subject of a patent. Thus, we say that a board is undergoing the process of being planed, grain of being ground, iron of being hammered or rolled. Here the term is used subjectively or passively as applied to the material operated on, and not to the method or mode of producing that operation, which is by mechanical means, or the use of a machine, as distinguished from a process. In this use of the term it represents the function of a machine, or the effect produced by it on the material subjected to the action of the machine. But it is well settled that a man cannot have a patent for the function or abstract effect of a machine, but only for the machine which produces it."

50. The law concerning *process* and *product* as, respectively, the subject of a patent, was stated by Mr. Justice Swayne, in the case of Rubber Co. *v.* Goodyear (9 Wall. p. 796), as follows: —

"A machine may be new, and the product or manufacture produced from it may be old. In that case the former would be patentable and the latter not. The machine may be substantially old and the product new. In that event, the latter, and not the former, would be patentable. Both may be new or both may be old. In the former case, both would be patentable; in the latter, neither. The same remarks apply to processes and their result. Patentability may exist as to either, neither, or both, according to the fact of novelty or the opposite. The patentability, or the issuing of a patent as to one, in no wise affects the rights of the inventor or discoverer in respect to the other. They are totally disconnected and independent facts. Such is the sound and necessary construction of the statute."

51. It should be added, however, that a *product* sometimes carries with it proof that it is the result of a particular process.

Shepley, J., in the case of Merrill *v.* Yeomans,[1] after saying that in many cases the product might be produced by various methods, remarked: —

"In other instances, however, not only does a new process produce a new product, but the process is inseparable from the product, and inheres in it after it is made, so that, upon inspection of the product, it is manifest that the process must have been employed."

And he gives as an instance vulcanized rubber.

The remaining terms — machine, manufacture, composition of matter — give rise to no difficulty, or if to any, it is in determin-

[1] 1 Holmes, 331.

ing under which head a particular invention or discovery should be classed. This, being a matter of the specification, does not belong to our subject. It may be convenient, however, to define the words.

52. II. *A machine.* Says Mr. Curtis: —

"When the supposed invention is not a mere function, or abstract mode of operation, separate from any particular mechanism, but a function or mode of operation is embodied in mechanism designed to accomplish a particular effect, it will be a machine in the sense of the patent law." Curtis on Patents, § 20.

He also quotes from Mr. Justice Heath:[1] —

"When a mode of doing a thing is referred to something permanent, it is properly termed an engine; when to something fugitive, a method."

"Machine" includes combinations of machines, as well as single organizations, or organizations for a single purpose.[2]

53. An improvement of a machine is, perhaps, the most frequent subject of a patent. It is a patentable improvement, if it contain a new idea; and is neither a copy of the idea embodied in the original machine or in any other prior machine, nor a mere logical carrying forward of that idea. There is no difference between an improved machine and an improvement upon a machine.

54. III. *A manufacture.* This means any thing made as a finality, or as a thing to be used by itself, and not as a part of any mechanism.

Mr. Curtis says: "Fabrics or substances made by the art or industry of man, not being machinery." And he continues: —

"It may sometimes require a nice discrimination to determine whether one of these classes does not run into the other, in a given case; as, for instance, when a tool or instrument of a novel or improved

[1] Boulton *v.* Bull, 2 H. Blackstone, 463, 468.

[2] "Patentable inventions pertaining to machines may be divided into four classes: first, entire machines, as a car for a railway, or a sewing-machine; second, separate devices of a machine, as the colter of a plow, or the divider of a reaping-machine; third, new devices of a machine in combination with old elements, all embraced in one claim, or with separate claims for what is new, together with a claim for the new combination of all the elements; fourth, devices or elements of a machine in combination where all the devices or elements are old." Mr. Justice Clifford, in Sanford *v.* Merrimac Hat Co., 4 Cliff. 404, and *passim*.

construction is produced, to be used in connection with other machinery or to be used separately. As an article of merchandise, found and sold separately in the market, such a production would be a manufacture; but regarded with reference to its use and intended adaptation, it might be considered as a machine, or part of a machine.

"In determining, in such cases, how the patent for the article should be claimed, it would probably be correct to range it under the one or the other of these classes, according to the following test: If the article is produced and intended to be sold and used separately as a merchantable commodity, and the merit of it, as an invention, consists in its being a better article than had been before known, or in its being produced by a cheaper process, then it may properly be considered simply as a manufacture. But if its merit appear only after its incorporation with some mechanism with which it is to be used, and consists in producing, when combined with such mechanism, a new effect, then it should be regarded as a machine, or an improvement of an existing machine." Curtis on Patents, § 25.

55. IV. *A composition of matter* might be defined as an artificial substance made up of two or more elements so united as to form a homogeneous whole. Medicines and paints are examples.

When a solid substance and a liquid are united by absorption of the liquid, as, for instance, if a a block of wood should be soaked with oil or liquid tar, the article so produced might properly be called either a manufacture or a composition of matter.

The patent may be for the method of compounding, or for the result, the composition. "Generally speaking," says Mr. Curtis, "the patent covers both, because if the composition is itself new, the process by which it is made must also be new, and the law will protect both as the subjects of invention. But if the article itself be not new, but the patentee has discovered merely a new mode or process of producing it, then his patent will not be for a new 'composition of matter,' but for a new 'art' of making that particular thing." Curtis on Patents, § 28.

We may add, that in a composition the elements are united by reason of the qualities which they possess, and not by reason of their form.

CHAPTER II.

ANTICIPATION OR IDENTITY.

56. By the terms placed at the head of this chapter we mean to indicate the objection to a patent, that its subject-matter is identical with some prior thing, whether patented or not.[1]

Cases of anticipation are distinguished, on the one hand, from cases of patentability strictly or ingenuity; and, on the other hand, from cases of new use, of substitution, or of combination. In cases of ingenuity, the question is whether the alleged invention is patentable generally, — patentable, that is, when considered, not with reference to any one thing in particular, but to everything in general. Again, in cases of new use, of substitution, or of combination, invention is shown, if shown at all, either in making a new use of some old thing, or in making one new thing out of two or more old ones. Whereas, in cases of anticipation, as we have said, the question is whether the patentee has really produced a new contrivance, or has merely changed, developed, or transformed an old one, without exercise of invention. This question is raised more frequently than any other in suits upon patents, and especially when a machine is the subject of the patent.

57. The point to be decided is this: Does the new contrivance embody a new idea, or is it but a carrying forward or transformation of the idea embodied in the contrivance to which it is referred? Is the identity of the first lost or preserved in the second contrivance? In answering these questions, two things are to be considered; namely, the change made in the second contrivance, and the result of that change as shown in the altered or increased utility of the contrivance. If both the

[1] The subject of anticipation is not to be confounded with that of prior knowledge or use. *Vide post*, page 621.

change and the result of that change are great, there is a presumption of invention.

In the case of Hall *v.* Wiles,[1] Nelson, J., charged the jury as follows: —

"A formal change, such as a change in proportions, a mere change of form, or a different shape, is not a change within the meaning of the law. An improvement upon an old contrivance, in order to be of sufficient importance to be the subject of a patent, must embody some originality, and something substantial in the change, producing a more useful effect and operation. And in determining this question the jury have a right to take into consideration, in connection with the change, the result which has been produced. Because the result, if greatly more beneficial than it was with the old contrivance, reflects back, and tends to characterize, in some degree, the importance of the change."[2]

58. The doctrine of equivalents is especially applicable in cases of anticipation. Of that doctrine we have already treated in the first chapter of this book, to which the reader is referred. By the substitution of equivalents, it often happens that the appearance of a machine is altered entirely, and yet its principle, its mode of operation, remains substantially the same.[3] On the other hand, two machines may look alike, — may be alike, in fact, in respect to details, — and yet they may act upon very different principles. Betts, J., said: —

[1] 2 Blatch. p. 200.

[2] McCormick *v.* Seymour, 3 Blatch. 209; Eames *v.* Cook, 2 Fish. 146; Waterbury Brass Co. *v.* Miller, 9 Blatch. 77; King *v.* Hammond, 4 Fish. 488; U. S. Stamping Co. *v.* King, 17 Blatch. 55.

[3] In Jupe *v.* Pratt, Web. 146, Alderson, B., spoke as follows of a gas-meter, and of an infringing machine: "It was for measuring the quantity of gas that was supplied to every individual, in order that they might not take it without its being known. There never was a more instructive case than that. . . . There never were two things, to the eye, more different than the plaintiff's invention and what the defendant had done in contravention of his patent-right. The plaintiff's invention was different in form — different in construction; it agreed with it only in one thing, and that was, by moving in the water, a certain point was made to open, either before or after, so as to shut up another, and the gas was made to pass through this opening; passing through it, it was made to revolve it. The scientific men, all of them, said, the moment a practical scientific man has got that principle in his head, he can multiply without end the forms in which that principle can be made to operate."

"The slightest change of a machine, which effects a real improvement in it, may be patentable, while great apparent variations may be only disguises under which an older discovery is attempted to be employed and appropriated."[1]

59. If there is nothing in an original patent to affect the validity of a later patent, then no reissue of such original patent, made subsequent to the date of the second patent, can affect its validity.[2]

60. Mr. Justice Clifford instructed the jury in a case of anticipation[3] as follows: —

"In determining that question [of identity] you are not to determine about similarities or differences merely by the names of things, but are to look to the machines, or their several devices or elements, in the light of what they do, or what office or function they perform, and how they perform it, and to find that a thing is substantially the same as another if it performs substantially the same function or office in substantially the same way to obtain the same result, and that things are substantially different when they perform different duties, or in substantially a different way, or produce a different result.

"For the same reason you are not to judge about similarities or differences merely because things are *apparently* the same, or *apparently* different in shape or form; but the true test of similarity or difference in making the comparison is the same in regard to shape or form as in regard to name, and in both cases you must look at the mode of operation, or the way the parts work, and at the result as well as at the means by which the result is attained.

"In all your inquiries about the mode of operation of either of the machines, you are to inquire about, and consider more particularly, those portions of a given part or element which really do the work, so as not to attach too much importance to the other portions of the same part, which are only used as a convenient method of constructing the entire part or device.

"You will regard the well-known substantial equivalent of a thing as being the same as the thing itself, so that if two machines having the same mode of operation, do the same work in substantially the same way, and accomplish substantially the same results, they are the same; and so also if the parts of two machines, having the same mode of operation, do the same work in substantially the same way, and accom-

[1] Carr *v.* Rice, 1 Fish. p. 208.

[2] Hitchcock *v.* Tremaine, 9 Blatch. 550.

[3] Union Sugar Refinery *v.* Mathieson, 2 Fish. p. 626; 3 Cliff. 639.

plish substantially the same result, those parts are the same, although they may differ in name, form, or shape; but in both cases, if the two things perform different work, or in a way substantially different, or do not accomplish substantially the same result, then they are substantially different."

NOTE. — The cases of strict anticipation follow, — cases, that is, where the patented contrivance and that alleged to anticipate it are compared as wholes. After them are put those cases in which the patentability of the second contrivance rests upon a change of form, or of situation, or of size; upon a change in degree, or upon the multiplication or omission of parts. After these abstracts of cases there are references to cases elsewhere set forth in this book, in which the question of anticipation arose, but in which it was not the principal question. Finally, there will be found the titles of certain less important cases, omitted for want of room.

WYETH *v.* STONE, 1 STORY, 273.

D. OF MASS., 1840. STORY, J.

Wyeth's patent, dated March 18, 1829, describing machinery for cutting out ice. It consisted of two spur-wheels, 3 feet 6 inches in diameter, connected by an axle-tree (immovable at the wheels, but turning in composition boxes), furnished with handles, and with fills for the attachment of a horse, and (quoting now from the specification) "a cog-wheel about 3 feet 2 inches in diameter, more or less, fixed in the centre of the axle-tree, so as to be incapable of turning except with the axle-tree; two cog-wheels, about 4 inches diameter, more or less, one of which to work on the large cog-wheel, and the other to work on the one so working, and both to be secured by pintles passing through the handles; the small cog-wheel, not working on the large cog-wheel, to have secured beside it a circular saw about 2½ feet diameter, more or less. The proportion between the large and small cog-wheels is varied to obtain greater or less velocity for the same, as may be wanted. This part of the apparatus for cutting ice is called the saw, and is used as follows: Put the saw into one of the outside grooves made by the cutter; drive the

horse forward, following the groove made by the cutter; at the same time, a man who manages the handles presses them down as much as the strength of the horse will admit of. This operation is followed back and forth until the ice is cut through."

The ice was cut through on three sides of a square in this manner, and then pried up and broken off by an iron bar and chisel.

Story, J.:—

". . . I am of opinion that the invention is substantially new. No such machinery is, in my judgment, established by the evidence to have been known or used before.

"The argument is, that the principal machine described as the cutter is well known, and has been often used before for other purposes, and that this is but an application of an old invention to a new purpose; and it is not therefore patentable. It is said that it is in substance identical with the common carpenter's plough. I do not think so. In the common carpenter's plough there is no series of chisels fixed in one plane, and the guide is below the level, and the plough is a movable chisel. In the present machine there are [*sic*] a series of chisels, and they are all fixed. The successive chisels are each below the other, and this is essential to their operation.

"Such a combination is not shown ever to have been known or used before. It is not therefore a new use or application of an old machine."

Judge Story construed the specification to intend only the particular apparatus and machinery described for cutting ice, and not (we quote from the opinion) —

"For any mode whatsoever of cutting ice by means of an apparatus worked by power, not human, in the abstract, whatever it may be. If it be the latter" (Judge Story continued), "it is plain that the patent is void, as it is for an abstract principle, and broader than the invention, which is only cutting ice by one particular mode, or by a particular apparatus or machinery."

STAINTHORP *v.* ELKINTON, 1 FISH. 349 (E. D. OF PA., 1858. GRIER AND CADWALADER, JJ.); THAYER *v.* WALES, 9 BLATCH. 171 (E. D. OF N. Y., 1871. BENEDICT, J.); STAINTHORP *v.* HUMISTON, 1 FISH. 475 (S. D. OF N. Y., 1859. HALL, J.).

Stainthorp's patent of March 6, 1855, for improvement in machines for making candles.

In all these cases the defence was the same. In the first two, the question of anticipation and the fact of infringement only were considered. In the third case, Hall, J., raised the question of invention, but decided it in favor of the patentee. The first claim of the patent (the only one infringed in any of these cases) was "the employment of pistons formed at their upper end into moulds for the tips of candles, in combination with *stationary* candle moulds, *to throw out the candles in a vertical direction*, substantially as set forth in the specification."

The prior devices upon which the patentee's device was an improvement are not fully described in the report of any one of these cases, but they appear to have been: —.

First, a device which started or *popped* the candles from beneath, after which they were drawn out by hand.

Secondly, one in which there was a piston, but not in combination with tips and stationary moulds; and this device threw the candles out horizontally and not vertically.

Of the plaintiff's invention, Grier, J., said: "The patentee does not claim to be the first who conceived the idea of pushing a candle out of the mould by a piston; but he has succeeded in inventing a labor-saving machine of great practical value, by a combination of devices, using a hollow piston with a mould for the tip, in combination with stationary moulds." And of the prior devices, already described, so far as they can be from the reports, he said: —

"None of these abandoned experiments or machines would infringe the combination of devices claimed in this patent, if used, nor can they be invoked to destroy it."

Hall, J., observed as follows upon the question of ingenuity: —

"It must be conceded that, with all these prior machines before him, an intelligent, thoughtful person, practically acquainted with the whole art and process of candle-making, and constantly superintending and aiding in the operation of several of the prior machines, might, without the exercise of any extraordinary power of invention, devise and perfect the organization covered by the first claim of the Stainthorp patent; and that, looking now at the several prior machines in connection with that of Stainthorp, it appears somewhat strange that the invention perfected by him was not sooner produced.

"But this is true in respect to many important inventions, and, upon the whole case, I am of the opinion that invention was required to

produce the organization and device covered by the first claim of Stainthorp."

In this opinion, Judge Hall referred to the decision made by Grier and Cadwallader, JJ., in the trial mentioned above, with which, of course, he would be loath to disagree. Had the defence of want of invention been urged at that trial, the fate of the patent might have been different.

There was still another suit on this patent, Stainthorp *v.* Humiston, 4 Fish. 107 (N. D. of N. Y., 1864, Hall, J.), where the court considered, without particularly describing, several prior patents, and held that they did not anticipate Stainthorp's patent.

CAHOON *v.* RING, 1 CLIFF. 592; 1 FISH. 397.

D. OF MAINE, 1859. CLIFFORD, J., AND A JURY.

The patent was for an improvement in broadcast seed-sowers. The first claim, which only we need consider, was for—

"The employment of a tubular chamber or discharger, rotating rapidly in a horizontal position, so that its outer edge or periphery will be on a plane vertical or nearly vertical to the horizon, and thereby communicating a centrifugal motion to the grain, seed, &c., away from the centre of a circle whose plane is thus vertical or nearly vertical to the horizon."

The report contains no description of the prior machines relied upon to defeat the patent; but the following statement of law in regard to them was made by Clifford, J.:—

"It is insisted on the part of the defendant to the effect that an apparatus for discharging seed in sowing broadcast, though invented, constructed, and designed to throw out the seed in horizontal planes, and adapted to produce and accomplish that mode of operation, yet, if such apparatus, by having certain changes and modifications made in its construction and arrangement, could be adapted to the discharge of seed in vertical planes, that then such apparatus, while in its original form, . . . embodies the principles and mode of operation of Cahoon's machine. . . . On the contrary, I instruct you that if you shall find that discharging seed in vertical planes, in the manner and by the means described in the Cahoon specification, is a new and useful, or different and better, mode of sowing seed broadcast, and that Cahoon,

as claimed in his patent, was the first person to invent and adapt an apparatus so as to accomplish that method of sowing, such prior horizontal machines cannot invalidate his patent."

HUSSEY *v.* BRADLEY, 5 BLATCH. 134; 2 FISH. 362.

N. D. OF N. Y., 1863. NELSON AND HALL, JJ.

Infringement of various patents for improvements in reaping-machines. The novelty of all the patents was contested, prior inventions being adduced as anticipating them. In the case of every claim but one, however, it was perfectly obvious that there was a patentable difference between the earlier invention and that of the plaintiff. The claim in regard to which the question of patentability really arose was that of reissue No. 742, viz.: —

"I claim as my invention the combination of side and cross-bearings of the guards, with flush edges at and near the forks of the blades, substantially," &c.

The object of this device was thus described in the original patent: "My improvement extends also to the prevention of the accumulation of *grass*, &c., under the blades, which I will describe as follows: In my original invention, the blades are ground with a bevel on both sides of the edge. The purpose of this is, that by means of the shoulder of the bevel the sharp edge is prevented from coming into immediate contact with the iron in passing the guard. This bevel is not so necessary near the fork of the blades as near their points; hence, in this improvement, about one inch of the edge at the fork is flush on the under side, leaving the bevel all on the upper side. The design of this is that the *grass*, &c., which is forced in between the blades and the lower part of the guard, shall be cut up and worked out by the flush edge, acting close to the iron at the fork. This latter improvement is also claimed as new in its application to the particular purpose for which it is designed."

Upon this invention, and upon that by one White, alleged to anticipate it, the court, Hall, J., remarked as follows: —

"The cutting apparatus of White, in which this invention is alleged to be embodied, was made an exhibit, and has been examined in reference to this question of novelty.

"It has substantially the same side and cross bearings of the guards as the Hussey machine, and it has a scalloped cutter with flush edges; but it is insisted by the complainant that it does not present the same combination, because the separate plates which together constitute the scalloped cutter — each plate forming a single projection of the tooth-formed cutter — were, as a general rule, placed on the cutter-bar with their flushed edges so arranged that only every other flushed edge was uppermost, the alternate plates being placed on the bar with their flushed edges on their lower side. It is conceded that there were exceptions to this rule, there being, if we recollect rightly, in one case two, and in another three, of the adjoining plates having their flush edges on the same upper or lower side as they were fastened to such cutter-bar.

"The evidence in the case shows that a cutter-bar constructed in this manner is much inferior to one constructed according to the specification of Hussey; that it chokes more rapidly and requires more frequent cleaning, and that the cutters and other parts of the machine are more likely to be broken or injured. It is quite certain that Hussey's mode of arranging the cutter-blades with the flushed edges of each on the lower side is so far preferable to the alternate arrangement as to constitute a substantial difference in the practical operation of the machine. The White machines were substantially abandoned and given up. . . . If the maker of the White machine had appreciated the advantage of this arrangement, he would certainly have adopted it; as it was as easy to manufacture the machine with the uniform arrangement of the cutter-plates as it was to manufacture it with the alternate or promiscuous arrangement presented in the cutting apparatus of that machine. As these differences are matter of substance, and as we think the patent of Hussey may properly be so construed as to give such effect to the words '*substantially as described*,' as to require this uniformity of arrangement, we have concluded, after some hesitation, that the proof of the prior existence of the White machine does not avoid the patent No. 742."

In a subsequent case, Hussey *v.* Whitely, 1 Bond, 407 (Leavitt, J., 1860), two of the reissued patents not directly mentioned above, viz. No. 449 and No. 912, were sustained on a motion to dissolve the injunction granted in the previous July by Hall, J.

Hussey *v.* McCormick, 1 Biss. 300 (N. D. of Ill., 1859, McLean, J.). Reissue 449 was sustained.

MAGIC RUFFLE CO. *v.* DOUGLASS, 2 Fish. 330.

S. D. of N. Y., 1863. Shipman, J., and a Jury.

G. B. Arnold's patent of May 8, 1860, for an improvement in ruffles, thus described by the court (quoting first from the claim): —

"'The ruffle therein described, as a new article of manufacture, the gathered cloth A (the ruffled strip) being secured to the binding B (the band), by the single series of stitches C, which perform the double duty of securing the gathered cloth to the binding, substantially as therein set forth.' The distinguishing features of this article, by which it is materially different from all other ruffles known before, are the single series of stitches and the unvarying regularity of the plaits or gathers, thus dispensing with the gathering thread, avoiding the injurious process of whipping or scratching the fabric with a sharp needle, and the perforations in the ruffled piece which the needle and thread make in gathering, before sewing on the band, and by pulling out the thread after it was sewed on, or in case the thread was left in, by dispensing with its presence. I repeat, the ruffle patented differs from those that existed before, by the uniformity of the plaits, and by the absence of all whipping or scratching with the needle, with all perforations except those made by the permanent stitches, and by the absence of an appendage in the shape of a useless thread in the ruffle after it was finished." He also said: "Of the utility, in the legal sense, you can have no doubt. The superior beauty and rapid sale of the article is shown on all sides. The beauty of an *ornament* is one great test of its utility."

The judge told the jury that this invention was patentable, leaving it to them to determine whether it was patentable to the plaintiff or to certain other persons. The evidence on this last point is not reported.

AYLING *v.* HALL, 2 Cliff. 494.

D. of Mass., 1865. Clifford, J.

Ayling's two patents, one for the process, one for the product, dated May 10, 1864.

The invention consisted in a method of treating caoutchouc, in order to make it independent of temperature, of exposure to the

atmosphere, &c., as well as to increase its strength and elasticity. The means used was a bath of carbon spirits and chloride of sulphur (in the proportion of 50 to 1), at a natural or cold temperature.

It was held that this was not anticipated by an English patent granted to one Alexander Parker for treating caoutchouc, for the same purpose, with a bath of coal-tar naphtha and chloride of sulphur, in the proportion of 40 to 1.

Carbon spirits, or petroleum naphtha, is the product of the distillation of natural petroleum. Coal-tar naphtha (called also light spirits naphtha, crude benzole, and rectified naphtha) is obtained by treating coal with heat, and it was proved that it differs both physically and chemically from carbon spirits. "The evidence also shows," said the court, "that the product obtained by the complainant is new."

SANGSTER *v.* MILLER, 5 BLATCH. 243.

S. D. OF N. Y., 1865. NELSON, J.

H. & J. Sangster's patent for an "improvement in lanterns," reissued Aug. 21, 1855.

"The patent," says the report, "was originally issued June 30, 1851, and claimed the mode of attaching the lamp to the lantern by means of the springs and flanges, as therein substantially described. A suit was tried upon this patent in the District of Massachusetts, at the May Term, 1855, . . . in which the novelty of the improvement was attacked, and a decree was rendered for the defendants. The patent was afterwards surrendered, and a reissue granted on the 21st of August, 1855, in which reissue the patentees disclaimed the fastening of the lamps to lanterns by springs, and also the fastening of the springs to the upper part of the lamp and extending down so as to spring outward over a flange in the lantern; but claimed the constructing and arranging the springs to cause the attachment of the lamp to the lantern, by the operation of pressing the lantern down upon the springs, and also arranging thumb-pieces at the base of the lamp, by extending the springs toward each other horizontally, and thus forming an elbow-catch to rest against the shoulder of the flange of the lantern."

Nelson, J.: —

"The amendment of the claim will hardly help out the novelty of the improvement against the proof of lamps previously in use, embracing substantially a similar arrangement of the parts connecting the lamp with the lantern, causing 'the attachment of the lamp to the lantern by the operation of pressing the lantern down upon the spring-catches,' is not well distinguishable from the process of causing the attachment by pressing the lamp upwards through the aperture into the lantern, — the mode of fastening being the same, — which seems to have been in general use at the date of this discovery. The construction of the parts is the same, in substance, in the reissue, as described in the original patent; but the patentees suppose that they have avoided the objection by changing the form of the claim. I think . . . that the claim itself, as set forth in the reissue, is not the subject of a patent, but is a mere result from the arrangement and combination of the parts. Then, as to the second claim, the arrangement of the thumb-pieces attached to the springs. This is but a change of form. The springs may, perhaps, be worked with greater facility than when the thumb-piece is straight, instead of being bent; but the change is only in degree. It involves no invention. It is simply the device of the mechanic," &c.

MORRIS *v.* RYER, 3 Fish. 176 (1867); BLANCHARD *v.* PUTNAM, 3 Fish. 186 (1867).

S. D. of Ohio. The first case before Leavitt, J., and the second before Leavitt, J., and a Jury.

In the first case, it was contended that the plaintiff's — Morris's — invention (for which a patent was granted in March, 1856, reissued in May, 1862) was anticipated by the prior invention of Thomas Blanchard, patented in December, 1849. The second suit was for infringement of *Blanchard's* invention by the defendants, who used *Morris's* invention. In this suit, besides the defence of non-infringement, the defendants set up prior inventions alleged to anticipate Blanchard's invention.

In the first suit, the judge held Morris's patent to be valid. In the second suit, Morris's patent was again upheld by a verdict for the defendants.

"The invention of Morris," says the report, "consisted of a stationary form or mould, around which wood could be bent into any required shape. The bending was effected by placing the

centre of a piece of wood, previously steamed, against the centre of the mould, and clamping them together. Levers then pressed against the ends of the wood, and gradually forced them around the form; the levers being drawn together by cords wound upon a drum. In bending the wood, the inner fibres were condensed and the outer ones stretched. But while wood may be greatly compressed without injury, a slight stretching tears the fibres. To obviate this difficulty, the wood, before being bent, was laid upon a strap of flexible iron, and the ends were confined between two blocks of solid iron, called clamps or abutments, which were attached to the flexible strap. By this means the stretching of the outer fibre was prevented, and the entire change in the length of the fibre, caused by the bending, took place, by compression, in the inside of the curve."

The claims were as follows:—

"Having thus fully described my improvements, I do not wish to be understood as claiming them in connection with machines for bending wood, where the bending is effected by the rotation of the form; but what I claim therein as new . . . is:—

"1. A wood-bending form, to which timbers are made to conform by bending them from the centre or inner end of the desired curve outward, when used in combination with abutments or clamps, to prevent or regulate end expansion, and lever or handles, or their equivalents, to guide the bending, substantially as described.

"2. A stationary or poised wood-bending form in combination with the cords, levers, and drum, or their equivalents, and the eccentric clamp, or its equivalent, in the manner and for the purpose set forth.

"3. In combination with the stationary form, levers, and abutments, I claim the employment of hooks, or hooks and pins, or their equivalents, that shall embrace the ends of the wood, to restrain the wood in shape, and permit the removal of the abutments after the completion of the operation."

In Blanchard's invention, "the wood was bent by attaching one end of the stick to a form which was rolled over the wood toward the other end." He claimed "my improved method of bending wood, substantially as hereinbefore described."

In neither case, as reported, is there any description of the inventions set up by the defence, excepting the invention of Blanchard. We quote the following remarks of Leavitt, J., made to the jury in the second case, to show that the inventions were dis-

tinguished on the broad ground that one, as we have seen, operated from the centre of the stick outward, and the other from one end inward: —

"I will state very rapidly some of the points in which it is claimed by the counsel for the defendants that there is a substantial difference between the two structures.

"In the first place, it is claimed that the Morris machine bends from the centre to the outer end, whereas the Blanchard machine bends from the end inward. The jury have seen the operation of these machines, and are doubtless prepared to say whether, in that respect, the two machines are alike.

"It is also claimed that the application of the power, in the operation of bending, is different in the two machines, and that the effect upon the timber bent by these two methods is different; that in timber bent under the Morris patent there is less disturbance of the fibres of the wood; that bending from the centre outward to the end leaves the fibres more firmly set than they are by the operation under the Blanchard invention. If the jury should be satisfied of this difference in the operation of the two, it will be for them to say whether it does or does not constitute a substantial difference in the principle of the machines. It is also contended that there is a substantial difference in this, that it is one of the main elements of the invention patented to Blanchard that there is provision made for end relaxation,[1] when the end pressure is too great, and that, upon the principle and theory of the Morris machine, there is no necessity for this relaxation, and therefore no provision is made for it."

The judge construed the patent of Blanchard as not including a stationary form or mould.

AIKEN *v.* DOLAN, 3 FISH. 197.

E. D. OF PA., 1867. CADWALADER, J.

Hibbert's patent of Jan. 9, 1849, extended for seven years, from Jan. 9, 1863, to P. Hall, administrator. It was for an improvement in knitting-needles, namely, the invention of "the latch-needle," as an optional substitute for the spring-hook needle formerly used in knitting-machines.

[1] By means of an upsetting screw.

The court thus remarked upon the question of priority, as to which the report contains nothing further: —

". . . Latch-needles . . . certainly were made and experimentally used in the United States a great many years before 1846 [date of Hibbert's invention]. In one prior instance, at least, they were openly used in making an experimental fabric. The work and its product were imperfect; but both work and product were seen by persons who have not lost the recollection of them; and more than one of the needles, and a machine by which some of them were made, have been preserved to the present day. This was a sufficient prior knowledge by others to prevent the subsequent invention of Hibbert from being new."

The court held, however, that Hibbert had made a patentable improvement upon this old latch-needle, inasmuch as he had given to it a certain curved swell, which produced a new effect. The old needle and the improvement are thus described by the court: —

" Now, in the primitive needle, the yarn, when passing backward from the hook, was held down to the surface, first of the needle, and afterward of the latch, and was thus, on reaching the projecting end of the latch at the further extremity of the groove, jerked over the projection with more or less of shock immediately following tension. The strain with shock must thus have occurred after every stitch. . . . Hibbert . . . made or caused to be made latch-needles with a curved elevation, since called a swell, which was highest at the middle of the groove, and with such a corresponding elevation of the pivot that the end of the latch was depressed when it fell back at that extremity of the groove where the latch of the primitive needle had projected upward. The curvature of the swell was determined so as to effect this depression of the latch with a sufficient *longitudinal* extension of the latch beyond the furthest extremity of the groove, to receive the returning thread underneath. The remedy of the former defect was thus, in theory, complete. The improvement, though depending upon a change in *form*, was, in purpose and effect, a change in a material part of the *process* of manufacture. Tension of the yarn occurred at the swell, but was graduated so as to avoid shock."

BLANDY *v.* GRIFFITH, 3 Fish. 609.

S. D. of Ohio, 1869. Swayne, J.

Patent granted, Aug. 3, 1858, to H. F. & F. J. L. Blandy for a bed-plate for steam-engines. The report says:—

"The invention consisted of a hollow bed-plate, substantially in the form of an eight-inch pipe, about eight feet in length, which was attached by feet or saddles to the side of the boiler of a portable engine. To the outside of this pipe the working parts of the engine were attached; being thus removed from contact with the boiler, and from the injurious effects of the unequal contraction and expansion of the boiler-plates. The cylindrical form of the bed-plate imparted great strength, while, as it was hollow, it was exceedingly light." The claim of the patent was as follows:—

"The application to portable steam-engines of a hollow continuous bed-plate, in the manner substantially as described, for the support and attachment of the operative parts of the engine, whereby the latter, in working, is rendered independent of the contraction and expansion of the former, and the boiler relieved from the direct strain of the engine, as set forth."

Upon the specification and claim the court thus remarked:—

"Fairly construed, we think the context claims for the patentees, as their invention: 1. A hollow continuous bed-plate placed between the boiler and the engine. 2. The bed-plate to have flanges in its upper and outer side cast with it. 3. The attachment and securing of the operative parts of the engine upon its upper and outer side, by means of the flanges. According to these views, the essence of the invention lies in two things: The construction of the bed-plate and its lateral attachment to the engine, as set forth in the specifications."

The defence set up as anticipating this invention prior bed-plates thus described by the court:—

"At first they were solid. After the year 1845 or 1846 they were altered and cast hollow. The plate consisted of a frame cast in one or four pieces. The sides were hollow boxes from four to eight inches square. They extended the whole length of the boiler. The frame was placed upon it. The parts were secured to the boiler by feet or flanges cast with them, and secured by bolts. Upon the bed-plate so attached the engine was placed, and firmly fixed there by bolts or

rivets. Both the bed-plate and engines were directly over the boiler. About the year 1853, feed-pipes for the supply of water were introduced into the bed-plate. The exhaust steam from the cylinder was passed along its entire length, and by that means heated the water before its entrance into the boiler. The object of the feet or flanges on the plate was to render the engine, as far as practicable, independent of the contraction and expansion of the boiler, and to relieve the boiler from the direct strain of the engine. In other words, the purpose was to effect, as far as was possible by the means employed, the insulation of the engine.

"Here are certainly some striking points of analogy to the engine of the complainants. But able scientific experts have testified that the dominant conceptions in the two cases are totally distinct from each other, and that the differences are not merely mechanical or equivalent, but that they strike deeper, and are radical in their character. Whether they are so is the test to be applied to the solution of the question before us. We have already held that the use of the plate as a heater is not a part of the invention patented. This subject may therefore be laid out of view. The essential diversities are to be found, it is said, in two particulars: The bed-plate covered by the patent is *a single, continuous shell or tube.* It is proved that this gives a combination of lightness and strength beyond any other configuration or structure which has yet been devised. The engine is attached to the outer side of the bed-plate, and is not placed upon it, or over the boiler. The attachment is lateral.

"In both these points the proof is that it is essentially different from the Talbott engine, and from any other which preceded it. In these views, after much reflection, we have found ourselves able to concur. It is not our business to form any opinion of the *comparative* value of the complainants' engine. The question is, not whether the invention is better or worse than its predecessors, but whether it is new, useful, and different from anything before used or known. Those who hold the negative are at liberty to use anything older to which the proofs in this case relate. All required of them is that they shall not use, either in form or substance, what is patented to the complainants."

AMERICAN HIDE & LEATHER SPLITTING & DRESSING MACHINE CO. *v.* AMERICAN TOOL & MACHINE CO., 1 Holmes, p. 520.

D. of Mass., 1870. Shepley, J., and a Jury.

On the question of anticipation by a prior English machine, Judge Shepley said:—

"... If the English machine is shown to have required further invention to make it a practical and operative machine, and to embody the same invention which is described in the American patent, it would not work a forfeiture of the American patent. I do not say that if the English machine would require change or adjustment of its parts, it would not work such forfeiture, because a change or adjustment of its parts might have nothing to do with the question of invention. But if you find that in the English machine there was the same device, the same combination of elements to produce the same results in the same mode, so that there was an identity of invention, then it is immaterial whether it did or did not require more adjustment of parts or mechanical perfection to make it work as well or better than the American machine."

SEYMOUR *v.* OSBORNE, 11 Wall. 516 (1870).

Infringement of reaping-machine patents. (Appeal from the N. D. of N. Y., where a judgment had been given for the defendants by Nelson and Hall, JJ. See 3 Fish. 555.)

The chief parts of a reaping-machine are the following: 1. The reel which presses the standing grain against the cutting apparatus. This is a revolving frame, having a top, middle, and bottom bar, but otherwise open. 2. The cutting apparatus, which usually consists in "a vibrating, scalloped sickle, sliding through a series of fingers or guards." 3. A platform on which the grain falls after it is severed.

It is to this third part that the patents in the present case relate. In the first reaping-machines, the platform was directly in the rear of the cutting-bar, and square in shape, so that the grain either fell off from it and lay in the path of the machine, or else it was taken up in a hand-rake by a man who sat at the end of the platform and threw it to one side. In the first case, the severed grain lay in the path of the horses when the next swath

was cut; and, in the second, the office of the raker was laborious, and it was impossible for him to lay the grain neatly and in piles. Some device was necessary to throw the cut grain aside, so that it should fall in the track just passed over by the horses, and be out of their way on the next round.

"The invention of Seymour consisted in constructing the platform . . . in the shape of a quadrant or sector of a circle, and placing it just behind the cutting apparatus, and in such relation to the main frame that the cut grain could be swept around on the arc of a circle, and dropped on to the ground behind the horses, so as to be so far removed from the standing grain as to leave room for the horses and frame to pass between the standing grain and the gavels, thereby obviating the necessity of taking up the cut grain as fast as cut, and at the same time doing the work more perfectly." This invention did not dispense with the hand-rake and its user, but it enabled him easily to lay the grain in piles on one side.

The original patent was divided, and two reissues were granted, of which the claims were as follows: —

Reissue No. 72. "A quadrant-shaped platform, arranged relatively to the cutting apparatus substantially as herein described for the purpose set forth."

Reissue No. 1683. "The combination in a harvesting machine of the cutting apparatus (to sever the stalks) with a reel, and with a quadrant-shaped platform located in the rear of the cutting apparatus, these three members being and operating as set forth."

The defendant set up several prior machines, as follows: 1. Obed Hussey made a machine without a reel, and with a square platform, from which the grain was discharged (by a hand-rake operated by a man who sat in the body of the machine) directly into the path to be travelled by the horses on their next round. Hussey also made a machine with a straight adjustable guide-board on the platform, which would press the grain aside far enough to leave room for a single horse or for a tandem team to pass by on the next round; also machines with two platforms, one attached to the rear of the other, whereby two men were employed, — one to rake the grain back, and the other to sweep it to one side; also a machine "with a square platform, to the rear of which was bolted an angular addition, giving to the whole, where the

addition was made, an angular form."[1] 2. Nelson Platt's reaper, which was propelled from the rear, and which had two platforms. The first was rectangular, and the grain fell on it from the cutters; whence it was raked to the second, a quadrant-shaped platform, from which it was discharged by a vibrating rake sweeping across the platform in the arc of a circle. [This rake was automatic. It will be noticed in a subsequent part of the case.] The Supreme Court held that the invention of Nelson Platt and the inventions of Hussey did not anticipate

[1] Of this the court said: "Examined where the addition is bolted to the main platform, irrespective of the other ingredients of the combination, it approaches much nearer to the invention of the complainants than any of the other exhibits introduced in evidence by the respondents. Conceding all that, still it would not be difficult to show that the two are substantially different in several respects; but it is unnecessary to enter that field of inquiry, as the proofs are entirely satisfactory to the court that the machine as constructed was merely an experiment, and that it was never reduced to practice as an operative machine.

"Undoubtedly it was built in the autumn of 1848, subsequent to the close of the harvest season; but the respondents' testimony shows that it was not used for cutting grain during that harvesting season.

"Some obscurity surrounds its early history, nor is it of much importance that it should be better known. It appears that it was sent to the railroad depot to be transported to some other place for trial; but there is no positive evidence that it was ever forwarded or used, or that it was capable of any beneficial use. Where it was transported, if at all, from the depot, does not appear; but it does appear that it was returned the next year to the shop of the maker, and that it was set against the wall by the side of the street, in front of the shop, where it remained for some time; that it was then removed to the new shop of the maker, where it remained until it was taken to pieces and broken up by his order, and never restored till long subsequent to the complainant's patent. [No other facts in regard to this machine are stated in the report].

"Original and first inventors are entitled to the benefit of their inventions if they reduce the same to practice, and seasonably comply with the requirements of the patent law in procuring letters-patent for the protection of their exclusive rights. Crude and imperfect experiments are not sufficient to confer a right to a patent; but in order to constitute an invention, the party must have proceeded so far as to have reduced his idea to practice, and embodied it in some distinct form.

"Desertion of an invention, consisting of a machine, never patented, may be proved by showing that the inventor, after he had constructed it, and before he had reduced it to practice, broke it up as something requiring more thought and experiment, and laid the parts aside as incomplete, provided it appears that these acts were done without any definite intention of resuming his experiments, and of restoring the machine with a view to apply for letters-patent. Johnson *v.* Root, 2 Cliff. 123; Gayler *v.* Wilder, 10 How. 498; Parkhurst *v.* Kinsman, 1 Blatch. 494; White *v.* Allen, 2 Cliff. 230."

the plaintiff's improvement, and that the combination invented by him was patentable.

The plaintiff also alleged infringement of two patents held by him as assignee of the inventors, Palmer and Williams, which were as follows: —

Reissue No. 4. "Discharging the cut grain from a quadrant-shaped platform, on which it falls as it is cut, by means of an automatic sweep-rake sweeping over the same, substantially as described."

No. 1682. "The combination of the cutting apparatus of a harvesting machine with a quadrant-shaped platform arranged in the rear thereof, and a sweep-rake operated by mechanism in such manner that its teeth are caused to sweep over the platform in curves when acting on the grain, these parts being and operating substantially as hereinbefore set forth." [1]

The defendants contended that this improvement of Palmer and Williams was merely the work of a mechanic, not invention; that all they had done was to take Platt's automatic sweep-rake and put it upon Seymour's quadrant-shaped platform. On the other hand, the plaintiff maintained that the patents of Palmer and Williams were for the *means* of discharging the grain, that "this means" was a combination, and that the elements of such combination must bear the following relation to each other: —

"*First.* The quadrant-shaped platform must be directly behind the cutting apparatus.

[1] The defendants contended that these two patents were for one and the same invention; and the plaintiff, that they were not, on the ground that the first included, and the second did not include, the return movement of the sweep-rake.

Judge Clifford thus construed these patents: ". . . Number 4 is the combination of a quadrant-shaped platform located behind the cutting apparatus of the harvester, so as to receive the grain as it falls after it has been cut, with an automatic sweep-rake so constructed as to sweep over the platform in circular curves, and to move forward and backward, or towards and from the cutting apparatus, so as to seize upon the grain as it falls after being cut, sweeping it over the platform in circular curves, and delivering it upon the ground behind the machine with its stalks at right angles, or nearly so, with the line of progression of the machine, and to return by a forward movement towards the cutting apparatus to the original position, when the first operation commenced."

"Number 1682 . . . consists of a combination of the cutting apparatus of a harvester with a quadrant-shaped platform arranged in the rear thereof, and with a sweep-rake operated by mechanism in such a manner that its teeth are caused to sweep over the platform in curves when acting on the grain and to discharge the stalks crosswise to the direction of the swath, and out of the way of the team on the return of the machine."

"*Second.* The automatic sweep-rake must traverse the platform so as to sweep the grain from where it falls as, cut round to the place of its destiny upon the ground.

"*Third.* To accomplish this, the rake must have a certain relation to the cutting apparatus, to the platform, and to the material which has been laid upon the platform."

The Supreme Court upheld the combination, its novelty as regarded the prior inventions set up, and its patentable ingenuity, Clifford, J., delivering the opinion, but not entering into any analysis of the inventions.

Also, it was contended that the several patents sued on were for an *effect*, and not for any particular machinery, and were therefore void. The court said: "Founded as the defence is upon an obvious misconstruction of the claims of the several patents, it does not seem to require much explanation. Omit the words 'substantially as described,' or 'substantially as set forth,' and the question presented would be a very different one; but inasmuch as those words, or words of equivalent import, are employed in each of the claims, the defence is without merit. Where the claim immediately follows the description of the invention, it may be construed in connection with the explanations contained in the specifications, and where it contains words referring back to the specifications, it cannot properly be construed in any other way. Curt. on Pat. (3d ed.) §§ 225–227."

Patents No. 72, No. 1682, and No. 1683 were again before the court in the case of Marsh *v.* Seymour (97 U. S. 348, 1877), when they were sustained against the same objections. One new point was taken, namely, that the invention described in No. 1682 was "neither useful nor practical." On this head Mr. Justice Clifford (for the court) said:—

" . . . The second assignment of error is, that the patent does not in terms describe any device to prevent the rake from rising when operating upon the grain, and enough appears to show that the rake in the first machine made by the complainants was not of sufficient weight to prevent it from rising when the teeth came in contact with heavy grain. Brief experiment, however, was sufficient to disclose the defect, which was immediately remedied by adding a spring of proper stiffness to hold the rake down without impairing the other operating devices, to enable the rake to perform the function of removing the cut grain from the platform and causing it to drop in gavels in the proper place. None

of these facts are [*sic*] controverted; but the respondents contend that the spring was a new invention, and that any one may make and use the patented machine, or vend the same to others to be used, without the spring, and not be liable as infringers; but the court is entirely of a different opinion, as the addition of the spring for the purpose suggested is nothing more than any practical mechanic or operator would supply as soon as the difficulty was discovered. Viewed in the light of these suggestions, it is clear that the defence to the second patent [No. 1682] must be overruled."

KNOX *v.* MURTHA, 9 BLATCH. 205.

E. D. OF N. Y., 1871. BENEDICT, J.

Infringement of a patent for an improved smut-mill and separator, reissued to Daniel Shaw, Jan. 11, 1870. The third and fifth claims only were in suit.

The court decided first that there was no infringement, and secondly that the third claim was void for want of novelty and of invention, and the fifth for want of invention. The third claim was as follows: —

"In combination with a smutter or scourer, and a suction-fan, both arranged on and driven by the same shaft, and an air-trunk for directing the force of the blast, a regulator for changing the force or volume of the current of air, without changing the speed or motion of the smutting or scouring cylinder, substantially as described."

A prior invention, called the Sanders machine, was set up as anticipating that described in this claim. The only difference between the two was in the shape of the air-trunk. The Sanders machine, according to the court,

"consists of an air-trunk, through which an air-current is created by a suction-fan, and the same regulated by a regulator. In this trunk the current first ascends through an ascending leg. At the top of the ascending leg the air-trunk turns at right angles, and gives to the air-current a horizontal direction. This horizontal portion of the air-trunk is enlarged, and its lower surface given the form of a capacious hopper, with a slide-valve at the bottom. After passing the hopper, the air-trunk turns down again, and into the eye of the fan. In this machine, material coming from a scourer is spouted into the ascending leg, where the heavy grain is separated from the rest of the mass by

gravity, precisely as in the Shaw machine. This separation effected, the remainder of the mass passes into the horizontal part of the air-trunk, where the current is weakened by the enlargement of the trunk, and, by means of the depression of the bottom of the air-trunk to form the deep hopper, the force of gravity is again rendered effective. Here, therefore, while the dirt, dust, and chaff are carried on by the air-current to the eye of the fan, the screenings are carried by their gravity out of the air-current to the bottom of the hopper, and thence removed by the slide-valve. The dust and dirt thus separated from the screenings pass out of the machine through the fan."

In the Shaw machine the enlargement of the air-trunk was in the descending leg thereof, and the court said: —

"It is manifestly no substantial change in the air-trunk to place the enlargement on the descending leg, instead of on the horizontal portion as in Sanders's separator. In both cases the air-current is weakened by an enlargement of the trunk, and in both cases the separation is effected by the air-current being forced to take a lateral direction away from the force of gravity."[1]

"The fifth claim," said the court, "is as follows: 'The arranging of the smutter or scourer, and the suction separating-fan, within or between the legs of the blast or air-trunk, in which the entire separation is made, and which passes over or around them for the purpose of economizing space and cheapening the construction of the machine, substantially as described.' The idea here expressed . . . is that in a machine having a scourer and fan connected by an air-trunk, as described, economy of space and cheapness of construction would be gained by placing the smutter or scourer between the legs of the air-trunk, instead of elsewhere. Certainly no invention was required to reach such a result. It would rather require invention to find any reasonably convenient place to locate a fan and scourer so connected, other than the one chosen by the patentee. . . . A similar arrangement of materials for the same reason is to be seen everywhere. I am, therefore, of opinion that the fifth claim of the Shaw reissue is invalid because of insufficiency of invention."

[1] Compare this case with that of Roberts *v.* Ryer, *post*, page 151.

THE WATERBURY BRASS CO. *v.* MILLER, 9 BLATCH. 77.

D. OF CONN., 1871. WOODRUFF, J.

Patent originally granted to one Hayden, and reissued to the complainant May 24, 1870, for an "improvement in brass kettles," embracing both the new kettle and the machine that produced it.[1] The machine may be described very briefly. It consists of an engine-lathe, with a revolving mandrel, the foot of which is pointed in order to hold the object to be operated upon. Attached to the mandrel and revolving with it is a form or pattern in the shape of the interior of the article to be produced. Against the form is fastened, by its centre, a disk of the metal to be fashioned, and, in a carriage secured to the frame of the lathe, a burnishing or spinning tool, which revolves close to the form, and is "so adjustable, and so guided when adjusted, that the tool is sustained and guided in a precise path prescribed for it before motion is given to the machine, the path being such that the tool will, when moved, travel along and in near proximity to the form set upon the mandrel." This tool spins or shapes the metal into the desired form. Its motion is "taken by gear wheels and pinions, from the wheels or pulleys of the revolving lathe. These wheels and pinions act upon a screw connected with the tool carriage, which will move it forward or backward, but with such arrangement of devices that, as already stated, the tool must move in its described path."

Several processes were set up by the defence as anticipating this invention of Hayden. It was proved that small articles of brass fastened to a lathe had been spun by a tool in the hand of a workman. Such tools were neither driven nor guided by machinery, and whatever efficacy they possessed was due to the strength and skill with which the workman applied them. Judge Woodruff held that such devices were very plainly no anticipation of Hayden's machine. The strength of the defendant's case rested on a prior patent granted in France, Dec. 4, 1835, and Jan. 26, 1838, to the Messieurs Japy. Their device was substantially like Hayden's, with one very important exception, — the tool in this case was merely a burnishing, and not a spinning tool. The

[1] There was an earlier and less important suit on this patent, before Ingersoll, J., and a jury, in the Southern District of New York, in 1858, viz. Waterbury Brass Co. *v.* New York & Brooklyn Brass Co., 3 Fish. 43

metallic article, under this patent, was first fashioned by dies, and then smoothed and polished by the tool, which was not adapted, and was never used, to shape the article. "It cannot be denied," said Judge Woodruff, "that this device for smoothing the kettle already complete in form would be very suggestive to an ingenious mind already conversant with the art of hand-spinning on a lathe. It was a near approach to a device for spinning by a machine; but I think it clear that it stopped short of it."

In the argument for the defence, the position was taken, that if the Japy machine were capable of the use for which Hayden made his machine, though such capability was unknown to Japy, the inventor; then Hayden's invention, being in effect the discovery of a new function in the Japy machine, was not patentable.[1] The judge, however, held that the Japy machine "had, in truth, no such capacity, or certainly not in any such degree as made it useful, as Hayden's machine is useful, for spinning metals." And he went on to say: —

"It was a pertinent and quite plausible suggestion of the counsel for the complainant that the inventor of a machine should be presumed to know not merely its purpose, but its capacity; that, when the product sought was in great demand, the art of spinning upon a lathe, well known, the best mode of producing kettles and like articles, the subject of attention and study, the objections to the process of stamping known and appreciated, the fact that an inventor of a machine, contrived expressly for the making of such articles, should have made a machine, and had no suspicion that it could raise the disk which he used to the required form by spinning, is no slight evidence that it had no such capacity; that the wisdom which comes to an alleged infringer after another inventor has perfected a similar machine by which the operation can be usefully performed, is not to destroy the claim to an original invention, and that an alleged example of a machine claimed to produce an effect which the original never did produce, and which its inventor never claimed for it, is to be looked upon with some distrust of its actual likeness to such original."

In a subsequent case, reported in the 10th of Blatchford, p. 319, Judge Blatchford, using this case as an illustration, said: —

"Japy Brothers, as early as 1835, invented a machine for smoothing brass pans, kettles, &c. It served only to make the surface smooth,

[1] *Vide post*, page 303.

after the pan or kettle, &c., had been reduced by other slow, and what would now be deemed tedious, means to the desired form. Subsequent ingenuity has shown that a very slight change either in the form of the edge of the smoothing or burnishing tool, or even of the direction of its contact with the pan, &c. (the parts being appropriately strengthened for the purpose), produced the machine for spinning metals to form, which has revolutionized the manufacture." [1]

BAILEY WASHING & WRINGING MACHINE CO. *v.* LINCOLN, 4 Fish. 379.

D. of Mass., 1871. Lowell, J.

Suit on claims Nos. 1, 5, and 6 of the last reissue of J. Allender's patent, dated April 18, 1865, originally granted in 1859, for a wringing-machine. Allender's roller was a wooden cylinder surrounded by a flat metal spring, which in turn was covered by a cylindrical strip of india-rubber. The rollers were "fitted with a frame and boxes, and with spiral springs and set-screws, to give and adjust the requisite pressure to the rollers, and a guide

[1] This case is similar to that of Stimpson *v.* Woodman (*post*, page 429), where it was held that, given an engraved roller operated by hand to stamp leather, and also an unengraved roller operated by machinery to press leather, it is no invention to make an engraved roller operated by machinery to stamp leather. In that case the patentee had simply brought together two devices; but in the present case he did something more, for the hand-tool in use before his invention did not produce the same effect (by reason of want of strength and precision in the workman's hand) that it did when the patentee had communicated to it the mechanical force and direction the idea of which, it must be assumed, he derived from the Japy machine-driven tool; whereas, in the case of Stimpson's invention, the engraved roller, for aught that appears, was as effectual when operated by hand as it afterward was when the patentee had communicated to it the machine-motion, which he transferred, so to say, from the smooth roller in use for compressing leather. The gain was not in the effect (as was the case with Hayden's invention), but in the speed and ease with which the effect was obtained. Nevertheless, the greater utility of the substitution or combination made in this case does not change the character of the mental process by which the patentee attained to his improvement. This case must be distinguished from that of Stimpson *v.* Woodman, if at all, on the ground that the Japy burnishing tool and the hand-spinning tool were not so associated in the minds of those skilled in the art concerned as were the pressing roller and the stamping roller in the leather case.

to conduct the clothes properly between the rollers" (quoted from the opinion).

Claim No. 1 was for the roller; No. 5, for

"rollers for washing or wringing machines made of or covered with vulcanized rubber or *any other elastic substance or compound*[1] impervious to water, when used in combination with adjusting spring or springs."

No. 6, for the same combination, with the addition of set-screws to regulate the pressure of the adjusting springs.

It was proved that in 1848 J. Young made an india-rubber covering for rollers of wringing-machines, and obtained a patent therefor. It was also in evidence that soon after the invention of Allender it was discovered that the spiral spring might be omitted with advantage, and thereafter rollers were made without it.

Some English patents were adduced, but the court held that the chief of them was not prior to Allender's invention. There was, however, in New Jersey, a prior invention made and used by one Day, namely (quoting from the opinion): —

"A washing and wringing machine, with which he squeezed starch out of flat webs of cloth; and this machine had one, and afterward two, rollers covered with india-rubber, which again was covered with folds of printer's blanket or felt, and over this with folds of muslin. The rollers were combined with blocks of india-rubber to give the pressure, and with wedges to adjust the pressure, and these are undoubtedly the equivalent of the springs and set-screws of the reissued patent. . . . For a wringing-machine it is of importance to dispense with the cloth; but the question is, whether there could be invention in dispensing with it. I have had much doubt on this point; but upon the whole am of opinion that the rollers of the Day machine are different

[1] The point being taken that this was not a claim for the india-rubber, and that the patentee had not discovered the peculiar value of its use in a roller, the court remarked: "It does appear to be true that he either did not understand the full value and scope of his machine, or was induced or obliged not to claim it. Taking the strongest view against him, namely, that he was not informed of the peculiar value of india-rubber as a covering for the rollers, but thought any flexible material would do as well, or nearly as well, still he points out india-rubber as the covering which he considers the best; *and no one who should afterwards discover its peculiar value could patent its use in the same combination;* and if so, Allender may by reissue claim its use in that combination if he invented it; otherwise it must be held that by describing and not fully claiming it he has abandoned it, which is precisely what he may avoid by a reissue."

from those of the complainants. They are not covered with india-rubber, and I think there might be invention in combining a rubber-covered roller, as Allender did, with the other elements of the Day machine. The india-rubber of Day performs the office of the spiral spring of Allender, and if the latter had not covered his roller with india-rubber, but with cloth, and had claimed, and continued to claim only any flexible covering, he could have held perhaps only his peculiar spring; because Day had already covered rollers with cloth, and had a spring of india-rubber beneath it; but to substitute an india-rubber covering for one of cloth appears to be important and valuable, and I do not know that it is any less an invention than to substitute a spiral spring for india-rubber underneath. I was much pressed with the argument that a person who should merely wind a piece of cloth over the plaintiff's rollers would infringe the patent by using the machine in that way; and if so, one who had done the same thing beforehand had anticipated the invention. Here, I think, the true test is whether the machine is substantially the same. If a piece of cloth or muslin were so tightly stretched over the roller that it remained for practical purposes covered with india-rubber, no doubt there would be infringement; but a roller covered with cloth, as distinguished from one covered with india-rubber, would not infringe. In this connection, the reissued patent clearly claims only coverings impervious to water; and though there is no such claim or intimation in the original patent, yet the model shows such a roller, and its value being discovered, as we have already seen, it may be claimed by a reissue."

KING *v.* HAMMOND, 4 Fish. 488.

N. D. of Ohio, 1871. Sherman, J.

Z. King's reissued patent of July 30, 1867, for an improvement in iron bridges, thus described by the court: —

"The invention in its main and principal features relates to the channel iron or stay plates, so constructed and arranged in relation to an arch that the said plates form a vertical and lateral support to the bridge, and said plates being constructed with a flange or rim on one or both sides, so as to have two or more, and conforming to the spring or sweep of the arch; and in addition, the said plates, by means of the flanges, admit of the side or top plates being so secured to them that a continuity in the structure of the bridge is attained. The said plates may be so formed or bent as to be either placed on the side, top,

or bottom, or other parts of the arch, of any form, without regard to the outer or inner lines of the arch being parallel. The said plate or plates are arched, with a flange on one or both sides."

The novelty of the patent was attacked, and the prior inventions adduced were thus described and disposed of by the court:—

" . . . French patent, dated Sept. 15, 1851, granted to Cadiat & Ougey . . . published in the Records of Invention in 1857, I do not find that the channel irons, as described in the King patent, are contained. The specification and drawings represent what are more familiarly known as angle irons, being a separate iron, and the office of which is to unite two or more plates, either at the top, bottom, or side, and secured in positions in relation to the said plates by means of bolts, rivets, or other equivalents. In all forms of this construction there is an increased weight of material, and requiring additional labor and cost, instead of a diminution of all these, which is accomplished by the King invention." And so of other similar inventions. " . . . To sum up, . . . the channel iron of the King bridge presents in a single piece of metal what had been before accomplished, if at all, only by the union of several distinct pieces or parts, which was attended with great additional expenditure of material and labor, and consequent cost. It dispenses with angle irons and numerous rivets, and in one solid, firm construction, complete in itself, furnishes this essential feature of an iron arch bridge. It certainly cannot be the doctrine of the patent law that an invention apparently so valuable for its simplicity and increased economy should be antedated by more complex and expensive combinations, which do not contain the essential feature of the King invention."

CAREW *v.* BOSTON ELASTIC FABRIC CO., 5 FISH. 90.

D. OF MASS., 1871. CLIFFORD, J.

Suit on Hayward's patent of Aug. 29, 1854, afterward extended and reissued to Carew, July 6, 1869, for improvements in the manufacture of india-rubber.

The invention consisted in a means of remaking rubber that has once been vulcanized, either alone, or with cheaper stuff embodied in it, by subjecting it, while in moulds or dies, to the action of steam heat. The moulds were heated before the com-

pound was introduced; and after its introduction heat was applied by means of steam, in chambers or jackets, the heat of the steam being conducted by the walls of the jackets or chambers to the moulds. Moreover, *the heat was applied while the compound was under pressure.*

The court held that this invention was not included in that of the celebrated Goodyear patent,[1] and that it was not anticipated by any of several prior processes set up by the defence, and alluded to in the opinion, but not of importance in this regard.

CAHILL *v.* BECKFORD, 1 HOLMES, 48.

D. OF MASS., 1871. SHEPLEY, J.

Patent of Miles S. Cahill, granted Nov. 10, 1868, No. 83,925. It was for a bronze leather-dressing or varnish composed of spirit-varnish and aniline fuchsine, the proportions being determined by the point of saturation; that is, by the amount of fuchsine which the varnish will dissolve. Fuchsine is a golden green crystal of aniline red; aniline crystals being sulphates or chlorides of aniline, which is a colorless substance produced by the distillation of coal-tar.

Before the plaintiff's invention, bronze varnishes had been made by dissolving bronze aniline crystals in shellac which contains alcohol; but all of these had failed of their object, for the reason (we quote from the opinion),

"that when shellac was present in quantity sufficient to make a reasonably durable dressing, the action of the shellac in the varnish destroyed or changed the color of the bronze crystal. . . . The complainant seized upon this very property which the shellac possesses of modifying the color of the aniline crystal, and by experiment discovered that the shellac varnish, which destroyed the bronze color in the bronze crystal of aniline violet, developed a bronze color from the green crystal of fuchsine, or aniline red. In this preparation, not only was the desired color obtained, but a resinous coating was formed on the surface of the leather, sufficiently compact to be reasonably durable."

The patent was therefore sustained.

[1] Which was for mixing caoutchouc with sulphur, and subjecting the compound to a high degree of heat. *Vide* page 655.

Cahill *v.* Brown, 15 O. G. 697 (D. of Mass., 1878). Clifford, J., sustained the Cahill patent. Prior inventions are discussed at great length; but none of them really resembled the plaintiff's invention, and their consideration is not profitable.

BRIDGE *v.* BROWN, 1 HOLMES, 53.

D. OF MASS., 1871. SHEPLEY, J.

S. W. Pingree's reissued patent of March 28, 1865, held invalid for want of novelty. It claimed an improved process for extracting tan-bark.

Dictum, that there is no invention in directing a steam jet into a mass of bark in a vat by means of pipes thrust downward from the top through the bark at different points, instead of introducing the steam "through tubes, holes, or other apertures from the bottom," as was formerly done.

Said the court: —

"When the steam was [thus] introduced through holes in the false bottom, it first came in contact with the bark *top of the false bottom*, in substantially the same way and substantially the same places that it does from the aperture of the pipe extending from the top of the mass of bark down to the top of the false bottom."

MASURY *v.* TIEMANN, 8 BLATCH. 426.

S. D. OF N. Y., 1871. BLATCHFORD, J.

Masury's patent, granted July 12, 1859, for improvement in paint-cans. Paint-cans are made of thick tin or of galvanized iron. Before the plaintiff's invention it was difficult to open them at all, and especially difficult to open them without injury to the contents. The specification said: —

"For the top of the can, in the place of using material of the same weight and thickness as for the other parts, I take thin brass or other soft metal, and attach a rim or ring thereof to the top of the can, and secure the same by soldering, as in the ordinary mode. For sealing the can after it shall have received its contents, I take a disk of tin and

solder it to the rim or ring, leaving between the said disk and the edge of the can sufficient space to admit the passage of a penknife blade. The can is then in all respects like the ordinary tin can hermetically sealed, except that the cover of my . . . can may be removed by severing the thin brass rim or ring with a penknife or other sharp instrument."

"The defendants," said the court, "claim to have shown by testimony that in 1852 they substituted in use for a can with a loose or slip cover a can having a hole in the middle of its top, covered by a thin brass cap, on which were shown in relief, by being struck through from the other side by a die, the name of the defendants' firm and other words; and that this brass cap could be easily removed by inserting a knife under its edge and prying it up, or by severing it. But this can was not the equivalent of the plaintiff's, and did not embody the invention. The rim or ring between the brass cap and the edge of the can was not of thin metal capable of being severed, but was of the same thick metal as the body and bottom of the can; and when the cap was removed the difficulty existed of getting at so much of the contents of the can as lay in the recess formed inside between the thick ring and the body of the can, — a difficulty which the plaintiff's invention obviates."

In a subsequent suit on this patent, before the same judge,

MASURY *v.* ANDERSON, 11 BLATCH. 162,

S. D. OF N. Y., 1873,

another prior patent was set up in defence, namely, that of Lignac, granted in England, Oct. 7, 1847, numbered 11,892. The invention thus patented was described by the court as follows:—

"A cylindrical can made of ordinary sheet tin, some five inches in depth and four inches in diameter, one end of which is composed of a circular-shaped piece of tin, formed with a flange something less than a quarter of an inch deep, turned down at the outer circumference of such end. The lower end of such flange is connected with the outer wall or side of the can by a band of sheet-lead, a little over one-half of an inch wide, encircling the circumference of the can, the lower part of the band being soldered to the top of the wall or side of the can, and the upper part of the band being soldered to the lower edge of such flange so as to leave a width of lead of about one-quarter of an inch between the upper edge of the wall or side of the can and the lower

edge of the flange, and to allow the lead to be penetrated and cut in such width around the circumference of the can, and thus the top or end of the can to be separated from the body of the can."

This, at first sight, seems to embody the essential feature of the plaintiff's patent, but it was proved that the Lignac can failed to accomplish the end in view of both devices. In the first place, lead is much more difficult to solder than thin metal, so that the Lignac can was more costly than the Masury can. Moreover, the band of thin brass was capable of a much better and more complete "finish" than the other. Beside these, the Masury can possessed the three following advantages over the Lignac can: 1. It was almost as easy to make as the simplest form of can; whereas, in the Lignac can the band required additional labor for its preparation and insertion, and the seams could not be soldered by machinery as the seams of the Masury can could be. 2. The brass in the end of the Masury can could be cut in an oblique or vertical direction; whereas, the knife must be applied to the Lignac can in a lateral direction, — a much more difficult process. 3. The Masury can could be opened without waste; whereas, again, from the Lignac can, if full, the contents above the centre of the lead band would escape when the band was cut.

It was in evidence that the Masury can, even when brass was substituted for lead in the band, was opened more easily by cutting out the hard top with hammer and knife than by cutting through the band.

"Although," said the court, "the inventor of the Lignac can had the general idea of enabling a can to be opened by cutting more easily through a softer or a thinner metal, he did not embody his idea in a form which was practically of any substantial utility, and the means he adopted were substantially different from those adopted by the plaintiff."

Another prior invention also was set up, but it was too unlike the plaintiff's to merit description here.

THE STANLEY WORKS *v.* SARGENT & CO., 8 BLATCH. 344.

D. OF CONN., 1871. SHIPMAN, J.

Infringement of a patent for improvement in door or shutter bolts, granted to one William H. Hart, July 4, 1865.

Shipman, J.:—

" . . . The invention . . . consists, as I understand it, in making the barrel in which the bolt slides of one piece of sheet-metal, with prongs passing through holes in the plate, by which it is riveted to the plate itself. The defendants claim that there is no novelty in this device, or at least none worthy of being dignified with the name of invention. They produce two wrought-iron bolts, which, they insist, antedate the invention of Hart. The barrel proper on these bolts produced in evidence by the defendants is short, and to secure firmness and accurate movement of the bolt into the catch-piece or staple, a guide, or short additional barrel, is placed at the end of the plate nearest the catch-piece or staple. But the main barrel and the guide, or short barrel, are both secured to the main plate by flanges riveted to the latter. On the other hand, the barrel on the plaintiff's bolt consists of one long piece of sheet-metal, extending nearly the entire length of the plate, with prongs passing through the latter, by which both are firmly riveted together. No additional short barrel or guide is necessary. To this extent the invention of Hart is clearly new. It is true that the wrought-iron bolts of English manufacture which were in use before Hart's invention had barrels riveted by prongs to the main plate; but in every instance the main barrel was short, or rather it consisted of three short guides or staples, within which the bolt moved, one of them being cut open at the top for the knob of the bolt to pass through as the bolt was advanced or retracted. In these English bolts, therefore, the barrel proper, if it can be so called, consisted of four pieces of metal; and, in addition to these, a fifth piece constituted the guide or short barrel near the forward end of the main plate. They are, therefore, widely different in construction from Hart's invention. . . .

"Utility is not an infallible test of originality. The patent law requires a thing to be new as well as useful, in order to entitle it to the protection of the statute. To be new, in the sense of the act, it must be the product of original thought or inventive skill, and not a mere formal or mechanical change of what was old and well known.

"But the effect produced by a change is often an appropriate, though not a controlling, consideration in determining the character of the

change itself. In this case, the result of what may not improperly be called the new organization of the common door-bolt by Hart, was both considerable and useful. The evidence abundantly shows that the new article to a great extent superseded the old ones in the market. It can be manufactured with less expense. It is certainly a much more neat and compact article than any in prior use.

"An inspection of his new bolt, in contrast with the old ones produced at the hearing, clearly shows, in my judgment, that these advantages resulted from the changes made by Hart and claimed in his specification; and, though this reconstruction of a well-known article shows no very brilliant inventive skill, yet I think it is sufficiently new and original to support the patent."

REEVES *v.* KEYSTONE BRIDGE CO., 5 FISH. 456.

E. D. OF PENN., 1872. MCKENNAN, J.

Patent granted to S. J. Reeves, June 17, 1862, for an "improvement in the construction of columns, shafts, braces," &c., of iron bridges. The patentee claimed

"The uniting together three or more pieces of wrought-iron, made with flanges in the direction of their length, so that they shall form a column or shaft, to be used as posts, and also as braces or compressive chords, in the construction of buildings, bridges, piers, or other structures."

The court thus described the invention: —

"The peculiar features of this column are, that it is composed of not less than three longitudinal segments or bars of wrought-iron; that the edges are flanged throughout their whole length; that when they are brought together, the flanges are brought face to face; and the unity of the column is secured by bolts or rivets passing through these flanges at short intervals. . . . A hollow wrought-iron column does not constitute the patentee's invention; but it consists in a hollow shaft, so made as the result of a concentration in its periphery of the metal used in its construction, composed of at least three longitudinal segments of rolled iron, with flanges throughout their whole length, which are to be brought face to face, and through which they are to be fastened by bolts or rivets."

Its advantages were ease and cheapness of manufacture, and strength of resistance.

Prior inventions were set up as follows (quoting again from the opinion) : —

1. "The invention is claimed by Linville and Piper, two of the respondents. On Jan. 14, 1862, a patent was granted to J. H. Linville, for an improvement in iron truss-bridges, which is described as partly consisting in a novel construction of the posts of wrought and cast iron. This post is composed of two rolled plates of wrought-iron, semi-octagonal in form, secured by rivets passing through the length of its diameter, or by bands shrunk around it, binding the plates firmly to distance pieces interposed between them at suitable distances to spring them apart at the middle, and terminating in cast-iron bases and capitals.

"In the second claim of his specification, the patentee, therefore, very properly described his post as 'composed of two wrought-iron plates or bars *a a*, distance pieces *b b*, and rivets J J, or their equivalents, and cast-iron bases L L, and capitals O O, the whole combined as herein specified.'

"It must be observed that the specification does not indicate the form of the post as an appropriated or distinctive feature of the invention. The shaft is composed of two rolled-iron bars, but that it must be hollow is an inference merely, from the description. In comparing the invention with others, it must be considered as the product only of the elements, which the patentee has indicated as necessary to give it its distinctive character. While, therefore, it may be constructed upon the principle of expanding the metal from the centre toward the periphery, yet the special mode in which this principle is embodied in it, and is made practically available, constitutes its patentable peculiarity.

"Treating it, then, as the patentee himself does, not as a technical combination, but an organized unit, composed of the enumerated constituents, I think it is essentially distinguishable from the complainant's post. They are alike only in this, that neither is solid, and both are made of rolled-iron plates. In every other material point they are unlike. This dissimilarity consists, first, in the number of pieces of which the column is composed; second, in the use or absence of flanges to these pieces; third, in the mode of uniting or fastening the several pieces of the columns together; and, fourth, in keeping the pieces in a straight line, and therefore parallel to each other, or forming them into curves by swelling the post in the middle. That these differences are essential is apparent from Mr. Linville's specification, in which he describes plates without flanges, their number, the mode of fastening them together, and their being sprung apart at the middle, as com-

ponent, and therefore material, constituents of his organized post. But it is unnecessary to enlarge upon this. Any other hypothesis is inconsistent with the patentee's acts. His patent imports that he was the sole inventor of the post therein described. But in 1865, in conjunction with Mr. Piper, he applied for and obtained a patent nominally for improvements in his post of 1862, but really changing its fundamental organization, and seeking to fix its invention in 1860, and in fact describing and appropriating the distinctive features of Reeves's post, which had been patented three years before," [1] &c.

[1] Here follows, in the opinion, some discussion of the doctrine of abandoned experiment, or invention not prosecuted with diligence, as thus: "It is vigorously urged that although the patent of 1865 to Linville and Piper is subsequent in date to Reeves, the post described in it was invented in 1860, and that they therefore anticipated him. It is in evidence by several witnesses that in 1860 Linville and Piper were engaged together in getting up plans for a proposed railroad bridge over the Schuylkill, near the arsenal at Philadelphia; that sketches of various forms of posts were made, among them those described in the patents of 1862 and 1865; that all the forms thus delineated were rejected, except the one described in the patent of 1862, which was adopted for the construction of the posts in that bridge; that the sketches of the posts described in the patent of 1865 were preserved for a time, but were lost; that no post of that description was made by the patentees until after the date of that patent; and, in fact, that nothing beyond the making of the sketches was done to embody or carry out the alleged invention until the patent was applied for.

"Will these sketches carry back the date of the invention to the time when they were made? . . . A patentee whose patent is assailed upon the ground of want of novelty may show, by sketches and drawings, the date of his inceptive invention; and if he has exercised reasonable diligence in 'perfecting and adapting' it, and applying for his patent, its protection will be carried back to such date; and in a race of diligence between rival inventors, the one who first perfects an invention and embodies it in a distinct form is entitled to priority. But can this be accorded to one who has conceived the idea of an invention, and has sketched it on paper, but has done nothing more in reference to it for a period of five years, as against the patent of an independent though subsequent inventor? Reasonable diligence in 'perfecting and adapting' the invention is essential to the efficacy of such a claim."

The judge then examined and approved the cases of Reed *v.* Cutter, 1 Story, 590; White *v.* Allen, 2 Fish. 440; Gayler *v.* Wilder, 10 How. 477; Parkhurst *v.* Kinsman, 1 Blatch. 494; Sickels *v.* Borden, 3 Blatch. 535; Ellithorpe *v.* Robertson, 2 Fish. 83; Winans *v.* Harlem R. R. Co., 4 Fish. 1; also he referred to Curtis on Patents, § 43, and continued: —

"Numerous other cases affirm the same doctrine, and it must therefore be considered as an established rule that illustrative drawings of conceived ideas do not constitute an invention, and that unless they are followed up by a seasonable observance of the requirements of the patent laws, they can have no effect upon a subsequently granted patent to another. Applying this rule to the present case, the conclusion is unavoidable that Linville and Piper had not 'perfected and adapted' an

2. "The publication of the description and plates in the *Allgemeine Bauzeitung* preceded Reeves's invention. It is a public work, and describes the post illustrated by the accompanying drawing. . . . The post described in this work is cruciform. It consists of a flat iron bar, which forms the main part of the column, with two other flat bars at right angles to it, connected by means of peculiarly shaped angle-irons, so that in the centre of the connection a hollow space is formed, which produces an increase of the rigidity of the column, while the section remains which is necessary for carrying the load. Now, it is apparent that the single flat bar is prescribed as the main part of the column relied upon to bear up the weight imposed upon it; that the two other bars are designed to furnish it lateral support; and that the angle-irons. while they serve the purpose of connection, are further auxiliary to it by giving it additional stiffness. . . . Following the description, then, all these bars, or at leas the single one, must necessarily be incorporated in the structure. To omit them would be to discard the part prescribed as necessary to resist the compressive strain upon the column, and therefore to abandon the vital principle of its construction. Indeed, all these constituents must be embodied in it to fulfil the fundamental requirements of the text.

"Now, a column thus constituted is not the column of Reeves. It differs from it in the necessary elements which compose it, and in the

invention in 1860, and that by reason of their subsequent and long-continued remissness they lost any inchoate right they might have had to priority over Reeves."

Next, to show that the experiment of Linville was abandoned as well as incomplete. the court quoted from the evidence of one of the witnesses — Linville's draughtsman at the time the drawings were made — as follows: "'Mr. Linville showed and sketched for me different forms of wrought-iron bars in pieces for posts; any number of them, and all shapes. . . . He had two pieces in some posts, and four in others. Finally, he [Linville] rejected all the other pieces except those pieces which we employed at the Schuylkill bridge.'" "And the testimony," continued the judge, "of Linville and Piper is in substantial accord with this. . . . The proofs show, further, that the sketch of the post then rejected, but now in controversy, was lost with other sketches in 1863, and that it was not reproduced until 1865, when steps were taken to obtain a patent. In the mean time, Reeves had invented, 'perfected and adapted,' and obtained a patent for his post, and was engaged in its manufacture and introduction into public use. In point of fact, then, all that Linville and Piper did before the date of Reeves's patent, can only be regarded in the light of experiment, which they abandoned, and did not take up again until the lapse of more than two years after his patent was issued.

"Whether the sketches made are to be considered as an incomplete invention, not prosecuted with the required diligence or as an experiment actually abandoned, they cannot impair the right of Reeves to be treated as the first inventor."

principle of its construction and operation. Four angle-bars and at least one flat cross-bar must be incorporated in its structure; while in the Reeves column three flanged bars, without any cross-bar, are required, and as many more as are desired may be employed. The latter is entirely hollow, and must be made so as to conform to the fundamental conditions of its construction. It corporealizes the principle that increase of diameter secures additional power of compressive resistance, and therefore that the metal used in its construction must be thrown out as much as possible from its centre, and concentrated in its periphery. Its resisting power is located exclusively in its circumference. Such a condition is clearly not indicated in the German description of that post. As before stated, the bar which traverses its diameter is an indispensable part, and as it is described as subject to the greatest compressive strain, corresponding strength for resistance must be provided in the diameter of the post. This is a vital diversity, so that the two posts can only be identified by confounding the distinct principles embodied in each of them," &c.

SMITH *v.* FRAZER, 5 FISH. 543.

W. D. OF PENN., 1872. MCKENNAN, J.

Smith & Denniston's patent of Aug. 27, 1867. The claims were: —

"1. The introduction of a stream or flow of water into the crushing-pan of a revolving sand, sand-rock, or sand-stone crusher, to aid the crusher or crushers in disintegrating the rock, and to cleanse and discharge the pulverized sand, substantially," &c.

"2. The rotating and revolving crushing-wheels *b*, in a sand-rock crusher, in combination with a crushing-pan A, provided with a discharge-gate s, and a water supply-pipe *h*, or its equivalent, all constructed and operated substantially," &c.

The court said: —

"By the words of the specification the patentee purposes to employ only the co-operative agency of water, and the patent must, therefore, be construed to claim, not its abstract functions, but the special mode in which, in connection with the mechanical devices described, its power is made available. In this view of the patent, the objection that the claim is for a subject not patentable is clearly unfounded."

The court, however, held that this invention was anticipated by the "Chilian mills," which were for crushing and cleansing gold ores: —

"These mills were constructed with two rotating crushing-wheels, which revolved in a pan provided with a hole in its side to wash the sand and *débris* away, and with a constant stream of water flowing into the pan. There can be no doubt, from the explanation given of their construction and mode of operation, that they are substantially identical with machines embodying the invention claimed by the patentee. It is true that their discharge-gate does not extend to the bottom of the pan, so that the gate was adapted to carry off the water with only the lighter impurities suspended in it. And such was its intended function where the machine was used for crushing and cleansing gold ores, and it was desired to retain the particles of gold in the pan; but where it is desired to discharge the whole contents of the pan, it could be so obviously effected by extending the aperture to the bottom that the change would fall far below the rank of an invention. To conceive and make it would require but a moderate degree of mechanical knowledge. Certainly it would evince no patentable merit, and cannot, therefore, in any of its relations, be treated as within the protection of a patent."

TILGHMAN *v.* MORSE, 9 BLATCH. 421.

S. D. OF N. Y., 1872. BLATCHFORD, J.

Patent granted to Tilghman, Oct. 18, 1870, for an "improvement in cutting and engraving stone, metal, glass," &c. The first claim only was in suit. It ran thus: —

"The cutting, boring, grinding, dressing, engraving, and pulverizing of stone, metal, glass, pottery, wood, and other hard or solid substances, by sand used as a projectile, when the requisite velocity has been artificially given to it by any suitable means."

By "sand" the patentee meant, as he explained in the specification, small particles of any hard substance. In his specification he also described many methods of imparting velocity to the column of sand, among others, the following: —

"The means of propelling the sand which I prefer is by a rapid jet or current of steam, air, water, or other suitable gaseous or liquid medium. . . .

"I have produced some cutting and grinding effects by sand impelled by the force of gravity. . A stream of sand fed into the top of a high, vertical tube at first falls slowly, but after the air in the tube is set in motion the sand gradually falls more rapidly, and can finally acquire velocity sufficient to grind or depolish glass."

The court said: —

" . . . It is set up in defence that it has for many years been customary to deaden or roughen parts of the surface of articles of smooth glass by covering over certain portions with thin sheets of metal, . . . and then subjecting the exposed surface of the glass to the frictional action of some suitable material, produced by such material striking against the exposed portion of the glass. It is not alleged that prior to the invention of the plaintiff a simple stream of falling sand . . . was used to wear away or roughen the exposed portions of glass, but it is alleged that it was always known that any solid or liquid material falling continually on any surface would wear away the latter. . . . There is nothing in all this that touches the plaintiff's invention. His invention consists in the discovery that a stream of sand, driven with sufficient velocity to cause the grains of sand, through their own velocity and momentum, to act as projectiles against the article to be cut or dressed, will do the work effectually, without any vehicle to carry the sand into contact with the article, and without any contact between anything and the article except the sand.

"This view disposes of the apparatus or process described in the provisional specification of John Robinson in England of Dec. 13, 1866, for 'improvements in ornamenting glass.'"

This, in a word, was the application to the glass of a rotating wire brush, fed with emery or with sand and water.

"It is urged," said the court, "that this process of Robinson produces an action and effect very similar to that produced by the defendant in the use of a concentrated stream of granulated material falling or poured on the article to be operated upon, at about right angles to its surface, where there is a greater or less accumulation of the material all the time, and where, during the displacement of the particles, a continuous friction and rubbing on the surface being operated upon is kept up; that the action and effect so produced by the defendant are not similar to what occurs in projecting at a high velocity a very small stream of sand against a surface obliquely; and that the process of Robinson is not a grinding process, but is one in which, by the action of the wires of the brush, the exposed surfaces are deadened or roughened, just as they are deadened or roughened, and not ground away, in

the defendant's process. Whether the process of Robinson was practically of any use is not shown, and is left to conjecture. But even if useful, in its employment the surface of the glass was subjected 'to the action' of the wire brush, and the parts roughened or deadened were put in that condition by being operated upon by the wire brush, as Robinson expressly states. It is true that the brush was 'fed with emery or sand and water.' What part the emery or sand fulfilled is not stated. . . . Robinson states that the emery or sand is capable of roughening or deadening the surface of the glass. But his process, so far as it can be understood, is to rub the emery or sand against the surface of the glass by means of the rotating wire brush. . . . If the rotation of the wire brush would make projectiles of the grains of emery or sand, by a velocity of rotation sufficient to overcome their adhesion, through the water, to the wires of the brush, it would be a pure matter of accident whether those projectiles would strike the glass. It seems probable that the sand and water were fed to the surface of the glass, and that the wire brush was used to scratch the grains of sand against the glass. The description is very vague. Whatever the process was, it would suggest to no one the plaintiff's invention, or the process used by the defendant."[1]

JENKINS *v.* WALKER, 1 HOLMES, 120.

D. OF MASS., 1872. SHEPLEY, J.

The patent was for an elastic packing for joints and valves that are exposed to steam or to hot and corrosive liquids. It was a composition (we quote from the opinion of the court) "containing forty per cent or more of refractory mineral matter, cemented together by vulcanized rubber. The term 'refractory,' as used in the arts, indicates the quality of resisting the action of heat and solvents. In this sense, Paris white, French chalk, and plumbago are refractory."

The defence brought forward a patent to one Newton "for mingling plumbago with hard-rubber compound, to be used in the manufacture of bearings for machinery, in order to prevent attrition or friction. It appears from the evidence in this case that the composition of matter described in the Newton specification, if made in the mode there described, would not have the physical properties of the compound described in the complain-

[1] For another, but absurd, defence set up in this case, *vide post*, p. 298, n.

ant's specification, because the presence of so large a proportion of sulphur, as indicated in the formula of the Newton patent, would render the valves susceptible to the action of the heat and solvents.

"The patenting a material for one purpose does not necessarily invalidate patenting it for another different and not analogous purpose. Newton *v.* Vaucher, 6 Exch. 859." [1]

STUART *v.* SHANTZ, 6 FISH. 35.

E. D. OF PENN., 1872. MCKENNAN, J.

Infringement of a patent granted to Stuart & Wemys, for an "improved guard-plate for stoves," dated May 18, 1868. The chief defence was that this invention had been anticipated by the patent granted to W. L. McDowell, April 28, 1863.

The objects of the Stuart & Wemys guard-plate were, first, to conceal the fire-pot; and, second, to direct downward the heat that radiated from the fire-pot, so that none of the rays of heat should pass upward or horizontally into the room, but all of them should be deflected so as to impinge upon the floor, or upon objects near it. This was accomplished by surrounding the fire-pot with a perforated shield, having above each perforation a projecting roof. These projections concealed the fire-pot from the eye, when they were looked at from any point more than a few feet above the floor, and they deflected the rays of heat.

The McDowell device, on the other hand, was intended to send all the rays of heat *upward*, in order to avoid burning or charring objects which might be near the red-hot cylinder; and it was particularly designed for stoves in railway cars. The result desired was brought about, according to the specification,

"by making the fender of a series of deflectors consisting of short, hollow frustums of cones or other suitable forms of sheet-metal, and arranging them around the outer side of the fire cylinder or box, so as to be supported together upon the said perforated supplementary top plate of the base, leaving sufficient spaces between the said deflectors, and between the latter and the stove, for the hot air to pass obliquely outward and upward from the cylinder or fire-box into the surrounding external air."

[1] *Vide post*, page 381.

It will thus be seen that in both devices the object was to give a new direction to the rays of heat proceeding from the fire-box, and in both devices the method was to place metallic surfaces near the cylinder in such position as to turn the currents of heat in the desired direction. But in one device the direction given was an upward one, with the object of sending the heat away from the vicinity of the cylinder, where it might burn the clothes of persons standing by; and in the other device the direction given was a downward one, with the different object of heating the lower strata of air before heating the other strata. The objects of the two devices were, therefore, essentially different; and it could not be maintained that the method used was the same in each, and that its employment in the later invention was merely the new use of an old device, because the metallic surfaces opposed to the rays of heat in the second device were, both in shape and in arrangement, different from those of the first device. The court so held, remarking: —

"Constructed, therefore, upon different theories, and intended for the production of different primary results, and with peculiar mechanical adaptations, the inventions in question fall into distinct categories, and so are distinguishable in form, design, and mode of operation from each other."

WOODWARD *v.* MORRISON, 1 HOLMES, 124.

D. OF MASS., 1872. SHEPLEY, J.

Woodward's patent of Feb. 20, 1866, for an improved bookbinder's paste.

Ordinary bookbinder's paste is made of wheat-flour and water. The albuminous or nitrogenous constituents of the flour have a tendency to putrefy, and their putrefaction causes fermentation of the non-nitrogenous constituents. The paste, therefore, will not keep. The plaintiff's invention was designed to overcome this tendency, and to render flour-paste a standard article of commerce. This was accomplished by making the paste of the following ingredients: Flour, two pounds; chloride of sodium, one ounce; alum, one-quarter ounce; bichloride of mercury, six grains. This small quantity of bichloride of mercury (corrosive sublimate) preserved the paste from decomposition, and its ex-

tremely poisonous character was neutralized by the gluten of the flour, so that the patentee's paste was not liable to putrefy or to ferment, and yet it was not poisonous. The chloride of sodium assisted the composition, though the evidence as to the manner and the extent of its assistance was conflicting.

The defence was want of novelty. It was proved that every ingredient of the patented composition had been used in paste, separately, and all the ingredients, except salt, in combination, but not in the same proportions or for the same object. In 1847 one Turner had employed corrosive sublimate mixed with alum and water in a paste used to affix paper labels to wooden boxes containing pills manufactured to be sold in the South; but this paste Turner purposely made poisonous by using a comparatively large quantity of corrosive sublimate, in order to prevent insects from destroying the boxes and their contents. So, also, one of the respondents had used corrosive sublimate, with a similar intention, in paste put between layers of leather pasted together for heels and stiffenings. And in "Cooley's Cyclopedia of Practical Receipts," London, 1856, p. 938, it is stated that the addition of a few drops of corrosive sublimate to paste will prevent insects from attacking it, and will preserve it in covered vessels for years; and again, at page 216: "the addition of a few grains of corrosive sublimate or a few drops of creosote will prevent it turning mouldy, and is said to preserve it for years."

The court remarked as follows: —

". . . What, then, remained to be discovered in the art of making a prepared paste as a standard article of commerce? It was known that corrosive sublimate and other poisonous substances might be used for the purpose of arresting or preventing spontaneous decomposition of the paste, and also for preventing the attacks of vermin or insects on the paste. It does not appear to have been known that paste could be preserved by means of these substances without making a corrosive and poisonous composition, unsafe to handle and, to a certain extent, unfit to use. The desired result which remained to be attained was to arrest the fermentation and prevent the spontaneous decomposition, and consequent great waste of the paste, without making a composition corrosive or poisonous. The complainant . . . did not discover that the poisonous qualities of corrosive sublimate were neutralized by albumen, but he does appear first to have discovered that, by the use of a quantity of corrosive sublimate so small that its poisonous qualities were neutralized by the albuminous bodies in the flour, a comparatively

large quantity of paste could be preserved from putrefactive decomposition. . . ."

The court go on to notice the discovery of the complainant, stated above, that the addition of chloride of sodium (or of some other salt soluble in the aqueous solution of corrosive sublimate, or in the same solution in which that is soluble) improved the composition. Patent sustained.

RENWICK *v.* POND, 10 BLATCH. 39.

S. D. OF N. Y., 1872. BLATCHFORD, J.

Patent reissued to W. C. Hicks, March 1, 1870, for improvement in breech-loading fire-arms.

Blatchford, J.: —

". . . There can be no doubt on the evidence that Hicks was the first person who devised a practical mechanism for certainly withdrawing a loaded cartridge from its chamber, in a breech-loading fire-arm, under all conditions, as well when its rim or flange has not been expanded by the blow of a striking instrument as when it has been so expanded, by effecting such withdrawal through the engagement, within the periphery of such chamber, of a hook, actuated automatically, with a metallic flange forming part of the cartridge. In devising such mechanism he made an important invention. Sometimes it is desired to withdraw the loaded cartridge without attempting to fire it. Before the invention of Hicks, the only certain means of doing so was to insert a rammer in the muzzle of the barrel of the fire-arm, and push the cartridge out through the breech end. This was dangerous, because liable to cause the cartridge to explode by striking its fulminate end against the breech-closing piece. The mechanism described in the patent issued to Horace Smith and Daniel B. Wesson, Feb. 14, 1854, and reissued to them Oct. 10, 1854, would withdraw the cartridge only after its rim had been forced by expansion, caused through the blow of the striking instrument, to engage with recesses provided to receive it, and would not withdraw a loaded cartridge before any attempt had been made to fire it."

Later on the court say: —

"Claiming the arrangement of a combination, when the arrangement is such as to produce a given mechanical result of the combination, is

not a claim to a function. The result is not claimed irrespective of the means producing it. The means alone are claimed, and claimed only when specially arranged to produce a given result. This is very far from claiming a function."

CLARK *v.* SCOTT, 9 BLATCH. 301.

S. D. OF N. Y., 1872. BLATCHFORD, J.

Infringement of a patent granted to Dudley and Clark, July 27, 1869, for an "improved hand-mirror."

Before this invention, the glass of a hand-mirror was imbedded in a wooden frame, the end or extension of which was fashioned into a handle. Such mirrors were defective in two ways: there was "a want of strength, especially at the neck, or junction of the handle with the body," and worse, the glass was liable to be fractured by the twisting or warping of the wooden holder. The patentees remedied these defects by first placing the glass in a cheap, thin frame of wood, and then imbedding it in a cement, which formed the back, edge, and outside handle of the mirror. The patentees claimed the use of any cement for the purpose, and they described and recommended a particular cement.

When the plaintiffs applied for this patent they also applied for a patent claiming a brush-handle made in the same way as the mirror. But this application was rejected, on the ground of an existing patent for the same thing, namely, that of Parsons & Scott, assignees of Estabrook, granted June 19, 1866. The defendants contended that the invention of Parsons & Scott anticipated the plaintiffs' mirror as well as their brush. But the court remarked upon it as follows:—

"It [the Parsons & Scott patent] describes a brush in which the bristles, inserted through a perforated plate, are imbedded and held firmly in a suitable cement, which cement, at the same time, in combination with the plate and an extension of the plate into the handle, forms the back and handle of the brush. As a structure, such brush was not substantially the same thing as the hand-mirror of Dudley. The Patent Office so decided, necessarily, in granting the patent for Dudley's mirror, and the decision was proper. The removal from Estabrook's brush of the plate and bristles removes also the extension of the plate, which forms the strengthening piece in the handle, and if

a mirror were inserted in lieu of the plate and bristles, the article would be without a strengthening piece. The cutting off of the bristles would leave no cavity for the glass.

"The specifications of the Parsons & Scott patent gives [*sic*] no suggestion as to how to construct a mirror like Dudley's. . . . Where the glass in a hand-mirror is mounted in a wooden frame, it is liable to be broken by the warping of the wood; and in the mirror of Dudley there is no liability to warp in the frame, and no danger of the fracture of the glass from such cause. . . . This point of advantage in the mirror does not exist in the brush. Consequently there is a special function exerted by the mirror-back in protecting the glass from fracture through the warping of the frame which is not exerted by the brush-back." And he concluded by saying that this result or function "constituted sufficient invention to support a patent for the mirror, even though a brush with a like back and handle had existed before. Whether, if the mirror had existed before, a patent for a brush with a like back and handle could be sustained, and whether, the Dudley mirror being patented, a patent for the Dudley brush could be sustained, are questions which do not here arise. The Dudley mirror has been patented. The Dudley brush has not been patented."

MURPHY *v.* EASTMAN, 1 HOLMES, 113.

D. OF MASS., 1872, SHEPLEY, J.

McLaughlin's patent of Jan. 11, 1870, for an improved brush. The invention was an improvement in brush-heads, designed to prevent the breaking of glass, or the scratching of wood surfaces by the brush-head. It consisted in making a groove around the brush-head near the bristles, and putting in the groove a rubber ring in the form of a parallelogram, "so that the ring fitting into the groove, or furrow, which had a sharp angle in it, presented a sharp angle outward." Devices alleged to anticipate this invention were thus disposed of by the court: —

"Monzani's patent was merely for covering with vulcanized rubber those parts of brushes or brooms which in their use are liable to be struck against places or things which are to be dusted or cleaned thereby. . . . Crittenden's specification described the same thing substantially as Monzani's. . . . There is nothing in these patents or rejected applications to invalidate the McLaughlin patent. . . . Re-

spondents also offer evidence tending to show that, prior to the date of the McLaughlin invention they made, in the fall of 1867, *first*, a brush with a block or head, with a projecting shoulder, by which a square vulcanized rubber band was attached upon the block for the purpose of keeping the head of the brush from injuring the wood-work; *second*, a similar brush, with a circular groove and a round band; and, *third*, a brush with a cork block or head inserted in a tin cover. Around the edges of this cover was a projecting shoulder, and round the edge of this cover, and held in place by this shoulder, a square vulcanized india-rubber band. Brushes made in the similitude of these three forms of brushes are put into the case. No brush made in either of these forms, before the date of McLaughlin's invention, is produced in evidence, and there is no reason, from the testimony, to believe that any one is in existence. The testimony is conflicting as to their form and structure; but it leaves no doubt in the mind of the court, that, whatever they were, and whenever and howsoever constructed, they were mere experiments. They were never put upon the market, they never came into practical use, they were never sold, they were not even thought worthy of preservation, and cannot now be found. Such brushes, if previously constructed in the form contended for by respondents, as experiments, and never made public or brought to the knowledge of McLaughlin, and ultimately abandoned and lost, could be no obstacle to his right to take out a patent."

There was another suit upon this patent, namely, Murphy *v.* Kissling, 1 Holmes, 432, also decided by Judge Shepley, who said: —

"The defendants also set up, as anticipating the invention of McLaughlin, a door-step," . . . having "an angular groove in it, with a rubber ring fitting therein in the same manner as in the brush-head in the McLaughlin invention. It was not new at the date of the McLaughlin invention to put a rubber ring into an angular groove. What was new was his combination of a brush-head with an angular groove and a rubber ring fitting therein, whereby the elements of the combination operated together and jointly in the function of the brush."

PLATT *v.* UNITED STATES PATENT BUTTON, RIVET, NEEDLE, AND MACHINE MANUFACTURING CO., 9 BLATCH. 342.

S. D. OF N. Y., 1872. BLATCHFORD, J.

Infringement of a patent granted to Platt, July 10, 1866, for improvement in buttons. The claim was: —

"The button, formed of a single piece of metal, with the edge turned over, and with one central hole, as a new article of manufacture, as specified."

The specification stated that the button was fastened by a rivet or eyelet passing through the button and the garment.

Before this invention, buttons fastened in the same way were made "by uniting two thicknesses of metal at the edges, with a piece of paper between them." This article was too costly. They were also made of one piece of sheet-metal; but such buttons were objectionable on account of the sharpness of their edges. The edge of the plaintiff's button was thickened by being turned over on itself. It therefore avoided the defect in each of the old kinds of button, and it was a valuable improvement.

The defence set up prior inventions, which are described only in the following remarks of the court: —

"Some of the prior buttons contain one or two of the three features of the plaintiff's button, but all of such features are not found combined in any one of the prior buttons. Those features are, the single thickness of metal, — its edge folded over on its body, — the central hole, capable of being used for a single rivet or eyelet to fasten the button to the garment. Thus, the Rose button has the single piece of metal and the folded edge, but no central hole. In the Jamison button, the edge is not folded over upon the body of the single piece of metal. . . . The Fay button is not made of metal. The Smith button is not made of a single piece of metal. . . . Nor is the plaintiff's button anticipated by a button made of a single piece of metal with its edge folded over on the body of the metal, and with two, or three, or four holes, so as to be attached to a garment by sewing, or by a button made of more than one piece of metal, in which the edge of one of the pieces of metal is folded over upon the other parts, which make up the thickness of the button, and not upon itself."

Patent sustained.

RUMFORD CHEMICAL WORKS *v.* LAUER, 10 BLATCH. 122.

S. D. OF N. Y., 1872. BLATCHFORD, J.

Patent originally granted to E. N. Horsford, reissued to the plaintiffs, June 9, 1868. The third claim: "I claim the mixing in the preparation of farinaceous food, with flour, of a powder or powders, such as described, consisting of ingredients of which phosphoric acid, or acid phosphates and alkaline carbonates, are the active agents, for the purpose of liberating carbonic acid, as described, when subjected to moisture."

This claim, the court held, was anticipated by the patent of John Fowler, dated May 1, 1849, for an invention which consisted

[1] "in the adding to a certain weight of flour such quantities of alkaline and acids, sugar and salt, as shall, by the addition of water only, enable such prepared flour to be manufactured into bread, &c., without the use of fermenting matter.

"The specification then describes a mode of making the prepared flour, by first mixing with one hundred weight of dry flour ten and a half ounces of fine, dry, tartaric acid, and then, after two or three days, mixing with the flour and acid twelve ounces of bicarbonate of soda, or fourteen ounces of bicarbonate of potassa, in fine powder, twenty ounces of muriate of soda (common salt), and eight ounces of loaf sugar, in fine powder. The specification adds: 'The quantities of acids and alkalies may have to be slightly varied, according to their quality; but the point to be attained is the neutralization of both. My prepared flour, when used to make bread, biscuits, or other like food, only requires to be made into dough with cold water, in the proportion of ten ounces of water to one pound of flour for bread, and about six ounces to one pound of flour for biscuits, and baked at once in a well-heated oven. I do not claim mixing acid and alkali with flour as a substitute for yeast, nor do I claim mixing one of these ingredients with flour in the dry state, when the other is dissolved for making bread.' The claim is this: 'Mixing both the acid and alkali with the flour in the dry state, sugar and salt being added or not, at will, substantially in the manner and for the purpose herein set forth, as a new article of manufacture.'

"In view of the Fowler patent, it is impossible to see any patentable novelty in the third claim of the plaintiffs' patent. The prepared flour

[1] By the court.

made with the ingredients named in said claim contains the phosphoric acid, or the acid phosphate, as a mere equivalent for the tartaric acid of Fowler's prepared flour; as much so as a screw or a lever is a mechanical equivalent for a pulley. Any pulverulent acid, capable, on the application of heat or moisture, of liberating carbonic acid to make the dough porous, is, in the prepared flour, the equivalent of any other pulverulent acid having the like capacity, so far as regards such prepared flour, before heat or moisture is applied. Everything of substantive, patentable invention, in regard to prepared flour as composed of an acid in dry powder, and an alkaline carbonate in dry powder, mixed with dry flour, is found in the patent of Fowler. Especially is this so in regard to the plaintiffs' patent, in view of the fact that the specification of that patent discloses no mode of practically mixing the ingredients composing the self-raising flour, but merely states that the acid 'may be mixed with flour and bicarbonate of soda,' as a substitute for cream tartar and tartaric acid 'in the practical preparation of self-raising flour.'"

The rest of the case is not sufficiently important to require our attention. For the different opinion in regard to chemical equivalents, expressed by Judge Nixon in the later case of the same plaintiff *v.* Hecker (10 O. G. p. 291), see *ante*, page 66.

DECKER *v.* GROTE, 10 BLATCH. 331.

S. D. OF N. Y., 1872. BLATCHFORD, J.

Infringement of a patent for "improvement in cushions for billiard tables," granted to Levi Decker, Dec. 18, 1866, and reissued March 19, 1869.

The cushion sloped inward, that is, its upper edge was nearer than its lower edge to the centre of the table, and the ball therefore struck against the upper edge, where only it came in contact with the cushion. At this point of contact the patentee fastened upon and partly in the cushion a narrow cord of catgut, or like material, which ran longitudinally around the cushion. The ball, therefore, struck against the cord, and not against the cushion. This device had several advantages. It made the cushion stiff, so that it would not give way, and thus let the ball ride over it; it obviated much friction, the contact-surface of ball and cushion being restricted; it made the course of the ball,

after striking, more true; it concentrated, so to say, the elasticity of the cushion (made of rubber), and also saved it from wear. The invention, therefore, was of great utility, and it went into general use.

Several prior inventions were set up in defence. First, the invention of Carpenter. Carpenter's application for a patent was rejected, April 10, 1858, on the ground that his invention was anticipated by a patent granted to the plaintiff, December, 1857. Carpenter's device was a wire of "whalebone, steel, brass, or other elastic material suitable for the purpose," placed in a groove running along the upper edge of the cushion, *above* the point of contact of ball and cushion. The object was thus stated: —

"When the ball advances with considerable force, and is imbedded into rubber, the whalebone or wire is lifted, the ball acting as a wedge, and from the natural tendency of the wire to resume its former position, it hugs the ball firmly upon the table, which allows the rubber to repel the ball without hopping or jumping."

This device differed essentially from the plaintiff's, inasmuch as it did not present any surface, other than that of the cushion, for the ball to strike against; and, therefore, unlike the plaintiff's invention, it did not possess the advantages of elasticity imparted to the cushion, saving of wear and tear, and directness of rebound given to the ball. Its only merit in common with the plaintiff's invention was that it kept the ball on the table, and this it accomplished in a different way, namely, by pressing it down after it had hopped, instead of presenting a surface which obviated the hop. The court, therefore, held that Carpenter's device did not anticipate the plaintiff's; and they held the same in regard to the patent of John Lyncher, granted Nov. 10, 1863, which Judge Blatchford thus described: —

"Lyncher uses thin strips of horn, cut spirally, in connection with hard or soft rubber, to form a cushion. The strip of horn is used as a facing to the rubber pad, or is inserted into a long slit cut into the pad, and made fast therein by rubber cement. The grain of the horn, in the spiral strip, runs crosswise of the strip, so that when the ball strikes the cushion the spring action of the horn, although crosswise of the strip, is with the grain, and not crosswise of the grain. When the strip is inserted in the pad, it is shown as extending downward from the upper exterior corner of the pad, in a slanting direction away from the face of the

pad. A facing to the pad presents nothing in common with the plaintiff's invention. In the case of the inserted strip of Lyncher, the action of the cushion, under the impact of the ball, is different from what it is in the plaintiff's arrangement. The cushion does not yield in substantially a horizontal direction, because of the interposition of the strip of horn. For the same reason the resilience of the rubber is not returned to the ball in substantially a horizontal direction.

"By inserting the strip, Lyncher destroys the homogeneous character of the cushion. The plaintiff preserves the homogeneous character of the cushion. From this difference results the different action of the two cushions under the impact of the ball and in response thereto. It follows that nothing in Lyncher's arrangement anticipated the plaintiff's invention."

In a subsequent case,

DECKER *v.* GRIFFITH, 13 BLATCH. 187,

E. D. OF N. Y., 1875. BLATCHFORD, J.,

additional devices alleged to anticipate the plaintiff's device were set up as follows: First, a patent granted to William K. Winant, Aug. 10, 1858.

"The specification of that patent sets forth," said the court, "that the invention of Winant 'consists in the introduction of a strip of spring-steel (or equivalent material) into a crease or groove cut in the upper face of the rubber, near the angle thereof, in such a manner that said steel is protected from injury by the rubber which thus intervenes between the steel and the ball, and the cushion is rendered sufficiently firm to prevent the ball imbedding and injuring the correctness of the angle of deflection; and beside this, the strip is so narrow as not to be injured by the concussion, and is retained in place without requiring any attachment by screws, cement, or otherwise.' . . . 'There is one feature in this patent of Winant's which is unlike the arrangement of Decker. Winant describes his strip of steel as merely lying in the crease or groove cut in the rubber, and as being kept in place without being attached by screws, cement, or otherwise; whereas Decker describes his cord as being moulded or imbedded entirely within the rubber. The patent of Winant was considered, and very properly, by the Patent Office, when Decker's patent was reissued, as not having anticipated Decker's claim in his reissue. It is shown by the evidence of Daniel D. Winant, the brother of William K. Winant, that, prior to 1864, he made many billiard tables constructed in accordance with the

Winant patent, but with the added feature of an arrangement for tying down the steel strip to the cushion by means of holes in the lower edge of the strip, and wires put through them and fastened to the under side of the rail, to keep the strip in place in the rubber. In that arrangement, the steel strip was incorporated in the structure, so as to be incapable of dislodgment, quite as effectually as if moulded or imbedded entirely within the rubber, as suggested in Decker's specification. It stiffened the angle or corner of the cushion, and prevented its yielding under the impact of the ball, and allowing the ball to pass over it. . . .

"It is also shown that one Stevens, in Boston, prior to 1864, made india-rubber cushions for billiard tables, which had a French clock-spring placed in a slit cut in the upper face of the rubber, parallel to and near the inner face of the rubber, bringing the upper edge of the spring near the upper corner of the rubber. The spring was cemented into the slit, and cloth was glued or cemented over the slit. The spring was thus imbedded entirely within the rubber. . . . As to the defendants' arrangement with the round wire imbedded in the rubber, it required no invention to substitute in the Stevens arrangement a round wire for the steel strip. If the plaintiff's reissued patent can, in view of the Winant and Stevens arrangements, above described, be upheld at all, because it is made to cover a cord imbedded entirely within the rubber, and is not limited, as his original patent was, to a cord applied outside of the upper corner of the cushion, it certainly cannot be extended to cover arrangements which are substantially the same as the Winant and Stevens arrangements.

"The bill must be dismissed with costs."

ROBERTSON *v.* SECOMBE MANUFACTURING CO., 10 BLATCH. 481.

S. D. OF N. Y., 1873. BLATCHFORD, J.

Robertson's reissued patent, dated Dec. 12, 1871, for an "improvement in hand-stamps."

Head-note: "Robertson's invention, by which a permanent type-form is combined with a handle, and with type-wheels, so arranged as to be capable of making as many impressions as may be desired, is not anticipated by a combination of type-wheels for numbering with a fixed type-form for dating and printing, but which, having no handle, is incapable of use as a hand-stamp, and which requires the materials to be pressed down upon it from above.

"Nor by a combination of type-wheels for numbering (requiring the change of one or more type-wheels at every stroke), combined with type-forms for dating and printing."

This patent was again sustained in Robertson *v.* Garrett, 10 Blatch. 490.

TILLOTSON *v.* MUNSON, 5 Biss. 426.

N. D. of Ill., 1873. Blodgett, J.

Infringement of a patent for an improved filter-well, reissued to Tillotson & Tillotson, Oct. 25, 1870. The claim ran as follows:—

"In its application as a buried water reservoir, in the bottom of a well, the filter consisting of a perforated cylinder or cylinders, the central space forming a chamber into which the water is filtered, and from which the water supply is drawn by an ordinary elevating device, as described."

The filter consisted of two cylinders, one enclosing the other, and both closed at top and bottom. The water from the well or earth passed through the perforations of the outer cylinder into the space between it and the inner cylinder, this space being filled with charcoal or other filtering substance, and thence the water passed through similar perforations into the inner cylinder, whence it was drawn up by a pipe and pump. In addition, another cylinder might be used, enclosing the outer of the two cylinders already described, having similar perforations, and filled with coarse sand, to act as a preliminary filter. In the original patent, more than one filtering space was required; in the reissued patent, but one. When the filter was placed in the bottom of the well, it might be buried and the well filled up, "if desired," so that the pipe would form its only communication with the surface.

The novelty of the patent was attacked. It was shown that one Bartlett, to whom a patent was granted Feb. 19, 1856, invented a reservoir which was buried, so to say, at the bottom of a well, so that the only means of drawing up the water was the pump-pipe, and an additional air-pipe, which, the inventor supposed, was necessary to make the pump work. And some

provision was made for surrounding this reservoir with filtering material. Further, in a patent of March 28, 1865, to one Andries, is described a filter having "concentric casings of perforated metal around a water chamber, and the spaces between those casings filled with gravel, charcoal, and other filtering material." This patent is essentially like the complainants', except that it calls for more than one filtering space, which, as we have seen, was also a requirement of the complainants' original patent. The court, therefore, held, in effect, that all the complainants had done was to bury Andries's filter according to Bartlett's method, and that such substitution of the Andries filter for the less efficient filter used by Bartlett was not patentable.

The counsel for the complainants contended that there was a new feature in their filter, inasmuch as, the filter being buried, the atmospheric pressure upon the water in the earth was utilized to drive the water through the filter whenever a vacuum was created in the water-chamber, by pumping the water therefrom. But, said the court, all drive-wells operate upon this principle; and, moreover,

"the aid of atmospheric pressure is invoked by the Andries filter, when used in an open well surrounded by water. The moment the action of the pump exhausts the water from the water-chamber, the pressure of the atmosphere helps to drive the surrounding water through the filter into the chamber to fill the vacuum."

THE LYMAN VENTILATING & REFRIGERATOR CO. *v.* LALOR, 12 Blatch. 303.

S. D. of N. Y., 1874. Blatchford, J.

Patent reissued to Stephen Cutter, March 10, 1874, for an "improvement in methods of cooling and ventilating rooms," the original patent having issued March 26, 1856. The first claim was:—

"The combination of a descending conduit, or cold-air flue, or either, with a reservoir for containing cooling materials, substantially in the manner and for the purposes described."

The method was as follows: An upright box, having openings at the top and at the bottom (or near it), is divided by a hori-

zontal grate into two compartments. Upon the grate rests the ice or other cooling material. The drippings from the melting ice fall into a trough or lip at the bottom of the lower compartment, whence they are carried away. The air of the room coming in contact with the ice in the upper compartment is condensed. It loses its moisture, and (cold air being heavier than warm air) it falls through the grating into the lower compartment, whence, through the opening or openings near the bottom, it passes out into the room again, and, spreading over the floor, it displaces the warmer, moist air, which is forced to the top of the room, and itself enters the ice-box, to be condensed and cooled. Thus, a constant circulation of air over the ice is kept · ·.

"On the question of novelty," said the court, "the defence sets up a refrigerator built by Mace & Healy, in February, 1851, for one Van Arsdale, in the house No. 31 East Twenty-first Street, in the city of New York, as a part of the house, where it still is. The ice is placed in an ice-chamber in the upper part of the refrigerator. The bottom of the ice-chamber is slatted, so that the cooled air and the drip of water can pass down between the slats. Underneath these slats is a solid drip-roof of zinc, sloping each way from the centre, and terminating on each side a very short distance from the side of the refrigerating chamber, the edges of the roof being turned down. The water runs down the roof and over these edges, and then falls down to the bottom through narrow, vertical spaces, formed on each side by sheets of metal running down parallel to the sides of the chamber, just within the overhang of the turned-down edges of the drip-roof, and running down nearly to the bottom of the chamber. It is claimed that these narrow, vertical spaces act as conduits, not merely for the water, but for the cooled air, and that the latter can pass under the lower edges of the sheet of metal into the chamber. It is also claimed that there are openings between the upper edges of these sheets of metal and the overhangs of the drip-roof, though this is disputed. Now, it is very plain that this structure does not embody what is covered by the first claim of the plaintiff's patent, as above defined. There is a reservoir for containing ice, combined with a descending conduit, and it may be that a small proportion of cooled air will, at some time in the operation of the apparatus, find its way down the narrow, vertical spaces and out into the chamber. But none of it, or of any other part of the air in the chamber, will find its way again into the ice-reservoir, whether there be or be not openings over the tops of the vertical partition sheets of metal. There is no such circulation of air as there is in the plain-

tiff's structure. The Van Arsdale refrigerator does its work by conduction, by the contact of the air in the chamber with the cooled metallic drip-roof, and the cooled metallic vertical partitions, and not upon the principle of the plaintiff's structure."

The next invention alleged to anticipate the plaintiff's was a movable refrigerator, called the Harpel refrigerator. The court held that the prior existence of this was not proved. Several other inventions were set up, but either their priority or their success was in doubt. All of them cooled the air, or the substance to be preserved, by conduction, instead of circulation, as was the case in the plaintiff's invention. The evidence in regard to them is reported at length, but none of them came so near the plaintiff's invention as the Van Arsdale refrigerator, described above.

The first claim of a reissue of 1871 was also sustained in two other suits, — one before Judge Hall, in the Northern District of New York, in March, 1872 (Lyman *v.* Myers); and the other before Judge Benedict, in the Eastern District of New York, in January, 1874 (The Lyman Patent Refrigerator Co. *v.* Oswald). In both of these suits, as in the present suit, the patent was sustained against the alleged prior invention of Thaddeus Fairbanks, a patent for which was applied for Sept. 5, 1846. The application was rejected Feb. 6, 1847, and withdrawn July 27, 1847. A patent was granted Aug. 12, 1856, the invention having been assigned by Fairbanks to one Schooley for five dollars. Nothing was done by Fairbanks with invention or patent between 1847 and 1856. Judge Blatchford held that the application was not a "prior publication." His remarks upon this point are quoted at page 719, *post*.

Judge Blatchford's construction of the patent was adopted by Shepley, J., in

THE LYMAN VENTILATING & REFRIGERATOR CO. *v.* CHAMBERLAIN, 10 O. G. 588,

D. OF MASS., 1876,

where also was reiterated the doctrine that a withdrawn and abandoned application does not afford sufficient evidence of an invention to defeat a subsequent patent.[1]

[1] *Vide post*, page 627.

FRINK *v.* PETRY, 5 O. G. 201.[1]

S. D. OF N. Y., 1874. BLATCHFORD, J.

Frink's patent for reflectors, reissued in two divisions, Feb. 8, 1870, numbered respectively 3826 and 3827. The report is very long and full of detail. We quote from the head-notes, slightly transposing them. Like most of those in the Patent Office Gazette; they are clear and accurate.

"The plaintiff's patent was for a reflector, of which the principal features were a metallic surface, above the source of light, reflecting the light downward below its source; and a glass surface in sections under the other, serving as a lining to it, and aiding in reflecting the light, with a space between the two surfaces for the circulation of air and ventilation.

"Prior to the plaintiff's invention, one Boyle had obtained an English patent for a reflector, in which the reflecting surface consisted of silvered glass in sections, arranged in several series around the light, one series above another, and diminishing in circumference upward, and all contained in a wire or metal frame.

"As it had no upper reflecting surface, it was held to be no anticipation of the plaintiff's first claim, which was, in substance, for a reflector having a reflecting surface of glass, in combination with another reflecting surface placed above the first, with a space between the two for air, &c.

"The employment of a glass lining over the reflecting surface of a known reflector is patentable, since it protects the surface, and increases the reflected light."

DALTON *v.* JENNINGS, 12 BLATCH. 96.

S. D. OF N. Y., 1874. BLATCHFORD, J.

Infringement of a patent for "improvement in ladies' hair-nets."

The improvement, viewed in relation to a net formerly in use, was simply the substitution of a coarse thread for every alternate fine thread, in both directions.

Blatchford, J., held that this might be patentable as a design, but not as a manufacture, its only possible superiority to the old net consisting in its appearance.

[1] Also 11 Blatch. 422.

On appeal to the Supreme Court (93 U. S. 271) this decision was affirmed, the court saying, *obiter*, that, if new, the improvement was not patentable, and holding that it had been anticipated by various prior inventions; namely, a piece of lace, a tidy, a mosquito bar, a hair-net, — in all of which the interstices of the threads or cords were traversed, diagonally or otherwise, by finer threads or cords; "in each case," said the court, "the precise arrangement described in the plaintiff's patent."

THE WOOD-PAPER PATENT, 23 WALL. 566 (1874).

Improvements in the manufacture of paper. Of the several patents sued on in this case, we have to consider only reissue No. 1448, granted to Watt & Burgess, April 7, 1863, for a paper-pulp made from wood. It was held invalid, on the ground that it described an article improved indeed, as compared with its predecessors, but not patentably different from them.

In making paper-pulp, the object is to extract cellulose from the vegetable substances that contain it. It exists in straw and in wood, but in them it is mixed with what is called "intercellular matter." Before the invention of Watt & Burgess, cellulose was extracted from wood and straw only by the use of both mechanical and chemical processes; whereas Watt & Burgess, or the other inventor whose patent (assigned to them) we are presently to notice, extracted pure cellulose by chemical means alone. This cellulose, however, was not substantially different from that produced in the old way.

The court, through Mr. Justice Strong, remarked as follows:[1] —

"Though the two reissued patents (Nos. 1448 and 1449) were granted on the same day and to the same patentees, and though they are both substitutes for the one original patent granted July 18, 1854, antedated Aug. 19, 1853, they are to be carefully distinguished one from the other. The first (No. 1448) is a patent for a product or a manufacture, and not for any process by which the product may be obtained. The second (No. 1449) is for a process, and not for its

[1] No facts bearing upon the point stated other than those contained in the quotation here made are given in the report.

product. It is quite obvious that a manufacture, or a product of a process, may be no novelty, while, at the same time, the process or agency by which it is produced may be both new and useful, — a great improvement on any previously known process, and, therefore, patentable as such. And it is equally clear, in cases of chemical inventions, that when, as in the present case, the manufacture claimed as novel is not a new composition of matter, but an extract obtained by the decomposition or disintegration of material substances, it cannot be of importance from what it has been extracted.

"There are many things well known and valuable in medicine or in the arts which may be extracted from divers substances. But the extract is the same, no matter from what it has been taken. A process to obtain it from a subject from which it has never been taken may be the creature of invention, but the thing itself, when obtained, cannot be called a new manufacture. It may have been in existence and in common use before the new means of obtaining it was invented, and possibly before it was known that it could be extracted from the subject to which the new process is applied. Thus, if one should discover a mode or contrive a process by which prussic acid could be obtained from a subject in which it is not now known to exist, he might have a patent for his process, but not for prussic acid. If, then, the Watt & Burgess patent for a product is sustainable, it must be because the product claimed, namely, 'a pulp suitable for the manufacture of paper, made from wood or other vegetable substances,' was unknown prior to their alleged invention. But we think it is shown satisfactorily that it had been produced and used in the manufacture of paper long before 1853, the year in which the original patent of Watt & Burgess was dated.

"It is insisted, however, that the paper-pulp which had been produced before the invention of Watt & Burgess was not pure cellulose, that it was only approximately pure; and from this it is argued that the pure article obtained from wood by their process is a different and new product or manufacture. Whether a slight difference in the degree of purity of an article produced by several processes justifies denominating the products different manufactures, so that different patents may be obtained for each, may well be doubted, and it is not necessary to decide. The product of the complainant's patent is a pulp suitable for the manufacture of paper, and, confessedly, to make white paper it requires bleaching. The pulp which had been obtained by others from rags in large quantities, and from straw, wood, and other vegetable substances to a lesser extent, was undeniably also cellulose, suitable for manufacturing paper, and, so far as appears, equally suitable. The substance of the products, therefore, was the same, and so were their

uses. The design and the end of their production was the same, no matter how or from what they were produced.[1]

"It is freely admitted that the patent of an originator of a complete and successful invention cannot be avoided by proof of any number of incomplete and imperfect experiments made by others at an earlier date. This is true, though the experimenters may have had the idea of the invention, and may have made partially successful efforts to embody it in a practical form. And though this doctrine has been more frequently asserted when patents for machines have been under consideration, we see no reason why it should not be applied in cases arising upon patents for chemical products. But the doctrine has no applicability to the present case. What had been done before the Watt & Burgess invention was more than partially successful experimenting. A product or a manufacture had been obtained and had been used in the arts, — a manufacture which was the same in kind and in substance, and fitted for the same uses, as the article of which the complainants now claim a monopoly. That this manufacture may have been the product of one or more different processes is, as we have said, quite immaterial in considering the question whether it is the same as that produced by the complainants.

"It has been, however, argued that the product of the complainant's process and the product claimed as a new manufacture is cellulose, of the proper consistency and dimensions, and with a fibre of proper length for immediate felting into paper, while the cellulose obtained from rags or wood, or other vegetable substances, by other processes than that of the Watt & Burgess patent, had a longer fibre, and required, in addition to chemical agency, mechanical treatment to prepare it for use in paper-making. Hence it is inferred the product is a different one; that it is properly denominated a new manufacture, and that it was patentable as such.

"This argument rests upon a comparison of the finished product of the complainants with an article in an intermediate stage, and while undergoing treatment preparatory to its completion. It may be quite true that at some stage of its preparation the paper-pulp made and used before 1853 was not of the proper consistency for paper-making, or that its fibre was too long, and that it required additional manipulation to fit it for use. But when it had received that treatment, its fibres were reduced to the proper length, and it became capable of all the uses to which it is claimed the product of the complainants is adapted. It is with the finished article that the comparison must be made, and,

[1] Compare this case with that of the Badische, &c. Co. *v.* Hamilton,&c. Co., *post*, page 170.

being thus made, we are of opinion that no substantial difference is discoverable.

"It may be that if the cellulose which had been produced prior to 1853, of such form and with such properties that it could be at once felted into paper, had been only a chemical preparation in the laboratory or museum of scientific men, and had not been introduced to the public, the Watt & Burgess product might have been patented as a new manufacture. Such appears to be the doctrine asserted in some English cases, and particularly in Young *v.* Fernie.[1] In that case, Vice-Chancellor Stuart remarked upon a distinction between the discoveries of a merely scientific chemist, and of a practical manufacturer who invents the means of producing in abundance, suitable for economical and commercial purposes, that which previously existed as a beautiful item in the cabinets of men of science. 'What the law looks to,' said he, 'is the inventor and discoverer who finds out and introduces a manufacture which supplies the market for useful and economical purposes with an article which was previously little more than the ornament of a museum.' But this is no such case. Paper-pulp obtained from various vegetable substances was in common use before the original patent was granted to Watt & Burgess, and whatever may be said of their process for obtaining it, the product was in no sense new. The reissued patent, No. 1448, is, therefore, void for want of novelty in the manufacture patented. . . ."

THE CORN-PLANTER PATENT, 23 Wall. 181 (1874).

This case is so long and intricate, that we can take up only certain comparatively brief portions of it. There were in suit several patents for improvements on a corn-planting machine. Most of the difficulties that arose were on the subject of this chapter, and some were on the subject of *Prior Knowledge or Use.* We begin, however, with a question of "ingenuity." The claim of reissue 1092 ran as follows: —

"In combination with a seed-planting machine, operating by hand, and having its seeding devices forward of the wheels, and forward of the driver's seat, and a hinged connection, the locating of the seat in such relation to a line drawn through the centres of the wheels or ground-supports, as that the occupant of said seat may, by moving himself or throwing his weight forward or backward on his seat, with-

[1] 10 Law Times Reports, 851.

out the necessity of rising, walking, or standing over or near the seeding devices, force the seeding apparatus into, or raise it from, the ground, substantially as described."

Upon this the court said: —

"After a careful consideration of this claim, we are brought to the conclusion that the subject of it is not patentable, prior inventions having placed the driver on the machine, and having constructed the platform in such manner that his movement backward or forward would raise or lower the seeding apparatus, and the seat itself not being claimed as new. it can hardly be contended that the proper location of the seat for effecting the same object required the exercise of inventive power."

"The next patent," said the court, "reissue 1093, after describing the machine as before, with its runners and front frame, its seat for the driver over the wheels, and contrivance for raising and lowering the front frame, its seat for the dropper over the runners, its hinged joint, &c., concludes as follows: —

"'There are two points in this machine that have unvarying positions or heights with regard to the ground; namely, the point of the tongue, as its height is defined by the horses' necks, to which it is attached, and they standing, of course, upon the ground, and the journals or axle of the covering or supporting wheels F F, as they roll on the ground, and between these fixed points the hinged connection between the front and rear part of the machine is made, so as to admit of raising or lowering the seeding devices.

"'Having thus fully described the nature and object of this part of my invention, what I claim under this patent is, in combination with a seed-planting machine that has a hinged or yielding joint between its fixed points of support and with its seeding devices between said points, the so connecting of the parts between said fixed points of support as that that portion of the machine carrying the seeding devices may be raised up out of the ground by the attendant riding on the machine, and be carried by the tongue or horses' necks, and the supporting wheels, substantially as and for the purpose described.'"

The court held that if this were a claim for "any and every connection of the parts which will produce the result 'substantially as described,'" it was anticipated by Kirkman's and also by Remy & Kelly's device.

"But if the claim is to be construed as limited to the mode of connecting the parts in the appellant's machine (being a hinged connection between the two frames, and therefore different from Kirkman's ma-

chine), and to the means by which the final result was accomplished, namely, by the shifting of the driver's weight on the machine (and therefore different from Remy & Kelly's), then this objection would be obviated. But, thus modified, it would substantially correspond with reissue 1038, being simply for a mode of doing that with the driver on the machine which was done before under reissue 1038 with the driver on the ground, employing only in addition the mode of operation used by Kirkman. In other respects the two combinations would be precisely the same. We are of opinion, therefore, that this patent cannot be sustained."

They continued as follows: —

"The next patent, reissue 1094, is for a matter too frivolous to form the subject of invention. It is simply for a peg or stop to prevent the rear part of the machine from tipping so much as to dump the driver on to the ground. No mechanic of any skill would construct a machine of the character prescribed, without providing some such arrangement. . . .

"The latest patent of the series, reissue 1095, is for a peculiar valve in the tube, through which the seed is dropped to the ground, called the flipper-valve. When the machine is in motion, the time taken for the seed to drop from the hopper to the ground, supposing it to drop from a height of only 18 or 20 inches, would carry it forward more than a foot after its discharge, and thus carry it beyond the cross-row. It became important, therefore, to drop the seed from a point near the ground, or from the bottom of the tube instead of the hopper, at each movement of the lever by the operator. To do this required two movements: one for dropping the seed from the hopper into the tube; the other for dropping it from thence to the ground."

This invention enabled both objects to be accomplished by a single movement of the hand. The seed for one hill was dropped into the ground at the same time that the seed for the next hill was dropped into the tube from the hopper. This was effected (we quote again from the opinion)

"by placing in the seed-tube a long, slender valve, composed of a slip of metal, suspended on a pivot in the middle, so that when one end was pushed forward the other end would be pushed backward. In this way each movement of the upper extremity would let a charge of seed into the tube on one side, and keep it there, whilst the simultaneous movement of the lower extremity would discharge the previous charge on the other side."

The claim was as follows: —

"So combining with a lever, by which both may be operated, a valve or slide in the seed-hopper and a valve in the seed-tube, as that a half motion of the lever by the operator riding on the machine, by which they are operated, shall both open and close the seed-passages at regular periods, and pass measured quantities only, substantially," &c.

Two devices, Finn's and Case's, alleged to anticipate this improvement were thus disposed of by the court: —

"Finn says that he invented his machine in the summer or fall of 1851. The seed-dropping apparatus consisted of a vibrating side or back to the seed-tube, which required two movements, one backward and the other forward, for dropping each hill of corn, alternately opening and closing the tube. It was operated by levers, in connection with the valves in the hoppers. But each hill or check-row required one movement of the lever to let the seed into the tube, and a reverse movement to let it out, and this double movement was repeated at every check-row. Whereas by Brown's apparatus both results were accomplished by a single movement, — a forward movement effecting a dropping for one check-row, and a backward movement effecting it for the next. It is evident that although there was a similarity between the two processes, they were essentially different. It may be that Brown's is only an improvement on the process used by Finn. If this be so, still it is only the improvement (that is, the machine as he uses it) that he claims by his patent. The machine of Case, which he swears he constructed in March, 1853, is still more unlike Brown's in form, though less unlike in operation. It has two independent valves, — one in the hopper to let the seed into the tube, and one at the bottom of the tube to let it out. These two valves are so connected by a chain or spring that both are opened at once. A spring is arranged to shut them as soon as possible, so as to prevent the seed admitted above from escaping below until the next movement of the lever. This apparatus, it is true, requires but one movement of the hand for each dropping, the spring performing the other. But the spring has to be drawn by the force of the hand so as to have the necessary recoil. The same strength has to be exerted by the operator as if he made both movements with his hand. It is evident that this device is also different from the appellant's. The two have similarities, but they are essentially distinct machines."

The Chief Justice had not been appointed when this case was argued. Mr. Justice Clifford, with whom concurred Miller and

Davis, JJ., delivered a dissenting opinion. He held that the real invention of the patentee was a combination of old elements, whereas the reissue of his patent was for the separate elements of the combination claimed in the original patents.

HILL *v.* HOUGHTON, 6 O. G. 3.

D. OF MASS., 1874. CLIFFORD AND LOWELL, JJ.

Lowell, J.: "The reissued patent of the complainant is for a new and useful spelling-block, and the . . . invention is declared in the specification to consist, first, in placing different letters of the alphabet upon two or more sides of cubical or six-sided blocks, so that, by combining the blocks, words in which the same letters occur more than once may be readily spelled; and, second, in placing upon one side of each block a numeral, by the aid of which, in connection with a printed key, the blocks needed for spelling any word may be readily found. The two claims follow this description. . . .

"It is proved that six-sided cubical blocks of wood were in common use as toys before the plaintiff made his invention, and two sets are given in evidence which were actually made, and have been for twenty years in the possession of the witness, who identifies them. This evidence is not impeached or disputed; the blocks in both samples are made of wood, and have letters and pictures and other devices upon them. One set is numbered consecutively with conspicuous numbers from 1 to 24, and this set has several pictures illustrating each letter. The second set consists of twenty-four blocks, and has pictures, some of which illustrate the letters and some do not. The first set has two letters on two of the blocks, combining I and J, and W and V, thus enabling the twenty-six letters to be placed on twenty-four blocks. The second set has five blocks, on each of which two letters are placed, though evidently not intended to enlarge the spelling capacity of the blocks, since the repeated letters are not those which would be much in demand.

"In this state of the art, we are of opinion that it was not a patentable improvement in spelling-blocks to place two or more letters on each block, even though the plaintiff may have been the first person to place them systematically, with a view to enlarge the usefulness of the blocks. In a machine, it may sometimes be invention to adapt the

machine to greater usefulness by a plan which has been very nearly approached, but never actually reached before. The point is often a somewhat nice one.

"In this case, we think the invention was fairly complete when the blocks had been arranged for spelling a great variety of words, and especially when, for economy of space or other reasons, several of the blocks were impressed with more than one letter; otherwise the novelty and the infringement must depend upon the particular letters which are repeated."

ROBERTS *v.* RYER, 91 U. S. 150 (1875).

Appeal on a bill for infringing a patent to one Sanford for a refrigerator. Defence, a prior invention of one Lyman. The gist of both patents was constant circulation of the air in the refrigerator, Sanford making use chiefly of the descending current for refrigerating articles in the ice-box, and Lyman using chiefly the ascending current for that purpose. (The quoted parts are from the opinion of the court, delivered by Waite, C. J.)

Sanford's patent was for the combination of

"(1) an open-bottomed ice-box or its equivalent, so constructed that the air may pass freely down through it, while at the same time the drip of the water from the melting ice is prevented by collecting the water and taking it in an escape-pipe outside of the refrigerator; (2) a dividing partition open above and below, separating the refrigerator into two apartments; and (3) a chamber directly under the open-bottom ice-box, in which articles to be refrigerated may be placed in such manner as to receive the descending current of air from the ice-box directly upon them."

No particular shape of opening in the bottom of the ice-box was made essential by the patent, nor any special manner of collecting and carrying off the melted ice, nor any precise form of the partition. It was not even required that the partition should be vertical, but only that it should

"be open at the top and bottom and divide the refrigerator into two apartments. There are no specifications as to the size of the openings or their form, or as to the comparative size or form of the two apartments. It is said that the apartment for the ascending current may be so narrow that it will serve only as a passage for the air; but there is nothing to prevent that for the descending current being narrow also,

if the purposes of the refrigerator are such as to make that desirable. . . . If in any place the air descending from the ice-box can strike directly upon the articles to be refrigerated, the structure will be within the limits of the patent. . . . "

Lyman's "device consisted of a receptacle for ice, with a grate for its bottom, on which the ice rested. This receptacle was placed in the upper part of the refrigerator and on one side. Below it was a cold-air chamber, into which the air flowed from the ice through the grate. The water from the melting ice was collected in this chamber and conducted by a pipe to the outside of the refrigerator. From the cold-air chamber was a conduit leading downwards, but which did not extend to the bottom of the refrigerator."

There was a side opening in the upper part of the ice-box into the apartment for the ascending current. This apartment was the larger of the two, and was intended to hold most of the articles to be refrigerated. The conduit, however, which conveyed the air as it came from the cold-air chamber toward the bottom of the refrigerator, and so under the partition, was large enough to hold some articles for refrigeration, and it had so been used by the inventor in the course of his experiments.

"True, the partition was not vertical, and the apartments need not be of equal or of any particular proportionate size. Neither was this necessary, as has been seen, in the Sanford patent. Each, however, called for the circulation of air, and each obtained it substantially by the same device. They each passed the air cooled in the ice-box through convenient openings downwards in one apartment, and upwards through the other. In each device the cooled air passed through the opening in the bottom of the partition, and the warmed air through that in the top," and for the common object of "cooling, desiccating, and purifying the confined air. . . . Undoubtedly Lyman expected to use the ascending air principally for the purposes of refrigeration, and he. therefore, supposed the greatest benefit would be derived from that current; but there was nothing in his specifications to prevent the use of the descending air, or from so constructing his refrigerator as to make that available. If it should be thought advisable to extend the size of the chamber for the descending air, there was nothing to prevent it. It would still operate as a conduit in which the cold air would fall down and be kept separate by the sides from the other air until it mingled with the lower strata. It being, then, certain that Lyman contrived a machine which would produce the desired circulation, and could be used for refrigeration in the ascending current, it remains only

to consider whether, if one desired to make use of the descending current for the same purpose, he could claim such use as a new invention. It is no new invention to use an old machine for a new purpose. The inventor of a machine is entitled to the benefit of all the uses to which it can be put, no matter whether he had conceived the idea of the use or not. Lyman had the descending current. True, he concentrated the air as it fell, and sent it downwards through a space smaller than that which would be contained in a chamber extending the full size of the bottom of the ice-box to the bottom of the refrigerator. But he did have a space large enough to expose in it some articles to the effect of that current. If it should be found desirable to utilize that current to a greater extent than was at first contemplated, all that need be done is to enlarge the conduit. If the circulation is kept up, the device will be within the specifications.

"In fact, the proof is abundant, that in his experiments, while perfecting his invention, Lyman did, in more cases than one, utilize the descending current.

"With both the inventors, the circulation by means of an ascending and descending current was the principal object to be obtained. One considered the greatest benefit for the purposes of refrigeration was to be derived from the use of the descending current, while the other had his attention directed more particularly to the advantages of the ascending. They each had both, and could utilize both.

"It is no invention, therefore, to make use of one rather than the other," &c.

This was clearly a case of anticipation, though the court considered it as one of new use.[1]

JONES *v.* SEWALL, 6 Fish. 343.

D. of Maine, 1873. Clifford, J.

Infringement of two patents granted to Isaac Winslow, one for the product (No. 34,928) and one for the process (No. 35,274) of preservation of green corn.

The process was to strip the kernels from the cob with a curved and gauged knife, in such a manner as to leave a considerable portion of the hulls upon the cob and to set free the juice of the kernels. The kernels were then placed in stout tin cans, sealed up, and thoroughly boiled, whereby they were cooked

[1] *Vide post*, page 281.

in their own juices, and thus preserved in a sweet and tender condition. The cans were next punctured to allow the air to escape, and then immediately resealed to prevent evaporation of the juices of the corn. It was proved that by this method, and by it only, green Indian corn could be preserved in a fresh and juicy condition; and the two patents were held valid.[1] The chief defence was that the invention was anticipated by the English patent of Peter Durand, sealed in 1810, being a communication from one Appert,[2] a Frenchman. The court held

[1] The two patents are substantially the same; but the description of the process is a little more full in the *product* patent, No. 34,028. We subjoin so much of it as is necessary to explain the invention.

"Select a superior quality of sweet corn in the green state, and remove the kernels from the cob by means of a curved and gauged knife, or other suitable means. Then pack these kernels in ['strong '] cans, and hermetically seal the latter so as to prevent evaporation under heat, or the escape of the aroma of the corn. Now expose these cans of corn to steam or boiling heat for about one hour and a half; then puncture the cans, and immediately seal the same while hot, and continue the heat for about two hours and a half longer. Afterwards the cans may be slowly cooled in a room at the temperature of seventy to one hundred degrees Fahrenheit. Indian corn thus packed and treated may be warranted to keep in any climate. Being preserved in its natural state as near as possible, it retains the peculiar sweetness and flavor of fresh corn right from the growing field.

"It is only necessary to heat this preserved corn, and season the same, in order to prepare it for the table, as it is fully cooked in process of preserving. Other methods of treatment may be adopted without departing from my invention, so long as the hermetical sealing and use of the heat are so managed as to secure the aroma and fresh flavor and prevent putrefaction, thus producing the new article of manufacture substantially as described."

Claim: "The above-described new article of manufacture, namely, Indian corn when preserved in the green state, without drying the same, the kernels being removed from the cob, hermetically sealed and heated, substantially in the manner and for the purpose set forth."

[2] Appert's invention was for "preserving animal food, vegetable food, and other perishable articles a long time from perishing or becoming useless. . . . Vegetable substances are to be put into the vessel in a raw or crude state."

He put the substance to be preserved in an air-tight bottle or other vessel, and placed the vessel in cold water, which was gradually heated till it boiled, the "ebullition being continued according to the nature of the article and the size of the vessel," &c.

He also claimed the application of heat by placing the vessel in an oven, or stove, or steam-bath, instead of using the method already indicated, and he concluded as follows: "I do, as the choice of the consumer or the nature of the said food or other articles may render preferable, leave the aperture of the vessel, or a small portion thereof, open until the effect of the heat shall have taken place, at which period I close the same."

that this was no anticipation of the plaintiff's process, remarking (page 361): —

"Other vegetables, such as beets and carrots, or peas and beans, may be packed in cans in a crude state, as they retain their juices, and may be well preserved if entirely secluded from the atmosphere, as by packing them in vessels hermetically sealed; but their chemical composition is very different from green corn, which is much more difficult to preserve in its natural freshness, without loss of its peculiar flavor and aroma, as accomplished by the complainant's process."

Green corn was not known in England when Durand's patent was granted.

This case came before the Supreme Court,

SEWALL *v.* JONES, 91 U. S. 171 (1875).

The decision of the Circuit Court was reversed, Judge Clifford dissenting. The ground was that the invention already described, that of Appert, anticipated Winslow's process; but the point of difference between Judge Clifford and the rest of the bench was in regard to the construction of Winslow's patents rather than in regard to the substance of his invention. Mr. Justice Clifford's construction was the more liberal one. He held that the process covered by Winslow's patents included removing the kernels from the cob in such a manner that the juices were set free, and formed a liquid in which the kernels were cooked, so that they became soft and juicy; whereas the majority of the court held that this part of the process was only recommended and not required by Winslow's patents, and that his patents covered merely removal of the kernels from the cob, however accomplished, placing them in a can, boiling, puncturing, and resealing; and that Appert's process was for preserving vegetables in any form, intact, or separated from their husks: that Winslow's process, therefore, was anticipated by Appert's, although the method of separating the corn recommended by Winslow might be an improvement upon what was before known.

The dissenting opinion of Mr. Justice Clifford is long and exhaustive. We quote one paragraph: —

"Corn at that period was unknown in England, and it is not probable that the patentee had ever heard of such an article, and it does not

appear that a can of green corn has ever been preserved in that mode of operation to the present time. Patented inventions must be described so that those skilled in the art or science may be able to make, construct, and practise the same; and yet it is plain that no amount of study or examination of the foreign specification would ever enable any person to preserve green corn in the mode of operation employed by the assignor of the complainants."

Naturally, this decision was followed by a reissue of both patents, No. 7061, April 18, 1876, and No. 7067, of the same date.

The claim of No. 7061 (the process patent) was as follows:—

"The process described of separating and obtaining the nutritious and edible parts of the corn, and boiling them in a liquid composed wholly or mainly of their own juices."

There was a suit on this reissue, namely,

JONES *v.* McMURRY, 13 O. G. 6.

D. of Md., 1877. Bond, J.

Of reissue No. 7061 (the claim in which we have just quoted), Judge Bond (after expressing the opinion that the decision of the Supreme Court was broader than the complainant admitted, and that it determined the whole process described by Winslow to be anticipated by Appert's invention) said:—

"In his reissued patent the complainant states that he takes tender green corn, and scrapes it from the cob so as not to detach the inner ends of the kernel, which, with the pieces and softer parts of the corn, he cooks together, and then proceeds with the old process of Appert for cooking and sealing."

He then quotes the claim, and continues:—

"No one ever cut green corn from a cob who did not accomplish exactly what this claim describes, and no one under the process described in patent 35,274, which required the corn to be removed from the cob, could so remove it without breaking the kernels; and when he proceeded to cook in a can, as the patent required, he would find necessarily more or less of the juices with it. The reissue does not claim that the juices only should be used in the cooking.

"The process described in the reissue is substantially that of the original patent; but if we admit there is something new and patentable in the reissued patent which was not in the original, the patent is void

because it is not for the same invention as the original. It may be the subject of a new patent, but cannot be a reissue of an old one; and that, too, of an old one which has been adjudged invalid by the Supreme Court for the want of novelty."

COHN *v.* UNITED STATES CORSET CO., 93 U. S. 366 (1876).

M. Cohn's patent, granted April 15, 1873 (No. 137,893), for an improvement in corsets.

In making corsets, the fabric is woven with pocket-like openings, or slots, for insertion of the whalebones which stay it. In order to make a corset that will adapt itself to the form of the wearer, the whalebones, and consequently the pockets, must be of varying length,—shorter under the arms, for instance, than at the back. The patentee stated that before his invention it had been customary to weave these slots from top to bottom (from edge to edge) of the corset, and, after insertion of the whalebones, to stitch the slots by hand. There were two objections, he said, to this method: first, the hand-labor involved was expensive; and, secondly, the length of each pocket, or, in other words, the distance from the top edge (for all the pockets started from the bottom), having to be determined by the workman in each case, the pockets were formed without precision, and were not all of the same length. Further, the patentee recited that another method in common use was to weave the fabric with the slots all stopped and finished *at uniform distances from the top edge.*

His invention consisted in so weaving the fabric that the slots should all be stopped and finished, not at a uniform distance, but at the desired, *irregular* distances from the top edge.

"I am aware of, and do not claim," he said, "a woven corset with the pockets stopped and finished off at a uniform distance from the edge; I am also aware of, and do not claim, a hand-made corset with pockets of varying length stitched on; but what I do claim . . . is a corset having the pockets for the reception of the bones formed in the weaving, and varying in length relatively to each other as desired, substantially," &c.

To anticipate his patent, the defendants relied upon the specification of a patent left at the office of the Commissioner of Pat-

ents for England, in 1854, by John Henry Johnson. It was as follows: —

"This invention . . . consists in the employment of the jacquards[1] in the loom, one of which effects the shape or contour of the corsets, and the other the formation of the double portions of slots for the introduction of the whalebones.

"These slots or double portions are made simultaneously with the single parts of the corset; and in place of being terminated in a point, they are finished square off, *and at any required* length in the corset, instead of always running the entire length, as is usually the case in woven corsets. When the corset is taken from the loom, the whalebones are inserted into these cases, and the borders are formed, thus completing the article, which contains all the elegance and graceful contour of sewn corsets made by manual labor."

Mr. Justice Strong, delivering the opinion of the court, held that this specification described the same article that the plaintiff claimed in his patent, of which he said: —

" . . . No process is described; none is patented. The claim is for a manufacture, not for a mode of producing it. Its peculiarities, as described, are that the pockets for the reception of the bones are formed in the weaving rather than by hand, and that they are of varying lengths relatively to each other; that is, that the pockets differ in length from other pockets in the same corset, as desired. There are no other particulars mentioned descriptive of the patented improvement, unless they are that the weaving or variations in the length of the pockets are to be in the manner and for the purpose set forth in the specification. Referring to that, the purpose avowed is the production of a better-shaped corset at less expense; and the manner of effecting this is by substituting weaving for stitching, in closing the pockets at desired or predetermined distances from the edge. Now, in view of the patentee's disclaimers, stopping off the passages or pockets in the weaving is not covered by the patent. It is admitted that had been done before, and no claim is made for it. All that is left, then, is that the woven and closed pockets in the corset vary in length. No rule is stated for the variation." The court next showed that, by the state of the art, the patent must further be limited, namely, "to the pockets under the arms of the wearer, or on the back, or in front of the body, because pockets like, or substantially like, those described by the plaintiff had previously been used in the parts of the corset that cover the breasts and hips of the wearer."

[1] The plaintiff's patent also contemplated the use of a jacquard.

The court then quoted Johnson's specification, and said:—

"Undeniably, this is a description of woven corsets, woven by the use of the jacquards in the loom, woven with slots or passages for the bones, made simultaneously with the other parts of the corsets, and requiring nothing to be done to them after their removal from the loom, except the insertion of the bones and the formation of the borders. It is also plainly a description of corsets in which the passages for the bones, called the double portions or slots, are finished; that is, stopped off in the weaving."

The court gave several reasons to support this obvious conclusion, which we need not detail, and proceeded:—

"It is manifest, then, that there is nothing in the plaintiff's patent which was not described in the Johnson specification, unless it be that the closed slots or cases mentioned in the former are required to be woven of varying length. A variation in the length of the pockets relatively to each other, as desired, is, as we have seen, the sole distinctive feature of the plaintiff's invention. But it was well known before Johnson filed his specification that the bone-pockets of a corset must vary in length. They were made to vary in hand-made corsets and in woven ones by sewing. In all corsets, whether hand-made or woven, the pockets under the arms were made shorter, and those at the back and in front were made longer, in order to fit the wearer and preserve a graceful shape at the top. . . . Johnson knew — having before him the state of the art at the time — that pockets of uniform length would not adapt the corset to fit the wearer, and would not be consistent with elegance of shape, and there is not a word in his description that intimates the pockets are to be stopped off or closed at uniform distances from the edge or without variation in length. The contrary idea is manifest. It is said, they are to be finished (closed) *at any required length*. Required length? Required by whom, and for what? Plainly by the manufacturer, and that they may have all the elegance and graceful contour of sewn corsets made by manual labor, and also that they may fit the wearer. Such a requirement could be met only by pockets of different lengths in the same corset," &c.

"It is quite immaterial, even if it be a fact, that the Johnson specification is insufficient to teach a manufacturer how to make the patented corset.

"It is enough if it sufficiently describes the corset itself. Neither it nor the plaintiff's specification exhibits the process of making. Neither of them set up a claim for a process. The plaintiff claims a manufacture, not a mode of making it; and the important inquiry, therefore, is,

whether the prior publication describes the article. To defeat a party suing, it is sufficient to plead and prove that the thing patented to him had been patented or described in some printed publication prior to his supposed invention or discovery thereof. Rev. Stat. § 4920. What is required is a description of the thing patented, not of the step necessarily antecedent to its production. But the evidence shows that the Johnson specification, in connection with the known state of the art at the time when it was filed and published, was sufficient to enable one skilled in the art of corset-making and in the use of the jacquard to make the patented corset," &c.

FULLER *v.* YENTZER, 94 U. S. 288 AND 299 (1876).

The first of these suits was for infringement (and no question other than that of infringement was raised) of a patent granted to Fuller for a combination of devices by which a crease, or a mark if desired, is made in the cloth fed to the needle of a sewing-machine. The devices are, first, a vibrating point acting upon the upper surface of the cloth, and moving in unison with the needle, so that the point rests upon the cloth only when the needle is in it (this to avoid wrinkling the cloth); and, secondly, a notch or an elastic surface or pad under the cloth where it is pressed by the point. In this way, "the crease or creases are formed in the cloth itself, parallel to the line of sewing, in such a manner that the cloth is ready for doubling over at the creases for the next line of sewing." Instead of one point, several points may be used; or, when the object is to mark and not to crease the cloth, in place of the point a pencil or a similar article is attached to the vibrating arm, which, it should be mentioned, extends from the needle bar or arm, and thus, as has been said, vibrates with it. This combination was especially useful in tucking, plaiting, &c.

In the second suit, on a patent owned by Fuller as assignee, one defence was that the patent sued on was anticipated by this prior patent of Fuller;[1] but the court (Mr. Justice Clifford delivering the opinion) held otherwise.

This second patent, originally granted to one Rose, of which

[1] The first patent, No. 28,633, was granted to Fuller & Goodall, June 5, 1860. The second (reissue No. 3218) was granted, Dec. 1, 1868, to Fuller, assignee.

Fuller was assignee, may be described very briefly. The purpose of the device covered by it was the same as that of Fuller's prior invention, namely, creasing or making folds in the cloth. The Fuller invention, it was said, was open to this objection: the point sometimes pierced and cut very fine cloth, and very heavy cloth it did not impress sufficiently to make a crease in it. The Rose invention formed the creases or ridges by a succession of nips.

"Devices called jaws are provided for the purpose, which are caused to descend while open, with more or less force or pressure, on the fabric, and then in being closed are capable of seizing a portion of the fabric and compressing the same tightly, the fabric at the same time being properly supported against the descending force of the jaws, and which operation, being repeated while the fabric is moved along, produces the required ridge or crease in the line of which the fabric will naturally fold, to facilitate the forming of the tuck for future operations. . . . Effectual means are provided to cause the marking device to react after each creasing action, and follow the upward motion of the needle-arm, in order to give room for the free insertion and removal of the work; and this spring-branch shown in the drawings is made to hold the outer jaw away from the inner one when in the normal position there exhibited. . . . Motion is usually given to the fabric by the feed-mechanism of a sewing-machine, in which it is intended it shall be used as an attachment; but the motion may be imparted to the fabric in any other manner,"[1] &c.

THE CAWOOD PATENT, 94 U. S. 695 (1876).

The patent was for "an improvement in the common anvil or swedge-block, for the purpose of welding up and re-forming the ends of railroad rails when they have exfoliated or become shattered from unequal wear."

The case is so long and difficult that we are forced to omit the abstract which we had made of it. The only defence was that of anticipation. In regard to a prior English patent, alleged to anticipate the plaintiff's invention, the court (by the mouth of Mr. Justice Strong) said that the only question was

[1] We quote from the opinion of the court.

"whether the specification was sufficient to enable a mechanic skilled in mechanical arts to construct and carry into practical use the Cawood machine; or, in other words, whether whatever is essential to the Cawood machine could be read out of the prior specification."

The patent was sustained.

ELIZABETH *v.* PAVEMENT CO., 97 U. S. 126 (1877).

(City of Elizabeth *v.* American Nicholson Pavement Co.)

Infringement of an extended patent originally granted in August, 1854, and reissued for the second time Aug. 20, 1867.

Mr. Justice Bradley delivered the opinion of the court as follows: —

". . . The nature and object of the invention consists [*sic*] in providing a process or mode of constructing wooden block pavements upon a foundation along a street or roadway, with facility, cheapness, and accuracy; and also in the creation and construction of such a wooden pavement as shall be comparatively permanent and durable, by so uniting and combining all its parts, both superstructure and foundation, as to provide against the slipping of the horses' feet, against noise, against unequal wear, and against rot and consequent sinking away from below. Two plans of making this pavement are specified. Both require a proper foundation on which to lay the blocks, consisting of tarred paper or hydraulic cement covering the surface of the road-bed to the depth of about two inches, or of a flooring of boards or planks, also covered with tar or other preventive of moisture.

"On this foundation, one plan is to set square blocks on end, arranged like a checker-board, the alternate rows being shorter than the others, so as to leave narrow grooves or channel-ways to be filled with small broken stone or gravel, and then pouring over the whole melted tar or pitch, whereby the cavities are all filled and cemented together. The other plan is to arrange the blocks in rows transversely across the street, separated by a small space (of about an inch) by strips of board at the bottom, which serve to keep the blocks at a uniform distance apart, and then filling these spaces with the same material as before. The blocks forming the pavement are about eight inches high. The alternate rows of short blocks in the first plan and the strips of board in the second plan should not be higher than four inches.

"The patent has four claims, the first two of which, which are the only ones in question, are as follows: —

"'1. Placing a continuous foundation or support, as above described, directly upon the roadway; then arranging thereon a series of blocks having parallel sides, endwise in rows, so as to leave a continuous narrow groove or channel-way between each row, and then filling said grooves or channel-ways with broken stone, gravel and tar, or other like materials.

"'2. I claim the formation of a pavement by laying a foundation directly upon the roadway, substantially as described, and then employing two sets of blocks, — one a principal set of blocks that shall form the wooden surface of the pavement when completed, and an auxiliary set of blocks or strips of board, which shall form no part of the surface of the pavement, but determine the width of the groove between the principal blocks, and also the filling of said groove, when so formed between the principal blocks, with broken stone, gravel and tar, or other like material.'"

One defence was that the invention had been anticipated by previous patents. On this head the court said: —

"As claimed by him [the patentee], it is a combination of different parts or elements, consisting, as the appellant's counsel, with sufficient accuracy for the purposes of this case, enumerates them, first, of the foundation prepared to exclude moisture from beneath; second, the parallel-sided blocks; third, the strips between these blocks, to keep them at a uniform distance and to create a space to be filled with gravel and tar; and, fourth, the filling.

"Though it may be true that every one of these elements had been employed before, in one kind of pavement or another, yet they had never been used in the same combination, and put together in the same manner, as Nicholson combined and arranged them, so as to make a pavement like his. The one which makes the nearest approach to it, and might, perhaps, be deemed sufficiently like to deprive Nicholson of the merit of invention, is that of John Hosking, which, in one form, consisted of alternate rows of short and long blocks, the latter partially resting on the former by their being mutually rabbeted so as to fit together. The spaces thus formed between the longer blocks and on the top of the shorter ones were filled with loose stone and cement, or asphalt, substantially the same as in Nicholson's pavement. It would be very difficult to sustain Nicholson's patent if Hosking's stood in his way." . . . [But it did not so stand, Hosking's invention being first described in the English patent therefor, the specification of which was

not enrolled till after Nicholson had completed his invention and laid down a pavement for trial.]

"Stead's patent, enrolled in November, 1838, shows a plan of pavement consisting of a series of hexagonal, triangular, or square-sided blocks, standing close together on the surface of the roadway in a layer of sand, and being a little smaller at the bottom than at the top, so as to admit a packing of sand, or pitch and sand, in the interstices between them, below the surface. Small recesses at the top around the edges of the blocks are suggested, apparently for giving a better hold to the horses' feet. It had no prepared foundation like Nicholson's, and no spaces filled with gravel, &c.

"Parkins's patent, enrolled October, 1839, proposes a pavement to consist of blocks leaning upon each other, and connected together with a mixture of sand and bitumen, and connected by keys laid in grooves, and having grooves cut in the surface, either across the blocks or along their edges, to give the horses a better foothold. This plan exhibits no spaces to be filled with gravel or other filling.

"Wood's patent, enrolled in April, 1841, shows a pavement made of adjoining blocks fitted together, but alternately larger and smaller at the top, like the frustum of a pyramid, and not parallel-sided; those larger at the top standing slightly higher than the others, so that when pounded down, or pressed by rollers or loaded vehicles, they would act as wedges, binding the whole pavement more tightly together. No filling is used on the surface, and no prepared foundation is suggested. In one form of his pavement he describes continuous grooves, the grooves being formed of blocks which are shorter than the others, and states that the groove is to be filled with concrete, coal-tar, &c., mixed with gravel or sand; but there is no foundation described for the pavement; and the description given for laying down the pavement, namely, by ramming down the taller blocks after considerable surface has been covered by the pavement, shows that the road-bed on which the blocks are to be laid is to be a yielding one, capable of conforming itself to the under surface of the blocks in the same way as sand does to the ordinary stone pavement when the stones are rammed.

"Perring's patent, enrolled January, 1843, shows a pavement consisting, in one form, of blocks leaning one upon another in rows, with strips of board between the rows, coming to within an inch or so of the top of the pavement, and the same distance from the bottom, leaving gutters for the water underneath, and the adjoining rows being connected with pins passing through the strips of board. The rows are thus separated to enable the horses' feet to get a better hold. No filling is suggested, and, indeed, would not be admissible, as the boards have no support but the pins; and no prepared foundation is required.

"Crannis & Kemp's patent, enrolled Aug. 21, 1843, presents, amongst other things, first, a pavement consisting of rows of blocks adjoining each other, but each block having a small recess on one side, on the surface, to enable the horses to get a better foothold; secondly, a pavement of alternate blocks adjoining each other, but differing in width, and slightly differing in height, the top of one block being rounded off so as to make a groove next to the adjoining blocks, and the rounded blocks in one row alternating with the rectangular-topped blocks in the next row, the object of rounding off the alternate blocks being to give a foothold to the horses. This pavement is to be built on a flooring of plank, either of one or two thicknesses, but without any preparation to exclude moisture, and it has no filling in the depressions or grooves formed by rounding the alternate blocks.

"A French patent, granted to Hediard in 1842, shows a pavement constructed of rows of blocks laid on a board foundation, cemented together by a thin filling (four-tenths of an inch thick) of cement or mastic, from top to bottom; no provision being made to prevent the accession of moisture from the ground below, and no strips between the rows to keep them separate from each other.

"None of these pavements combine all the elements of Nicholson's, much less a combination of those elements arranged and disposed according to his plan. We think they present no ground for invalidating his patent, and no defence to this suit."

SCHILLINGER *v.* GUNTHER, 14 BLATCH. 152.

S. D. OF N. Y., 1877. SHIPMAN, J.

Plaintiff's reissued patent of May 2, 1871, for an improved

"concrete pavement . . . laid in sections, so that each section can be taken up and relaid without disturbing the adjoining section. With the joints of this sectional concrete pavement are combined strips of tar-paper or equivalent material, arranged between the several blocks or sections in such manner as to produce a suitable tight joint, and yet allow the blocks to be raised separately without affecting the blocks adjacent thereto."

The pavement was to be laid in a plastic state,

"either in moulds or between movable joints of the proper thickness, so as to form the edges of the concrete blocks *a a*, one block being formed after the other."

Full directions follow.

Alleged anticipating inventions were thus disposed of by the court:—

"Mr. Russ's invention consisted of a foundation pavement of concrete, which was afterwards to be covered with ordinary stone flagging. This sub-pavement of concrete was divided, in places where it covered a sewer or a drain, into panels, by bars of iron forming crosses, united by an eye-bolt, with a ring in the head of each bolt. When repairs were to be made upon the sewer, the panel could be lifted, without injury to the rest of the concrete, by suitable appliances attached to the ring.

"The Little patent was for a metallic framework, filled in with concrete blocks. Neither device had substantial similarity to the pavement of the plaintiff."

This patent was again sustained in the case of

SCHILLINGER *v.* GUNTHER, 17 BLATCH. 66,

S. D. OF N. Y., 1877. BLATCHFORD, J.,

where it was held, in addition, that a concrete pavement made "of cement, sand, and gravel, made plastic by water, and then laid in blocks, in a plastic state, at the place where it is to be used, and suffered to set or harden there," is not anticipated by a pavement made of "blocks of cement made elsewhere, and then laid, like bricks or flags, at the place of use."

BATES *v.* COE, 98 U. S. 31 (1878).

Patent for a screw-cutting and drilling machine. Anticipation. An extremely long case.

GOULD *v.* BALLARD, 13 O. G. 1081.

D. OF N. J., 1878. NIXON, J.

Reissued patent No. 7149, dated May 30, 1876, for "improvement in corner-clamps or protectors for trunks." Held, to be anticipated by Roulstone's patent, No. 27,476, dated March 13, 1860.

The complainant's invention, the court said,

"is a corner-clamp, made with an outwardly projecting bead at the corner, the bead being convex at the outer, and concave at the inner, side. . . . In the patent issued to Roulstone . . . the whole trunk, embracing sides, ends, top, and bottom, as well as corners, is made of corrugated metal plates or outwardly projecting beads, with an exterior convexity and an interior concavity. The object of the invention is the protection of the corners of a trunk, and it is done by the use of corrugated metal. When it is once demonstrated that the entire trunk may be improved and strengthened by covering it with corrugations, is there anything patentable or novel, or does it require invention, to apply to the covers of a wooden trunk substantially the same protection?"

GOTTFRIED *v.* BARTHOLOMAE, 13 O. G. 1128.

SAME *v.* FORTUNE BROS.

SAME *v.* SCHŒNHOFEN.

N. D. OF ILL., 1878. BLODGETT, J.

Holbeck & Gottfried's patent of May 3, 1864, for an improved mode of pitching the inside of barrels.

Blodgett, J.: —

"The complainants' invention consists of a device by which air is driven through fire by a fan or blower, where it becomes heated to a high temperature, whence it is forced by the blast into the barrels, so as to heat the inside of the barrels sufficiently to melt the pitch or resin which is used for the purpose of pitching the insides, so that it will readily flow into the cracks or pores of the wood. The cask is then closed, and rolled until the melted resin has covered the entire inner surface."

The air was conveyed from a chamber directly above the fire, through a pipe into the barrel. One advantage of this process was that the intensity of the fire was increased by blowing through it the air which was to be heated by it; another advantage was that the air to be heated, coming into direct contact with the hot fire, became decomposed, and its oxygen was in great part consumed, whereby, in spite of the high temperature of the gaseous products that passed into the barrel, all danger of their burning the barrel was removed.