A TREATISE

ON THE

LAW OF PATENTS

FOR USEFUL INVENTIONS,

AS ENACTED AND ADMINISTERED

IN THE UNITED STATES OF AMERICA.

BY

GEORGE TICKNOR CURTIS.

FOURTH EDITION,

REVISED AND ENLARGED.

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PREFACE TO THE FOURTH EDITION.

THE first edition of this work, published in 1849, has been the foundation of all the succeeding ones. The second was published in 1854; the third, in 1867. The present edition is believed to contain references to most of the important decisions in England and in this country that have appeared since the edition of 1867. In preparing it for the press, I have been ably assisted by Mr. E. S. DRONE, of the New York Bar, whose abstracts of the recent decisions and of the statute of 1870 have been made and adapted to my text, with clearness and precision.

NEW YORK, November 1, 1873.

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NOTE. — The references, unless otherwise indicated, are to the sections, and not to the pages. Where the volume of Webster's Patent Cases is not given, the reference must be understood to be to the first.

PRELIMINARY OBSERVATIONS.

WRITERS on the law of patents for useful inventions have often introduced their discussions of this branch of the law, by tracing the history of monopolies in the law of England. This example has not been followed in the present work, because it is believed that it tends to encourage incorrect conceptions of the legal nature of a patent privilege. A patent for a useful invention is not, under our law, or the law of England, a grant of a monopoly, in the sense of the old common law. It is the grant by the government to the author of a new and useful invention, of the exclusive right, for a term of years, of practising that invention. The consideration, for which this grant is made by the public, is the benefit to society resulting from the invention; which benefit flows from the inventor to the public in two forms: *first*, by the immediate practice of the invention under the patent; and, *secondly*, by the practice of the invention, or the opportunity to practise it, which becomes the property of the public on the expiration of the patent. As the exercise of the invention is wholly within the control of him who has made it, who may confine his secret entirely within his own breast, it is apparent that his consent to make it known and available to others, and finally to surrender it to the public, becomes a valuable consideration, for which, upon the principles of natural justice, he is entitled to receive compensation, in some form, from the public to whom that consideration passes. Inventors, in this respect, stand upon the same broad ground with authors. Both of these classes of persons have created something intellectual in its nature,

the knowledge of which it is desirable to others to possess. Both of them have, at first, the complete right of disposition over that which they have created; and when they part with the exclusive possession of this knowledge, and confer upon others the opportunity of reaping the benefits which it confers, they manifestly consent to something for which they are entitled to receive an equivalent.

Whether we regard the knowledge, remaining for the present in the exclusive control of him whose intellectual production it is, as property, or as a possession of ideas, to which some other term might be more appropriate, it is still a possession, of which the owner cannot by any rule of natural justice be deprived, without his consent. In this view it may, as it seems to me, justly be termed property; for although in political economy, and in common speech, material possessions, or the rights growing out of them, are the objects generally included under that term, yet no one will question that ideas constitute, in ethical contemplation, a portion of a man's possessions entirely under his own control; and in the case of useful inventions, or of written thought, there is to be added to the power of control the further economical fact, that other men will part with valuable possessions of all kinds, in order to obtain that invention or writing in exchange. For these and for other reasons, which I have endeavored more fully to develop elsewhere, in relation to the rights of authors, I do not hesitate to affirm, that in natural justice, — the ethics of jurisprudence, by which civil rights are to be examined, apart from all positive law, but on which positive law is usually founded, — the intellectual conception of an inventor, or a writer, constitutes a valuable possession, capable of being appreciated as a consideration, when it passes by his voluntary grant into the possession of another. If, by the same voluntary grant, this possession is bestowed upon the public, the logical justice of compensation, in some form, will appear at once, by supposing the benefit to have been

conferred exclusively upon any one of the mass of individuals who form in the aggregate the moral entity termed the public.

Let us suppose that A, by the exertion of his inventive faculties, has ascertained that by placing matter in certain positions to be operated upon by the forces of nature, a result will be produced, in the shape of an instrument, wholly unknown before, and capable of being usefully applied to the wants of mankind. Let us suppose that B, seeing the result, but wholly ignorant of the process by which it may be attained, desires to possess that instrument. Common gratitude would prompt him to return something valuable for it, if it were given to him; common policy would lead him to offer something for it, if it were not freely given; and common justice requires that he should not take it without an equivalent. How does it alter the case, if, instead of a single specimen of the instrument, we suppose A to have retained in his recollection the process by which copies of that instrument may be indefinitely multiplied, and that it is the secret process of making the thing, the intellectual conception and knowledge, which B desires to possess? If he obtains it, he can make the thing for his own use, or for the use of others, and by so doing can acquire valuable possessions in exchange; all of which A could do exclusively by retaining his own secret. But if he imparts that secret to B, he is surely entitled to receive for it some reward or remuneration.

This secret the inventor undertakes to impart to the public when he enters into the compact which the grant of a patent privilege embraces. In that compact he promises, after the lapse of a certain period, to surrender to the public completely the right of practising his invention; and, as a guaranty against his concealment of the process by which it is to be practised, and to prevent the loss of this knowledge, he is required to deposit in the archives of the government a full and exact description in writing of the whole

process, so framed that others can practise the invention from the description itself. The public, on the other hand, through the agency of the government, in consideration of this undertaking of the inventor, grants and secures to him the exclusive right of practising his invention for a term of years.

In all this, a patent right, under the modern law of England and America, differs essentially from one of the old English Monopolies. In those grants of the crown, the subject-matter of the exclusive privilege was quite as often a commodity of which the public were and long had been in possession, as it was any thing invented, discovered, or even imported by the patentee.

Nothing passed in such cases from the patentee to the public in the nature of a consideration for the enormous privilege conferred upon him; but the public were robbed of something already belonging to them, viz., the right to make or deal in a particular commodity, for the benefit of the favored grantee of the crown. So broad is the distinction between these cases and that of the meritorious inventor or importer of something new and useful, that when Parliament, in the 21 James I., taking encouragement from the courts of law, prohibited the granting of exclusive privileges in trade, by the Statute of Monopolies, they introduced an exception in favor of "letters-patent and grants of privilege for the term of one and twenty years or under, heretofore made, of the sole working or making of any manner of new manufacture, within this realm, to the first and true inventor or inventors of such manufactures, which others at the time of the making of such letters-patent and grants did not use, so they be not contrary to law, nor mischievous to the state, by raising the prices of commodities at home, or hurt to trade, or generally inconvenient," &c.

Upon this exception, the law of England, concerning Patents for Useful Inventions, stands to this day.

The modern doctrine, in England, and undoubtedly the

doctrine of our law, is, that in the grant of a patent right, a contract, or, as it has been said, a bargain, takes place between the public and the patentee. As far as the old cases on the subject of monopolies furnish, like other cases of grants by the crown, rules and analogies for the construction of this species of grant, so far the history of monopolies has a bearing upon this branch of jurisprudence. But it should always be remembered that in the grant of a patent privilege, as now understood, a contract takes place between the public and the patentee, to be supported upon the ground of mutual considerations, and to be construed, in all its essential features of a bargain, like other contracts to which there are two parties, each having rights and interests involved in its stipulations.

It is necessary also to have clear and correct notions of the true scope of a patent right, because its nature and character will show whether there is any close analogy between such privileges and those to which the term monopoly is correctly applied. In this connection, therefore, I shall attempt a brief general description of the subject of protection, in patent rights; without, however, designing to lay down definitions, or to draw exact lines, within or without which controverted cases may fall; but solely with the purpose of stating certain general principles and truths, the application and development of which may be found to assist, in particular cases, the solution of the question, whether a particular invention or discovery is by law a patentable subject.

In this inquiry it is necessary to commence with the process of exclusion; for although, in their widest acceptation, the terms "invention" and "discovery" include the whole vast variety of objects on which the human intellect may be exercised, so that in poetry, in painting, in music, in astronomy, in metaphysics, and in every department of human thought, men constantly invent or discover, in the highest and the strictest sense, their inventions and dis-

coveries in these departments are not the subjects of the patent law. Another branch of jurisprudence, of a kindred nature, aims at the protection and establishment of property in literary productions, and in some of those which fall within the province of the fine arts. The patent law relates to a great and comprehensive class of discoveries and inventions of some new and useful effect or result in matter, not referable to the department of the fine arts. The matter of which our globe is composed is the material upon which the creative and inventive faculties of man are exercised, in the production of whatever ministers to his convenience or his wants. Over the existence of matter itself he has no control. He can neither create nor destroy a single atom of it; he can only change its form, by placing its particles in new relations, which may cause it to appear as a solid, a fluid, or a gas. But under whatever form it exists, the same matter, in quantity, that was originally created, exists now, and, so far as we now know, will forever continue to exist.

The direct control of man over matter consists, therefore, in placing its particles in new relations. This is all that is actually done, or that can be done, namely, to cause the particles of matter existing in the universe to change their former places, by moving them, by muscular power or some other force. But as soon as they are brought into new relations, it is at once perceived that there are vast latent forces in nature, which come to the aid of man, and enable him to produce effects and results of a wholly new character, far beyond the mere fact of placing the particles in new positions. He moves certain particles of matter into a new juxtaposition, and the chemical agencies and affinities called into action by this new contact produce a substance possessed of new properties and powers, to which has been given the name of gunpowder. He takes a stalk of flax from the ground, splits it into a great number of filaments, twists them together, and laying numbers of the

threads thus formed across each other, forms a cloth, which is held together by the tenacity or force of cohesion in the particles, which nature brings to his aid. He moves into new positions and relations certain particles of wood and iron, in various forms, and produces a complicated machine, by which he is able to accomplish a certain purpose, only because the properties of cohesion and the force of gravitation cause it to adhere together and enable the different parts to operate upon each other and to transmit the forces applied to them, according to the laws of motion. It is evident, therefore, that the whole of the act of invention, in the department of useful arts, embraces more than the new arrangement of particles of matter in new relations. The purpose of such new arrangements is to produce some new effect or result, by calling into activity some latent law, or force, or property, by means of which, in a new application, the new effect or result may be accomplished. In every form in which matter is used, in every production of the ingenuity of man, he relies upon the laws of nature and the properties of matter, and seeks for new effects and results through their agency and aid. Merely inert matter alone is not the sole material with which he works. Nature supplies powers, and forces, and active properties, as well as the particles of matter, and these powers, forces, and properties are constantly the subjects of study, inquiry, and experiment, with a view to the production of some new effect or result in matter.

Any definition or description, therefore, of the act of invention, which excludes the application of the natural law, or power, or property of matter, on which the inventor has relied for the production of a new effect, and the object of such application, and confines it to the precise arrangement of the particles of matter which he may have brought together, must be erroneous. Let us suppose the invention, for the first time, of a steam-engine, in one of its simplest forms, the use of steam as a motive-power having never

been discovered before. Besides all the other powers of nature, of which the inventor avails himself almost without thought, by which the different parts of his machine are held together and enabled to transmit the forces applied to them, he has discovered and purposely applied the expansive power of steam, as the means of generating a force that sets his machine in motion. All that he actually does with the matter in which this expansive power resides is to turn certain particles of water into vapor, and to bring that vapor in contact with an obstructing mass of matter, to which it communicates motion, by pushing it from its place. But the invention consists in observing and applying this natural power, the expansive force of steam, to produce the effect or result of moving the obstructing mass of matter from the place where it was at rest. It would be singularly incorrect and illogical to say that a man who should take a certain other quantity of water, and convert it into a certain other quantity of steam, and bring that steam in contact with a certain other obstructing mass of wood or iron, for the purpose of moving it, would not produce the same effect by the same means, as the person who first discovered and applied the expansive power of steam to move a piece of wood or iron.

Again, let us take the case of an improvement in the art of manufacturing iron, which consisted in the discovery that a blast of air introduced into a smelting furnace in a heated state produces an entirely different effect on the iron manufactured from the ore, to that produced by blowing the furnace with cold air. What the inventor did, in this case, was to introduce a certain amount of caloric into the blast of air, on its passage from the blowing apparatus into the furnace, thereby creating a blast of a new character, productive of a new effect; and any other person who should introduce caloric into a certain other quantity of atmospheric air, and use that air, so heated, to blow a smelting furnace, would do precisely the same thing. The inven-

tion consisted in the discovery and application of the law or fact, that heated air produces a different effect from cold air, in a particular art, and in thereby accomplishing a new result in that art.

In these and in all other cases, there is a particular arrangement of matter, which consists in the new relations and positions in which its particles are placed. But beyond this, there is also the effect or result produced by the action of the forces of nature, which are for the first time developed and applied, by the new arrangement of the matter in which they reside. The use and adaptation of these forces is the direct purpose of the inventor; it is as new as the novel arrangement of the particles of matter; and it is far more important. In fact, it is the essence and substance of the invention: for if no new effect or result, through the operation of the forces of nature, followed the act of placing portions of matter in new positions, invention would consist solely in new arrangements of particles of inert matter, productive of no new consequences beyond the fact of such new position of the particles.

However inadequate, therefore, the term may be, to express what it is used to convey, it is obvious that there is a characteristic, an essence, or purpose of every invention, which, in our law, has been termed by jurists its *principle*; and that this can ordinarily be perceived and apprehended by the mind, in cases where the purpose and object of the invention does not begin and end in form alone, only by observing the powers or qualities of matter, or the laws of physics, developed and put in action by that arrangement of matter, and the effect or result produced by their application. Even in cases where the subject of the invention consists in form alone, the principle or characteristic of the invention is the result produced by the aid and through the action of the qualities of matter. As, for instance, to take the simplest case: if I make a round ball, for the first time, of clay, or stone, or wood, I do so by putting the particles of matter in

those relations and positions in which, through the attraction of cohesion which holds them together, the result of spherical form will be produced; and this result, so produced, is the essence or principle of the invention. In the case of inventions which are independent of form, we arrive at the principle of the invention in the same way. As if I, for the first time, direct a column of steam against a piece of wood or iron, for the purpose of producing motion, the characteristic or principle of my invention consists in the use and application of the expansive force of steam and the effect of motion thereby produced; and these remain logically the same, whether the form and size of the wood or iron, and the form or size of the column of steam are the same as mine, or different.

It is apparent, then, that the mere novel arrangement of matter, irrespective of the purpose and effect accomplished by such arrangement through the agency of natural forces or laws, or the properties of matter, is not the whole of invention; but that the purpose, effect, or result, and the application of the law, force, or property by means of which it is produced, are embraced in the complex idea of invention, and give the subject of the invention its peculiar character or essence. And if this is true, it is easy, — and as correct as it is easy, — to advance to the position that the discovery and application of a new force or law of nature, as a means of producing an effect or result in matter never before produced, may in some cases be the subject of a patentable invention. When it has been laid down that a "principle," — meaning by this use of the term a law of nature, or a general property of matter, or rule of abstract science, — cannot be the subject of a patent, the doctrine, rightly understood, asserts only that a law, property, or rule cannot, in the abstract, be appropriated by any man; but if an inventor or discoverer for the first time produces an effect or result, practically, by the application of a law, he may so far appropriate that law, as to be entitled to say,

that whoever applies the same law to produce the same effect or result, however the means, apparatus, forms, or arrangements of matter may be varied, practises or makes use of his invention, unless the variation of means, apparatus, method, form, or arrangement of matter introduces some new law, or creates some new characteristic, which produces or constitutes a substantially different result. For, in all such cases, the peculiarity of the invention consists in the effect produced by the application of the natural law, as an agent; and this effect is not changed by the use of different vehicles for the action of the agent, provided there is still the same agent operating substantially in the same way, to produce substantially the same effect or result.

This may be illustrated by several inventions or discoveries, for which patents have been granted, and which have been the subjects of litigation. One of the most striking of these cases is that already mentioned, of the application of a hot-air blast to the production of a particular effect in the manufacture of iron. It is very easy to say, in general terms, that no man can appropriate to himself the use of caloric, which is a substance, or element, or force in nature, bountifully supplied, as the common property of mankind. But if any man has discovered that the use of caloric in a particular manner, never before observed, will, as a universal fact, produce a particular effect of a new charac er upon matter, what reason can exist why he should not appropriate to himself the production of that effect by the use of that particular agent? His appropriation, in such a case, would embrace strictly what he has invented. It may be more or less meritorious; it may have been more or less difficult or easy of discovery; it is still his invention, and any one else who does the same thing after the inventor, however he may vary the particular means or apparatus, practises that invention which the inventor was the first to discover and announce to the world. If the patent law were to say, in this case, that the invention or discovery could not

be appropriated by him who had made it, because caloric is the common property of all men, it would be obliged, in consistency, to say that a certain arrangement of wood and iron, constituting a new machine, could not be appropriated by the inventor, because cohesion, gravitation, and the laws of motion, which are all applied by the inventor to the accomplishing a certain effect, are the common property of every man. But the patent law does not come to such determinations. It proceeds upon the truth, that while the properties of matter, the forces or elements of nature are common property, any man who applies them to the production of a new and useful effect in matter may rightfully claim to have been the inventor of that application to the purpose of that effect. The effect itself is what is commonly regarded as the patentable subject; but as that particular effect must always be produced by the application of the same properties of matter, or the same forces or elements in nature, it is correct to say that the appropriation rightfully includes their application to the production of the effect, and that to this extent they may be appropriated.

Inventions which consist in the application of the known qualities of substances extend the appropriation of the inventor to those qualities in the same manner and in the same sense. For instance, in the case of Walton's improvement in the manufacture of cards for carding wool, &c., which consisted in giving elasticity and flexibility to the backs of the cards, by making the sheet on the back, in which the teeth are inserted, of india-rubber, instead of leather. The qualities of elasticity and flexibility in india-rubber were common property; but this did not prevent the inventor from sustaining a patent, which was held to cover the general ground of giving to the backs of cards elasticity and flexibility derived from india-rubber, by whatever form of application of the india-rubber the effect might be produced.[1]

[1] See *post*, § 312, § 322–327.

In the same manner, inventions which consist in the application of a well-known law of physical science involve and admit of the appropriation of that law in its application to the production of the particular effect, however the machinery or apparatus may be varied. There is a known law of physics, that the evaporation of a liquid is promoted by a current of air, and this law is common property. An invention of certain improvements in evaporating sugar consisted in applying this law by forcing atmospheric air through the liquid syrup by means of pipes, the ends of which were carried down nearly to the bottom of the vessel containing the solution; and it is obvious that any person who should apply the same law to the same purpose, though by a different apparatus, would practise the same invention. Although, therefore, it is not safe, in reasoning upon the patent law, to lay down general rules of an abstract character, with the purpose of describing what every inventor appropriates to himself, without regard to the particular circumstances of the invention, yet it is, on the other hand, equally unsafe to assume, because the properties of matter, or the laws of physics, or the forces of nature are common property, that no inventor can establish a claim of a general character, irrespective of particular methods or forms of matter, to the application of such properties, laws, or forces in the production of a certain effect.

It is, in truth, wholly incorrect to say that the inventor in such cases, because his patent is held to embrace such a general claim, monopolizes the law, property, or quality of matter which he has applied by a particular means to the accomplishment of a certain end. His patent leaves the law, property, or quality of matter precisely where it found it, as common property, to be used by any one, in the production of a new end by a new adaptation of a different character. It appropriates the law, property, or quality of matter only so far as it is involved in the subject with which, the means by which, and the end for which the inventor

has applied it; and this application constitutes the essence and substance of the invention in all cases, and is in reality what the patentee has invented. He cannot be deprived of it without violating the principles on which all property in invention rests, and denying the whole policy of the patent law. The test which marks the extent and nature of his just appropriation is the same that is applicable to every invention.

This test may be stated thus: That the truth, law, property, or quality of matter, which, by reason of its application, enters into the essence of an invention, may be appropriated, to the extent of every application which, according to the principles of law and the rules of logic, is to be deemed piracy of the original invention.

One of the most well-settled as well as soundest doctrines of the patent law is, that where form, arrangement of matter, proportion, method of construction, or apparatus employed are not of the essence of the invention, any changes introduced in them which do not effect a change in the characteristic or purpose of the invention, are changes in immaterial circumstances. When the patent is a patent for form, or particular arrangement, or for the apparatus devised to accomplish a particular effect, changes in these respects will be changes in the subject-matter of the invention; but in cases where the invention has a characteristic or an aggregate of characteristics, independent of particular form, method, arrangement, or apparatus, changes in these things amount only to the substitution of one equivalent for another, unless they cause a change in the characteristic, essence, or, as it is commonly called, the *principle* of the invention. This is very clearly seen in the case of machinery. The characteristic or principle of the invention consists in producing a certain effect by the application of motion, through a form of apparatus adapted to that result. But if the same effect of the combined operation of the different parts of the mechanism can be produced by substituting a different con-

trivance, which does not change the characteristic of the machine, but is a mere equivalent for the part for which it is substituted, such a substitution is only a different mode of practising the same invention.

In this sense, all inventions are independent of form, except those whose entire essence, purpose, and characteristics begin and end in form alone; as would be the case with the manufacture of a sphere or a cube for the first time; and as is the case with all manufactures, the utility and advantage and proposed object of which depend on form. But where there is a purpose that does not begin and end in form alone, where the form or arrangement of matter is but the means to accomplish a result of a character which remains the same through a certain range of variations of those means, the invention is independent of form and arrangement to this extent, that it embraces every application of means which accomplishes the result without changing its nature and character. In other words, it may be stated as a general proposition, that in the characteristic or principle of an invention are embraced the truth, law, property, or quality of matter which is applied to the production of a result, and the result of such application; and that, by reason of such application, the truth, law, property, or quality of matter is appropriated, to the extent of all other applications which a jury, under the guidance of the law, shall consider as a piracy of the former.

In coming to this result, the patent law establishes no monopoly beyond the fair fruits of actual invention. It protects the real inventor in the enjoyment of what he was the first to produce; and it recognizes, as substantive inventions, all changes which may be produced in the same line of experiment, or in the same department of labor, which introduce new characteristics, new results, or new advantages not embraced by the former invention. As long as the patent law exists at all to afford protection to the labors

of ingenious men, it must proceed upon this fundamental principle. It is now too late in the history of civilization to question the policy of this protection, which forms a prominent feature in the domestic polity of every nation which has reached any considerable stage of progress in the arts of civilized life.

It will be seen in the following pages how far these views have prevailed in the administration of the patent law, in England and America, and to what extent they have been developed in particular cases. They have led, in the construction of patents in England, to a somewhat different spirit from that which formerly animated the courts of law; for, formerly, the judges exercised their ingenuity to defeat every patent that came before them, if it could by possibility be defeated. This was done upon the notion, that a patent is the grant of a privilege against common right; and hence some judges were in the habit of saying that they were "not favorers of patents." But within the last forty years a different view has been adopted; the more just and liberal doctrine has been acted upon, that public policy requires the encouragement of the inventive powers of ingenious men, and that this policy is supported by every consideration of justice. The consequence has been, that the patent law has made greater advances, in England, within the last forty years, towards a consistent and admirable system of justice, than it has ever made before during the whole period that has elapsed since the enactment of the Statute of Monopolies.

In America, the more liberal policy has always prevailed, from the time when patent rights came under the protection of the general government; and the rule has been often laid down by the Courts of the United States with a good deal of strength, — as if in obedience to the spirit of the Constitution, — that patents ought to be construed liberally. Perhaps the general language which has thus been employed by judges would lead to the conclusion, that the leaning of the courts is, systematically, in favor of the pat-

entee and against the public; but this tendency has not been exhibited so strongly, in practice, as to derange the administration of the law.

The truth is, a patent should be construed as, what it really is, in substance, namely, a contract or bargain between the patentee and the public, upon those points which involve the rights and interests of either party. These points relate to the extent of the claim, and to the intelligibility of the description for the purposes of practice. The first is universally a question for the court; the last is generally a question for the jury, under the direction of the court. As to the first question, the extent of the claim presents at once the relations between the patentee and the public; for it involves, among other things, the inquiry, whether the patentee has claimed any thing beyond what was really his own invention. If, in representing himself as the inventor of the thing for which he has asked and received a patent, the inventor has included in his claim any thing that existed before, he has made a representation untrue in point of fact; and whether he has made this representation intentionally or unintentionally, the grant of the patent proceeds upon it, and, if it is not true, the grant is not supported by an existing consideration, such as the inventor has represented it to be. In determining this question whether the patentee has really included in his claim something which he did not invent, two things are to be ascertained; *first*, whether he makes use of any thing not new; and *second*, whether that thing, according to the fair import of his language, is represented to be a part of the invention which he claims to have made. The fact of whether he makes use of any thing not new, is a question depending upon evidence, if it is not manifest on the face of the description. It is upon the second branch of the inquiry, whether the old thing is really included in the claim of invention, that the true principles of construction have to be applied. Recollecting, on the one hand, that if the

public have been misled, the patent ought not to stand, because of the false representation; and, on the other hand, that a construction, which will destroy the patent, ought not to be adopted lightly, it would seem to be the true rule, to construe the patent fairly, and so as to arrive at the just import of the language in which the claim is set forth. But if, after applying this rule, the question remains doubtful whether the claim is not broader than the invention, then the rule should be adopted, in favor of the patent, that the patentee is to be presumed to have intended to claim no more than he has actually invented. Every patentee is presumed to know the law, and to know that if he includes in his claim something which he has not invented, his claim is void. Such a claim is a kind of fraud upon the public, with whom the applicant offers to enter into a contract, when he asks for his patent; and fraud is never to be presumed, but is always to be proved. The rule, therefore, which presumes, in doubtful cases, that the patentee intended to claim no more than his actual invention, is founded in a maxim of general application to contracts; and it will be seen, in practice, that it has no tendency to support patents which ought not to be supported, or to encourage loose and sweeping claims. In all cases which are not doubtful, — where it is manifest that the claim admits of no construction but that which makes it too comprehensive to be valid, — this rule will have no application. The imposition attempted will be apparent, and the fraud — so far as it is a fraud — will not require to be presumed, but will stand proved.

This rule, although not distinctly announced by any of our courts, has much to support it, in several authorities. Judges would seem to have had a rule of this kind in view, when they have construed patents under the guidance of the maxim, *ut res magis valeat, quam pereat.* The use of this maxim, which has often furnished the spirit of construction in particular cases, implies that the claim is to be

supported, if it can be done without a violation of principle. But the rule has been distinctly applied, in England, by the Court of Common Pleas, that the patentee is not to be presumed to have intended to claim things which he must have known to be in common use, although, in describing his invention, he has not expressly excluded them from the claim. There are also cases, in this country, where it has been held not to be necessary to use words of exclusion, in reference to details, where it appears from the whole description of the invention that the new is capable of being distinguished from the old.

The same rule, in cases of doubt, should be applied to the construction, where the question is, whether the patentee has claimed as much as he has invented; that is to say, the specification should be so construed as to make the claim coextensive with the actual invention, if this can be done consistently with principle.

But beyond this rule it is not necessary or wise to go, in the construction of patents. By giving the patentee the benefit of this presumption, in cases of doubt, the doubt will be removed, and the patent will remain good for the real invention. But where there is no room for doubt, and no occasion for the application of the rule, but the claim is manifestly broader or narrower than the real invention, there can be no hesitation about the judgment to be pronounced, especially since the provisions of our law, by which a patent may remain valid *pro tanto*, after the real invention of the party has been judicially ascertained.

THE LAW OF PATENTS.

THE LAW OF PATENTS.

CHAPTER I.

OF THE SUBJECT-MATTER FOR WHICH LETTERS-PATENT MAY BE GRANTED.

§ 1. The patent system of the United States, having grown up under a positive grant of authority in the Federal Constitution, is to be considered, in respect to the subjects of the exclusive privilege, with reference to that grant, and to the legislation which has been had under it. In England, the corresponding system has rested upon a proviso in the Statute of Monopolies, which excepted from the prohibitions of that act letters-patent granted by the crown for "the sole working or making of any manner of new *manufactures*, within this realm, to the first and true inventor or inventors of such manufactures, which others at the time of the making of such letters-patent and grants did not use, so they be not contrary to the law, nor mischievous to the state."

§ 2. The distinction thus established between those exclusive privileges which the crown may and those which it may not grant proceeds upon the principle, that a monopoly, in the prohibited sense, is a grant which restrains others from the exercise of a right or liberty which they had before the grant was made;[1] whereas the exclusive privilege intended to be secured by letters-patent for an invention contemplates something in which other persons than the inventor had not, before his invention, a right to deal, or which they had not a right to use, because it did not exist. Other persons than the first inventor of a thing had the same right to invent it that he had; but as he has been the first to invent it, the patent system — proceeding upon the policy of encouraging the exercise of inventive talent by securing to the

[1] Sir E. Coke's definition of a monopoly, 3 Inst. 181, c. 85.

inventor an original property, which, without protection, would have rested only upon a principle of natural justice—takes notice of the exclusive right of that first inventor, and makes it effectual by assuming that he who has first exercised the right of invention has bestowed something upon society which ought to procure for him thereafter, at least for a time, the exclusive right to make or use that thing.

§ 3. This being the leading idea of the patent system, the executive and judicial departments of the English government had for a long time no other guide by which to distinguish the proper subjects of patents, which the crown could lawfully grant, excepting the description in the proviso of the Statute of Monopolies. Accordingly, the English system of patents for inventions has grown up under the constructions given to the term "manufactures." Taking into view the clear policy intended by the proviso of the statute, and the principle, that while the subject could not lawfully be restrained in the exercise of any right of trade which he possessed before a particular grant to another, yet that he might be lawfully restrained from the exercise of any trade in respect to a thing which did not previously exist, and which another had invented, the English judges had to consider what could be regarded as falling within the meaning of the term "new manufactures." The term itself, as well as the purpose of the statute, evidently contemplated something to be done or produced in matter, as distinguished from a philosophical or abstract principle. The subjects of patents which could be lawfully granted were to be "new manufactures," or "the working or making of new manufactures," invented by the grantee, and which "others," at the time of the grant, "did not use." Hence, it was apparent that something of a corporeal nature, something to be made, or at least the process of making something, or of producing some effect or result in matter, or the practical employment of art or skill, and not theoretical conceptions or abstract ideas, must constitute the subjects of the exclusive privileges which the crown was authorized to grant.[1]

§ 4. But, subject to this restriction, the words "any manner of new manufactures," in the Statute of Monopolies, have received in construction a comprehensive import. According to the con-

[1] See the comments on the statute, in The King *v.* Wheeler, 2 B. & Ald. 349, 350.

struction of the courts, the word "manufacture" is used in the statute in a literal and a figurative sense. It is used in a literal sense, because it clearly includes any species of new manufactured article, or tangible product of industry; or a new machine, the construction or production of which, as an arrangement of matter, is the result at which the inventor aims. But when it is extended to include the mode of producing an old or well-known substance, or an old and well-known effect upon matter, by a new method or process, it seems to be used in a sort of figurative sense; because, in such cases, it is the method or process of producing the thing or the effect that is new, and is the real subject of the invention; and the manufacture, or the result attained in matter, is then made to stand in the place of the new method or process of attaining it.

§ 5. Thus, "manufacture" has been defined to be "something made by the hand of man";[1] and it has also been held to include the practice of making a thing, or of producing a result.[2] As in

[1] Per Lord Kenyon, in Hornblower *v.* Boulton, 8 T. R. 99.

[2] "It was admitted, at the argument at the bar, that the word 'manufacture,' in the statute, was of extensive signification; that it applied not only to things made, but to the *practice of making*, to principles carried into practice in a new manner, and to new results of principles carried into practice. Let us pursue this admission. Under *things made* we may class, in the first place, new compositions of things, such as manufactures in the most ordinary sense of the word; secondly, all mechanical inventions, whether made to produce old or new effects, for a new piece of mechanism is certainly a thing made. Under the *practice of making*, we may class all new artificial manners of operating with the hand, or with instruments in common use, new processes in any art producing effects useful to the public. When the effect produced is some new substance or composition of things, it should seem that the privilege of the sole working or making ought to be for such new substance or composition, without regard to the mechanism or process by which it has been produced, which, though perhaps also new, will be only useful as producing the new substance. Upon this ground Dolland's patent was perhaps exceptionable, for that was for a *method* of producing a new object-glass, instead of being for the object-glass produced. If Dr. James's patent had been for his *method for preparing* his powders, instead of the *powders themselves*, that patent would have been exceptionable upon the same ground. When the effect produced is no substance or composition of things, the patent can only be for the mechanism, if new mechanism is used, or for the process, if it be a new method of operating, with or without old mechanism, by which the effect is produced. To illustrate this. The effect produced by Mr. David Hartley's invention for securing buildings from fire is no substance, or composition of things; it is a mere negative quality, the absence of fire. This effect is pro-

Watt's patent for "a method of lessening the consumption of steam and fuel in fire-engines," which was held, after great consideration, to be a good subject-matter.[1] The distinction to which this case gave rise, and which greatly extended the meaning of the term "manufacture," is this: that although a principle, or a rule in mechanics, or an elementary truth in physics, cannot be the

duced by a new method of disposing iron plates in buildings. In the nature of things, the patent could not be for the effect produced. I think it could not be for making the plates of iron, which, when disposed in a particular manner, produced the effect; for those are things in common use. But the invention consists in the *method of disposing those plates of iron* so as to produce their effect; and that effect being a useful and meritorious one, the patent seems to have been very properly granted to him for *his method* of securing buildings from fire. And this compendious analysis of *new manufactures*, mentioned in the statute, satisfies my doubt, whether any thing could be the subject of a patent but something organized and capable of precise specification. But for the more satisfactory solution of the other points which are made in this case, I shall pursue this subject a little further. In Mr. Hartley's method, plates of iron are the means which he employs; but he did not invent those means; the invention wholly consisted in the new manner of *using*, or I would rather say of *disposing*, *a thing in common use*, and which every man might make at his pleasure, and which, therefore, I repeat, could not, in my judgment, be the subject of the patent. In the nature of things it must be that, in the carrying into execution any new invention, use must be made of certain means proper for the operation. Manual labor, to a certain degree, must always be employed; the tools of artists frequently; often things manufactured, but not newly invented, such as Hartley's iron plates; all the common utensils used in conducting any process, and so up to the most complicated machinery that the art of man ever devised. Now let the merit of the invention be what it may, it is evident that the patent, in almost all these cases, cannot be granted for the *means* by which it *acts*, for in them there is nothing new, and in some of them nothing capable of approbation. Even where the most complicated machinery is used, if the machinery itself is not newly invented, but only conducted by the skill of the inventor so as to produce a new effect, the patent cannot be for the machinery. In Hartley's case it could not be for the *effect* produced; for the effect, as I have already observed, is merely negative, though it was meritorious. In the list of patents with which I have been furnished, there are several for new methods of manufacturing articles in common use, where the sole merit and the whole effect produced are the saving of time and expense, and thereby lowering the price of the article, and introducing it into more general use. Now I think these *methods* may be said to be *new manufactures*, in one of the common acceptations of the word, as we speak of the manufactory of glass, or of any other thing of that kind. Per Eyre, C. J., in Boulton *v.* Bull, 2 H. Bl. 492.

[1] Boulton *v.* Bull, *ut supra;* Hornblower *v.* Boulton, *ut supra.*

subject of a patent, yet a new principle, rule, or truth, developed, carried out, and embodied in the mode of using it, may be the subject of a patent. A mere principle is an abstract discovery, incapable of answering the term "manufacture"; but a principle so far embodied and connected with corporeal substances, as to be in a condition to act and to produce effects in any art, trade, mystery, or manual occupation, becomes the practical manner of doing a particular thing. It is no longer a principle, but a process.[1] Mr. Watt's invention was the discovery of a practical means of lessening the consumption of steam, by protecting the cylinder from the external air, and keeping it at a temperature not below that of steam itself. He thus brought a principle into practical application, by the invention of a process carried on by a newly contrived machine.

§ 6. In like manner, a patent for the application of the flame of gas, instead of the flame of oil, to remove the superfluous fibres of lace, was sustained.[2] So, too, where the invention consisted in the use and application of lime and mine-rubbish in the smelting of iron, Lord Eldon said there might be a patent for a new combination of materials previously in use for the same purpose, or for a new method of applying such materials.[3] But this distinction has been made still more prominent by two more recent cases. In one the patent was for the application of anthracite, combined with hot-air blast, in the smelting or manufacture of iron from iron-stone, mine, or ore; and the patent was sustained.[4] in the other, the invention was of a mode of welding iron tubes, without the use of a maundril, or any internal support; and this patent was also sustained.[5]

§ 7. These cases show that the term "manufacture" has been extended to include every object upon which art or skill can be exercised, so as to afford products fabricated by the hand of man, or by the labor which he directs.[6] In this sense it includes a pro-

[1] See the remarks of Eyre, C. J., *ante*.

[2] Hall *v.* Jervis, Webs. Pat. Cas. 100.

[3] Hill *v.* Thompson, 3 Mer. 626; Webs. Pat. Cas. 237. In Morgan *v.* Seaward, 2 Mees. & W. 544, Mr. Baron Parke said: "The word 'manufacture,' in the statute, must be construed one of two ways; it may mean the machine when completed, or the mode of constructing the machine."

[4] Crane *v.* Price, Webs. Pat. Cas. 393, 408.

[5] Russell *v.* Cowley, Webs. Pat. Cas. 459.

[6] Webster's Law and Practice.

cess; so that a patent may, it is said, be taken for a process, method, or practical application of a principle, that will cover every means or apparatus by which that process or method can be carried on, or by which that principle can be applied, provided the patentee has not only discovered the principle, but has also invented some mode of carrying it into effect.[1] Such has been the construction given to this important clause in the Statute of Monopolies, upon which the English patent system has been built. The recent English statutes, which have employed only the word "inventions," when referring to the subjects of this class of patent privileges, manifestly assume that the settled law has sufficiently defined them.[2]

§ 8. In this country, when the Constitution of the United States was framed, and the clause was inserted giving power to Congress "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 terms "inventors" and "discoveries" had a well-understood meaning, founded not only upon the practice and law of England, but upon a similar practice of some of the States before the adoption of the Constitution, which, by special grants in particular cases, often protected new and useful inventions. Accordingly, in the first general patent law passed by Congress, and entitled "An act to promote the progress of useful arts," the subjects of the patent privileges to be granted were described as the invention or discovery of "any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used."[3] In the next statute, the phraseology was first introduced, which has since been employed, and was continued in the patent law of 1836, namely, "any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement on any art, machine, manufacture or composition of matter, not known or used before the application" for a patent.[4]

§ 8 *a*. The language of the present patent law (Act of 1870) is: "That any person who has invented or discovered any new and useful art, machine, manufacture or composition of matter, or any

[1] Forsyth *v.* Riviere, Webs. Pat. Cas. 97, note. Per Alderson, B., in Jupe *v.* Pratt, ibid. 146, and in Nielson *v.* Hartford, ibid. 342.

[2] 15 & 16 Vict. cap. 83 (July 1, 1852).

[3] Act of April 10, 1790.

[4] Act of February 21, 1793.

new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, 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 duty required by law, and other due proceedings had, obtain a patent therefor." [1]

§ 9. I. An Art. What is meant by the statute when it describes the subject of a patent as "any new and useful art," or "any new and useful improvement on any art," it is not difficult to understand, if we bear in mind the general purpose of the patent laws, and the other classes of subjects which they embrace. We have just seen that, in order to make a new process or method of working or of producing an effect or result in matter a subject of a patent in England, a somewhat liberal construction of the term "manufacture" became necessary, by which an improvement in the art or process of making or doing a thing was made constructively to be represented by the term which ordinarily would mean only the thing itself, when made or done. It was doubtless to avoid the necessity for this kind of construction that the framers of our legislation selected a term which, *proprio vigore*, would embrace those inventions where the particular machinery or apparatus, or the particular substances employed, would not constitute the discovery, so much as a newly invented mode or process of applying them, in respect to the order, or position, or relations, in which they are used. Thus, for example, in the art of dyeing or tanning, it is obvious that an old article of manufacture may be produced by the use of old materials, but produced by the application of those materials in new relations. In such cases it might not be practicable to claim the article itself, when made, as a new manufacture, for it might, as an article of commerce or consumption, differ in no appreciable way from the same kind of article produced by the old and well-known method. At the same time the new method of producing the article might be a great improvement, introducing greater cheapness, rapidity, or simplicity in the process itself. Again, other cases may be supposed, where the manufacture itself, as produced by a new process, would be better than the same manufacture produced by the old process, as in the different modes of making iron from the native ore; and yet the really new discovery, in

[1] § 24.

such cases, could not well be described as a new "manufacture" or a new "composition of matter" without a figurative use of those terms which it is desirable to avoid. This difficulty is avoided by the use of the term "art," which was intended to embrace those inventions where the particular apparatus or materials employed may not be the essence of the discovery, but where that essence consists in using apparatus or materials in new processes, methods, or relations, so as to constitute a new mode of attaining an old result; or a mode of attaining a new result, in a particular department of industry, which result may not of itself be any new machine, manufacture, or composition of matter; or finally, an entirely new process of making or doing something which has not been made or done before, by any process.

§ 10. A case which occurred before Mr. Justice Washington furnishes an illustration of an "art," as the subject of a patent. The plaintiff alleged himself to be the inventor of a new and useful improvement in the printing of bank-notes, which was said to furnish an additional security against counterfeiting. The invention, as summed up in his specification, was "to print copperplate on both sides of the note or bill; or copperplate on one side and letter-press on the other; or letter-press on both sides of a bank-note or bill, as an additional security against counterfeiting." The art of printing with both letter-press and copperplate was not the invention of the plaintiff. He made use of old materials and processes in a new manner, for the purpose of producing a new effect, namely, a new security against counterfeiting. His patent, therefore, was for the new application of the process of printing by copperplate and letter-press, by printing on both sides of the note; and this new application was held by the court to be an art, within the terms of the statute.[1]

§ 11. Another illustration is presented by a patent for a mode of casting iron rollers or cylinders, so that, when the metal was introduced into the mould, it should receive a rotary motion, by which the dross would be thrown into the centre instead of upon the surface of the cylinder. This was effected solely by changing the direction of the tube which conveyed the metal to the mould from a horizontal or perpendicular position to a direction approaching a tangent of the cylinder.[2]

[1] Kneass *v.* The Schuylkill Bank, 4 Washington's R. 9, 12.

[2] McClurg *v.* Kingsland, 1 Howard, 204. See also Gray *v.* James, Peters's Circ. C. R. 394.

§ 12. Another very instructive illustration is presented in a severely litigated case in England, where an old machine was made use of in a new process. This case exhibits in a striking manner the advantage of a statute provision by which a patent may be granted for an improvement in an "art." The plaintiff had taken a patent for an invention, which was one thing according to his real discovery, but which, as described by the title, specification, and claim, was in truth another thing. The improvement which he in fact invented constituted a new *process* in the art of spinning flax; while his patent was taken for a new or improved *machine* for spinning flax. Before his invention, the common machine for spinning fibrous substances was fitted with slides by which the "reach" (the distance between the retaining and the drawing rollers) could be varied according to the length of the staple or fibre of the article to be spun; and the well-known principle of spinning fibrous substances in a dry state was to vary the "reach," according to the length of the fibre, — the distance for spinning dry flax into thread being from fourteen to thirty-six inches. But it was not known before the plaintiff's discovery, that by macerating the flax it could be spun at a shorter "reach"; and the plaintiff had ascertained by his experiments that in a macerated state flax could be spun at a "reach" of two and one half inches, and that thereby a much finer thread could be produced than had previously been made in any machine driven by steam power. In order to accomplish this new process the plaintiff invented an apparatus for macerating the flax, which was then new, and he reduced the "reach" of the ordinary spinning machine to two and one half inches. But, unfortunately, his patent was taken, not for a process, or an improved process, of spinning flax, but for "new and improved *machinery* for macerating flax and other similar fibrous substances previous to drawing and spinning it, which is called the preparing it; and also for improved *machinery* for spinning the same after having been so prepared. The patent was thus made to cover not only the machinery employed, but two distinct parts of the machinery, namely, that for preparing and that for spinning the flax after it had been prepared. The former was a new invention of the plaintiff, but the defendant did not use it; he made use of another mode of macerating, which had been discovered subsequently. The latter part of the patent was used by the defendant; but he denied that the

placing of the rollers at the distance of two and one half inches, when they had been before placed at greater and less distances. was a patentable invention. As this was a material part of the invention claimed, and the only part used by the defendant, the question as to the validity of the patent necessarily turned upon the inquiry whether the plaintiff had made a new invention of a machine, or had made a patentable invention by changing the "reach" in the old spinning-machine. It was held, upon the greatest consideration, both at law and in equity, and finally in the House of Lords, that this part of the invention described in the patent and specification was not a patentable subject, as it was but the application of a machine already known and in use to the new macerated state of the flax.[1]

§ 13. This decision resulted necessarily from the improper form in which the invention was claimed. At the same time, it is clear that the plaintiff had made a very important invention. He had discovered, by a long course of experiments, that flax in a macerated state presents a much shorter fibre than it has in a dry state, and that this new state of the flax admits of its being spun at a very short "reach," so as to produce much finer thread than had been made before by any spinning-machine driven by power. The case is therefore not to be regarded as deciding that this real invention of the plaintiff could not be the subject of a patent, but that the patent before the court was invalid, because it *claimed* a subject not patentable. There can be no question that the plaintiff should have described his invention as an improved process in the art of spinning flax, making his improved process to consist, first, in reducing the flax to a state of maceration, and then spinning it at a "reach" of two and one half inches. There could then have been no ground to say that the use of the old spinning-machine (previously capable of spinning at variable distances), for the special purpose of spinning macerated flax, could not be the subject of a valid patent. When the invention in this case was claimed as a new *machine* or new *machinery* for spinning flax, on account of the adaptation of the spinning-machine to the new macerated state of the flax, the objection that it was only the use of an old machine on a new occasion was fatal to the patent. But if the patent had been obtained for a new process in the art of spinning flax, consisting of, first, the macera-

[1] Kay *v.* Marshall, 2 Webs. Pat. Cases, 34–84.

tion, then of the spinning at a shorter "reach" than that at which dry flax could be spun, this objection would not have prevailed; for the invention, as claimed, would not have consisted in altering the "reach" of the old machine, but in a process of spinning never before used.[1]

§ 14. Although there may be cases where a patent might be taken either for a process (that is, for a new art, or an improvement in an art) or for a new manufacture, or a new machine or combination of machinery, indifferently, yet it may often become necessary to ascertain whether the subject-matter of a particular patent which has been issued is a process or something else; because the alleged infringement may depend on the construction that is to be given to the claim of the patentee in respect to this question. Thus an important invention in the manufacture of iron, consisting of a new mode of rolling what are called puddler's balls, was announced in the preamble of the specification as "an improvement in the process of manufacturing iron." The real invention consisted in causing the mass of iron as delivered from the puddling furnace to pass between vibrating and reciprocating curved surfaces, which subjected it to a pressure that was found to expel the impurities of the metal in a better manner than the old methods of making puddler's balls. Now it is obvious that this inventor might either have taken a patent for a new machine operating upon this principle, and covering all devices which could be substituted so as to operate substantially in the same way, or he might have taken a patent for the new method or process of making puddler's balls by passing the metal through vibratory and reciprocating curved surfaces, and thus have entitled himself to cover all machinery which accomplished this process, provided he had given proper directions for the construction of some machinery by which this process could be applied. But the misfortune of his case was, that, while he claimed to have invented a process of manufacturing iron not before known, he so described the machine by which he effected the operation, and so ambiguously summed up his claim in respect to the machine, that the Supreme Court of the United States construed it to be a patent for a machine, and not for a process. It was held, therefore, that evidence on the part of the defendant that his machine differed in mechanical structure and mechanical action from the plain-

[1] See the note of Mr. Webster on this case, 2 Pat. Cases, 83.

tiff's, which had been rejected at the trial, should have been received and submitted to the jury.[1]

§ 14 *a*. The Supreme Court of the United States held, in a very recent case,[2] that a process and the product of a process may be both new and patentable, and are wholly disconnected and independent of each other. On this occasion, Mr Justice Swayne, in delivering the judgment of the court, remarked that "patentable subjects, as defined by the patent law [Act of 1836, § 6], are 'any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement on any art, machine, manufacture or composition of matter.' A machine may be new, and the product or manufacture proceeding from it may be old; in that case, the former would be patentable, and the latter not.

[1] Corning *v.* Burden, 15 Howard, 252. I am not disposed to dispute the correctness of this decision, although the specification manifestly disclosed a discovery of a new process, and as clearly evinced the intention of the patentee to secure the benefit of it. But the instrument was unskilfully constructed, and the decision of the court may be defended. But I must express my dissent from some of the comments made by the learned judge, who delivered the judgment of the court, upon the distinction between the patentable character of a process, and the patentable character of a machine. I agree with him, of course, in the observation that a process, *eo nomine*, is not the subject of a patent under our laws, and that it is included under the general term "useful art." But the explanations given by the learned judge of the distinction between a process and a machine, as the subjects of patents, seem to carry with them the idea that a patentable process is confined to such means or methods of producing a result as are not machinery; but that if the means or methods are effected by mechanism, or mechanical combinations, the patent must necessarily be for a machine. If this is a correct view of his meaning, I must dissent from it. A process may be altogether new, whether the machinery by which it is carried on be new or old. A new process may be invented or discovered, which may require the use of a newly invented machine. In such a case, if both the process and the machine were invented by the same person, he could take separate patents for them. A new process may be carried on by the use of an old machine, in a mode in which it was never used before, as in the example above referred to, of spinning macerated flax. In such a case, the patentability of the process in no degree depends upon the characteristic principle of the machine, although machinery is essential to the process, and although a particular machine may be required. The case of Le Roy *v.* Tatham, 14 Howard, 156, exhibits a similar instance of a claim so unfortunately constructed as not to embrace the new *process*, which was the real invention, but making the novelty to depend on the apparatus made use of.

[2] Rubber Company *v.* Goodyear (1869), 9 Wal. 788.

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 remark applies to processes and their results. Patentability may exist as to either, neither, or both, according to the fact of novelty, or the opposite. The patentability, or the issuing a patent as to one, in no wise affects the rights of the inventor or discoverer in respect to the other. They are wholly disconnected and independent facts. Such is the sound and necessary construction of the statute."

§ 15. These illustrations will suffice to show the importance of a careful discrimination between an improved process and an improved machine, manufacture, or composition of matter, when a specification is to be prepared,—a discrimination that must be guided by the nature of the invention and its essential character. In order to assist the reader in forming the habits of investigation on which such an inquiry is to be conducted, it may be useful now to proceed to the discussion of the following question: Assuming that an invention has been made, and that it is *primâ facie* to be regarded as a new process, and not a new manufacture or machine, in what is the novelty to consist, that will entitle the inventor to claim it as an improvement in an art, in distinction from an improved machine or manufacture or composition of matter? Thus, for example, supposing that the object of the process be to make a vendible article, useful in the arts, such as is described in the statute by the general term "composition of matter": must the article, when made by the new process, possess properties which render it more valuable than the same kind of article when made by the old process, or is it sufficient, in order to sustain a patent for the new process of making it, that the process itself is different from the old process, while the article itself is not improved in respect to its properties, and in what must that difference consist? Again: suppose that there is novelty, both in the process of manufacture, and in the article or substance produced; how should the patent be taken?

§ 16. One of the most simple cases of this kind is to be found in Hall's invention of a new process of manufacturing lace, by singeing off the superfluous fibres of the thread, by directing upon it a flame of gas. The flame of other substances had been

used for the same purpose before. The plaintiff did not rest his claim upon any particular apparatus for applying the flame of the gas, although he described an apparatus fit for the purpose. What he claimed was, the application of the flame of gas to the singeing of lace; and it appeared that the fibres of the thread could be more effectually removed by this process than by the use of other flames. The case, therefore, was one where the article manufactured by the new process may be said to have possessed other properties, namely, a superior finish, as compared with the article manufactured by the old process. The patent was sustained; and the case is, therefore, an authority for the position, that whether the process itself, or the means employed in the manufacture, be cheaper or dearer, simpler or more complex, than the old process, or means employed, yet if it be different in respect to the agency used, and the article produced by it is improved in quality, the process is patentable, as an improvement in the trade or art of manufacturing lace.[1]

§ 17. A similar case is that of an improvement in copperplate printing, consisting in a new mode of preparing the paper, by putting upon it a glazed enamelled surface, by means of white lead and size; the effect or advantage gained being the better exhibition of the fine lines of the engraving than could be attained by the old modes of preparing the paper.[2] So, also, in another case, where the object of the plaintiff's invention was to render fabrics water-proof, at the same time leaving them pervious to air. Before the plaintiff's patent, a solution of alum and soap was used, and the fabric to be rendered water-proof was immersed therein. But this produced a water-proof surface only, which was, moreover, not lasting. The plaintiff's new process consisted in immersing successively in two solutions, — first, in a solution of alum and carbonate of lime, and then in a solution of soap. The effect was to make each fibre of the cloth water-proof throughout, while the whole fabric remained pervious to air.[3] In these and similar cases, where it appears that a superior article is produced by a change in the method or process of making it, the true subject of the patent is the improved process, and it is supported as an invention by the improved effect, whether the process be dearer or cheaper, simpler or more complicated, than the old one.

[1] Hall *v.* Jarvis, 1 Webs. Pat. Cas. 100.
[2] Sturz *v.* De La Rue, 5 Russ. Chancery R. 322.
[3] Halliwell *v.* Dearman, 1 Webs. Pat. Cas. 401, note (*t*).

§ 18. Another very important case is presented by Crane's patent for "an improvement in the manufacture of iron"; the improvement consisting in a new process of making iron, followed by extremely important effects. Before the plaintiff's patent, the use of a hot-air blast, in the manufacture of iron with bituminous coal, was known, and the use of a cold blast, with anthracite coal, was known; but the plaintiff's invention consisted in a new process of making iron with a hot blast and anthracite coal. The effect of the change in the process was, that the yield of the furnaces was more, the nature, properties, and quality of the iron better, and the expense of making it less, than under the former process. Upon the question whether this was a patentable invention, Tindal, C. J., delivering the judgment of the Court of Common Pleas, said: "We are of opinion, that if the result produced by such a combination is either a new article, or a better article, or a cheaper article, to the public, than that produced before by the old method, that such combination is an invention or manufacture intended by the statute, and may well become the subject of a patent."[1] By defining this as a new "manufacture," the learned judge did not simply mean that the iron produced was a new iron; although, in respect to its being of better quality, it may be said to have been a new article of iron; since that which has new or superior properties is, in a metaphysical sense, a new thing, although it is still iron. But the word "manufacture" was here used, as it must be used, in reference to any new process, by an English judge, when dealing with such a case, as meaning the art or process of manufacturing. Keeping this in view, it will be seen that the comprehensive proposition laid down by the court in this case, and the comments which follow it, embrace the cases where the process itself presents the advantages of the change from the old to the new, or where the article manufactured presents such advantages, or where they appear both in the process itself and in the result of using the process. Thus, if the article made be either new or better, having different or superior properties, the advantages are presented by the thing itself, as made by the new process. If the article, as made by the new process, is of as good or better quality, and cheaper, the advantage of cheapness is gained by a more economical process than the old one, and the improvement appears in the process, while the article made by it

[1] Crane *v.* Price, 1 Webs. Pat. Cas. 375, 409.

may or may not be new; that is to say, may or may not possess other new properties than cheapness.

§ 19. There is a class of cases, some of which have been already mentioned, where the distinction between a mere process and a machine has come into view, in the construction of the particular patent in controversy, in pursuance of the general rule of construction, by which the real invention is to be beneficially secured to the patentee, if the terms of his specification will admit of it. These cases will come under review hereafter, in considering the application of this rule.

§ 20. II. A MACHINE. The next subject of letters-patent recited in the statute is a machine, or an improvement of a machine. 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.[1] A very concise statement of the distinction between a machine and a method or process is to be found in a *dictum* of Mr. Justice Heath: "When a mode of doing a thing is referred to something permanent, it is properly termed an engine; when to something fugitive, a method."[2] But without recurring to the distinction between a machine and a process, it may be said that a machine is rightfully the subject of a patent whenever a new or an old effect is produced by mechanism new in its combinations, arrangements, or mode of operation.

§ 21. If the subject of the invention or discovery is not a mere function, but a function embodied in some particular mechanism whose mode of operation and general structure are pointed out, and which is designed to accomplish a particular purpose, function, or effect, it will be a machine, in the sense of the patent law.[3] A machine is rightfully the subject of a patent when well-known effects are produced by machinery entirely new in all its

[1] Blanchard *v.* Sprague, 3 Sumner, 535, 540.

[2] Boulton *v.* Bull, 2 Hen. Blackstone, 463, 468. The meaning of the learned judge, expressed in a more amplified form, appears to be this: that an engine or machine has been invented, when mechanism has been constructed, which does something in a particular mode; and that a method or process has been invented, when the mode of doing a thing has been devised that is capable of being carried out by various mechanisms, and does not require one permanent mechanism.

[3] Blanchard *v.* Sprague, 3 Sumner's R. 535, 540.

combinations, or when a new or an old effect is produced by mechanism, of which the principle or *modus operandi* is new.[1] The word "machine," in the statute, includes new combinations of machines, as well as new organizations of mechanism for a single purpose. There may be a patent for a new combination of machines to produce certain effects, whether the machines constituting the combination be new or old. In such cases, the thing patented is not the separate machines, but the combination.[2] A single instance of such a combination is presented by the telescope, in which a convex and concave glass of different refracting powers are combined to make the object-glass.[3] What constitutes a claim for a combination only, and what will be a claim for the specific parts of a machine, as well as for the combination, is a question of construction on the patent and specification, the rules for which will be stated hereafter.

§ 22. The statute also makes a new and useful "improvement" of a machine the subject of a patent. A patent for the improvement of a machine is the same thing as a patent for an improved machine.[4] Improvement, applied to machinery, is where a specific machine already exists, and an addition or alteration is made, to produce the same effects in a better manner, or some new combinations are added, to produce new effects.[5] In such cases the patent can only be for the improvement, or new combination.[6] The great question, of course, when an alleged invention purports to be an improvement of an existing machine, is to ascertain whether it be a real and material improvement, or only a change of form. In such cases, it is necessary to ascertain, with as much accuracy as the nature of such inquiries admits, the boundaries between what was known and used before, and what is new, in

[1] Whittemore *v.* Cutter, 1 Gallis. 480; Boulton *v.* Bull, 2 H. Bl. 463, 468. When a mode of doing a thing is referred to something permanent, it is properly termed an engine; when to something fugitive, a method. Per Heath, J., in Boulton *v.* Bull.

[2] Barrett *v.* Hall, 1 Mas. 474; Evans *v.* Eaton, 3 Wheat. 454, 476, 506; Prouty *v.* Draper, 1 Story's R. 568; Park *v.* Little, 3 Wash. 196; Pitts *v.* Whitman, 2 Story's R. 609, Ames *v.* Howard, 1 Sumner, 482.

[3] Dolland's Case, Webs. Pat. Cas. 42, 43.

[4] Per Heath, J., in Boulton *v.* Bull, 2 H. Bl. 463, 482; and per Story, J., in Barrett *v.* Hall, 1 Mas. 475.

[5] Whittemore *v.* Cutter, 1 Gallis. 480.

[6] Ibid.; Odiorne *v.* Winkler, 2 Gallis. 51.

the *mode of operation*.[1] The inquiry, therefore, must be, not whether the same elements of motion, or the same component parts are used, but whether the given effect is produced substantially by the same mode of operation, and the same combination of powers, in both machines; or whether some new element, combination, or feature has been added to the old machine, which produces either the same effect in a cheaper or more expeditious manner, or an entirely new effect, or an effect that is in some material respects superior, though in other respects similar to that produced by the old machine.[2]

§ 23. This inquiry will therefore involve the question, whether the alleged improved machine operates upon the same principle as the former machine; or, in other terms, whether it produces the same effect by the same mechanical means, or by means which are substantially the same. One machine may employ the same mechanical power in the same way as another machine, though the external mechanism may be apparently different. At the same time a machine may have an external resemblance to another, and yet may operate upon a different principle.[3] It is therefore necessary, where the effect is the same, to determine whether the *modus operandi*, the peculiar method of producing the effect, is substantially the same. Where the effect is different, the test of a sufficient "improvement" to sustain a patent will be the character and importance of the effect itself.

[1] Whittemore *v.* Cutter, 1 Gallis. 478, 481. Whether an improvement is trifling and insignificant, or real and important, is a question for the jury. Losh *v.* Hague, Webs. Pat. Cas. 205.

[2] Whittemore *v.* Cutter, 1 Gallis. 478; Brunton *v.* Hawkes, 4 B. & Ald. 540.

[3] Barrett *v.* Hall, 1 Mas. 470. In this case, Mr. Justice Story said: "The true legal meaning of the principle of a machine, with reference to the Patent Act, is the peculiar structure or constituent parts of such machine. And, in this view, the question may be very properly asked, in cases of doubt or complexity, of skilful persons, whether the principles of two machines be the same or different. Now, the principles of two machines may be the same, although the form or proportions may be different. They may substantially employ the same power in the same way, though the external mechanism be apparently different. On the other hand, the principles of two machines may be very different, although their external structure may have great similarity in many respects. It would be exceedingly difficult to contend that a machine which raised water by a lever was the same in principle with a machine which raised it by a screw, a pulley, or a wedge, whatever in other respects might be the similarity of the apparatus."

§ 24. There may be a patent for an improvement of a machine that is itself the subject of an existing patent. It has been held in England, that a patent including the subject-matter of a patent still in force is valid, if the improvement only is claimed in the specification. In such cases, the new patent will come into force after the expiration of the old one, or it may be applied by using a license under the former patent, or by purchasing the specific machine which the former patent covers, before its expiration.[1]

It has also been held, that, in an action for an infringement of a patent, professing to be an improvement on a former patent, the specification of that former patent must be read. But it is not

[1] Crane *v.* Price, Webs. Pat. Cas. 333, 413. In this case, Sir W. C. Tindall, C. J., said: "Now, it is further argued, that, in point of law, no patent can be taken out which includes the subject-matter of a patent still running or in force. No authority was cited to support this proposition; and the case which was before Lord Tenterden, and in which he held, that where an action was brought for an infringement of improvements in a former patent granted to another person, and still in force, that the plaintiff must produce the former patent and specification; that at least affords a strong evidence that the second patent was good. (Lewis *v.* Davis, 3 Car. & P. 502.) The case of Harmar *v.* Playne (14 Ves. Jr., 130, 11 East, 101; Dav. Pat. Cas. 311; Fox, *ex parte*, 1 Ves. & B. 67) is a clear authority on the same point; and upon reason and principle there appears to be no objection. The new patent, after the expiration of the old one, will be free from every objection, and whilst the former exists, the new patent can be legally used by the public by procuring a license from Neilson, or by purchasing the apparatus from him, or some of his agents; and the probability of a refusal of the license to any one applying for it is so extremely remote, that it cannot enter into consideration as a ground of legal objection."

See also Fox, *ex parte*, 1 V. & B. 67. Mr. Webster puts this very clear illustration: "For suppose a particular article — starch, for instance — to be the subject of letters-patent, and that all the starch in the country was patent starch; there are attached to the making and selling of that article certain exclusive privileges; but the individual who has purchased it of the patentee has a right to sell it again, and to use it at his will and pleasure; the exclusive privileges are, in respect of that particular portion of the article so sold, at an end, and do not pursue it through any subsequent stage of its use and existence, otherwise every purchaser of starch would be obliged, according to the terms of the letters-patent, to have a license in writing, under the hand and seal of the patentee; the absurdity of which is manifest. Hence it is obvious, that if a person legally acquires, by license or purchase, title to that which is the subject of letters-patent, he may use it or improve upon it in whatever manner he pleases, in the same manner as if dealing with property of any other kind."

material whether a machine, made according to that specification of the first patent, would be useful or not, if it be shown that a machine, constructed according to the subsequent patent, is useful.[1]

§ 25. III. A MANUFACTURE. It has been stated, in a former part of this chapter, that the term "manufacture" was used in the English statute 21 Jac. 1, to denote any thing made by the hand of man; so that it embraces, in the English law, machinery, as well as substances or fabrics produced by art and industry.[2]

§ 26. We have seen also that it came, by construction, to include the process of making a thing, or the art of carrying on a manufacture; so that all the various objects which are now held in England to be the subjects of letters-patent are included under this term, which alone saves them out of the prohibition of the statute of monopolies.[3]

[1] Lewis *v.* Davis, Webs. Pat. Cas. 488, 489.

[2] In Boulton *v.* Bull, Heath, J., said: "The statute 21 Jac. 1 prohibits all monopolies, reserving to the king, by an express proviso, so much of his ancient prerogative as shall enable him to grant letters-patent, and grants of privilege, for the term of fourteen years and under, of the sole working or making of any manner of *new manufactures* within this realm, to the true and first inventor and inventors of such *manufactures*. What, then, falls within the scope of the proviso? Such manufactures as are reducible to two classes. The first includes machinery, the second, substances (such as medicines) formed by chemical and other processes, where the vendible substance is the thing produced, and that which operates preserves no permanent form. In the first class the machine, and in the second the substance produced, is the subject of the patent. I approve of the term 'manufacture' in the statute, because it precludes all nice refinements; it gives us to understand the reason of the proviso, that it was introduced for the benefit of trade. That which is the subject of a patent ought to be specified, and it ought to be that which is vendible, otherwise it cannot be a manufacture."

In Hornblower *v.* Boulton, 8 T. R. 99, Lord Kenyon defined the term as "something made by the hands of man." In The King *v.* Wheeler, 2 B. & Ald. 349, Abbott, L. C. J., defined it thus: "The word 'manufacture' has been generally understood to denote either a thing made which is useful for its own sake, and vendible as such, as a medicine, a stove, a telescope, and many others, or to mean an engine or instrument, or some part of an engine or instrument, to be employed, either in the making of some previously known article, or in some other useful purpose, as a stocking-frame, or a steam-engine for raising water from mines. Or it may perhaps extend also to a new process to be carried on by known implements, or elements, acting upon known substances, and ultimately producing some other known substance, by producing it in a cheaper or more expeditious manner, or of a better and more useful kind."

[3] See Hindmarch on Patents, p. 80.

§ 27. Our statute, however, having made an enumeration of the different classes of subjects which in England are held to be patentable, it is to be presumed that this term was used to describe one of these classes only, namely, fabrics or substances made by the art or industry of man, not being machinery.[1] 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 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 appears 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. These distinctions, however, are not vitally important, to be taken in the patent itself, since it is not necessary to the validity of a patent, that the thing should be

[1] Perhaps the best general definition of the term "manufacture," as the subject of a patent, would be, any new combination of old materials, constituting a new result or production, in the form of a vendible article, not being machinery. In one sense, all materials are old; as the amount of matter in existence does not depend on the will or the skill of man, whatever he uses is, in one sense, an old material. In this sense, therefore, all that he does, in producing a new manufacture, is to bring old materials into a new combination, and by so doing to produce a new result in matter. It is this new combination, carried into, or evinced by, a new result or production, that is the subject of a patent. The use of all the materials in other combinations may have been known before; but if they are used in a new combination, producing a new result, there will be a good subject for a patent for a "manufacture," as there is in respect to "machinery" when the same thing is effected. See Cornish *v.* Keene, Webs. Pat. Cas. 512, 517.

described with entire accuracy as "a machine" or "a manufacture." If the thing itself is correctly described, and it appears to be novel and useful, and unites all the other requisites of the statute, it may be left to general interpretation to determine whether the subject-matter ranges itself under the one or the other of these classes, or whether it partakes of the characteristics of both. But if the subject-matter be neither a machine nor a manufacture, or composition of matter, then it must be an art. There can be no valid patent, except it be for a thing made, or for the art or process of making or doing something.

§ 28. IV. A COMPOSITION OF MATTER. The last class of patentable subjects mentioned in the statute is described by the term "composition of matter." It includes medicines, compositions used in the arts, and other combinations of substances intended to be sold separately. In such cases, the subject-matter of the patent may be either the composition itself, the article produced, or it may be the mode or process of compounding it. Generally speaking, 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.

§ 29. With regard to this class of subjects, it is sufficient to observe, that the test of novelty must, of course, be, not whether the materials of which the composition is made are new, but whether the combination is new. Although the ingredients may have been in the most extensive and common use, for the purpose of producing a similar composition, if the composition made by the patentee is the result of different proportions of the same ingredients, or of the same and other ingredients, the patent will be good.[1] The patentee is not confined to the use of the same precise ingredients in making his compound, provided all the different combinations of which he makes use are equally new.[2]

§ 29 *a*. DESIGNS. By the Acts of 1842[3] and 1861, provision was made for granting letters-patent for designs. This class of articles is now embraced within the patent law of 1870, section 71 of

[1] Ryan *v.* Goodwin, 3 Sumner's R. 514, 518.

[2] Ibid.

[3] Act of 1842, ch. 263, § 3.

which provides: "That any person who, by his own industry, genius, efforts, and expense, has invented or produced any new and original design for a manufacture, bust, statue, alto-relievo, or bas-relief; any new and original design for the printing of woollen, silk, cotton, or other fabrics; any new and original impression, ornament, pattern, print, or picture, to be printed, painted, cast, or otherwise placed on or worked into any article of manufacture; or any new, useful, and original shape or configuration of any article of manufacture, the same not having been known or used by others before his invention or production thereof, or patented or described in any printed publication, may, upon payment of the duty required by law, and other due proceedings had the same as in cases of inventions or discoveries, obtain a patent therefor."[1] Patents for designs may be granted for the term of three years and six months, or for seven years, or for fourteen years, as the applicant may, in his application, elect.[2] Section 76 provides: "That all the regulations and provisions which apply to the obtaining or protection of patents for inventions or discoveries, not inconsistent with the provisions of this act, shall apply to patents for designs."

[1] Act of 1861, ch. 88, § 11.

[2] Act of 1870, § 73.

CHAPTER II.

OF THE QUALITIES AND POSITION OF AN INVENTION WHICH WILL MAKE IT THE SUBJECT OF LETTERS-PATENT.

§ 30. In the foregoing chapter, the different kinds or classes of inventions described in the statute as the subjects of letters-patent have been considered. It is now necessary to ascertain, with as much precision as the inquiry admits of, what is the nature and character of a supposed invention, that will entitle it to be the subject of a patent privilege. And it is to be observed, at the outset of this inquiry, that it is the *discovery* or *invention* of any *new* and *useful* art, machine, manufacture, or composition of matter, or any *new* and *useful improvement* on any of these things, which the statute makes the subject of a patent. One of the first questions to be considered, therefore, in this connection, is, whether there is any special quality or character necessary to a patentable invention, apart from its novelty and utility; and if so, what that quality or character is.

§ 31. In discussions on the patentable character of a particular subject, the question has often been raised, whether there is a "sufficiency of invention" to support a patent. This, it is said, does not depend on the quantity of thought, ingenuity, skill, labor, or experiment, or on the amount of money, which the inventor may have bestowed upon his production. And it is undoubtedly true, that, whether the invention was the result of long experiment and profound search, or of a merely accidental discovery, is not the essential ground of consideration in determining the patentable character of any subject.[1] Still, we read in many of the adjudged cases frequent discussions of the question, whether the inventive faculty has been at work in the production of a particular thing. And nothing is more common than to witness at the bar, in the trial of patent causes, a great expenditure of

[1] Crane *v.* Price, 1 Webs. Pat. Cas. 411; Earle *v.* Sawyer, 4 Mason, 6.

evidence and argument upon the inquiry whether a particular change from an old to a new article, process, method of operation, or combination amounts to an invention, within the meaning of the patent law.

§ 32. It may be doubted, whether all the different forms of stating or investigating the question of sufficiency of invention are any thing more than different modes of conducting the inquiry, whether the particular subject of a patent possesses the statute requisites of *novelty* and *utility*, both of which qualities must be found uniting in it. Thus it may, in a particular investigation, be necessary to consider, not whether an invention, in point of fact, *was* the result of much thought, design, or ingenuity, but whether it *may* have been so. It may not be necessary that there should be positive or direct evidence of the expenditure of more or less thought, design, or ingenuity, or of a greater or less degree of exercise of what is sometimes called the inventive faculty. Still, it may be important to see, that the possibility of there having been an exercise of that mental process which is called invention is not excluded by the character of the supposed product of the act or process of invention; because the possibility that the thing made, or the result produced, was arrived at by study and experiment, and not by mere accident, although not an ultimate test of the right to a patent, is one test by which we can determine whether there is a substantial novelty in the alleged invention, as compared with what existed before. While the law does not look to the mental process by which the invention has been reached, but to the character of the result itself, it may still require that the result should be such as not to exclude the possibility of some skill or ingenuity having been exercised. It requires this, because it requires that the subject-matter of a patent shall be something that has not substantially existed before, and is useful in contradistinction to being frivolous. Now, while a thing that is both new and useful may have been produced by accident, and not by design, yet it may also have been the fruit of study and design. If, however, the character of the alleged invention be such that no design or study could possibly have been exercised in its production, then its character tends strongly to show that it does not differ substantially from what had been produced before; or that it is frivolous and immaterial. While, therefore, the law does not regard the process by which an inven-

tion has been produced as a decisive test of its patentable qualities, it is often necessary to see whether the character of the invention excludes the possibility of thought, design, ingenuity or labor having been exercised in its production, or exercised to any considerable extent.

§ 33. Thus, if an alleged invention is absolutely frivolous and foolish, though it may have the element of novelty, in one sense, it is not the subject of a patent. So, too, mere colorable variations, or slight and unimportant changes, will not support a patent; as the immersion of cloth in a steam-bath, with the view of damping it, instead of immersing it in hot water; [1] and the substitution of steam as the means of heating hollow rollers over which wool was to be passed, instead of heating them by the insertion of hot iron bars.[2] In such cases, if the consequences resulting from the change are unimportant, and the change consists merely in the employment of an obvious substitute, the discovery and application of which could not have involved the exercise of the inventive faculty in any considerable degree, then the change is treated as merely a colorable variation, or a double use, and not as a substantive invention.[3]

§ 34. On the other hand, the comparative utility of the change, and the consequences resulting therefrom, may be such as to show that the inventive faculty may have been at work; and in such cases, though in point of fact the change was the result of accident, its comparative utility and importance will afford a test of the amount of invention involved in the change. Thus, in Crane's patent the invention consisted in the use of anthracite and hot-air blast, in the manufacture of iron, in the place of bituminous coal and hot-air blast; and the Court of Common Pleas said: "We are of opinion, that if the result produced by such a combination

[1] Rex *v.* Fussell, cited in Webster on the Subject-Matter of Patents, p. 26.

[2] Rex *v.* Lister, cited in Webster on the Subject-Matter of Patents, p. 26.

[3] The illustrations put by Lord Abinger, in Losh *v.* Hague, Webs. Pat. Cas. 208, present the distinctions here taken in an amusing form. "If a surgeon had gone to a mercer and said, 'I see how well your scissors cut,' and he said, 'I can apply them instead of a lancet, by putting a knob at the end,' that would be quite a different thing, and he might get a patent for that; but it would be a very extraordinary thing to say, that because all mankind have been accustomed to eat soup with a spoon, that a man could take out a patent because he says you might eat peas with a spoon."

be either a new article, or a better article, or a cheaper article to the public than that produced before by the old method, that such a combination is an invention or manufacture intended by the statute, and may well become the subject of a patent."[1] But if the change be immaterial, and productive of no beneficial result, so that the end can be attained as well without as with the supposed improvement, it will not support a patent.[2]

§ 35. A concise and lucid *dictum* of Buller, J., presents a capital test of the sufficiency of many inventions: "If there be any thing material and new, which is an improvement of the trade, *that* will be sufficient to support a patent."[3] The term "improvement of the trade" was obviously used by the learned judge in the commercial sense, meaning the production of the article as good in quality at a cheaper rate, or better in quality at the same rate, or with both these consequences partially combined.[4] There are many cases where the materiality and novelty of the change can be judged of only by the effect on the result; and this effect is tested by the actual improvement in the process of producing the article, or in the article itself, introduced by the alleged invention. To these cases this test is directly applicable. Thus, in Lord Dudley's patent, the change consisted in the substitution of pit-coal for charcoal in the manufacture of iron, and it was new both in the process of manufacture and in the constitution of the iron.[5] In Neilson's patent, the change consisted in blowing the furnace with hot air instead of cold; and in Crane's, the substitution of anthracite as fuel, in combination with the hot-blast. Both these

[1] Crane *v.* Price, Webs. Pat. Cas. 409. It has been suggested, that if the immersion of cloth in steam instead of hot water had been attended with any considerable improvement in the manufacture, the change would have been held a sufficient substantive invention to have supported a patent. Webster on the Subject-Matter, p. 26, note (*t*).

[2] In Arkwright's case, there was evidence that the filleted cylinder had been used before, both in the way in which he used it and in another way. Buller, J., said: "If it were in use both ways, that alone is an answer to it. If not, there is another question, whether the stripe in it makes any material alteration? For if it appears, as some of the witnesses say, to do as well without stripes, and to answer the same purpose, if you suppose the stripes never to have been used before, that is not such an invention as will support the patent." Rex *v.* Arkwright, Webs. Pat. Cas. 72, 73.

[3] Rex *v.* Arkwright, Webs. Pat. Cas. 71.

[4] See Mr. Webster's note on this *dictum*, *ut supra*.

[5] Webs. Pat. Cas. 14.

processes were great improvements, leading to a cheaper production of iron of as good or a better quality.[1] In Derosne's patent, the invention was by the application of charcoal in the filtering of sugar, being a change in the process of manufacture, so as to produce sugar in a way unknown before.[2] In Hall's case, the use of the flame of gas, to singe off the superfluous fibres of lace, effected completely what had been done before in an imperfect manner.[3]

§ 36. In these cases, the subject of each invention was not the particular machinery or apparatus by which the new application was to be made available, but it was the new application itself of certain known substances or agents, to produce a particular result, differing either in the process or in the article produced from the former methods of producing the same thing, and thereby producing a better article, or producing it by superior and cheaper processes. It is obvious that the result, in such cases, furnishes a complete test of the sufficiency of invention; because the importance of the result shows that, whether actually exercised or not, the possibility of the exercise of thought, design, ingenuity, and skill is not excluded. The merit is the same, whether the invention was the fruit of accident or design; because the merit consists in having realized the idea, and carried it out in practice. But if the idea and the practice involve no beneficial results, superior to what had been before attained, there could have been no scope for the exercise of the inventive faculty, because the result excludes the supposition of its having been exercised.

§ 37. The same test is also indirectly applicable to another class of cases, where a particular instrument or machine, or combination of machinery, is the subject of the patent. As in Arkwright's case, the gist of the objection was, that the alleged new machinery did not serve the purpose of spinning cotton better than the machinery formerly used.[4] In the case of Brunton's patent, which covered two inventions, the one was for an improvement in the construction of chain cables, and the other for an improvement in the construction of anchors. As to the first invention, chain cables had been formerly made with twisted links, a wrought-iron stay being fixed across the middle of the opening of

[1] Webs. Pat. Cas. 191, 273, 375.
[2] Ibid.
[3] Ibid. 97.
[4] The King *v.* Arkwright, Webs. Pat. Cas. 71.

each link to keep it from collapsing. The alleged improvement consisted in making the links with straight sides and circular ends, and in substituting a cast-iron stay with broad ends, adapted to the sides of the link, and embracing them. This combination of the link and the stay was calculated to sustain pressure better than the old form. The court considered the substitution of a broad-headed stay in the link, in place of a pointed stay, under the circumstances, a sufficient invention to support a patent, on account of the utility of the substitution, in connection with the principles to be carried out, viz., the resistance of pressure according to the action of forces.[1]

§ 38. In respect of the anchor, the invention consisted in making the two flukes in one, with such a thickness of metal in the middle, that a hole might be pierced through it for the insertion of the shank, instead of joining the two flukes in two distinct pieces by welding to the shank. The hole was made conical or bell-mouthed, so that no strain could separate the flukes from the shank, by which means the injury to the iron from repeated heating was avoided, only one heating being necessary to unite the end of the shank perfectly with the side of the conical hole. But it appeared at the trial that the improvement in the anchor was the avoiding the welding by means well known and practised in cases extremely similar. It was a case of the simple application of a mode known and practised for a similar purpose in other like cases; and it did not appear that anchors so made were superior to those which had been made before. The court were therefore

[1] Brunton *v.* Hawkes, 4 B. & Ald. 540, 550. Abbott, C. J., said: "As at present advised, I am inclined to think that the combination of a link of this particular form, with the stay of the form which he uses, although the form of the link might have been known before, is so far new and beneficial, as to sustain a patent for that part of the invention, if the patent had been taken out for that alone." Bayley, J., said: "The improvement in that respect, as it seems to me, is shortly this; so to apply the link to the force to operate on it, that that force shall operate in one place, namely at the end; and this is produced by having a bar across, which has not the defect of the bar formerly used for similar purposes. The former bars weakened the link, and they were weak themselves, and liable to break, and then if they broke, there might be a pressure in some other part. Now, from having a broad-ended bar instead of a conical one, and having it to lap round the link instead of perforating it, that inconvenience would be avoided; and therefore the present impression on my mind as to this part of the case is, that the patent might be supported."

unanimously of opinion that the patent, in respect of the anchor, could not be sustained.[1]

§ 39. It appears, then, according to the English authorities, that the amount of invention, as being sufficient or insufficient to support a patent, may be estimated from a compound view of the change effected, and the consequences of that change. If the change introduced is so considerable as to warrant the conclusion that it may have been the result of thought, skill, and design, and the consequences produced by it are important and considerable, there will be, it is said, a sufficiency of invention. But in applying this test, it is obviously necessary to view the change and its consequences as a sum, and to see whether both, taken together, are considerable or inconsiderable, important or unimportant. The change alone may be very slight, or in point of fact accidental; yet, if it leads to consequences and results of great practical utility, as in the case of Dudley's, Crane's, Hall's, and Daniel's inventions, and others above mentioned, the condition of a sufficiency of invention is satisfied. But if both change and consequences are inconsiderable and unimportant, the condition is not satisfied.[2]

§ 40. I am persuaded, however, that at least under our statute the question of the patentability of an invention depends upon its satisfying the statute requisites of novelty and utility, after the subject is ascertained to belong to one or the other of the classes mentioned in the statute.[3] I shall proceed, therefore, to the consideration of those statute requirements, drawing the illustrations of their proper scope and application alike from the English and the American decisions. And first, as to the requisite of *novelty*.

§ 41. The subject-matter of a supposed invention is new, in the sense of the patent law, when it is substantially different from what has gone before it; and this substantial difference, in cases where other analogous or similar things have been previously known or u , is one measure of the sufficiency of invention to support a patent. Our courts have, in truth, without always

[1] Ibid.

[2] Webster on the Subject-Matter, pp. 29, 30.

[3] There are some observations by Mr. Justice Nelson, in the case of McCormick *v.* Seymour, 2 Blatch. 240, 243, which appear to me accurately to describe the qualities belonging to a patentable invention.

using the same terms, applied the same tests of the sufficiency of invention, which the English authorities exhibit, in determining whether alleged inventions of various kinds possess the necessary element of novelty. That is to say, in determining this question, the character of the result, and not the apparent amount of skill, ingenuity. or thought exercised, has been examined; and if the result has been substantially different from what had been effected before, the invention has been pronounced entitled to a patent; otherwise, the patent has failed.[1]

§ 42. Thus, where the patent was for an improvement in *copperplate* printing of bank-notes, by printing copperplate on both sides of the note, or copperplate on one side, and letter-press on the other, or letter-press on both sides, *as an additional security against counterfeiting;* and the defendants had used steel-plate printing; the question was, whether "copperplate printing" included "steel-plate printing." The plaintiff's counsel contended, that even if copperplate did not include steel-plate printing, still the use of the latter by the defendants, applied to bank-notes, to produce the effect stated in the patent, was a mere evasion, and virtually an infringement. Washington, J., instructed the jury, that if the use of steel plates was an *improvement* upon printing from copperplates, for which a patent might have been obtained by the inventor, the use of steel plates by the defendants could with no propriety be considered as an infringement of the plaintiff's right, unless it appeared that they had also used the plaintiff's improvement.[2]

§ 43. This is in substance the test applied by Mr. Justice Buller, of "any thing material and new that is an improvement of the trade."[3] If the process of printing by steel plates was an improvement, in the manufacture of notes, upon the process of printing by copperplates, so as to be a benefit to the trade, of manufacturing notes, it would have been a substantive invention, and therefore not an infringement upon the plaintiff's patent, if standing alone.

§ 44. So, too, upon the clause in the former statute, "that

[1] The application of these tests is most frequently found in cases, not where insufficiency of invention has been expressly the ground of defence, but where the question has been, whether the patent did not claim something that was not new.

[2] Kneass *v.* The Schuylkill Bank, 4 Wash. 9, 11.

[3] Cited *ante.*

simply changing the form or proportion of any machine shall not be deemed a discovery," Mr. Chief Justice Marshall held that the word "simply" was of great importance; that it was not every change of form or proportion which was declared to be no discovery, but that which was *simply* a change of form or proportion, and nothing more. If by changing the form and proportion a new effect is produced, there is not simply a change of form and proportion, but a change of principle also. The question will be, therefore, whether the change has produced a different effect.[1] If the result of a change is beneficial in a considerable degree, its character will reflect back upon the change itself, and aid in determining its extent.[2]

§ 45. In like manner, Mr. Justice Livingston decided that a patent was invalid, upon substantially the same test as that of Mr. Justice Buller. The patent was for an alleged invention in folding and putting up thread and floss cotton in a manner different from the ordinary mode, so that it would sell quicker, and for a higher price than the same cotton put up in the common way. The article itself was imported, and underwent no change. The whole of the improvement consisted in putting up the skeins or hanks in a convenient quantity for retailing, with a sealed wrapper, and a label containing the number and description of the article. The court declared that the invention, upon the patentee's own showing, was frivolous; that it was in no way beneficial to the public, not making the article itself any better, or altering its quality in any way. In other words, it was no "improvement of the trade" of making the article sold, but it was a mere improvement in the art of selling it, by which the retailer could get a higher price for the same article than could be obtained by putting it up without the label.[3]

[1] Davis *v.* Palmer, 2 Brock, 298, 310. See also Pettibone *v.* Derringer, 4 Wash. 218, 219.

[2] Hall *v.* Wiles, 2 Blatchford, 194–200.

[3] Langdon *v.* DeGroot, 1 Paine's C. C. R. 203. The learned judge said: "The invention is for folding the thread and floss cotton in a manner a little different from the ordinary mode, in which form the cotton will sell quicker and higher by twenty-five per cent than the same cotton put up in the common way. The cotton thus folded is imported from the factory of Holt, in England. The article itself undergoes no change; and the whole of the improvement — for it is a patent for an improvement — consists in putting up skeins of it, perhaps of the same size in which they are imported, decorated with a label and wrapper; thus rendering their appearance somewhat more attractive,

§ 46. So, too, where the question was whether, in a patent for a machine for making wool-cards, the patentee had not claimed what had been substantially done before, — his claim being for the whole machine, which comprehended several distinct operations or stages in the manufacture, — Mr. Justice Story said the question was, whether either of these effects had been produced in the machines formerly in use by a combination of machinery, or mode of operation substantially the same as in the machine of the patentee. That it would not be sufficient to protect the plaintiff's patent, — it being for the whole machine, — that his specific machine, with all its various combinations and effects, did

and inducing the unwary, not only to give a preference to other cotton of the same fabric, quality, and texture, but to pay an extravagant premium for it. When stripped of these appendages, which must be done before it is used, the cotton is no better in any one respect than that of Holt's retailed in the way put up by him. All this came out on the plaintiff's own testimony.

"Now, that such a contrivance — for with what propriety can it be termed a useful art, within the meaning of the Constitution? — may be beneficial to a patentee, if he can exclude from the market all other retailers of the very same article, will not be denied; and if to protect the interest of a patentee, however frivolous, useless, or deceptive his invention may be, were the sole object of the law, it must be admitted that the plaintiff has made out a satisfactory title to his patent.

"But if the utility of an invention is also to be tested by the advantages which the public are to derive from it, it is not perceived how this part of his title is in any way whatever established. Is the cotton manufactured by himself, which is put up in this way? The very label declares it to be that of another man. Is any thing done to alter its texture or to render it more portable, or more convenient for use? Nothing of this kind is pretended. Does the consumer get it for less than in its imported condition? The only ground on which the expectation of a recovery is built is, that he pays an enormous additional price, for which he literally receives no consideration.

"It is said that many ornamental things are bought of no intrinsic value, to gratify the whim, taste, or extravagance of a purchaser, and that for many of these articles patents are obtained. This may be so; but in such cases there is no deception, no false appearances; and the article is bought to be used with all its decorations and ornaments, which may have been the principal inducements to the purchase, and which will last as long as the article itself. In this the sight or pride of the party is gratified. But here it is the cotton alone which it is intended to buy, and the little label and wrapper appended to it, and which constitute the whole of the improvement, however showy, are stripped off and thrown away before it can be used. And when that is done, which may be at the very moment of its purchase, the cotton is no better, whatever the buyer at the time may think, than when it first left the factory.

not exist before; because, if the different effects embraced in it were all produced by the same application of machinery, in separate parts, and he merely combined them, or added a new effect, such combination would not sustain his patent for the whole machine;[1] that is to say, without looking at the apparent

"When Congress shall pass a law, if they have a right so to do, to encourage discoveries, by which an article, without any amelioration of it, may be put off for a great deal more than it is worth and is actually selling for, it will be time enough for courts to extend their protection to such inventions, among which this may be very fairly classed."

[1] Whittemore *v.* Cutter, 1 Gallis. 478. In this case, the learned judge said: "It is difficult to define the exact cases when the whole machine may be deemed a new invention, and when only an improvement of an old machine; the cases often approach very near to each other. In the present improved state of machinery, it is almost impracticable not to employ the same elements of motion, and, in some particulars, the same manner of operation, to produce any new effect. Wheels, with their known modes of operation, and known combinations, must be of very extensive employment in a great variety of new machines; and if they could not, in the new invention, be included in the patent, no patent could exist for a whole machine embracing such mechanical powers.

"Where a specific machine already exists, producing certain effects, if a mere addition is made to such machine, *to produce the same effects* in a better manner, a patent cannot be taken for the whole machine, but for the improvement only. The case of a watch is a familiar instance. The inventor of the patent lever, without doubt, added a very useful improvement to it; but his right to a patent could not be more extensive than his invention. The patent could not cover the whole machine as improved, but barely the actual improvement. The same illustration might be drawn from the steam-engine, so much improved by Messrs. Watt and Boulton. In like manner, if to an old machine some new combinations be added, to produce *new effects*, the right to a patent is limited to the new combinations. A patent can in no case be for an effect only, but for an effect produced by 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; and therefore, if new effects are produced by an old machine in its unaltered state, I apprehend that no patent can be legally supported, for it is a patent for an effect only.

"On the other hand, if *well-known effects* are produced by machinery in all its combinations *entirely new*, a patent may be claimed for the whole machine. So, if the principles of the machine are new, either to produce a new or an old effect, the inventor may well entitle himself to the exclusive right of the whole machine. By the principles of a machine (as these words are used in the statute) is not meant the original elementary principles of motion, which philosophy and science have discovered, but the *modus operandi*, the peculiar device or manner of producing any given effect. The expansive powers of steam, and

amount of skill or invention involved in bringing these several modes of operation into one machine, which was not the invention claimed, if the result accomplished thereby did not differ substantially, in respect to the processes embraced in it, from what had been done before in separate machines, the subject-matter claimed as the invention was not new.

§ 46 *a*. So, too, where the claim was for "an elastic erasive pencil head," the court viewed it as a claim to "a piece of india-rubber

the mechanical powers of wheels, have been understood for many ages: yet a machine may well employ either the one or the other, and yet be so entirely new, in its mode of applying these elements, as to entitle the party to a patent for his whole combination. The intrinsic difficulty is to ascertain, in complicated cases like the present, the exact boundaries between what was known and used before, and what is new, in the *mode of operation*.

"The present machine is to make cotton and woollen cards. These were not only made before the present patent, by machinery, but also by machinery which, at different times, exhibited very different stages of improvement. The gradual progress of the invention, from the first rude attempts to the present extraordinary perfection, from the slight combination of simple principles to the present wonderful combinations, in ingenuity and intricacy scarcely surpassed in the world, has been minutely traced by the witnesses on the stand.

"The jury, then, are to decide whether the principles of Mr. Whittemore's machine are altogether new, or whether his machine be an improvement only on those which have been in use before his invention. I have before observed that the principles are the *mode of operation*. If the same effects are produced by two machines by the same mode of operation, the principles of each are the same. If the same effects are produced, but by a combination of machinery operating substantially in a different manner, the principles are different.

"The great stages (if I may so say) in making the cards by Whittemore's machine, which admit of a separate and distinct operation in the machinery, are, — 1. The forming and bending the wire; 2. The pricking the leather; 3. The sticking the wire into the leather; and, 4. The crooking the wire after its insertion. Were either of these effects produced in the machines formerly in use by a combination of machinery or mode of operation substantially the same as in this machine? If so, then clearly his patent could only be for an improvement, and of course it is void; if not, then his patent is free from any objection on the ground of being broader than his invention. It will not be sufficient, to protect the plaintiff's patent, that this specific machine, with all its various combinations and effects, did not exist before; for if the different effects were all produced by the *same application* of machinery in separate parts, and he merely combined them together, or added a new effect, such combination would not sustain the present patent, any more than the artist, who added the second-hand or repeater to a watch, could have been entitled to a patent for the whole watch."

with a hole in it," and held it to be invalid for want of invention.[1]

§ 47. On the other hand, where the patent claimed, as the invention of the party, a new and useful improvement in the making of friction-matches, by means of a new compound, and it was said that the ingredients had been used before in the making of matches, the court said that the true question was, whether the materials had been used before in the same combination, and if not, that the combination was patentable, however apparently simple it might be. That is to say, if the result at which the inventor had arrived — the production of a friction-match, by a particular combination of materials — was new, there was a sufficiency of invention, without looking at the apparent facility or difficulty of accomplishing it.[2]

§ 48. So, too, where it was said in the defence that a machine for cutting ice was but an application of an old invention to a new purpose, it being likened to the common carpenter's plough, the court distinguished the machine from every thing that had been made before, by pointing out that such a combination of apparatus had not been known before.[3]

[1] The Rubber Tip Pencil Co. *v.* Howard (1872), 9 Blatchf. 490.

[2] Ryan *v.* Goodwin, 3 Sumner's R. 514, 518. In this case, Mr. Justice Story said: "It is certainly not necessary that every ingredient, or, indeed, that any one ingredient, used by the patentee in his invention, should be new or unused before for the purpose of making matches. The true question is, whether the combination of materials by the patentee is substantially new. Each of these ingredients may have been in the most extensive and common use, and some of them may have been used for matches, or combined with other materials for other purposes. But if they have never been combined together in the manner stated in the patent, but the combination is new, then, I take it, the invention of the combination is patentable. So far as the evidence goes, it does not appear to me that any such combination was known or in use before Phillip's invention. But this is a matter of fact, upon which the jury will judge. The combination is apparently very simple; but the simplicity of an invention, so far from being an objection to it, may constitute its great excellence and value. Indeed, to produce a great result by very simple means, before unknown or unthought of, is not unfrequently the peculiar characteristic of the very highest class of minds."

[3] Wyeth *v.* Stone, 1 Story's R. 273, 279. In this case, Mr. Justice Story said: "Assuming the patent to be for the machinery described in the specification, and the description of the invention in the specification to be, in point of law, certainly and correctly summed up, (points which will be hereafter considered,) I am of opinion that the invention is substantially new. No such

§ 49. But where an invention was claimed to be a mode by which the back of a rocking-chair could be reclined and fixed at any angle required, by means of a certain apparatus, the patent was declared void, because the same apparatus or machinery had been long in use, and applied, if not to chairs, at least in other machines, to purposes of a similar nature.[1] An examination of the result attained by the plaintiff showed that he had accomplished nothing which had not been done before, but had merely applied an old contrivance to a new purpose.

§ 50. The question will arise, then, in reference to any supposed invention, in what is the novelty to consist? or, in other words, what is the nature of the change that has been effected, which will entitle it to the protection of a patent? It is a leading general principle on this subject, as we have already seen, that there must be something more than a change of form, or of the juxtaposition of parts, or of the external relations of things, or of the order or arrangement in which things are used. The change, or the new combination or relations, must introduce or embody some new mode of operation, or accomplish some effect not before produced. This is what is called, in the judicial sense, introducing a new principle. But then it is plain, from the nature of this subject, that no rules can be laid down which will admit of application to all supposable cases. All that can be done in the way of exhibiting the doctrines which are to be applied in judicial inquiries into the novelty of inventions, is to classify the adjudged

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 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. This opinion does not rest upon my own skill and comparison of the machine with the carpenter's plough; but it is fortified and sustained by the testimony of witnesses of great skill, experience, and knowledge in this department of science."

[1] Bean *v.* Smallwood, 2 Story's R. 408, 410.

cases, and to observe the illustrations which they furnish of the different modes in which this patentable requisite of novelty may present itself. One class of the adjudged cases consists of those in which the supposed invention has been held to be nothing more than a double use, or double application, of what had in fact existed before; and another class embraces the cases where there has been held to be something involved which may be the subject of a patent.

§ 50 *a*. In a case in the Circuit Court for the Southern District of Ohio, the improvement claimed related mainly to the construction of portable steam-engines. The most desirable qualities in this class of machines were stated to be compactness and lightness, combined with strength and simplicity, so as to adapt them to purposes of transportation. The invention consisted, according to the specification, "in the arrangement of a hollow continuous bed-plate between the boiler and the engine, upon which, and to which, the entire working parts of the latter are supported and attached; the hollow bed-plate being for this purpose provided with suitable flanges on its upper and outer sides, by which the operative parts of the engine are supported and secured to it; there being others cast on its under side, by means of which the bed-plate itself is attached or riveted to the boiler. This hollow continuous casting, or bed-plate, may be also used as a heater for the supply water. By this plan the engine will be rendered insulated, as it were, from the boiler, so that the relative position of its working parts to each other cannot be affected by the expansion and contraction of the boiler so as to impair their regular and easy working; and, on the other hand, the boiler will not be subject to the injurious effects of the vibration and direct straining of the operative parts when at work. . . . The bed-plate, if desired, may be used as a heater for the supply of water, by passing the exhaust steam, as it escapes from the cylinder, through a pipe suitably arranged within the bed-plate."

The claim of the patentees was construed by the court to embrace: 1. A hollow continuous bed-plate placed between the boiler and the engine; 2. The bed-plate to have flanges on 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. The essence of the invention consisted in the construction of the bed-plate and its lateral attachment to the engine.

To defeat the claim of novelty in this case, evidence was adduced to show the prior existence of a similar bed-plate; this plate consisted of a frame cast in one or four pieces, the sides consisting of hollow boxes from four to eight inches square, and extending the whole length of the boiler. The frame was placed upon it, while 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 by bolts or rivets. Both the bed-plate and engine were directly over the boiler. Feed-pipes for the supply of water were introduced into the bed-plate, along which the exhaust steam from the cylinder was passed, thus heating the water before its entrance into the boiler. The object of the feet or flanges on the plate was to effect, as far as possible, the insulation of the engine. Admitting that there were striking points of analogy between the two engines, the court, in deciding in favor of the validity of the patent, concurred with the scientific experts that the differences were not merely mechanical, but were radical in their character, and pointed out the essential diversities to be in two particulars: 1. The bed-plate covered by the complainant's patent was a single continuous shell or tube, giving a combination of lightness and strength not found in other similar structures; 2. The engine was attached to the outer side of the bed-plate, instead of being placed upon it, or over the boiler.[1]

[1] Blandy *v.* Griffith (1868), 3 Fisher's Pat. Cas. 609. In delivering the judgment of the court, Mr. Justice Swayne said: "Here are certainly some striking points of analogy to the engine of the complainant. 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 above 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 con-

§ 50 *b*. In the case of Stimpson *v*. Woodman,[1] the invention claimed consisted in producing a pebbled or boarded grain or finish on leather, by subjecting it to the pressure of a short revolving cylinder or roller of metal, having the required design or figure engraved on its surface. But this machine was antedated by another, substantially the same in its combination and arrangement, and in its working and effect upon the leather, except that the metallic roller in the latter had a smooth, and in the former a figured surface. It further appeared that this figured roller was old, and had been used in pebbling leather by pressure. Upon this state of facts, it was held that the engraving or stamping of the figure upon the surface of the smooth roller, or the substitution of the old figured roller for the purpose, involved simply mechanical skill, and was therefore not patentable.

§ 50 *c*. An important case, illustrating the sufficiency of invention, is that of Treadwell *v*. Parrott,[2] decided by the Circuit Court for the Southern District of New York, in 1866. The invention claimed consisted in the improvement of cast-iron cannon, by surrounding them with wrought-iron hoops or bands, in the manner described, so as greatly to increase their strength. The patentee disclaimed the discovery of "hoops generally in making cannon, as the earliest cannon known were formed in part by hoops brazed upon them"; but limited his invention to "constructing cannon with hoops screwed and shrunk upon a body in which the calibre is formed in the manner herein described."

cur. It is not our business to form any opinion of the *comparative* value of the complainant's engine. The question is not whether the invention is better or worse than its predecessors, but whether it is new, useful, and different from any thing before used or known. Those who hold the negative are at liberty to use any thing 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."

[1] (1869), 10 Wal. 117. At the trial in the Circuit Court (3 Fisher's Pat. Cas. 98), the court was asked to charge the jury in substance that if the plaintiff's machine had been anticipated in every part of its construction except the figures or designs on the roller, which roller was old, he was not entitled to recover. The refusal to give this instruction was regarded as erroneous by the Supreme Court of the United States, and the judgment rendered by the Circuit Court for the plaintiff was reversed. In the Appellate Court, Mr. Justice Clifford, placing a different construction upon the claims of the patentee, delivered a dissenting opinion.

[2] 3 Fisher's Pat. Cas. 124; s. c. 5 Blatchf. 369.

According to the mode of construction described, the cannon was cast, having at its largest part a diameter about twice as great as the calibre. It was then bored, the outside turned, and a screw cut on the body. Hoops or rings of wrought iron, having a diameter about one-thousandth part less than that of the body to be encircled, after being expanded sufficiently by heat, were screwed upon the body of the cannon, where contraction was caused by a change from heat to cold. The gun might thus be encircled by an indefinite number of hoops or rings, while others might be formed in the same way over the first series. The claim of the patentee was: "First. In making a cannon consisting of a body (in which the calibre is formed), the walls of which are of one piece, surrounded by rings, hoops, or tubes, in one or more layers, placed upon said body under great strain, by which said body is compressed, and the natural equilibrium of the molecules or particles of which it is composed disturbed by their being brought nearer together; and this is accomplished in the manner herein set forth, namely, by making the hoops smaller than the part which they are to surround, and then expanding them by heat, and suffering them to shrink or contract after having been put in their places. Second. I also claim the method of securing the hoops to the body of the gun, and the several layers of hoops to each other, by screw threads, when they shrink to their places as above described."

In explanation of the principles that led to the invention, reference was made by the patentee to the Barlow law, so called, viz., that hollow cylinders of the same materials do not increase in strength in the ratio of increase in thickness, but that the ratio of increase in strength is such, that, when they become of considerable thickness, the strength falls enormously below that given by the ratio of thickness. This diminution in the power of resistance was thus stated by Barlow: "Suppose such a cylinder to be made up of a great number of thin rings or hoops, placed one within the other, and exactly fitting, so that the particles of each hoop shall be in equilibrium with each other; then the resistance of these rings, compared one with the other, to any distending force, will be inversely as the squares of their diameters."

The object of the patentee's invention was "to obviate the great causes of weakness arising from the conditions before stated, and to obtain, as far as may be, the strength of wrought iron in-

stead of cast iron"; and after describing the mode of construction he adds: "This compression [the compression of the body of the gun by the hoops] must be made such that, when the gun is subjected to the greatest force, the body of the gun and the several layers of rings will be distended to the fracturing point at the same time, and thus all take a portion of the strain up to its bearing capacity."[1]

Upon the construction of the specification and claim, the court held that the improvement of the patentee was intended to be confined to cast-iron guns, as a gun of this material was mentioned, and no other.

The defence relied upon was that the patentee was not the original inventor of the improvement, and evidence was adduced to show that it was well known as early as 1834 that the hooping of the body of cast-iron guns with wrought-iron bands, very much after the manner of the patentee, increased the resistance of cylinders of cast iron against the explosion of gunpowder; that the compression of the cast-iron metal, by the contraction of the heated hoops or bands, increased very much the strength of this resistance; and that the smallness of the diameters of the hoop, compared with the exterior diameters of the barrel, was governed by the principle of the law of expansion of wrought iron. As early as 1834, Thiery, a French officer, had discussed, in a publication of that date, the improvement of a cast-iron gun by combining with it a wrought-iron envelope; and in that year, as well as in 1840, had constructed guns according to his principle and theory. Thiery's mode of construction was substantially the same as that of the patentee. The body of his gun, however, was not purely of cast iron, but contained longitudinal

[1] The patentee adds: "There may, at first view, seem to be a great practical difficulty in making the hoops of the exact size required to produce the necessary compression; but wrought iron and all malleable bodies are capable of being extended without fracture much beyond their power of elasticity. They may, therefore, be greatly elongated without being weakened. Hence we have only to form the hoops small in excess, and they will accommodate themselves under the strain without the least injury. It will be found best in practice, therefore, to make the difference between the diameters of the hoops and the parts they surround considerably more than one one-thousandth part of a diameter." The result reached is that "a gun thus made will be nearly four times as strong as a cast-iron gun of the same weight, wrought iron being taken at only twice the strength of cast iron."

strips of wrought iron, which had been immersed in the metal in casting the gun. The court considered this circumstance as one of great importance, and held "that although the use of wrought-iron hoops in the way stated, and used for strengthening the barrel of a gun, had been known as early as 1834 or 1840, yet if the patentee was the first to apply the device to a cast-iron gun, he must be regarded as the original inventor, and entitled to a patent; and that the application of it to a wrought-iron gun, or a barrel composed of a combination of cast and wrought iron, prior in point of time, would not of itself be any objection."

It was held, however, that the complainant was not entitled to a patent, upon the ground that his gun was constructed upon substantially the same principles and method as the Frith gun, also having a cast-iron barrel, the patent for which had been granted in England in 1843.

§ 51. The application of an old contrivance to a new use, in the case of the rocking-chair, furnishes an instance where there may be a clear line of demarcation between the invention of a new thing and a double use of an old thing.[1] So, too, where the change consisted in the substitution of potter's clay, or any kind of porcelain, as the material for making door-knobs attached to a spindle or shank, the Supreme Court of the United States, proceeding upon a state of facts which ascertained that knobs made of wood or iron had been previously attached to the shank in the same way, and that the sole change consisted in the substitution of one material for another, held the subject not patentable.[2]

§ 52. Another case of a double use, or double application, of a well-known mode of manufacture, is presented by the case of the anchor, already referred to. The supposed invention consisted in manufacturing ship's anchors having two flukes, by making the two flukes of one piece of metal, and piercing it in the middle by a hole for the insertion of the shank, instead of making the two flukes in separate pieces and welding them to the shank. The advantage of the change consisted in avoiding the injury to the iron occasioned by repeated heating, and using a method of manufacture which required but one heating, namely, for the

[1] Bean *v.* Smallwood, 2 Story's R. 408, 410. See a somewhat similar case, Hovey *v.* Stevens, 1 Woodb. & Minot, 290.

[2] Hotchkiss *v.* Greenwood, 11 Howard, 248.

purpose of welding the end of the shank to the side of the hole in which it was inserted. Now, if anchors or other similar instruments had not been made before in this mode, there could be no doubt that a patent might be supported for anchors of this particular manufacture. But the principle of this mode of manufacture was not new, and nothing was new but its application to the making of what are called ship's anchors, or anchors with two flukes, which of themselves were an old instrument. It appeared that the mushroom anchor, the adze anchor, the common hammer, and the pickaxe had all been made in this way. There was no invention, therefore, of a new process of manufacture, or of an article as made by a new process; but the novelty consisted solely in the application of an old process of manufacture to a new occasion; that is, it was a double use. Had this mode of manufacture not been used before in cases extremely similar, an inventor of it might have patented its application, not only to anchors, but to other instruments.[1]

§ 53. Hence it appears that the presence or the absence of the *patentable* quality of novelty depends in some degree on the position in which the supposed inventor stands with reference to the history of the art; for there may be in what he has done an element of novelty, and yet that novelty may consist only in the new occasion or new use to which he applies an old or well-known method. Thus the principle, that is to say the method of operation, or the order of combination, under which his invention ranges itself, may have been discovered and applied before, but not on precisely the same occasions or uses, or with the same materials. When this is the case, the question to be determined is, whether the new application is any thing more than a double use, or whether something has been discovered, or some effect produced, which goes beyond the mere skill of a constructor in adapting a well-known method to different occasions, and enters the domain of what is called invention.

§ 54. Illustrations of this distinction may be seen in the application of well-known medicines, drugs, and chemical substances upon new occasions, or for new specific purposes. If it is discovered that a medicine, known and used as a valuable remedy in one class of diseases, has also great efficiency in curing another

[1] Brunton *v.* Hawkes, 4 B. & Ald. 510, 550.

and different disease, there is a new application of a known thing, but it is only a double use of that thing.[1]

§ 55. In order to escape the objection of a double use, it is necessary that the new occasion or purpose, to which the use of a known thing is applied, should not be merely analogous to the former occasions or purposes to which the same thing has been applied. There is a very material distinction between applying a new contrivance to an old object, and an old contrivance to a new object. The former may be patentable, but the latter cannot be, when the new object is merely one of a class possessing a common analogy. Thus, where a certain description of wheels had been used on other carriages than railway carriages, Lord Abinger, C. B., held that the plaintiff could not claim a patent merely for the use of such wheels upon railway carriages;[2] and where a patent claimed, as the invention of the patentee, a process of curling

[1] In Boulton *v.* Bull, 2 H. Bl. 487, Buller, J., said: "Suppose the world were better informed than it now is how to prepare Dr. James's fever-powder, and an ingenious physician should find out that it was a specific cure for a consumption, if given in particular quantities; could he have a patent for the sole use of James's powders in consumptions, or to be given in particular quantities? I think it must be conceded that such a patent would be void; and yet the use of the medicine would be new, and the effect of it as materially different from what is now known as life is from death. So in the case of a late discovery, which, as far as experience has hitherto gone, is said to have proved efficacious, that of the medicinal properties of arsenic in curing agues, could a patent be supported for the sole use of arsenic in aguish complaints? The medicine is the manufacture, and the only object of a patent; and, as the medicine is not new, any patent for it, or for the use of it, would be void."

[2] Losh *v.* Hague, 1 Webs. Pat. Cas. 207. In this case his Lordship said to the jury: "The learned counsel has stated to you, and very properly, and it is a circumstance to be attended to, that Mr. Losh has taken out his patent to use his wheels on railways. Now, he says, the wheels made by Mr. Paton, or by the other workmen who were called as witnesses, were never applied to railways at all. That opens this question, whether or not a man who finds a wheel ready made to his hand, and applies that wheel to a railway, shall get a patent for applying it to a railway. There is some nicety in considering that subject. The learned counsel has mentioned to you a particular case in which an argand lamp, burning oil, having been applied for singeing gauze, somebody else afterwards applied a lamp supplied with gas for singeing lace, which was a novel invention, and for which an argand lamp is not applicable, because gas does not burn in the same way as oil in an argand lamp. But a man having discovered by the application of gas he could more effectually burn the cottony parts of the gauze by passing it over the gas, his patent is

palm-leaf for mattresses, but it appearing that hair had long been prepared by the same process for the same purpose, Mr. Justice Story held it to be a mere double use of an old process.[1]

good. (1 Webs. Pat. Cas. p. 98, Hall's Patent.) That was the application of a new contrivance to the same purpose; but it is a different thing when you take out a patent for applying a new contrivance to an old object, and applying an old contrivance to a new object, that is a very different thing; if I am wrong I shall be corrected. In the case the learned counsel put, he says, if a surgeon goes into a mercer's shop, and sees the mercer cutting velvet or silk with a pair of scissors with a knob to them, he, seeing that, would have a right to take out a patent in order to apply the same scissors to cutting a sore, or a patient's skin. I do not quite agree with that law. I think if the surgeon had gone to him, and said, 'I see how well your scissors cut,' and he said, 'I can apply them instead of a lancet, by putting a knob at the end,' that would be quite a different thing, and he might get a patent for that; but it would be a very extraordinary thing to say that, because all mankind have been accustomed to eat soup with a spoon, that a man could take out a patent because he says you might eat peas with a spoon. The law on the subject is this: that you cannot have a patent for applying a well-known thing, which might be applied to fifty thousand different purposes, for applying it to an operation which is exactly analogous to what was done before. Suppose a man invents a pair of scissors to cut cloth with, if the scissors were never invented before, he could take out a patent for it. If another man found he could cut silk with them, why should he take out a patent for that? I must own, therefore, that it strikes me if you are of opinion this wheel has been constructed, according to the defendant's evidence, by the persons who have been mentioned, long before the plaintiff's patent, that, although there were no railroads then to apply them to, and no demand for such wheels, yet that the application of them to railroads afterwards, by Mr. Losh, will not give effect to his patent, if part of that which is claimed as a new improvement by him is, in fact, an old improvement, invented by other people, and used for other purposes. That is my opinion on the law, and on that I am bound to direct you substantially."

[1] Howe *v.* Abbott, 2 Story's R. 190, 193. In this case the learned judge said: "In the first place, it is admitted on all sides that there is no novelty in the process by which the stripping, or twisting, or curling the palm-leaf is accomplished. The same process of twisting, and curling, and baking, and steaming has long been known and used in respect to hair used for beds, mattresses, sofas, and cushions. It is, therefore, the mere application of an old process and old machinery to a new use. It is precisely the same as if a coffee-mill were now, for the first time, used to grind corn. The application of an old process to manufacture an article, to which it had never before been applied, is not a patentable invention. There must be some new process, or some new machinery used, to produce the result. If the old spinning-machine to spin flax were now first applied to spin cotton, no man could hold a new

§ 56. When, therefore, the principle is well known, or the application consists in the use of a known thing to produce a particular effect, the question will arise, whether the effect is of itself entirely new, or whether the occasion only upon which the particular effect is produced is new. If the occasion only is new, then the use to which the thing is applied is simply analogous to what had been done before. But if the effect itself is new, then there are no known analogous uses of the same thing, and the process may constitute such an art as will be the subject of a patent. Thus, the use of scissors to cut one substance produces a particular effect, entirely analogous to that produced when they are used to cut another substance; the effect, therefore, is not new. In like manner the use of a machine in the water, which was originally intended to be used on land, has been held to be no invention.[1] But the use of gas to singe off the superfluous fibres of lace was the use of an agent for a purpose not analogous to any other purpose for which the same agent had ever been used before; and therefore the effect, as produced by that agent, was new. Great discrimination, however, is to be used in determining whether the analogy is such as to justify the inference that the occasion only is new, and that the effect is not new. Of course, if any new contrivances, combinations, or arrangements are made use of, although the principal agents employed are well known, those contrivances, combinations, or arrangements may constitute a new principle, and then the application or practice will necessarily be new also.[2] But where there is no novelty in the preparation or arrangement of the agent employed, and the novelty professedly consists in the application of that agent, being a well-known thing, or, in other terms, where it consists in the practice only,

patent to spin cotton in that mode; much less the right to spin cotton in all modes, although he had invented none. As, therefore, Smith has invented no new process or machinery, but has only applied to palm-leaf the old process and the old machinery used to curl hair, it does not strike me that the patent is maintainable. He who produces an old result by a new mode or process is entitled to a patent for that mode or process. But he cannot have a patent for a result merely, without using some new mode or process to produce it."

[1] Bush *v.* Fox, 26 Law & Eq. R. 464.

[2] As where anthracite and hot-air blast were used in the manufacture of iron, in the place of bituminous coal and hot-air blast; and where sail-cloth was made, with the omission of an ingredient before used, that is, by a different combination from that before used.

the novelty of that practice is to be determined according to the circumstances, by applying the test of whether the result or effect produced is a new result or effect never before produced.[1] If a new manufacture is produced by an old process, or if an old manufacture is produced by new means, then the result or effect is new, as produced by that particular means, and the new case is such as can be protected by letters-patent. But if only an old manufacture is produced, or an old result is attained, by means analogous to what the same means have produced when applied the same way in other cases, the new occasion of using those means does not constitute a case that can be protected by a patent.

§ 57. The distinctions that are applicable to this question of a double use may be more readily perceived, however, by considering several of the adjudged cases, where the supposed invention consists in the application of an old process, or a known machine or combination of materials to a new use or occasion. Of this class there are two English cases, to which reference has already been made, and which require to be re-examined in this connection. In one of these cases (Kay *v.* Marshall) the real invention of the plaintiff was of a new mode of spinning flax. It consisted in first subjecting the crude flax to a process of maceration, and in then spinning it, by the well-known spinning-machine, at what is called a "ratch" of two and a half inches, that is, by adjusting the drawing and retaining rollers at that distance from each other, the existing machine having a well-known capacity for such adjustments. The invention was therefore the spinning of macerated flax at a short ratch. This had never been done before, and consequently the doing it was a new manufacture, and, *as such*, entitled to be protected by a patent. But the patent taken out made the invention to consist in "new and improved *machinery* for preparing and spinning flax," &c. And as it appeared at the trial that an old machine was used by the plaintiff, capable of being adjusted at different ratches according to the length of the fibre to be spun, although it had not been used at a ratch of two

[1] As in the case of the application of bells to fire-engines, to be rung by the motion of the carriage, for the purpose of alarms or notice, which Washington, J., instructed the jury might be a subject for a patent. Park *v.* Little, 3 Wash. 196. The application of steam for propelling boats is another illustration of novelty in practice. Ibid.

and a half inches to spin macerated flax, it became necessary to support the patent upon the ground that this new use of the old machine could be patentable as a "*new and improved machine*." It was held otherwise, upon great consideration, both by the Court of Common Pleas and in the House of Lords.[1]

§ 58. It should be recollected, in examining this case, that the facts presented by the record reduced the question simply to this: whether the construction or modification proposed by the patent was a patentable improvement of the spinning-machine. It was upon the ground that no new or improved *machine* had been invented, but that a new occasion only had been discovered for using the old machine in a manner for which it was before adapted, and because the patent claimed an improved machine, that it was held that there was a want of novelty. But there can be little doubt that a patent would have been good for a new or improved process in the art of manufacturing flax, consisting of two parts, the maceration of the flax, and the spinning it, when macerated, at a ratch of two and a half inches, provided that both parts of this process had been new.

§ 59. A question might arise upon this case, however, of a different nature. Assuming that the plaintiff had made no alteration in the structure of the spinning-machine other than to adjust the rollers which he found in it at a distance from each other at which they had not been before used, and assuming that this adaptation of the machine led to a manufacture of flax in a mode never before practised, would such an adaptation of the machine to a new use be a patentable invention? It was suggested by Lord Chancellor Cottenham, in delivering the judgment of the House of Lords in this case, that if "he" (the plaintiff) "has discovered any means of using the machine which the world had not known before the benefit of, *that* he has a right to secure to himself by means of a patent; but if this mode of using the spinning-machine was known before, (and the indorsement upon the *postea* states that it was known before,) then the plaintiff cannot deprive them (the defendants) of having the benefit of that which they enjoyed before."[2] The meaning of this *dictum* appears to be this. If the capacity of the spinning-machine to have its re-

[1] Kay *v.* Marshall, 2 Webs. Pat. Cases, 34–84.
[2] Ibid. p. 82.

taining and drawing rollers used at variable distances, according to the length of the fibre to be spun, was previously unknown, and the plaintiff discovered it, although he may not have altered the construction of the machine so as to produce this capacity, by adding any new parts, or taking out any old ones, he might have a patent for the new application or use of the machine; or, in other words, he might be considered as the inventor *quoad hoc* of an improved machine, which differed from the old one in the position and relations of its rollers. But if the capacity of the machine to have its rollers adjusted at variable distances was known, the fixing them at a particular distance could not, of itself, be an invention.

§ 60. The second of the two cases above referred to presents a good illustration of the doctrine of double use, and of the manner in which that fatal objection may be created by an improper mode of claiming what would have been entitled to a patent if the real invention had been correctly described. The plaintiff was the inventor of a method of making excavations, and building foundations of structures beneath the surface of water, such as light-houses, piers of bridges, &c., &c. For this purpose he constructed a caisson of iron, divided into chambers, and made air-tight, which was sunk in the water, the lowest chamber being open at the bottom. By means of an air-pump the atmospheric pressure upon the water within the chambers was sufficiently increased to force the water out at the bottom. The workmen placed in the lower chamber excavated the soil at the bottom, which was raised to the top of the machine in buckets through a system of valves arranged so as to retain the compressed air. The chamber was then filled with solid masonry, and the iron cylinder left on the outside as part of the structure. The next chamber was proceeded with in the same manner, until the structure had risen above the level of the water. The plaintiff had stated his claim thus: "What I claim is, the mode of constructing the interior of a caisson in such a manner that the workpeople may be supplied with compressed air, and be able to raise the materials excavated, and to make and construct foundations and buildings as above described." It is obvious enough that this claim hazarded the entire patentable quality of the invention upon the single question of the novelty of the caisson, and the manner of its operation in enabling the work to be done. For although the making and constructing foundations in

the manner described is stated as the object for which the caisson is used, yet it is clear that the caisson itself, in its peculiar structure and operation, was claimed as a very material part (to say the least) of the invention. Now it was shown at the trial that such an apparatus for excluding the water by forcing air into a series of chambers, in making excavations, was not new; and that the contrivance for enabling the workmen and the material excavated to be passed from one chamber to another, without permitting the compressed air to escape, was also previously employed by Lord Dundonald, who had invented and patented such an apparatus to be used in making excavations on land. So far as the apparatus was concerned, therefore, the only difference between the plaintiff and Lord Dundonald was, that the former used it under the surface of water, the latter under the surface of land. The new or double use of the thing operated no change in the character of the thing.[1] But then it is quite certain that the real invention of the plaintiff, provided his method of operation in building foundations under water was new, was entitled to a patent. It consisted in making the excavations by means of a machine adapted to the purpose of working under water as well as on land, and then in building the structure of masonry within the successive chambers of the machine, leaving them one after the other as parts of the permanent structure. He had thus developed a use of the machine to which it had not been before applied; and had he taken care not to claim the structure of the machine, and had claimed his proper improvement in the art of building foundations under water, he might perhaps have had a valid patent.

§ 61. Of a somewhat similar character was the American case of Le Roy *v.* Tatham. The real invention in this case consisted

[1] Bush *v.* Fox, 26 Law & Eq. R. 464. In this case, the Chief Baron, at the trial, after comparing the two specifications, heard two witnesses, who testified that the apparatus described in each worked in the same way, in respect of the process of excavating in a chamber of compressed air, and of raising the materials excavated from that chamber. He thereupon directed the jury to find a verdict for the defendant, if they believed this evidence. When the same case was before the House of Lords, on error from the Court of Exchequer, Lord Chancellor Cranworth, in delivering judgment, intimated that the Chief Baron might have gone much further, and might have directed the jury to find for the defendant, without any evidence at all, because it was for the court to compare the specifications and declare what each covered. Bush *v.* Fox (House of Lords), 38 Law & Eq. 1, 5.

in the discovery and practical application of a new method of making lead pipe, by forcing the metal, when recently set, but still under heat, by great pressure, from a receiver through an aperture and around a core, so as to make the metal reunite where it had been separated. Wrought pipe, as an improvement upon cast pipe, had been previously made from set or solid lead by great pressure; but before the discovery of the plaintiff's method, such wrought pipe could not be made with uniformity of thickness, and a true centrality of bore. The former mode of making wrought pipe from set or solid lead was founded on the supposition that the metal, when once set after being molten, would not unite perfectly if separated; and it was in consequence of the want of knowledge of the property of such metal to unite under heat and extreme pressure, that a mode of making the pipe was resorted to by which the contact of the particles of the metal would remain unbroken. This mode consisted in the use of the following apparatus. Lead in a fluid state was introduced into a cylinder in which a piston played from one end to the other. In the solid end of the cylinder opposite to the piston an aperture was fitted with a die, which formed the exterior of the wall of the pipe. To form the interior wall of the pipe, a core, or mandril, consisting of a long cylindrical rod of steel, was attached to the face of the piston, and extended through the cylinder, and through the centre of the die. When the metal in the cylinder had become set, the piston was forced through the cylinder by hydraulic pressure, carrying the metal to the die, and driving it through the annular space between the die and the core, and thus forming a continuous pipe from the whole charge of the cylinder, because the continuity of the particles composing the wall of the pipe was nowhere broken. But the liability of the long core to be warped out of a true line by the great pressure necessary to form the pipe, rendered it impossible to produce uniformity of thickness and an even bore.

§ 62. On the other hand, the great feature of the invention which the plaintiffs claimed consisted in the discovery of the fact, that lead, when recently set, and still under heat, will reunite perfectly around a core, under extreme pressure, *notwithstanding* the particles have been separated, and will thus form pipe of great solidity and unusual strength. This beautiful discovery was made available by the substitution of a short immovable core in front

of the die, supported by a bridge or cross-bars, and extending into and through the die, so that the true centrality of the core in reference to the die was constantly preserved; and although the particles of the metal, when forced through the apertures in the bridge, were necessarily separated, they reunited perfectly around the core, and formed a pipe superior in quality and cheaper in production than had ever been made before.

§ 63. The patent which was to protect this remarkable invention, after duly describing the apparatus and its mode of operation, and after disclaiming any design of patenting the machinery independent of the arrangement and combination set forth, summed up the claim as follows: "What we do claim as our invention, and desire to secure, is the combination of the following parts above described, to wit, the core and bridge, or guide-piece, with the cylinder, the piston, the chamber, and the die, when used to form pipes of metal, under heat and pressure in the manner set forth, or in any other manner substantially the same."

§ 64. It does not appear with sufficient distinctness, from the report of this case, whether the precise combination of the bridge or guide-piece with the cylinder, the piston, the chamber, and the die, had been used before; although evidence was offered in the defence tending to show that substantially the same combination had been used before in the manufacture of lead pipe, of clay pipe, and of the confection called macaroni. It may be assumed, however, that the evidence did not show any previous manufacture of lead pipe by the substitution of bridge for the long cylindrical mandril, for the purpose of making available the capacity of lead, when recently set, to reunite after separation. From the charge of the judge who tried the cause, and from the finding of the jury, it is to be inferred, that before the plaintiff's invention this combination of machinery had not been used for the development and application of this property of lead, and that this was a newly discovered property, for the first time made known, and made of practical consequence by the invention of the plaintiff. The jury were instructed, in substance, that the invention of the plaintiff did not consist in the combination of the machinery separate from the manner in which and the purpose for which it was used by him, but that the novelty of the invention consisted in the application of a combination of machinery, which might of itself be old, to a new end, by making a newly discovered prop-

erty of lead practically useful, and producing thereby an article of manufacture which was both new in respect to the process by which it was made and in respect to its superior qualities, and that such an invention was patentable. That this instruction was correct, provided the patentee's summary of his claim had not made the novelty of his machinery essential, there can be, I conceive, no doubt. But in the Supreme Court of the United States it was held, by a majority of the judges, that the claim did not admit of a construction that would support this direction; but that the patentee had made the novelty of his machinery essential by claiming it as part of his invention, and that therefore the novelty of the machinery was a material fact for the jury.[1]

§ 65. Two questions obviously arise upon this case: *First*, whether it was a correct construction of the claim, to hold that the patentee had limited his claim, in part, to the novelty of the machinery; and, *secondly*, whether, assuming that his claim correctly described his invention, namely, the application of that machinery to a new method of making lead pipe, through the instrumentality of a newly discovered property of lead, such an invention is patentable. Upon the first question, it is only necessary in this connection to remark, that although the claim was not skilfully stated, the purpose of the patentee to claim the combination of the machinery only "when used" for the purpose and in the manner of his new process of making lead pipe, which his patent set forth, was sufficiently manifested; but the second question, namely, whether the application of the machinery, assuming it to be old as a combination of devices, to the new purpose of making lead pipe through the instrumentality of a newly discovered property of lead, was a patentable subject, or was only a double use, belongs to the topic now under consideration.

§ 66. In all the cases which have heretofore been cited, in which the objection of a double use has prevailed, it is to be observed that the new occasion or purpose to which an old contrivance, device, or method of operation has been applied, without any alteration of the agent itself, there has been no new effect produced, or no new development of properties of matter heretofore unknown, or no application of the agent to any uses that were not strictly

[1] Le Roy *v.* Tatham, 14 Howard, 156. Justices Nelson, Wayne, and Grier dissented from this view of the patent. See the case again in 22 Howard, 132, where Judge McLean explained.

analogous to the former ones. It may therefore be practicable to state a rule which will furnish a safe general principle in the following terms: viz., that in order to escape the objection of a double use, it is necessary that the new occasion or purpose to which the use of a known thing is applied should not be merely analogous to the former occasions or purposes to which the same thing has been applied. The meaning which should be given to the term *analogous use*, in this connection, will be sufficiently illustrated by the adjudged cases. Thus, in the case of the rocking-chair, the ship's anchor, and the wheel for railway carriages, an old contrivance or a well-known mode of manufacture was applied to a purpose which, considered by itself, was new; but that application developed no new mode of operation, and exhibited no effect differing from what had been done before. In like manner, the use of the machine for making excavations under the surface of water, in the same way in which it had been used for the strictly analogous purpose of making excavations under the surface of land, could not make it a new machine, although the new use, as part of a new method of building solid structures under water, was so far patentable as it entered into a new method of building such structures. So, too, the application of the spinning-machine, with its rollers fixed at a particular position, to the purpose of spinning flax with a very short fibre, was not an invention of a new machine, because the use was purely analogous to the former uses of the same machine; but as one of the elements of a new process of spinning flax, of which the other element consisted in the previous maceration of the flax, the spinning at a particular distance was new.[1]

[1] To these may be added another illustration of the doctrine of merely analogous or double uses. A. took out a patent for improving the texture of threads of *cotton* or *linen* yarns, by exposing the threads in a distended state to the action of beaters, which gave them smoothness and polish. B. took a subsequent patent for producing the same effect upon yarns of *wool* or *hair*. On comparing the two specifications, it appeared that the machinery and method of using it were the same in both, although their mere application to wool and hair was shown to be new. Upon the ground that this was but the application of an old machine in the old manner to an *analogous substance*, a rule to enter a nonsuit was made absolute in the Queen's Bench (Brook *v.* Aston, 8 Ell. & Bl. 478). But it was admitted by the court that novelty in the application of an old invention to a new purpose will support a patent. When this case came before the Exchequer Chamber on appeal, some effort was made by the plaintiff's counsel to support the patent, upon a ground

§ 66 *a*. An important case illustrating the degree of novelty essential to a valid patent was recently decided in the House of Lords. The case was that of Harwood *v.* the Great Northern Railway Company.[1] The invention in controversy was made by one Wild, and was for "improvements in fishes and fish-joints for connecting the rails of railways." The function to be performed by this invention is clearly explained in the following language of Mr. Justice Blackburn: "The rails meet but-end to but-end, and, as the engine passes along the rails, its weight has a tendency to depress the rail on which it rests below the rail to which it is approaching, on which the engine does not yet rest; and unless this tendency is counteracted, the end of the rail to which the engine approaches being more elevated than that on which the wheel of the engine rests, there will be a jolt when the wheel passes over the joint. The mode of counteracting this tendency is by attaching to the sides of the rails plates called 'fishes' by means of bolts and nuts. The plates are at the sides of the joint and in the hollow of the double-headed rail, and, so long as the fishes are held in that position, the one rail cannot be depressed below the other, except in so far as the fish bends. The main strain, therefore, which the fish has to bear, is a strain tending to the flexure of the fish in the vertical plane, which is also the plane of the fish or plate attached to the side of the rails, the forces which tend to push the fish off from the rails being comparatively slight, and being counteracted by the bolts and nuts."

The fish in use at the time of the patentee's invention was a solid plate of equal thickness throughout; and as a strain in the

which was not adverted to in the Queen's Bench. It was argued that, under the earlier patent, the process was accompanied by the use of sizing, which had a beneficial effect on the thread of cotton or linen; whereas under the plaintiff's patent no sizing was used, as it would *not* have a beneficial effect on wool or hair. But the court, on comparing the two specifications, did not find the sizing process to be an essential part of the old patent; although it was admitted that it was intended to apply the machinery and mode of operation to articles sized. But it was said the question was, whether the plaintiff could take the process as applied to cotton and linen yarns sized, and apply it to woollen yarns unsized; and it was held he could not (Brook *v.* Aston, 32 Law Times Reports, 341). It is very easy to see the distinctions to which a practitioner should attend, who has occasion to advise on the patentability of similar inventions.

[1] 11 House of Lords Cases, 654.

plane of a plate, and tending to produce flexure in that plane, is chiefly borne by the upper and under parts of such plate, there was a considerable part of the iron in the centre of the plate which did not contribute to the resistance of the strain. The inventor conceived that this superfluous material might be removed, by constructing a groove which would serve as a bed for the heads of the bolts, thus producing economy of material without diminution of strength.

The nature of the invention will sufficiently appear from passages of the specification : " The fishes are made with a groove or recess in their outer surfaces, which groove serves to receive the square heads of the bolts, and prevent them turning round when the nuts are screwed on or off. Washers are placed in the groove of the fish which is next to the nuts, so as to allow of the nuts being turned round ; or the fish on this side may be made without the groove. The position of the bolts and nuts may be reversed, if preferred, so that the nut may be prevented from turning round while the bolt is screwed into it. The groove renders the fish lighter for an equal strength, or stronger for an equal weight of metal, than a fish which is made of an equal thickness throughout. The top and bottom of each fish is a plane surface, and the parts of the rail with which they come in contact are also plane surfaces, forming the same angle as the top and bottom surfaces of the fish. The fishes are thus made to fit into their places with greater facility than if these surfaces were of curved or irregular forms. If, however, the surfaces of the rails are curved, the fishes may be made to fit them." Another important advantage claimed was that the heads of the bolts, nuts, or rivets, being imbedded in the groove, would not be exposed to contact with the flanges of the wheels.

Such was the invention the validity of which was contested for want of novelty. It was proved that fishes of different kinds had been used prior to this invention for the same purpose; but such fishes had not been made with a groove in their lateral surfaces, so as to receive the square heads of the bolts, and render the fish lighter for equal strength, or stronger for an equal weight of metal. It was also proved that, before the date of the patent, in the construction of bridges, beams of timber had been laid horizontally, one above the other, and fastened or bolted together

with bolts or nuts; that horizontal bars or plates of iron were placed beneath, and parallel to, and in contact with, the horizontal beams, and were also fastened or bolted by the same bolts and nuts, and that each of these bars or plates of iron was constructed with a groove in its under surface, which received the square or horizontal heads of the bolts. This was done for the purpose of strength, and also to prevent the heads of the bolts from turning. But in these bridges there were not joints to be fished by the bars or plates of iron, nor were there corresponding bars or plates of iron above the horizontal beams.

It was further proved that in 1847 Mr. Brunel had constructed a bridge, known as the "Hackney Bridge," over the Teign canal. Owing to the length of the span, the bridge was constructed so as to have upon each side two horizontal longitudinal beams of timber, the ends of which met and were joined together in the middle of the bridge by scarf-joints. Beneath these beams were placed transverse planks, which extended from side to side of the bridge, and constituted its flooring or roadway, and immediately beneath the ends of the planks were longitudinal bars of grooved iron, one upon each side of the bridge, running parallel to, and under the longitudinal beams along the whole length of the bridge, with the grooves or channels downwards. Bolts passed through the grooved iron bars, with square heads resting in the grooves, which prevented them from being turned round.

At the trial below, in answer to questions specially put by the Lord Chief Justice, the jury found "that the channel irons upon the railway bridges (independently of the particular instance of the 'Hackney bridge') were used before the patent, for the double purpose of obtaining increased strength and preventing the bolt-heads from turning round, but they were not used for the purpose of fishing. Secondly, that the fastening of the scarf-joint of the longitudinal beam at the Hackney bridge was a fishing of that joint, but that the use of the channel iron as one of the plates of the fish arose from its being already there for the purpose of fastening the beam and this iron together, and was not adopted by Mr. Brunel with reference to, or in contemplation of, the special advantages in fishing contemplated by Wild's patent."

A verdict was thereupon directed to be entered for the plaintiff; on appeal to the Exchequer Chamber, that decision was

reversed, and it was ordered that the verdict be entered for the defendants, upon the pleas denying that the invention was new and that it was the subject-matter of a patent.

An appeal was then taken to the House of Lords, where, after great deliberation, it was held that the patentee had merely transferred a known thing from one use to another, and an analogous use, and that there was not sufficient novelty or invention to support a patent.[1]

[1] The following able discussion of the facts and legal principles involved in this important case was made by the Lord Chancellor, Lord Westbury:—

"At the trial, the novelty of this invention was impeached, on the ground that channelled iron, which altogether corresponded with the grooved fish-plate, had been in use for a considerable period anterior to the patent, and several examples were furnished to illustrate that; but, in particular, one example in the construction of a railway bridge by the late Mr. Brunel, in which channelled iron was used to a very great extent for the purpose of acting as a support to the beams which were placed transversely, and in which there were scarf-joints. In that case, the square heads of the bolts which bolted on the iron that served as a support, or fish, were received in the hollow produced by the channel, and fitted the channel, in order to effect the same object as is here described by the plaintiff, namely, the preventing of the head of the bolt from being turned when the nut was unscrewed.

"I particularly wish to point out to your Lordships the difference between the grooved plate and the channelled iron. The centre of the plate of the channelled iron is not cut away at all; it has the same thickness throughout; but it is constructed with two flanges, one at either end, joining the plate at right angles, and producing therefore this configuration of the plate, that there is a lateral plate forming the base, having on either side a flange at right angles to the plane of the plate. The difference, therefore, between the grooved fish-plate and the channelled iron consists in this: that the centre of the plate of the grooved fish is cut away by the groove, and part of the metal is taken away, so that the plate is not of a uniform thickness throughout; but in the channelled iron the plate is of a uniform thickness throughout; and instead of a groove formed by hollowing out a recess in the plate, the same object is effected by two flanges, one on either side of the plate which forms the bottom (I am speaking in familiar language) of the channelled iron.

"Unquestionably this is a difference, and it would have raised in my judgment a material question whether, if the plaintiff had pointed out and had rested upon this difference of configuration as constituting his invention, it would have been possible to set up the anterior use of the channelled iron as depriving him of all claims to that invention; because the true mode of trying the question of course would be to reverse the order of time of the two productions, and to inquire whether, if any one had now introduced the channelled iron, it would or would not have been an infringement of the plaintiff's patent. If, tried by that criterion, the conclusion should be that the channelled iron

§ 66 *b*. The principles of law decided in Harwood *v*. The Great Northern Railway Company were applied in the subsequent case

would be an infringement of the plaintiff's patent; then, of necessity, it would follow, that as the channelled iron had been in use, and in public and notorious use, preceding the date of the plaintiff's patent, that patent could not be lawfully considered as granted for a 'new invention.'

"My Lords, the learned judges differed on this point. Two learned judges, Mr. Justice Blackburn and Mr. Justice Shee, have in a very learned argument pointed out the difference between the mechanical effects produced by the use of the grooved fish-plate placed so as to resist vertical pressure, in the one case, and the mechanical effect produced upon the channelled iron placed so as to resist transverse pressure, in the other case; but I do not think that that of itself would constitute a material difference. The patent is taken out for a fish of a particular configuration; the patent is not taken out for a saving of metal in the construction of the fish-joint, but the patent is limited entirely to the introduction and use of fishes of a particular shape and configuration. Then the question is simply this: whether the channelled iron, which undoubtedly was a fish (and one of the objects of the patent was to receive the square heads of the bolts and to prevent their turning), is not, in truth, substantially the same thing as a grooved plate with a recess hollowed out in its own plane, instead of a hollow being effected by flanges placed on either side of the plate. Regarding the patent as limited to a claim for fishes of a particular configuration, I cannot for a moment doubt that the channelled iron having the same object, and being capable of the same application, substantially involves the fish-plate made with a grooved hollow in the manner which I have attempted to describe.

"Then, my Lords, the question is, whether there can be any invention of the plaintiff in having taken that thing which was a fish for a bridge, and having applied it as a fish to a railway. Upon that I think the law is well and rightly settled, for there would be no end to the interference with trade and with the liberty of adopting any mechanical contrivance, if every slight difference in the application of a well-known thing should be held to constitute ground for a patent. There is the familiar contrivance of the button to the button-hole, taken from the waistcoat or the coat, which may be applied in some particular mechanical combination in which it has not hitherto been applied; but it would be an idle thing, if it were possible, to take a well-known mechanical contrivance, and, by applying it to a subject to which it has not hitherto been applied, to constitute that application the subject of a patent to be granted as for a new invention. No sounder or more wholesome doctrine, I think, was ever established than that which was established by the decisions which are referred to in the opinions of the four learned judges who concur in the second opinion delivered to your Lordships, namely, that you cannot have a patent for a well-known mechanical contrivance merely when it is applied in a manner or to a purpose, which is not quite the same, but is analogous to the manner or the purpose in or to which it has been hitherto notoriously used. The channelled iron was applied in a manner which was notorious, and the application of it to a vertical fish would be no more than the application of a

of Jordan *v*. Moore.[1] The complainant was the inventor of "certain improvements in the construction of ships and other vessels navigating on water."

In his specification, he claimed, among other things in the construction of ships, "the combination of an iron frame, with an external covering of timber planking for the sides, bilges, and bottoms; and, 6, the construction of iron frames adapted to an external covering of timber for the sides, bilges, and bottoms, *as described*."

On a careful consideration of the specification the court were of opinion that the expression "iron frame" in the first claim was not confined to an iron frame such as that specified in the sixth claim, but comprehended whatever might, according to the ordinary use of language, be called "an iron frame" for a ship, and was therefore "a claim for planking with timber any iron frame of a ship."

Such being the construction put upon it by the court, the main question arose whether the application of wooden planking to the iron frame of a vessel, without any peculiarity in the nature of that planking, could be the subject of a patent in view of the facts that iron had been extensively used in the construction of ships; that ships partly of iron and partly of wood had frequently been constructed; that frames partly of iron and partly of wood had been coated with iron, and that the iron coating of iron vessels had been placed upon iron frames of more or less strength and completeness. It was held that such a patent could not be sustained. In the language of the opinion: "It is not only the substitution of one well-known and analogous material for another, that is, wood for iron, to effect the same purpose, on an iron vessel, but it is the application of the same old invention, viz., planking with tim-

well-known contrivance to a purpose exactly analogous or corresponding to the purpose to which it had been previously applied. Therefore, my Lords, with some anxiety upon this subject, and feeling that the intricacy of the matter must render it impossible to convey one's ideas in words unless one perpetually referred to drawings or models, I think that, upon the whole, I must advise your Lordships, and move your Lordships to confirm the decision of the Court of Exchequer Chamber: that there was no novelty in the patent, and that, therefore, there was a misdirection on the part of the Lord Chief Justice. The consequence will be that I shall move your Lordships to affirm the judgment of the Court of Exchequer Chamber, and to dismiss the appeal with costs."

[1] Law Reports, 1 C. P. 624.

ber, which was formerly done on a wooden frame, to an analogous purpose, or rather the same purpose, on an iron frame."[1]

§ 67. In the case of the new mode of making lead pipe, the new use of the previously existing combination of the devices employed was not analogous to the former uses of that combination. The new use depended on and involved the application of a newly discovered property of the metal of which the pipe was to be made, thus producing, by a new process, an article of manufacture possessing a great superiority over the same kind of article made by former processes. It seems to be quite apparent, that, however old the apparatus, this great improvement in the art of manufacturing lead pipe was not a use of that apparatus, in any legal or logical sense, analogous to the former uses to which it had been applied.[2]

[1] "In this view of the case," continued Mr. Justice Byles, "the recent decision of the Exchequer Chamber and of the House of Lords in Harwood *v.* The Great Northern Railway Company, appears to us to be in point, and decisive for the defendant. These grooved fish-plates having been before used for fastening the scarf-joints of timbers, a patent was taken out for their application to fastening the butt-joints of iron rails; and it was held that the patent was bad, because it claimed the application of an old contrivance to an analogous purpose."

[2] I entirely concur in the following reasoning of Mr. Justice Nelson, embraced in his dissenting opinion given in the case of Le Roy *v.* Tatham, and reported 14 Howard, 156 *et seq.*

"Now, on looking into the specification, we see that the leading feature of the invention consists in the discovery of a new property in the article of lead, and in the employment and adaptation to it, by means of the machinery described, to the production of a new article, wrought pipe, never before successfully made. Without the discovery of this new property in the metal, the machinery or apparatus would be useless, and not the subject of a patent. It is in connection with this property, and the embodiment and adaptation of it to practical use, that the machinery is described and the arrangement claimed. The discovery of this new element or property led naturally to the apparatus by which a new and most useful result is produced. The apparatus was but incidental, and subsidiary to the new and leading idea of the invention. And hence the patentees set forth, as the leading feature of it, the discovery that lead, in a solid state, but under heat and extreme pressure in a close vessel, will reunite, after separation of its parts, as completely as though it had never been separated. It required very little ingenuity, after the experiments in a close vessel, by which this new property of the metal was first developed, to construct the necessary machinery for the formation of the pipe. The apparatus, essential to develop this property, would at once suggest the material parts, especially in the state of the art at the time. Any skilful mechanic, with Burr's machine before him, would readily construct the requisite machinery.

§ 68. A case involving the same distinctions, founded on the discovery and practical use of a new property in a particular compound of metal, was tried in the Court of Common Pleas in England some years before the case of Le Roy *v.* Tatham. The patent was for "an improved manufacture of metal plates for sheathing the bottoms of ships or other such vessels." The invention consisted in making plates of metal of an alloy of zinc and copper, in such proportions of the two metals as would cause in the water a degree of oxidation of the surface sufficient to prevent impurities attaching to it, but not sufficient to wear away the substance of the plate, and in applying such plates as sheathing for the bottoms of vessels. At the trial, evidence was offered tending to prove that plates had previously been made of a compound of zinc and copper in proportions which came within the limits given by the plaintiff in his patent, and that such plates had been sold for the ordinary purposes for which such metal is used; but it did not appear that it had been applied for the purpose of sheathing ships, or that the property of oxidation to a certain degree, and not beyond that degree, when in the water, had been made use of or discovered. Upon this evidence the jury were instructed (by Tindal, C. J.) that the previous existence of plates made in the proportions of metal embraced by the patent was immaterial, provided they had never been applied to the purpose for which the

"The patentees, therefore, after describing their discovery of this property of lead, and the apparatus by means of which they apply the metal to the manufacture of pipe, claim the combination of the machinery, only when used to form pipes under heat and pressure, in the manner set forth, or in any other manner substantially the same. They do not claim it as new separately, or when used for any other purpose, or in any other way; but claim it only when applied for the purpose and in the way pointed out in the specification. The combination, as machinery, may be old; may have been long used; of itself, what no one could claim as his invention, and may not be the subject of a patent. What is claimed is, that it had never been before applied or used, in the way and for the purpose they have used and applied it, namely, in the embodiment and adaptation of a newly discovered property in lead, by means of which they are enabled to produce a new manufacture — wrought pipe — out of a mass of solid lead. Burr had attempted it, but failed. These patentees, after the lapse of seventeen years, having discovered this new property in the metal, succeeded, by the use and employment of it, and, since then, none other than wrought lead pipe, made out of solid lead, has been found in the market, having superseded, on account of its superior quality and cheapness, all other modes of manufacture."

patentee used the plates manufactured by him; for the discovery and application of a new property of such plates, developed by the new use to which the plaintiff had applied them, might well be the subject of a patent. This ruling is in substance the same as that of Mr. Justice Nelson at the trial of the case of Le Roy *v.* Tatham; and although it was not subjected to the revision of any court of errors (the litigation having been compromised), I cannot entertain any doubt of its correctness. The case is a valuable illustration of the doctrine, that when the new use of a thing produces an important effect never before produced, or develops or makes practical some new property of matter not previously known, the new use is not analogous to the former uses, and therefore the novelty of the mere agent is immaterial.[1] But of course

[1] Muntz *v.* Foster, 2 Webs. Pat. Cas. 96–103. In the summing up to the jury, Sir N. C. Tindal, C. J., said upon this part of the case: "I come now to the question, was this a new manufacture within the realm at the time? That is, did people before this patent had been obtained on the 22d October, 1832, know any thing of a manufacture such as this is described in the specification? Therefore it becomes necessary to state what I conceive to be the meaning of the claim, and how far the plaintiff is bound to make out the novelty of it, and how far any objection arising from a user of part of it before can or cannot invalidate the patent which he has got. It appears to me to be properly described in its title, that that is in fact the very discovery for which the patent was granted, namely, 'an improved manufacture of metal plates, for sheathing the bottoms of ships or other such vessels.' He goes on to state that he declares 'his invention to consist in making the said plates for sheathing of an alloy of zinc and copper in such proportions and of such qualities as, while it enables the manufacturer to roll the said compound metal into plates or sheets fit for the said sheathing, at a red heat, and thus makes the said plates or sheets less difficult to work and cheaper to manufacture, renders the said sheathing less liable to oxidation, and consequently more durable, than the ordinary copper sheathing now in use, though at the same time it oxidates sufficiently to keep the bottom of the vessel clean.'

"I look upon the invention to consist in this, that he has, by an experiment, ascertained that a certain mixture of the alloy of zinc with copper will have the effect of producing a better sheathing, by reason and by means of its oxidating just in sufficient quantities, that is, not too much, so as to wear away and impair the sheathing, and render the vessel unsafe, but enough, at the same time, to keep by its wearing the bottom of the vessel clean from those impurities which before attached to it. That I consider to be the meaning of the patent, and the object with which it was taken out. And I cannot think, as at present advised, that if it was shown (as possibly it might be) that sheets had been made of metal before, in the same proportions which he has pointed out, that if this hidden virtue or quality had not been discovered

it is not intended to intimate that it is immaterial in what way the invention is described and claimed. The several cases on

or ascertained, and consequently the application never made, — I cannot think the patent will fail on that ground. That is the opinion which I form upon it. I look upon it that there is as much merit in discovering the hidden and concealed virtue of a compound alloy of metal as there would be in discovering an unknown quality which a natural earth or stone possessed.

"We know, by the cases that have been determined, that where such unknown qualities have, from the result of experiments, been applied to useful purposes of life, that such application has been considered as the ground, and a proper ground, of a patent; and therefore, when I come to that part of the case in which they seek to show this is not so, because these metal plates have been invented before, — that is, persons have used them before, — in my judgment it will not go far enough, unless they can show there has been some application of them before to this very useful purpose.

"There is a third ground upon which they contend that this is not a new invention. They call a class of witnesses, consisting of Emery and Mercer, the casters, and Clarson, who was a caster, and Greson, who was a roller, and Ralph, who was a roller, to state to you, that in 1828, and down from that time to the year 1830 or 1831, they were all employed together in a mill (some of them perhaps not quite so long as the others), but employed in a mill that had once belonged to a person of the name of Rose; that mill is called "Nechell's Mill," I think; and they undertake to tell you (and you heard the mode they gave their evidence, and it is for you to appreciate properly, and to lay what stress on it you think right), they say, so far back as that year 1828, they most distinctly remember that they used the compound of zinc and copper in the proportions of one and a half to one, which would be within the limits mentioned in the plaintiff's specifications, and that they made a quantity of yellow metal from it for the purposes of sale.

"If it was an objection to this patent, that in point of fact any person had made a plate of this compound metal in the interval, — if the patent cannot exist, although no person had discovered what the virtues of this mixture were, but the mere fact of making it and combining the zinc and the copper together was sufficient to destroy the validity of the patent, — then indeed it would be a very material point for you to consider whether the testimony was such as you who have heard it — the cross-examination of some of the witnesses — would entirely rely upon.

"That would be a question I should not take out of your hands, but should leave, as I ought to do, entirely to yourselves. You recollect what the nature of the evidence was; and it is a long time ago (without the attention of the parties being called to it apparently until very lately); the year 1828 is a long time ago. Those are observations I should make to you when you are exerting your own discrimination on the value of the evidence; but, as I have stated already (from which I do not mean to recede), I do not think that the circumstance of showing the combination of these two materials in a metal plate will of itself destroy this patent, when no attention at the time was paid to the purpose for which this patent was taken out, and it was made merely

which the foregoing comments have been made, are apt and forcible illustrations of the necessity of great care in the statement of what constitutes the invention; for if the particular apparatus, agent, compound, or combination employed, is not of itself new, and the novelty consists in the use, which forms a new process, or develops and makes practical a new property of matter, then it will certainly be an error to describe and claim the invention in such a way as to make it necessary to construe the patent as a claim for a new machine, or agent, or combination.

§ 69. The case of Newton *v.* Vaucher rests upon similar principles. The defendant was the earlier inventor of a mode of applying soft metal to the surfaces in contact in a particular class machines, for a specific purpose. He discovered that a lining of soft metal, introduced into the parts of machines where moving surfaces require to be packed so as to be steam tight, could be substituted for the elastic substances which had been used as packing before. The plaintiff afterwards discovered that soft metal had the property of diminishing friction, and of preventing the evolution of heat when applied to the surfaces in contact of machines in rapid motion where there is great pressure; and he embodied the application of that discovery to machines in a patent. It was held that the two inventions were entirely distinct, and that the plaintiff's patent did not cover a mere double use of the discovery made by the defendant.[1]

§ 69 *a*. In the case of Tilghman *v.* Morse, the patent granted to the complainant was for an improvement in cutting and engraving the surfaces of stone, metal, glass, and other hard substances, by means of a stream of sand or grains of quartz driven as projectiles rapidly against such surfaces by any suitable method

in the ordinary course of melters of metal for the various and ordinary purposes of life.

"I do not think that the circumstances of showing that in the long time that has passed before us in the different, and, I may say, infinitely varying combinations that must have been made for the various purposes for which brass and other metal was manufactured for ordinary and common purposes of life, — to call a workman to show that on some occasion or occasions he had combined them in those proportions for another and different purpose, — it does not appear to me that such destroys the patent; and therefore it makes that which was the third head of objection, under the question of new invention or not new invention, immaterial for you to consider."

[1] Newton *v.* Vaucher, 11 Law & Eq. R. 589.

of propulsion; the most common being a rapid jet or current of steam, air, or water. "The invention of Tilghman," said Blatchford, J., "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 any thing and the article, except the sand." The court had no doubt as to the novelty and utility of this process, and sustained the validity of the complainant's patent, which was for a process or art, notwithstanding the prior use of a process in which sand or emery was rubbed against the surface of glass by the wires of a rotating wire brush, and the use on a locomotive engine of a stream of sand combined with a jet of steam to drive cows from the track of a railroad. "Grave reference is made," said Judge Blatchford, "on the question of novelty to patents granted for projecting a stream of sand combined with a jet of steam from a locomotive engine, for the purpose of driving cows from the track of a railroad; and the learned expert, who makes an affidavit on the subject, says with great truth, that the only difference between such use, in combination, of a jet of steam and a stream of sand, and the use by the plaintiff of the combination of a jet of steam with a stream of sand, is that, in the former case, the sand, after having had velocity imparted to it, came in contact with cows, while, in the latter case, it comes in contact with glass, stone, &c. This is the only difference; but in this difference lies the distinction between the two. No one, from observing the temporary operation of the process on the animal, would infer that he could, by the same means, produce the results which the plaintiff describes. Nor is there any resemblance in kind between those results and the result produced on the animal."[1]

§ 70. But there is a class of cases which come much nearer to the line, and in which it is much more difficult to determine whether the supposed invention is to be regarded merely as a double use, or as a substantive improvement entitled to a patent. These are the cases where the change consists in the substitution of one material for another in a particular manufacture or machine, and in the consequences produced by that change. Thus, to take one of the most simple of these cases, — that mentioned by Mr.

[1] Tilghman *v.* Morse (1872), 9 Blatchf. 421.

Justice Nelson in his judgment in the case of Hotchkiss *v.* Greenwood, — in which the patent was for an improvement in manufacturing buttons, the foundation being made of wood, the face being covered with tin bent over the rim. At the trial, the defendant produced a button made long before the plaintiff's in the same way, excepting that the foundation was of bone. It was admitted that the new article was better and cheaper than the old one; but the case was given up on the part of the plaintiff, rightly, as the learned judge thought, since, in his view, the mere superiority of the material, unconnected with any change in the contrivance or mode of putting the button together, could not make the manufacture a new one, in the sense of being entitled to a patent.[1]

§ 71. The case in which this illustration was resorted to was one where a similar substitution of one material for another had been made by the supposed inventor. It consisted of an improvement in the manufacture of door-knobs, and other knobs to be used as handles of locks or other fastenings. Previous to the invention of these patentees, knobs had been made of metal and fastened to the shank by a peculiar arrangement, namely, by making a dovetail cavity in the knob for the insertion of the shank, which had a screw upon its end, and by pouring fused metal into the cavity around the shank, so as to form the proper corresponding screw. It appeared, moreover, at the trial, that door-knobs had previously been made of potter's clay, but not that they had been attached to the shank in the mode in which the metallic knobs had been attached. The patentees described in their specification the method of fastening the knob and the shank together, which proved to be substantially the same as the mode previously used with the metallic knobs; and they claimed the manufacturing of knobs, in this mode of fastening, of potter's clay, or of any kind of clay used in pottery, or of porcelain.[2] It is quite apparent that the invention (if there was one) of these patentees consisted in making door and other knobs of clay or porcelain, in the same way in which knobs had previously been made of iron, or brass, or glass, or wood.

[1] See the statement of this case by Mr. Justice Nelson, in his opinion in the case of Hotchkiss *v.* Greenwood, 11 Howard, 248, 266.

[2] The claim was as follows: "The manufacturing of knobs, *as stated in the foregoing specification*, of potter's clay, or any kind of clay used in pottery,

§ 72. Now the question of the patentability of the application of this new material to the manufacture of door-knobs, in a well-known mode of attaching the knob to the shank, appears, from the evidence adduced at the trial, to have depended upon the single consideration of the superiority of that material in point of cheapness or durability; and both the court below and the Supreme Court of the United States held, that mere superiority of material could not constitute an invention of a new manufacture.[1] It is true that the patentees asked for an instruction to the jury, under which it would have been their duty to inquire whether the attaching of the clay knob to the shank required more skill or invention than to attach the metal knob. But it does not appear from the report of the case that any evidence was offered which would have justified the jury in finding that the patentees' method of attaching the knob differed from the method previously used. The amount of ingenuity or skill or invention involved in the attaching of the knob and the shank was therefore not a material issue in the case; and the sole material issue was, whether the substance of a knob, so attached, was new, and whether *that* novelty made the new knob a patentable invention. The case therefore presented the naked question of the superiority of a new material for the purposes for which that material was used in an old manufacture as the ground for a patent.

§ 72 *a*. It is a question, however, whether a hoop used for ladies' skirts, consisting of a brass wire in the form of a spiral, having a thread of catgut running through it and forming a core, would be patentable, in view of the fact that the large strings of a bass viol and other stringed musical instruments had been made in the same way, with the exception that the wire of the skirt-hoop was heavier and stiffer than that on the viol string, and therefore more elastic.[2]

and shaped and finished by moulding, turning, burning, and glazing, and also of porcelain." The claim is stated in the text as a claim for the manufacture of knobs of clay, in that mode of fastening, because the patent, under all the facts bearing upon it, was capable of no other construction.

[1] Hotchkiss *v.* Greenwood, 4 McLean's R. 456; s. c. 11 Howard, 248. This, it should be observed, is a different question from the one that would arise where the material is itself a new composition of matter; for, in such a case, the superior fitness of the material for particular uses has relation to the question of its novelty as a composition, if it is any relevancy at all.

[2] West *v.* Silver Wire and Skirt Manufacturing Co. (1867), 3 Fisher's

§ 72 *b*. The true test would seem to be that of invention. In the first place, the application to another purpose must be new and useful. Then it must be such as to require invention. If the new application be merely within the knowledge of an ordinary person, or a skilled mechanic, it is not patentable, though its use may have been previously unknown. A discovery is not necessarily an invention. Thus, the application of a fabric, which is not new, to a new use, is not invention, when nothing novel is required for its adaptation.[1] But if any one discovers that a machine or a process may be applied to a new and valuable use, and such discovery is novel and has the qualities of invention, it

Pat. Cas. 306. In referring to this point, Shipman, J., said: "It will be seen by referring to the description of the state of the art, and the defects to be remedied as set forth in the first paragraph, that mere steel, brass, whalebone, or rattan strips, formed into hoops, or combined with a covering of any kind, are not claimed. Hoops made of the material mentioned were old and well known. These materials were only claimed when curved into a spiral form, either with or without a core or central cone, of a flexible character. The specimen presented on the trial as an illustration of the invention covered by the patent was a brass wire in the form of a spiral, having a thread of catgut running through forming a core. Whether such a hoop would be patentable in view of the state of the mechanic arts need not now be determined. But it may be remarked, as it is familiarly known, that the large strings of a bass viol, and other stringed musical instruments, are nearly identical with this core which formed the hoop of the skirt presented on the trial, as one manufactured under this patent, with this exception: the wire of the skirt-hoop was heavier and stiffer than that on the viol string, and therefore more elastic. Both, however, had the same combination and the same mechanical construction. Whether such an article, by simply using a stiffer wire and inserting it in a lady's skirt in circular form, could legally be the subject of a patent, without claiming it in combination with some new element, or as part of some new combination; or whether it is the application of an old thing to a new use, and therefore not patentable, does not arise properly on the pleadings, and therefore will not be decided."

[1] Smith *v.* Elliott (1872), 9 Blatchf. 400. In this case the court remarked: "There are many changes which may be suggested by the judgment or taste of the manufacturer, or by the particular uses to which the article produced is to be applied, which are not invention; and many exhibitions of superior skill, in producing an article of greater excellence, which are not invention. Thus, if a fabric be already known and in use, change of color, change of mere material, change in its degree of fineness, or in the fineness of parts thereof, if these changes involve nothing new in construction, in the relation of its parts, in the office or function of either part or of the whole, do not constitute invention, although for many purposes these may constitute the greater excellence of the fabric."

would seem that such improvement would be patentable so far as its application to the new use is concerned. Thus, in a recent important case, the application of annealing to the manufacture of car wheels was held to be new and patentable, notwithstanding the fact that the ordinary process of annealing metals had been applied to wheels other than car wheels.[1]

[1] Whitney *v.* Mowry (1867), 3 Fisher's Pat. Cas. 157. The facts and the principles of law involved in this case were thus presented by Leavitt, J:—

"1. First, as to the novelty of the invention patented to the complainant. The allegations of the answer assailing the novelty of the patent are: 'That, in so far as the complainant, in his said letters-patent, claims to be the inventor of reheating car wheels after their removal from the moulds, or of a continuing process of removing them, while at a red heat, from the moulds, and, without allowing them to cool, placing them in that state, in a previously heated furnace or chamber, and then reheating them to a high temperature, and then allowing them to cool gradually; such claim is beyond the invention of complainant, and his said letters-patent are void, for the reason that the same process was known and used long prior to such alleged invention by the complainant.' The defendant then specifies more than twenty persons to whom the complainant's process was known, and by them used, in different places in the United States, prior to the date of his patent. He also refers to twenty or more works or printed publications in this country and in Great Britain, in which it is averred the complainant's process is described.

"Before advancing further in considering the question of novelty, it will be necessary to state at least the outlines of the complainant's process, as set forth in his specification and claim. In the patent the invention is designated as 'a new and useful improvement in the process of manufacturing cast-iron railroad wheels. In his specification, the complainant calls it 'a new and useful improvement in the process of manufacturing cast-iron railroad wheels.' And he says: 'My improvement consists in taking railroad wheels from the moulds in which they are ordinarily cast, as soon after being cast as they are sufficiently cool to be strong enough to move with safety, or before they have become so much cooled as to produce any considerable inherent strain between the thin and thick parts, and putting them, in this state, into a furnace or chamber that has been previously heated to a temperature as high as that of the wheels when taken from the moulds. As soon as they are deposited in this furnace or chamber, the opening through which they have been passed is closed, and the temperature of the furnace or chamber and its contents gradually raised to a point a little below that at which fusion commences, when all the avenues to and from the interior are closed, and the whole mass left to cool no faster than the heat it contains permeates through, and radiates from, the exterior surface of the materials of which it is composed. By this process all parts of each wheel are raised to the same temperature, and the heat they contain can only pass through the medium of the confined atmosphere that intervenes between them and the walls of the furnace or chamber; consequently, the thinnest and

§ 72 *c*. In Rushton *v*. Crawley,[1] it was held that the use of a new material to produce a known article could not be the subject

thickest parts cool simultaneously together, which relieves them from all inherent strain whatever, when cold.' After referring to the drawings descriptive of the furnace, the patentee adds: 'To heat this furnace, I have used anthracite coal, it requiring less than one-fourth of a ton to anneal two tons of wheels.' He also provides for other kinds of fuel for heating the furnace, but declares that, by whatever means the heat is produced, the furnace or chamber must be so constructed as that the operator can control the quantity and intensity of the heat used 'by admitting more or less of it into the chamber, and excluding it entirely.' After stating the advantage of annealing car wheels by this process, as adding to their strength and durability, and as being more economical than any other known process, he disclaims the annealing of castings in the ordinary way, and also says he does not 'claim to be the inventor of any particular form or kind of furnace in which to perform the process.' And he adds: 'But what I do claim as my invention, and desire to secure by letters-patent, is the process of prolonging the time of cooling, in connection with annealing railroad wheels in the manner above described, — that is to say, the taking them from the moulds in which they are cast, before they have become so much cooled as to produce such inherent strain on any part as to impair its ultimate strength, and immediately after being thus taken from the moulds, depositing them in a previously heated furnace or chamber, so constructed, of such materials, and subject to such control, that the temperature of all the parts of the wheels deposited therein may be raised to the same point (say a little below that at which fusion commences), when they are allowed to cool so fast, and no faster than is necessary for every part of each wheel to cool and shrink simultaneously together, and no one part before another.' Such is substantially the specification and claim of the complainant, stated in such full, clear, and exact terms as that an intelligent mechanic in that department, according to the testimony of a well-qualified expert in the case, could readily follow the process described.

"Before referring to the evidence offered as impeaching the novelty of the complainant's patented invention, it is proper to remark, that the evidence to sustain such a claim must be strong and conclusive, to justify a judgment setting aside the patent as void for want of novelty. The presumption of law is with the complainant upon this issue, arising not only from the grant of the original patent, but from its extension for seven years after its expiration. The statute authorizing the extension of a patent is too well known to require special reference or citation. It is sufficient to say that it imposes on the head of the Patent Office the duty of a critical revision of the grounds on which the original patent was granted. He must be satisfied, not only that the invention was new, but that it had proved of great practical utility to the public, and that the patentee had used proper diligence in bringing the invention into public use, and had not been sufficiently remunerated, as the conditions on

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[1] Law Rep. (1870), 10 Eq. Cas. 522.

of a patent, unless some invention and ingenuity were displayed in the adaptation.

which alone the patent can be extended. And the statute requires notice of the application of the extension, so that all persons opposing it may have the opportunity of making their objections. A patent which successfully undergoes this scrutiny, without any modification of the original claim and specification, has very strong presumptive claims to validity, as being both new and useful. Another fact strengthening this presumption is, that the complainant, for eighteen years before the commencement of this suit, had practically and successfully practised his patented method of annealing car wheels, during which time, as the proof shows, nearly five hundred thousand car wheels were manufactured and sold at his foundry in Philadelphia.

"But how does the issue of novelty stand upon the evidence? The complainant's patent bears date of April, 1848, but it appears that his application for a patent dates back to August 2, 1847, which is to be viewed as the date of his invention. All the witnesses agree, that prior to that time no car wheel, made of cast iron, was known having the required qualities of durability and strength. The art of casting in chills as it is called — that is, casting in a mould, the outer circumference of which was iron instead of sand — was previously known and practised. This produced a hardened surface of the periphery of the wheel; but in casting, the thin and thick parts of the wheel contracted unequally; and the result was an inherent strain between the periphery or tread of the wheel, and its inner parts, that greatly impaired the strength and durability of the wheel. Prior to the date of the complainant's invention, several devices had been resorted to, and patented, designed to remove the injurious effects of this inherent strain. The first remedy for this difficulty was to cast the hub in sections, dividing it into four parts. After the wheel had cooled, and the process of contraction ended, the spaces between the divided parts of the hub were filled with some fused metal, and the hub thus made solid. But this method involved a waste of time, and was too expensive for practical use. It was found, too, that the wheel was sometimes distorted, so as to be useless. It appears that the next device for avoiding the inherent strain was to make the plate, or thin part of the wheel, of a curved form, so that in cooling the curve in the plate would be straightened. There were also patents for other plans, embodying changes in the shape of the wheels to overcome the effects of unequal contraction in cooling, and thus avoiding the inherent strain. But none of these inventors seem to have conceived the idea of making a practical car wheel with straight plates, so annealed and cooled as to leave it strong and durable, and uninjured by the unequal contraction of its parts.

"It is safe to say, that up to the date of the complainant's invention, the process of prolonging the time of cooling the wheel, in the mode described and claimed by him, and thus overcoming the difficulties of the prior methods, was unknown. Several intelligent witnesses sustain this conclusion in a manner that frees it from all doubt.

"I have not deemed it necessary to advert to the publications referred to in the defendant's answer as anticipating the complainant's invention. They

§ 73. The mere quality of cheapness, or other superiority in the material of which an article is made, disconnected with any

prove, undoubtedly, that the process of annealing metals has been long known, and that various plans and modes of accomplishing it have been described by scientific writers. But the evidence is clear, that casting railroad car wheels is a distinct branch of the art of casting, and that none of the printed works referred to describe or apply to that art. One witness examined as an expert, and apparently well acquainted with mechanical science, testifies that in none of those works is the complainant's process of making car wheels alluded to or described. There is some reference to annealing wheels, other than car wheels, but none to any wheel cast with a chill; and therefore it has no application to the process described by and patented to the complainant.

"Without enlarging on the question of the novelty of this invention, I have no hesitancy in the conclusion that the evidence is entirely satisfactory to prove that the process of prolonging the cooling of car wheels, and thus avoiding inherent strains, is due to the thought and inventive talent of the complainant. And I cannot, perhaps, more appropriately close my remarks on this point than by quoting what was said in relation to it by my learned brother, Mr. Justice Swayne, who sat with me on the hearing of the application for an injunction, at the last April term of this court. His remarks on that occasion show a very intelligent apprehension of the subject, and are very pertinent to the question now under consideration. The learned judge, speaking for the court, said: 'Our impression is, that the patent may be sustained on the ground of a discovery. Annealing is undoubtedly an old invention, but, as applied to car wheels, may be valid as a discovery applied to car wheels. It strikes us, as the case is presented, we may fairly hold, and perhaps are bound to hold, that the patentee and complainant did discover a mode of overcoming this difficulty (the inherent strain of the wheels) by his process. That result is a meritorious one, and we should be inclined, at the final hearing, as we are now, to give such a construction to this patent as will sustain his claim to that invention, and give him the fruits of his discovery. There is no proof that he was not the inventor or discoverer of that art, and the application of that art.'

"Such were the views of the learned judge, upon the case as presented on the application for the injunction. I may add, that the evidence on the final hearing, instead of detracting from the correctness of these views on the question of the novelty of complainant's invention as covered by his patent, has strengthened and confirmed them. Several reliable witnesses, familiar with the progress of making car wheels, from their first introduction in this country, agree in their testimony, that, up to the time of this invention, no successful method of making them had been discovered; and that the complainant's process of prolonged cooling was the first known which overcame the defects in all wheels previously made. In the language of one witness: 'It enabled a better wheel to be produced at a less cost than had been the case before his invention.' And again: 'There was a general confidence felt in regard to their strength as well as durability, which never had been the case regarding other wheels.'"

new or different mode of applying that material in the process of making the thing, has not been held to be the subject of a patent. There are *dicta* of judges in which cheapness has been made an important consideration in determining the patentable character of inventions. But it is necessary to observe carefully the nature of these inventions, and the relation which this quality of cheapness bears to the subject-matter. Thus in Crane's invention, consisting in the use of anthracite coal and a hot-air blast in the manufacture of iron, in the place of bituminous coal and a hot-air blast, one test applied by the court, in order to determine whether this change in the process of manufacturing iron was a patentable invention or new mode of manufacture, was to inquire whether the article produced by it was cheaper or better than that produced by the old process. Here the superiority of the article made by a particular process was resorted to as proof that the process is new or improved, in the sense of being a patentable change. So, also, in Lord Dudley's patent, where pit-coal was substituted for charcoal in the manufacture of iron, the different constitution of the iron so made was evidence of a new process of making it. The production of an article, therefore, as good in quality as before, and at a cheaper rate, or better in quality than before, at the same rate, by a process which claims to be new, may be taken as evidence tending to show a substantive difference between that process and any former one. But in the case of a manufacture or a machine, the substitution of one material for another, leading to greater cheapness or durability in the manufacture or machine itself, seems to belong to the province of construction and not to that of invention.

Still, it is not to be laid down broadly that the use of one material in place of another, in a manufactured vendible article or a machine, can never be the subject of a patent. If such substitution involves a new method of attachment or construction, or leads to any new mode of operation, or develops a new application of the properties of matter, so as to change the use of the manufacture or machine, there may be in the use of the new material a patentable invention.[1]

[1] Mr. Phillips takes the same distinction. "There may be cases," he says, "in which the substitution of a different material may be a matter of contrivance and invention, and in such case the particular mode of applying the new material would be a good subject of a patent." Phillips on Patents, 134.

§ 73 *a*. But if any one merely makes a machine out of iron that has been made out of wood, and it is the same machine, producing the same result in the same way, it is no invention; because any constructor can make a machine of iron instead of wood. So the application of horse power, or water power, or steam power to a machine that has been moved by hand power, provided the change is within the ordinary knowledge and skill of any constructor, is not patentable. "The mere means," says Lowell, J., "of giving motion to a machine would not ordinarily be a part of the essence of the machine."[1]

It has been seen, however, that the application of a device to cast-iron guns was held to be patentable, notwithstanding the fact that substantially the same device had been applied to wrought-iron guns, or guns composed of wrought and cast iron in combination.[2]

§ 74. Having presented these illustrations of the doctrine of novelty, as applied to cases of double use, it may be expedient to consider, in reference to the same patentable quality, that class of inventions where there is supposed to be a new process, formed by the substitution of one thing for another, or by the use of a new combination of materials, or by the omission or addition of some step or manipulation, in a manufacture or an art. What is it, in this class of cases, which constitutes the patentable novelty? In other words, what is it that affords proof of a change sufficient to constitute a patentable improvement in the art or manufacture, or to form a new process or method distinguishable as an invention from what had gone before it?

§ 75. The leading case of Crane *v.* Price, involving a new mode of making iron, stands very prominent among the cases of this description. The whole invention in this case consisted in the use of a well-known material, anthracite coal, in the manufacture of

It was in reference to the same distinction that Mr. Justice Nelson, in delivering the opinion of the Supreme Court of the United States in Hotchkiss *v.* Greenwood, laid down the doctrine that superiority of material cannot, *of itself*, be the subject of a patent. The meaning of this doctrine is, that the superiority must extend beyond mere comparative cheapness or durability, or adaptation to the purpose for which the old material was used, and must lead to some change in the construction or mode of operation. 11 Howard, 266. See, in connection, the dissenting opinion of Mr. Justice Woodbury.

[1] Woodman *v.* Stimpson (1866), 3 Fisher's Pat. Cas. 98.

[2] Treadwell *v.* Parrott, *supra*.

iron, in combination with the use of a hot-air blast, after bituminous coal had been used with a hot-air blast, and after anthracite coal had been used with a cold-air blast. The doctrine applied by the court to this state of facts is embraced in the proposition that, if the result produced by the new combination is either a new article, a better article, or a cheaper article to the public than that produced by the old method, the new combination is patentable as an invention or manufacture intended by the statute. The meaning of this proposition, when applied to the English statute (the Statute of Monopolies) is, that the improvement in the article manufactured is proof that the change which has been made in the process of manufacture amounts to a new process or new mode of manufacturing iron. Applied to our statute, which embraces any new and useful art, or any new and useful improvement in an art, and therefore embraces a new process of manufacturing iron, the doctrine means the same thing. The question arises, then, whether this doctrine is sound.

§ 76. It may be observed, that patents of the class to which this case of Crane *v.* Price belongs embrace inventions which consist entirely in the use of known things, acting together in a manner already known, and producing effects already known, but producing those effects so as to be more economically or beneficially enjoyed by the public. That is to say, these inventions consist in a change of process, by the substitution of one thing for another, or the omission or addition of one or more steps, in the manufacture of an article known before as manufactured by a different process. It is quite clear, that, if there is any test capable of being applied to these changes of process, and fit to determine whether there is a patentable novelty in them, that test must be found in the improved effect which the new combination of materials or agents produces. This is the ground on which the decision in Crane *v.* Price was made.[1] The decision has been questioned; but it appears, from the whole of the discussion embraced in the opinion of the court, that it was intended to be put upon the ground that the iron manufactured by the new process was a new metal, that is to say, new in respect to its superior properties, or its cheapness, or both.[2]

[1] See also the cases cited in the opinion of the court, as contained in 1 Webs. Pat. Cas. 407–411.

[2] In Dobbs *v.* Penn, 3 Exchequer R. 427, 432, the Lord Chief Baron is

§ 77. The previous case of Sturz *v.* De La Rue, before Lord Chancellor Lyndhurst, was very similar in principle to Crane *v.* Price. The patent covered "improvements in copper and other plate printing"; and the invention consisted in "putting a glazed enamelled surface on the paper by means of white lead and size, whereby the finer lines of the engraving are better exhibited than heretofore." This was held to be a patentable invention, as an improvement in copper-plate printing.[1] In like manner, the omission of any ingredient previously used in, and considered essential to, a particular process, may constitute such a change in the series of processes pursued as to amount to a patentable invention. As where a patent was taken for "a new and improved method of making and manufacturing double canvas and sail-cloth with hemp and flax, or either of them, without any starch whatever";[2] and where another invention, for rendering cloth fabrics water-proof, consisted in immersing them in various solutions in a different order from that which had been previously followed, although the same solutions had been previously used.[3]

§ 78. It appears, then, that there is a large class of cases where improvements or inventions in the mode of producing a particular known effect will be the subject-matter of letters-patent; and

reported to have said, that the decision in Crane *v.* Price might be put upon the ground that the patent produced a new result, — that the metal produced was a *new* metal; and Baron Parke observed, that upon that ground he could understand the decision, although before he had entertained serious doubts as to the correctness of it.

[1] Sturz *v.* De La Rue, 1 Webs. Pat. Cas. 83, 5 Russel's Ch. R. 322, 324.

[2] Campion *v.* Benyon, 4 B. Moore, 71, cited in Webster on the subject-matter, p. 23, note.

[3] Halliwell *v.* Dearman, 1 Webs. Pat. Cas. 401, note (*t*). "The object of the plaintiff's invention was the rendering fabrics water-proof, but at the same time leaving such fabrics pervious to the air. It appeared that, before the plaintiff's patent, a solution of alum and soap was made, and the fabric to be rendered water-proof was immersed therein. By this means a water-proof surface was produced on the fabric, but it was not of a lasting nature; it wore off. According to the plaintiff's invention, the fabric is immersed first in a mixture of a solution of alum with some carbonate of lime, and then in a solution of soap. The effect is, that by the first immersion every fibre becomes impregnated with the alum, the sulphuric acid of the alum being neutralized by the carbonate of lime, and by the second immersion the oily quality, rendering it repellant of water, is given to every fibre, so that each fibre is rendered water-proof, instead of the surface only; but the whole fabric continued pervious to air."

another large class of cases, in which the discovery and application of new means of producing an effect before unknown will also be the subject-matter of a patent. One of these classes embraces all cases of the new application of known agents and things, so as to lead to a change in the series of processes by which the particular effect, result, or manufacture is produced, or by which an entirely new effect, result, or manufacture is produced. The other embraces all cases of the discovery and application of new agents or things, by which a new effect or result is to be produced.

§ 79. But with respect to that class of inventions which we have been considering, and which consist in a change of process produced by the omission of some step in the old process, or the new application of a particular agent, there are some recent English cases which show the test that is to be applied in determining the patentable novelty. In one of them the alleged invention consisted in a new mode of extracting garancine, the pure red coloring matter contained in madder. Before the plaintiff's patent, garancine had been obtained from fresh madder by the application of sulphuric acid and hot water or steam. The refuse, called spent madder, was regarded as useless. The plaintiff discovered that, by applying the same process to spent madder which had formerly been applied to fresh madder, garancine could still be extracted; and this discovery rendered spent madder very valuable. Upon the trial, — there being an issue which embraced the question whether this was a patentable invention, — the presiding judge told the jury that, if they believed the evidence which had been offered to show the facts above stated, they must find this issue for the defendant. This instruction made the patentable character of the invention an inference of law, to be drawn from too narrow a basis of facts. In the Exchequer Chamber, on a writ of error, it was held that this direction was wrong, and that the jury should have been directed to find certain questions of fact, as inferences from the evidence, which questions are thus stated in the opinion of the court. "There is here no new contrivance, for the process used under the plaintiff's patent with the spent madder is the same as that previously used with fresh madder; neither is the product new, for garancine produced from the one and the other appears to us precisely of the same quality. If, therefore, the patent be good, it must be on account of the old contrivance being applied to a new object under such circumstances as to support

the patent. Now, spent madder might be a very different thing from fresh madder in its properties, chemical and otherwise, or it might be in effect the same thing as fresh madder in its properties, chemical and otherwise, with the difference only that part of its coloring matter had been already extracted; again, the properties, chemical and otherwise, of both might or might not have been known to chemists and other scientific persons, so that they could tell whether fresh madder and spent madder were different things, or substantially the same things. These points appear to us to be questions of fact, and material to affect the validity or invalidity of the patent," &c.[1]

§ 80. From this ruling it is apparent that there might be one state of circumstances which would support this patent, and another state of circumstances which would show the supposed invention to be nothing more than a double use of the old process. The proper instruction to have given to a jury in this case would have been to direct them to find whether spent madder, as a substance from which to extract garancine, was, chemically or otherwise, a substantially different substance from fresh madder; or whether it was, chemically or otherwise, substantially the same substance, differing only in the amount of coloring matter remaining in it. If the latter should turn out to be the case, the supposed invention would be nothing more than the repetition of an old process, for the purpose of extracting from the same substance what had not been extracted by the first application of that process. But, if spent madder was a substantially different substance from fresh madder, then there would have been an invention, consisting in the application of an old process to a substance to which it had not been before applied, and obtaining thereby the same result which had formerly been obtained from a different substance.[2]

§ 81. The still more recent case of Booth *v.* Kennard is an in-

[1] Steiner *v.* Heald, 6 Eng. Law & Eq. R. 536. A new trial was directed, but it does not appear that it was ever had. The patent was repealed, on the production of a foreign work which affected its validity. See Webster's argument in Booth *v.* Kennard, 38 Eng. Law & Eq. R. 457.

[2] Just as if the discovery had been made (to use an illustration suggested by *Maule*, J., at the argument of this case) that, by applying to potatoes the process used for obtaining garancine from madder, a valuable coloring matter could be obtained.

stance where there was an invention in making an article by the omission of one step in the process. Before the plaintiff's patent, gas had been made from oils extracted from seeds and other substances. The plaintiff discovered that gas might be made directly from the seeds, &c. The apparatus which he employed was not new, the seeds or other matters from which the gas was made were the same from which the oils had been previously extracted, and the gas produced was the same. The distinction, therefore, between the plaintiff's and former methods consisted in the saving of one step in the process of making gas. This was held to be a substantive invention, capable of supporting a patent.[1]

§ 82. Having thus considered the statute requisite of novelty in respect to the quality and extent of the difference between the alleged invention and other things which preceded it, the next inquiry is, whether this must be an absolute novelty, in respect to all previous time and all other countries, or whether it may, under any and what circumstances, be relative to the existing state of knowledge, and to the knowledge of this or of other countries. And here an inspection of the statute brings into view certain clauses which have an important bearing upon the issue of novelty, and, in one way or the other, qualify or limit the circumstances under which a valid patent may be taken. One of these clauses, found in the sixth section of the act of 1836, provides, as if by way of accumulation, that the subject-matter of the alleged invention must be something "not known or used by others before his or their discovery or invention thereof." The other is the provision, in the fifteenth section of the statute, which declares 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 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."

§ 83. The clause of the statute which makes the condition of a valid patent, that the supposed invention was "not known or used by others before his or their invention or discovery thereof," was founded upon a similar clause in the patent act of 1793, and

[1] Booth *v.* Kennard, 38 Eng. Law & Eq. R. 457.

upon the construction which that clause had received. The words of the act of 1793 were, "not known or used before the application." The seeming ambiguity of this language led to the inquiry in what way and by whom a previous knowledge was to vitiate a claim to an otherwise original invention. It was perceived that the applicant or patentee himself must have had a knowledge and use of his invention before his application for a patent; and that others, who might have been employed to assist him in developing or applying it, might have thus derived a knowledge of it from him, and that others still might have pirated it from him, or used it without his consent, before his application. In order, therefore, to give the statute a rational interpretation, it was held by the Supreme Court that it must be construed to mean, not known or used by *the public* before the application.[1] This construction made the clause to mean, that if the public were, at the time of the application, in possession of the invention, whether derived from another inventor or from the applicant himself and with his consent, the patent obtained would be invalid.

§ 84. This construction was adopted into the act of 1836 by inserting the words "by others"; but the previous use or knowledge by others was made to relate to the time of the invention or discovery by the applicant, instead of the time of his application for a patent. Thus altered, the text of the clause "not known or used by others before his or their discovery or invention thereof," obviously gives rise to several very important questions. In the first place, looking at the authority of the decision on which the clause was founded, and at the reasons of that construction, it is apparent that the term "others," although used in the plural, was used to denote that the use or knowledge was to be the use or knowledge of any other person or persons than the patentee himself; and therefore the prior use or knowledge by one person, other than the patentee, is sufficient to defeat his statute claim to be regarded as the inventor, provided that use or knowledge was not such as to be excluded by the further construction which the clause is to receive, or by the limitations which are imposed upon it by some other clause.[2] We have seen, then, that when the Supreme Court inserted the term "others," by con-

[1] Pennock *v.* Dialogue, 2 Peters, 1. See also Mellus *v.* Silsbee, 4 Mason, 108; Treadwell *v.* Bladen, 4 Wash. 703.

[2] See Reed *v.* Cutter, 1 Story, 590; Bedford *v.* Hunt, 1 Mason, 302.

struction. into the statute of 1793, they gave it two limitations: first, that the prior use or knowledge must have been from the invention or discovery of some other person than the applicant for a patent; or, secondly, if derived from his invention or discovery, that it must have been with his consent. The first of these limitations is embodied in the clause in the act of 1836, which is now under consideration; and the second is embraced in another clause of the same statute, which permits the applicant to have allowed the use of his invention for a certain period, —a regulation that will be considered hereafter. With these limitations, then, kept in view, the question arises, what is to constitute a prior "use" or "knowledge" of an alleged invention within the meaning of this statute? Does the "use" or "knowledge" comprehend all time and place, or is it limited, under any and what circumstances?

§ 84 *a*. The language of the present statute (1870) is that the invention or discovery for which letters-patent are sought shall not have been "known or used by others in this country, and not patented, or described in any printed publication in this or any foreign country, before his [the inventor's or discoverer's] 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."

§ 85. It is apparent that, if the whole state of a particular art, past and present, were to become known, on a full investigation, the previous use or knowledge of a thing which is sought to be made the subject of a patent might relate to a foreign country, or a former period of time, or to this country, or the present time. Confining our inquiries, therefore, to the state of the existing knowledge of this country, at the time of a supposed invention, one question to be considered is, whether the former existence of the supposed subject of invention, after the previous specimen of it has been laid aside, lost, or abandoned, is sufficient to prevent a patent being granted to one who has reinvented it. This question has been judicially considered, under our statute, but under circumstances which should be carefully noted. One Fitzgerald was an original inventor of an iron safe for the preservation of papers from fire, of a peculiar construction, patented in the year 1843. In the defence it appeared that one Conner, a stereotype founder in the city of New York, between the years 1829 and

1832, made a safe for his own use of substantially the same construction, and used it in his own counting-room as a place of deposit for his papers, and for their preservation from fire, until the year 1838, when it passed into other hands. There was no evidence to show what became of this safe afterwards, or that the person into whose hands it fell was aware of any peculiar construction making it valuable as a protection against fire, or that it was ever used for that purpose after Conner had parted with it.[1] While in Conner's possession, its construction and supposed value, as a means of protection against fire, were known to the workmen employed in his foundry, but no test was applied to it to ascertain its value in this respect. After it passed out of his possession, he did not make another like it, but used a safe of different construction. The case, therefore, on which the Supreme Court intended to pass, was that of a single specimen, of substantially the same construction as the patentee's safe, used for some years, by the person who made it, as a place of deposit for his papers, then laid aside and lost to the world, but still capable of being described from the recollection of the person who made it, when recalled to his recollection by the subsequent reinvention of it by an original inventor. Does such a state of facts negative the claim of a subsequent original inventor to a patent?

§ 86. In considering this question, the Supreme Court came to the conclusion that it was not the intention of Congress to require that a patentee should be *literally* the original and first inventor or discoverer of the thing patented. This conclusion they deduced from the obvious policy and object of the statute, namely, to reward him who first gives to the public the means of knowledge of a useful discovery, — a policy which is evinced by that provision of the statute which requires that a previous foreign invention must have been patented, or described in a printed pub-

[1] I state the facts of this case as they appeared in the record on which the Supreme Court pronounced its opinion. Unfortunately, the bills of exceptions were somewhat loosely drawn, and it appears to have been true that the Conner safe was in existence at the time of the trial. See the application made to the Supreme Court to open the judgment, after it had been pronounced. 19 Howard's Reports, 509, original edition. But the decision of the Supreme Court must be examined as if this fact were not in the case, and upon the supposition that the Conner safe and all knowledge of it, except such knowledge as was recalled to the mind of Conner by Fitzgerald's invention, had likewise been lost.

lication, in order to invalidate the claim to a patent in this country by an original inventor, who believed himself to be the first inventor. This provision is obviously founded upon the hypothesis that an invention might exist for ages in a foreign country, and yet the means of knowledge would not be within the reach of the public in this country, unless the foreign invention were patented, or described in a printed publication. The policy of the statute, thus deduced, the court seem to have considered would cover the case of a lost art, when reinvented, and also such a case as that of Fitzgerald, which they likened to the case of a lost art, and to the case of the reinvention of an unpatented or unpublished foreign invention. The particular instruction given to the jury by the court below, and in which the Supreme Court held there was no error, required the jury to find two facts: first, whether the Conner safe had been finally forgotten or abandoned, before Fitzgerald's invention; and, secondly, whether Fitzgerald was the original inventor of the safe for which he obtained a patent. The jury were directed, if they found these two facts affirmatively, to return a verdict for the plaintiff. This instruction and verdict were sanctioned by the Supreme Court, mainly upon the ground that the evidence authorized the inference that the Conner safe had been finally forgotten before Fitzgerald's invention, so that there was no existing and living knowledge of the improvement, or of its former use, at the time of Fitzgerald's discovery.[1]

[1] Gaylor *v.* Wilder, 10 Howard, 477. The opinion of a majority of the court (McLean and Daniel, Justices, dissenting) was delivered by Mr. Chief Justice Taney. The following is his view of the subject considered in the text: "It appears that James Conner, who carried on the business of a stereotype founder in the city of New York, made a safe for his own use, between the years 1829 and 1832, for the protection of his papers against fire, and continued to use it until 1838, when it passed into other hands. It was kept in his counting-room, and known to the persons engaged in the foundry; and after it passed out of his hands, he used others of a different construction.

"It does not appear what became of this safe afterwards. And there is nothing in the testimony from which it can be inferred that its mode of construction was known to the person into whose possession it fell, or that any value was attached to it as a place of security for papers against fire, or that it was ever used for that purpose.

"Upon these facts the court instructed the jury, 'that, if Conner had not made his discovery public, but had used it simply for his own private purpose, and it had been finally forgotten or abandoned, such a discovery and use would

§ 86 *a*. The principles of law determined in the case of Gaylor *v.* Wilder were applied in a similar case in the Circuit Court for

be no obstacle to the taking out of a patent by Fitzgerald or those claiming under him, if he be an original, though not the first, inventor or discoverer.'

"The instruction assumes that the jury might find from the evidence that Conner's safe was substantially the same with that of Fitzgerald, and also prior in time. And if the fact was so, the question then was, whether the patentee was 'the original and first inventor or discoverer,' within the meaning of the act of Congress.

"The act of 1836, ch. 357, § 6, authorizes a patent where the party has discovered or invented a new and useful improvement, 'not known or used by others before his discovery or invention.' And the 15th section provides, that if it appears, on the trial of an action brought for the infringement of a patent, that the patentee 'was not the original and first inventor or discoverer of the thing patented,' the verdict shall be for the defendant.

"Upon a literal construction of these particular words, the patentee in this case certainly was not the original and first inventor or discoverer, if the Conner safe was the same with his, and preceded his discovery.

"But we do not think that this construction would carry into effect the intention of the legislature. It is not by detached words and phrases that a statute ought to be expounded. The whole act must be taken together, and a fair interpretation given to it, neither extending nor restricting it beyond the legitimate import of its language, and its obvious policy and object. And in the 15th section, after making the provision above mentioned, there is a further provision, that, if it shall appear that the patentee at the time of his application for the patent believed himself to be the first inventor, the patent shall not be void on account of the invention or discovery having been known or used in any foreign country, it not appearing that it had been before patented or described in any printed publication.

"In the case thus provided for, the party who invents is not, strictly speaking, the first and original inventor. The law assumes that the improvement may have been known and used before his discovery. Yet his patent is valid if he discovered it by the efforts of his own genius, and believed himself to be the original inventor. The clause in question qualifies the words before used, and shows that by knowledge and use the legislature meant knowledge and use existing in a manner accessible to the public. If the foreign invention had been printed or patented, it was already given to the world and open to the people of this country as well as of others, upon reasonable inquiry. They would therefore derive no advantage from the invention here. It would confer no benefit upon the community, and the inventor therefore is not considered to be entitled to the reward. But if the foreign discovery is not patented nor described in any printed publication, it might be known and used in remote places for ages, and the people of this country be unable to profit by it. The means of obtaining knowledge would not be within their reach; and, as far as their interest is concerned, it would be the same thing as if the improvement had never been discovered. It is the inventor here that brings

the District of New York in 1869. The controversy had reference to a machine for stretching chains, which had been patented

it to them, and places it in their possession. And as he does this by the effort of his own genius, the law regards him as the first and original inventor, and protects his patent, although the improvement had in fact been invented before and used by others.

"So, too, as to the lost arts. It is well known that centuries ago discoveries were made in certain arts, the fruits of which have come down to us, but the means by which the work was accomplished are at this day unknown. The knowledge has been lost for ages. Yet it would hardly be doubted, if any one now discovered an art thus lost, and it was a useful improvement, that, upon a fair construction of the act of Congress, he would be entitled to a patent. Yet he would not literally be the first and original inventor. But he would be the first to confer on the public the benefit of the invention." He would discover what is unknown, and communicate knowledge which the public had not the means of obtaining without his invention.

"Upon the same principle and upon the same rule of construction, we think that Fitzgerald must be regarded as the first and original inventor of the safe in question. The case as to this point admits that, although Conner's safe had been kept and used for years, yet no test had been applied to it, and its capacity for resisting heat was not known; there was no evidence to show that any particular value was attached to it after it passed from his possession, or that it was ever afterwards used as a place of security for papers; and it appeared that he himself did not attempt to make another like the one he is supposed to have invented, but used a different one. And upon this state of the evidence the court put it to the jury to say whether this safe had been finally forgotten or abandoned before Fitzgerald's invention, and whether he was the original inventor of the safe for which he obtained the patent; directing them, if they found these two facts, that their verdict must be for the plaintiff. We think there is no error in this instruction. For if the Conner safe had passed away from the memory of Conner himself, and of those who had seen it, and the safe itself had disappeared, the knowledge of the improvement was as completely lost as if it had never been discovered. The public could derive no benefit from it until it was discovered by another inventor. And if Fitzgerald made his discovery by his own efforts, without any knowledge of Conner's, he invented an improvement that was then new, and at that time unknown; and it was not the less new and unknown because Conner's safe was recalled to his memory by the success of Fitzgerald's.

"We do not understand the Circuit Court to have said that the omission of Conner to try the value of his safe by proper tests would deprive it of its priority, nor his omission to bring it into public use. He might have omitted both, and also abandoned its use, and been ignorant of the extent of its value; yet if it was the same with Fitzgerald's, the latter would not upon such grounds be entitled to a patent, provided Conner's safe and its mode of construction were still in the memory of Conner before they were recalled by Fitzgerald's patent.

to the complainant in 1864. The defence relied upon was the prior use by the defendant's father of a machine similar to that used by the defendant. This machine had been kept under lock and key in a cellar concealed from persons in general, its existence being known only to the machinist who constructed it, to the father and the brother of the defendant, and to the defendant himself. The machine was seldom used before the death of the defendant's father in 1862, and was suffered to become rusty and neglected after that time. In 1864 the plaintiff's machine was described to the defendant by a workman who was at that time in his employ, and who had previously been in the employ of the plaintiff and had used his machine. Thereupon the rusty machine was taken from the cellar in July, 1865, and cleaned and fitted up in the defendant's shop, and used to stretch chains. Prior to this, the defendant, in making chains which required the links to be of equal length, stretched the links by means of the hammer and anvil, and not by any machine.

Upon this state of facts, the court, assuming that the old machine, in the condition in which it was while in the cellar, was substantially the same in construction with the machine as used by the defendant after July, 1865, and with the plaintiff's machine, held that it was an abandoned and lost invention, and its existence was no bar to the recovery of the plaintiff, especially as the plaintiff had no knowledge of its existence at the time of his invention. It appeared, moreover, that the machine as used by the defendant was not identical with that taken from the cellar.[1]

"The circumstances above mentioned, referred to in the opinion of the Circuit Court, appear to have been introduced as evidence tending to prove that the Conner safe might have been finally forgotten, and upon which this hypothetical instruction was given. Whether this evidence was sufficient for that purpose or not, was a question for the jury, and the court left it to them. And if the jury found the fact to be so, and that Fitzgerald again discovered it, we regard him as standing upon the same ground with the discoverer of a lost art, or an unpatented and unpublished foreign invention, and, like him, entitled to a patent. For there was no existing and living knowledge of this improvement, or of its former use, at the time he made the discovery. And whatever benefit any individual may derive from it in the safety of his papers, he owes entirely to the genius and exertions of Fitzgerald."

[1] Hall *v.* Bird, 6 Blatchf. 438; s. c. 3 Fisher's Pat. Cas. 595. After referring to the principles of law laid down by the court in the case of Gaylor *v.* Wilder, Judge Blatchford continued: "Now, although the old machine in the present case was constructed in 1852, and had been kept in the

§ 87. It may be suggested that the principles and analogies of the patent law would have furnished another mode of testing this question, which would have led to the same result, and which probably was what the learned judge who tried the cause in the court below intended to embrace in his instruction to the jury, but which does not appear to be distinctly developed in the decision of the Supreme Court. In every question of an alleged priority, there arises the necessary inquiry whether there was a completed invention or discovery by another before the invention or discovery by the patentee. If the thing patented has once been actually and completely invented or discovered before, however limited the use, the patent is invalidated, unless the former article was an unpatented or unpublished foreign invention, never introduced into this country. But what amounts to proof of a completed invention will depend on the nature of the subject-matter, and may also depend on the nature of the previous use. If the subject-matter is a mere structure, whose adaptation or capacity to effect what is proposed requires no test or practical use, then nothing is needed but to ascertain if the structure has been once previously made. The extent of use, or the mode in which the first inventor treated the article, or the fact that he had once forgotten that he had ever made it, are immaterial, provided he had completed the structure. But this is a case which rarely occurs.[1]

cellar of the defendant's father under the circumstances stated, and had been occasionally used there, and although it had not bodily disappeared from view, yet its existence and use were not made public, the knowledge and use of it did not exist in a manner accessible to the public, it had been substantially abandoned, and it had substantially passed away from the memory of those who had used it, as is shown by the fact that when they were called on to stretch the links of chains to a uniform length — a purpose to which it is not shown that the defendant's father ever applied the machine — it did not occur to them to use the machine for the purpose, until after they had learned of the existence and use of the plaintiff's machine. The knowledge of the machine was, therefore, as effectually lost as if it had never been constructed, and the public could derive no benefit from the invention, embodied in it, until such invention could be discovered by another inventor. As it clearly appears that the plaintiff made his invention by his own efforts without any knowledge of the machine in the cellar of the defendant's father, he invented an improvement which was then new, and was at the time unknown, because the old machine was recalled to the memory of the defendant, and of his brother, and of the machinist who put it up, by the success of the plaintiff's machine."

[1] A case was once tried before Mr. Justice Nelson, upon a patent for an

In the larger number of inventions, some amount of actual use is necessary, in order to determine whether the structure did effect in practice the supposed theory of its construction; and until this use has been had, until the capacity of the structure to effect what is proposed is ascertained, it cannot be said that there has been a completed invention.[1] What kind of use this must have been in order to test and ascertain the capacity of the structure, so that the inference of complete invention can be drawn, depends upon the character of the invention. Thus in the case of Conner's safe, the mere structure alone, and its use as a place of deposit for papers, for any number of years, without its having been subjected to the test of fire at all, would not make it a completed invention of such a safe as that patented by Fitzgerald, but would rather leave it all the while in the position of an experiment, or a theoretical structure, whose relation to the question at issue would depend upon the fact of its having been abandoned, or of its having been prosecuted to the required result. Hence it is, that in all inquiries of this kind, the principles which determine how far a former use rested only in experiment, or in preparation for experiment, and how far it is to be regarded as a use in which the proposed result or mode of operation was actually reached by a practical test, are of great significance. There is no real danger of having this inquiry lost in questions of

improved water-wheel, in which a witness testified that ten years before the plaintiff's patent he assisted in constructing a water-wheel embracing the principle of the plaintiff's invention, which was carried away by the person for whom it was made, and the witness never saw it afterwards. The judge instructed the jury, that, if they believed the witness, and the wheel was a perfect wheel and was taken away to be used, the evidence was sufficient to invalidate the patent, without proof that the prior wheel was ever actually used. Parker *v.* Ferguson, 1 Blatchf. 407. This instruction was appropriate to a case where perfect or complete invention could be inferred from the structure alone, without any use whatever. But this class of cases is entirely distinguishable from those where some test of actual use is necessary to ascertain whether the alleged prior invention was any thing more than an experimental effort to do what the patentee has afterwards done.

[1] In the trial of patent causes, on questions of priority of invention, it is very common to hear expert witnesses asked the question, whether the alleged prior machine or other thing *would have worked* as well as, or in the same mode as, that of the patentee. This evidence is not otherwise relevant to the true inquiry, than so far as it tends to the inference that the thing actually did work. This tendency is often very slight.

degree, if it is properly conducted; because the question of complete prior invention does not depend upon questions of degree, or perfection, but upon the inquiry whether the two things actually accomplished a result that may be regarded as substantially the same in kind.

§ 87 *a*. It is not sufficient that another may have previously conceived the idea that the thing patented could be done; he must have reduced his idea to practice, and have embodied it in some useful practical form. The representation of such ideas by means of drawings is not such embodiment into practical and useful form as will defeat a patent which has been granted.[1]

It is well settled that a prior experiment will not invalidate an invention subsequently completed by another. Such experiment must have been brought to a practical, completed form, capable of producing some useful result. He is the inventor, and is entitled to the patent, who has first completed the machine and made it capable of useful operation, although others may have previously had the idea, and made some experiments towards putting it into practical form.[2] Prior machines, in order to defeat a patent for subsequent machines, must have been working machines, and not mere experiments; they must either have actually done work, or have been capable of doing it.

Whether they were in use a greater or less time is immaterial, except so far as that fact may tend to show whether they were or were not mere experiments. The prior machine may have been inferior to the subsequent one, and may not have performed its work so well; but so long as it is substantially the same, and was a perfected invention, it anticipates the latter.[3]

Moreover; it is not necessary that a prior machine should have been actually used for the purpose contemplated; but if it is capable of such use, and its adaptation to such use be within the knowledge of a mechanic of competent skill, it will be a bar to

[1] Poppenhusen *v.* N. Y. Gutta-Percha Comb Co. (1868), 2 Fisher's Pat. Cas. 62; Ellithorpe *v.* Robinson (1859), ibid. 83; Union Sugar Refinery *v.* Matthiessen (1865), ibid. 600.

[2] Agawam Co. *v.* Jordan (1868), 7 Wall. 583; Seymour *v.* Osborne, 11 Wall. 516; Whitely *v.* Swayne, 7 Wall. 685.

[3] Woodman *v.* Stimpson (1866), 3 Fisher's Pat. Cas. 98; Swift *v.* Whisen (1867), ibid. 343; Rich *v.* Lippincott (1853), 2 Fisher's Pat. Cas. 1; Pitts *v.* Wemple (1853), ibid. 10; Waterman *v.* Thomson (1863), ibid. 461; Sayles *v.* Chicago & N. W. R.R. (1865), ibid. 523.

the validity of the subsequent invention.[1] The adoption of an invention in practical use is generally strong evidence that it is a completed invention, and not a mere experiment. But it may be a completed invention, put into practical form, ready for practical use, and reduced to practice, without having been put into use in the general acceptation of that word. The case of Coffin *v.* Ogden is authority for the doctrine that a piece of mechanism, which has been completed and is capable of working successfully, may defeat the claim of novelty in a subsequent alleged invention, though such piece of mechanism was not actually used before the date of the subsequent invention. In this case one Erbe, prior to the date of the plaintiff's invention, had made a lock, embodying the reversible latch, which had been patented by the plaintiff. It was a complete working reversible latch, requiring no alteration, adaptation, addition, or improvement, to fit it for use as a latch, and as a reversible latch. It was therefore a complete and perfected invention. It does not appear that Erbe had made more than one lock prior to the plaintiff's invention, or that such lock had been in any way used. But it had been exhibited by its inventor, and its construction and operation explained to three persons skilled in the mechanism of locks. This was construed by the court to be imparting to the public such knowledge of it as a completed invention, before the complainant's assignor had made his invention, as to deprive the latter of the right to be considered in law as the first inventor, notwithstanding he was an original and independent inventor of the improvement. The principles of law applicable to this statement of facts were thus stated by the court: —

"A putting of an invention into use is generally a strong evidence of a reduction of it to practice. But it may be a completed invention, put into practical form, ready for practical use, and reduced to practice, without being put into use in the general acceptation of that word. If the adaptation to use, or even the use itself, is merely experimental, the invention is not perfected. But use is not necessarily required in order to show perfection or completion. In respect to most inventions, use, not merely experimental, is one of the best proofs of the reduction of an invention to practice. But the particular invention in question is an illustration of the fact that a piece of mechanism may be shown to

[1] Pitts *v.* Wemple (1865), ibid. 10.

have been completed, and not to have rested in experiment, and to have been capable from its structure of working successfully, so as to deprive of the merit of novelty, in the patent law, a subsequent independent invention of the same thing, without its being shown that such piece of mechanism was actually used before the making of such subsequent invention.[1]

§ 88. A great deal of light may be thrown upon the particular question now under consideration, by an examination of some of the English cases; for while our statute is not precisely the same as the British Statute of Monopolies, in its description of the qualities and circumstances of a patentable invention, it is substantially the same in its provisions respecting prior use and knowledge, and the requisite of novelty.[2] But in examining the

[1] Coffin *v.* Ogden, Blatchford, J. (1869), 7 Blatchf. 61; s. c. 3 Fisher's Pat. Cas. 640; Reed *v.* Cutter, 1 Story, 590; Bedford *v.* Hunt, 1 Mason, 302; Whitely *v.* Swayne, 7 Wall. 685.

[2] The difference between the English statute and ours, in the particulars referred to in the text, is as follows: The clause in the English Statute of Monopolies, on which the patent system rests, embraces the two conditions: *first*, that the manufacture is *new* within the realm; *second*, that others did not use it at the making of the letters-patent. The object of the last condition was to prevent a patent being held for a thing which the patentee had — although it was new within the realm at the time he invented or introduced it — permitted to go into public use. Our statute has put these two conditions into distinct clauses; and therefore the clause "not known or used by others before the discovery or invention thereof," by the applicant for a patent, is to be taken as a repetition of the quality of novelty, and is to be construed in connection with the clauses which allow the special defence of want of priority of invention, and the previously stated condition that the subject-matter must be "new." For this reason the principles laid down in the English cases, by which the fact of priority has been ascertained, are equally applicable under our statute, where the alleged prior use or knowledge was in this country. The question which has sometimes been raised in the English cases, as to the prior use being a public use or not, is not founded upon the conditions of their statute, but upon the proviso in the letters-patent, which makes them void if the invention is not new "as to the public use and exercise thereof" in England, and which has been supposed to add to the conditions of the statute. As to this, it is well settled that the phrase "public use," introduced into the proviso, means use in public, or in a public manner, in opposition to a secret use, and that it does not mean use by the public generally. Carpenter *v.* Smith, 1 Webs. Pat. Cas. 530, 534; Hindmarch on Patents, 108–112; Stead *v.* Williams, 2 Webs. Pat. Cas. 126; Stead *v.* Anderson, 2 Webs. Pat. Cas. 147. But in this country there can be no such distinction, since our letters-patent do not contain this proviso, and the validity of

English cases on priority of invention or introduction, it is necessary to bear in mind that the judges, in giving instructions to juries, and in deciding cases *in banc*, have often brought into the discussion the inquiry whether the subject of the patent was in "public use" before or at the time of granting the patent, in opposition to any secret or entirely private use. This has arisen from two circumstances, which have had a tendency to blend two distinct issues into one. The first of these circumstances is that the English law allows a patent to the first introducer of a thing from abroad, as well as to the first inventor. Hence a question may arise, whether the public were already in possession of the thing, or were already using it, at the time of a patent being granted. The other cause for the consideration of this question of prior "public use" is to be found in the proviso of the letters-patent, which makes them void if the subject was not new as to the "public use and exercise thereof." But in all the cases, whether the issue to be found was directed expressly under the statute, on the question of novelty, or under the proviso of the patent, on the question of prior "public use," this point of a perfected invention, as distinguished from mere experimental trials or efforts, has been alike involved; and if we examine the facts of the several cases and the tests applied to them, taking care to remember that under our law, on the question of novelty, the publicity of the prior use is not otherwise important than as a circumstance tending to show that there was or was not a completed invention, we shall find the English cases of great value.

§ 89. Thus in the case of Jones *v.* Pearce, which bears some resemblance to the case of Gaylor *v.* Wilder, and which was an action on a patent for making wheels on a principle of suspension, evidence was offered, in the defence, to show that, many years before the plaintiff's invention, a Mr. Strutt had caused a pair of wheels to be made for his own use, and had used them on a cart until they had become broken and laid aside, and that they were constructed and worked on the principle of the plaintiff's invention. On this last point there was conflicting evidence. Mr. Justice Patterson instructed the jury as follows: "If, on the whole

the grant depends upon the same principles, as to the novelty of the invention, which have been applied to that question under the English statute, where the question has arisen directly upon the statute respecting the priority of invention.