PATENTING SOFTWARE IN TAIWAN: A COMPARATIVE STUDY OF THE LAWS OF TAIWAN AND THE UNITED STATES

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I. INTRODUCTION

The current Taiwan patent law became effective on January 23, 1994.40_IDEA_319)_and_footnotes(n1);.FTNT n1 Many significant changes were made to the law in accordance with the agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPS").40_IDEA_319)_and_footnotes(n2);.FTNT n2 However, to fully comply with the patent provisions of TRIPS, Taiwan patent law was further amended on May 7, 1997.40_IDEA_319)_and_footnotes(n3);.FTNT n3 Although the amended patent law is compliant with TRIPS, the Executive Yuan40_IDEA_319)_and_footnotes(n4);.FTNT n4 has not declared the amended law effective. Executive Yuan is likely to declare the law effective when Taiwan is admitted to the World Trade Organization ("WTO").40_IDEA_319)_and_footnotes(n5);.FTNT n5 The current Taiwan Enforcement Rules of Patent Law were promulgated on October 3, 1994 and effective as of October 5, 1994. Both the patent law and the enforcement rules make no mention of computer programs or software in their provisions.

When the United States enacted the first copyright law in 1790,40_IDEA_319)_and_footnotes(n6);.FTNT n6 it could not have envisioned the development of computer software. Generally, the U.S. Copyright Act40_IDEA_319)_and_footnotes(n7);.FTNT n7 provides copyright protection to the literal elements of a computer program. However, it is unclear whether copyright protection is available for non-literal aspects of computer software, such as structure, sequence and organization of programs, and screen displays generated by the program.40_IDEA_319)_and_footnotes(n8);.FTNT n8 Computer programs are inherently functional works that cause machine processes to be performed. Because

computer programs define how and which processes a computer performs, there is a risk that overprotecting a program under the U.S. Copyright Act would grant a patent-like monopoly for a program's functional processes, regardless of whether a program could properly obtain patent protection.40_IDEA_319)_and_footnotes(n9);.FTNT n9

Like U.S. patent law, Taiwan patent law has been evolving to reflect the growing importance of computer software. The Taiwanese Intellectual Property Office ("TIPO")40_IDEA_319)_and_footnotes(n10);.FTNT n10 prepared its first examination guideline ("Old Guidelines") for computer software-related inventions in May 1991. When first introduced, the Old Guidelines were not officially released to the public and were only an internal reference document for examiner use. Nevertheless, the Old Guidelines made clear that both computer programs and computer-readable storage media were not per se unpatentable. However, the functionality of a computer program could not be patentable if the process used a law of nature.40_IDEA_319)_and_footnotes(n11);.FTNT n11 Therefore, under the Old Guidelines, it was possible to obtain a software patent in Taiwan.

On October 7, 1998, the TIPO issued the Examination Guidelines for Computer Software-Related Inventions ("Taiwanese Guidelines"). 40_IDEA_319)_and_footnotes(n12);.FTNT n12 These guidelines made obtaining computer software patents easier. A simple keyword search of the patent database established by the Asia Pacific Intellectual Property Association ("APIPA")40_IDEA_319)_and_footnotes(n13);.FTNT n13 finds over 1087 existing patents for computer games and twenty-seven patents on methods for encoding Chinese characters. However, the numbers do not mean that software patents have been officially recognized as patentable subject matter in Taiwan. In contrast, the findings are better interpreted as a result of the unclear policies regarding software patents and inconsistent examination standards among examiners.

Recently issued patents show that the TIPO now distinguishes a logic algorithm from a mathematical algorithm in examining applications for computer software-related patents.40_IDEA_319)_and_footnotes(n14);.FTNT n14 That is, a mathematical algorithm is per se unpatentable subject matter because it preempts the logic algorithm. However, a logic algorithm may be patentable if it has utility, uses hardware resources,40_IDEA_319)_and_footnotes(n15);.FTNT n15 and falls within the realm of recognized technological arts. Accordingly, computer softwarerelated inventions can be claimed as a method (process), a system, or an apparatus, regardless of inconsistencies among attitudes of the TIPO examiners in dealing with pure software inventions.

The Taiwanese Guidelines resolved the confusion and inconsistent treatment of software patents. The TIPO intends to provide a clear standard for the examiners to follow when evaluating the patentability of software inventions. More particularly, the Taiwanese Guidelines provide an important basis for promoting the software industry with patent protection in accordance with Article 27 of the TRIPS Agreement.40_IDEA_319)_and_footnotes(n16);.FTNT n16 Unlike the U.S. Examination Guidelines for Computer-Related Inventions ("U.S. Guidelines"),40_IDEA_319)_and_footnotes(n17);.FTNT n17 the Taiwanese Guidelines are considered rulemaking and constitute the same legal effect as Taiwan administrative

procedure law.40_IDEA_319)_and_footnotes(n18);.FTNT n18 For this reason, the Taiwanese Guidelines provide legal support for office actions, appeals and petitions.

This paper presents a comparative study between the Taiwanese Guidelines and the U.S. Guidelines. It starts with a brief synopsis of the Taiwanese Guidelines. Then to illustrate the differences between the Taiwanese Guidelines and the U.S. Guidelines, hypothetical patent examinations are conducted from some U.S. court cases based on the Taiwanese Guidelines. In conclusion, this paper offers on several suggestions for foreign applicants filing applications for computer software-related inventions in Taiwan.

II. SUMMARY OF TAIWANESE EXAMINATION PROCEDURES

A. Preface

The Taiwanese Guidelines explain why software inventions should be protected under patent law rather than Copyright Law. Although existing Taiwan patent law does not explicitly bar software inventions from patentability, it also fails to clearly distinguish software inventions from algorithms.40_IDEA_319)_and_footnotes(n19);.FTNT n19 The requirements of the Taiwanese Guidelines are based on Taiwan patent law and the Enforcement Rules of the Patent Law, and still comport with the General Examination Guidelines issued in October 1994. Furthermore, the Taiwanese Guidelines reference both the U.S. Guidelines and the Japanese Guidelines.

As previously mentioned, the Taiwanese Guidelines have the effect of law, even though they were designed to assist patent examiners in analyzing the subject matter of applications for computer softwarerelated inventions. The Taiwanese Guidelines also include flowcharts for the examiners to follow in conducting examinations of applications for computer software-related inventions.

B. Specification

Prior to discussing statutory subject matter, the Taiwanese Guidelines state the specification requirements for software patent applications. For instance, means-or step-plus-function language is allowed.40_IDEA_319)_and_footnotes(n20);.FTNT n20 However, the applicant must understand that means-or stepplus-function language in the claims is not interpreted to cover all possible elements or steps capable of achieving those functions, unless the embodiments are actually disclosed in the specification. Examiners interpret the scope of means-plus-function language from Article 56, paragraph 3 of the Taiwan patent law.40_IDEA_319)_and_footnotes(n21);.FTNT n21 That is, the means-plus-function language can only read on the structures or materials disclosed in the specification or equivalents thereof. Moreover, an element recited in means-plus-function language will only be included within the scope of the prior art under three conditions: 1) if the prior art element can perform the same or similar function(s) as the means-plus-function element; 2) if the prior art element comprises a similar structure, material, or acts as the means-plus-function element; or 3) if the prior art means-plus-function element can easily substitute for the means-plusfunction element.40_IDEA_319)_and_footnotes(n22);.FTNT n22

Claim interpretation relies on the specification. However, a positive limitation in a specification cannot be read into a claim that does not impose that limitation. When evaluating the scope of a claim, the claim must be considered as a whole. The examiner

may not dissect a claimed invention into discrete elements and then evaluate those elements in isolation.40_IDEA_319)_and_footnotes(n23);.FTNT n23

C. Classify the Claim to Its Proper Statutory Category

1. Non-Statutory Subject Matter for Computer-Related Inventions

An invention is non-statutory if it uses a law of nature, claims nothing but a law of nature per se, is a mere discovery, or conflicts with a law of nature.40_IDEA_319)_and_footnotes(n24);.FTNT n24

In addition, if the claimed invention "simply uses a computer to process data" or "simply stores computer programs or data in a computer readable storage media"40_IDEA_319)_and_footnotes(n25);.FTNT n25 without involving in any technological arts, then the claimed invention does not constitute statutory subject matter.40_IDEA_319)_and_footnotes(n26);.FTNT n26

Article 21 of Taiwan Patent Law lists six categories of non-statutory subject matter, including: scientific principles or mathematical theorems; rules or methods of games and sports; and methods or plans which can be implemented only by means of human reasoning and memory.40_IDEA_319)_and_footnotes(n27);.FTNT n27

However, the three categories given above do not embody the literal meaning of Article 21 when applied to software inventions. For instance, consider the situation in which a claimed software program uses scientific principles or mathematical theorems but does not preempt scientific principles or mathematical theorems. In such a case, determining patentability involves viewing the claim as a whole, considering the part that involves the technological arts, and analyzing the use of natural laws. In another example, if a video game or computer program includes rules or methods of games or sports that encourage the participation of human reasoning, memory, skills, or other mental activities, then the patentability of the claimed subject matter would depend on the technological arts involved. Moreover, a decision-supporting system or an automatic controlling system containing information that originated from human memory may also be patentable. Thus, the Taiwanese Guidelines define statutory subject matter into three categories: product, process, and computer-readable storage media.40_IDEA_319)_and_footnotes(n28);.FTNT n28

2. Statutory "Product" Claims

A computer software-related invention is a statutory product if it is a technological art created through the use of natural laws, if it is defined in terms of a combination of hardware and software, or if it has industrial applicability.40_IDEA_319)_and_footnotes(n29);.FTNT n29

There are two types of product claims: 1) a claim that encompasses either any and every machine for performing an underlying process or any and every manufacture that can cause a computer to perform the underlying process, and 2) a claim that defines a specific machine or manufacture.40_IDEA_319)_and_footnotes(n30);.FTNT n30

3. Statutory "Process" Claims

A claim that requires one or more acts, procedures, operations or steps to be performed by a computer that yields concrete and tangible results defines a process for

computer software-related inventions.40_IDEA_319)_and_footnotes(n31);.FTNT n31
There are three types of process claims:

(1) Pre-computer process activity: a process that results in a physical transformation of information or signals;

(2) Post-computer process activity: a process that involves controls or accompanying controls of hardware resources; and

(3) Practical applications: a process that is limited by the language in the claim to a practical application within the technological arts.40_IDEA_319)_and_footnotes(n32);.FTNT n32

4. Computer-Readable Storage Media

The patentability of computer-readable storage media claims is determined by whether the computer-readable storage media interrelates functionally or structurally with a computer, regardless of whether the claimed subject matter is the information per se, or is the process of the information per se.40_IDEA_319)_and_footnotes(n33);.FTNT n33 That is, the patentability of a computer-readable storage media invention is determined not only by recorded computer programs and data structures, but also by the program's structural and functional interrelation with the computer to resolve the problem defined in the specification.40_IDEA_319)_and_footnotes(n34);.FTNT n34

D. Patentability Requirements

A statutory software invention needs to meet the requirements of industrial applicability, novelty, and non-obviousness. More particularly, the Taiwanese Guidelines provide the following six factors which illustrate the circumstances that would render the application obvious.

1. Application in Other Fields

A software invention is obvious if it simply applies a procedure or a data structure to another application in a different field and generates the same functions and effects.40_IDEA_319)_and_footnotes(n35);.FTNT n35

2. Obvious Supplement or Replacement

A software invention is obvious if it simply replaces a well-known constituent part with another part that can perform equivalent functions.40_IDEA_319)_and_footnotes(n36);.FTNT n36

3. Software Implementation that Provides Functions Otherwise Performed by Hardware

A software invention is obvious if it can perform the same functions as a hardware device.40_IDEA_319)_and_footnotes(n37);.FTNT n37

4. Computerization of Human Transaction

A software invention is obvious if it is within the exercise of ordinary creative ability of a person skilled in the art to systematize transactions in an applied field by means of a computer.40_IDEA_319)_and_footnotes(n38);.FTNT n38

5. Claims with the Limitation of Computer Readable Storage Media

A software invention is obvious if it does not contain any inventive step, even if the claim is limited to "recording computer programs or data on a computer readable storage media."40_IDEA_319)_and_footnotes(n39);.FTNT n39

6. General Effects Accompanying Computerization

A software invention is obvious if it can generate effects that are often obtained as a result of computerization and normally are considered foreseeable from the knowledge of the state of the art.40_IDEA_319)_and_footnotes(n40);.FTNT n40

III. ANALYSIS OF THE TAIWANESE GUIDELINES

A. Background

The Examination Guidelines for Computer Software-Related Inventions ("Taiwanese Guidelines") are attached to Chapter VIII, Part II of the General Examination Guidelines of Patent Application ("General Guidelines")40_IDEA_319)_and_footnotes(n41);.FTNT n41 for examining a patent application in a specific technological field. Therefore, the legal effect of the Taiwanese Guidelines is the same as that of the General Guidelines.

The TIPO started drafting the Taiwanese Guidelines as early as January 1996 and finally issued them in October 1998. During this period, both Japan40_IDEA_319)_and_footnotes(n42);.FTNT n42 and Korea40_IDEA_319)_and_footnotes(n43);.FTNT n43 issued new examination guidelines. Thus, the TIPO considered these two guidelines, as well as the U.S. Guidelines, when establishing examination standards for Taiwan. In principle, the Taiwanese Guidelines rely on current Taiwan patent law and its enforcement rules. In the Taiwanese Guidelines, many examples are directly adopted from the Japanese and the U.S. Guidelines. Nevertheless, the success of the Taiwanese Guidelines depends on its practical effect rather than its originality -- that is, whether claims issued pursuant to the Taiwanese Guidelines can survive a statutory subject matter challenge in both invalidation and litigation. The effectiveness of the Taiwanese Guidelines also depends on whether they continue to clarify the confusion and uncertainty in this area of law.

B. Statutory Subject Matter

Taiwan patent law does not list patentable subject matter. Instead, it specifies the following categories of subject matter, for which patent protection is unavailable.40_IDEA_319)_and_footnotes(n44);.FTNT n44 Accordingly, the Taiwan patent law neither explicitly grants nor denies patent protection to computer programs or software-related inventions.

The Taiwanese Guidelines classify three statutory subject matters for software patents: process, product, and computer-readable storage media. A process is defined as a series of specific operational steps to be performed on or with the aid of a computer. Product has a broader meaning than machine, because it encompasses a computer or other programmable apparatus whose actions are directed by a computer program or

another form of software. A computer-readable storage medium is an article of manufacture that, when used with a computer, directs the computer to perform a particular function. The computer readable storage medium is patentable only if it has functionality when used with the computer. A computer program or data structure stored in a computer-readable storage medium, such as a memory device, compact disc or floppy disk, is deemed statutory subject matter when it directs a computer to operate in a specific and predefined manner.40_IDEA_319)_and_footnotes(n45);.FTNT n45 However, data representing creative or artistic expression (e.g., works of music, art or literature) are not statutory subject matter even if stored in computer-readable storage media.

The classifications of process and product are basically identical to those in the U.S. Guidelines.40_IDEA_319)_and_footnotes(n46);.FTNT n46 The definitions used in the U.S. Guidelines are clear and accepted without change in the Taiwanese Guidelines.40_IDEA_319)_and_footnotes(n47);.FTNT n47 In contrast, the classification of computer-readable storage media as statutory subject matter is controversial. The committee members participating in the establishment of the Taiwanese Guidelines heatedly debated whether the computer-readable storage media should be included as a statutory subject matter.40_IDEA_319)_and_footnotes(n48);.FTNT n48 The committee members finally agreed to extend patent protection to computer-readable storage media to hold software owners accountable for direct infringement.40_IDEA_319)_and_footnotes(n49);.FTNT n49 Appendix I includes a flowchart for examining patent applications on computerreadable storage media.

C. Criteria for the Scope of Protection

The TIPO appears to be very aggressive in broadening the allowable scope of software patents. The largest allowable scope for a software patent would be achieved by determining statutory subject matter based on utility or practical application. In the Taiwanese Guidelines, pre-computer process activity, post-computer process activity, and practical applications have been classified as the standards for determining statutory process claims.40_IDEA_319)_and_footnotes(n50);.FTNT n50 The U.S. Guidelines state, "If a claim does not clearly fall into one or both of the safe harbors, the claim may still be statutory if it is limited by the language in the claim to a practical application in the technological arts."40_IDEA_319)_and_footnotes(n51);.FTNT n51 In contrast to the U.S. Guidelines where practical application is used to establish the presence or absence of statutory subject matter, the Taiwanese Guidelines gives a more expressive standard for determining whether a software invention is a statutory subject matter.40_IDEA_319)_and_footnotes(n52);.FTNT n52 Under the Taiwanese Guidelines, a software process claim having any practical application will render the invention statutory subject matter.40_IDEA_319)_and_footnotes(n53);.FTNT n53 The patentability examination then turns on whether the software process claim satisfies the requirements of novelty, utility, and non-obviousness.

In Taiwan, the utility aspect of an invention corresponds to "industrial applicability" as set forth in Article 1 of the Taiwan Patent Law, which is considered a necessary, though not a sufficient, prerequisite for patentability. Fundamentally, Article 1 states that the Taiwan Patent Law "is enacted for purposes of encouraging, protecting and using

inventions and creations, so as to promote the development of scientific technology in industries."40_IDEA_319)_and_footnotes(n54);.FTNT n54

Since the primary purpose of Taiwan's patent system is to encourage disclosure of technical information, to promote domestic innovation, and to contribute to industrial development, the practical application category seems to reflect Taiwan's desire to promote its software industry.

However, practical application should not be interpreted as another safe harbor. Practical application should be viewed as a provisional solution for examining and evaluating an invention in a category prohibited by Article 21 of the Taiwan Patent Law, such as a method relating to medical treatment or games. Generally, an invention may not be granted a patent unless it is industrially applicable.40_IDEA_319)_and_footnotes(n55);.FTNT n55 More particularly, inventions that are rejected for failure of practical application are usually incomplete inventions or violate a law of nature, e.g., a perpetual motion machine.

D. Contributions

One of the main contributions of the Taiwanese Guidelines is that they shift the focus of the subject matter inquiry from contentspecific, mechanical rules regarding mathematical algorithms, methods of doing business, printed matter and mental steps, to classifications in terms of statutory categories and technological utility. For instance, if a software invention is related to one of the three non-statutory subject matters listed in Article 21, first paragraph, then patentability depends on viewing the claims as a whole and assessing the level of skill in the technological arts.40_IDEA_319)_and_footnotes(n56);.FTNT n56 Consequently, if a patent application for an invention is rejected under Article 21 on the grounds of being unpatentable subject matter, then the applicant may turn to the Taiwanese Guidelines for legal support in a responsive action.

The second major contribution of the Taiwanese Guidelines is that they provide a clear and explicit definition for algorithm, defining it as a statutory process rather than merely an abstract idea.40_IDEA_319)_and_footnotes(n57);.FTNT n57 The Taiwanese Guidelines' interpretation of algorithms mirrors that of the U.S. Guidelines.40_IDEA_319)_and_footnotes(n58);.FTNT n58 Mathematical algorithms per se are not patentable, unless properly applied. A mathematical algorithm differs from a logical algorithm in that a logical algorithm is interpreted to be a process or steps towards solving a problem. Strangely, the distinction between these two types of algorithms is so well accepted that no one has ever objected to it in committee meetings or even in public hearings in Taiwan. Perhaps after the twenty-year struggle in the U.S. courts over the Gottschalk v. Benson40_IDEA_319)_and_footnotes(n59);.FTNT n59 case, the meaning of algorithm has finally reached worldwide consensus.

In addition, Taiwan patent law does not provide any stipulation regarding means-plus-function claims. However, it is not unusual to find this claim format in Taiwanese patent practice. Means-plus-function language is discussed for the first time in the Taiwanese Guidelines.40_IDEA_319)_and_footnotes(n60);.FTNT n60 In the past, a Taiwan examiner would sometimes reject a claim for using means-plusfunction language because it was vague and ambiguous in Chinese. In the Taiwanese Guidelines, means-

plus-function language is interpreted limitedly.40_IDEA_319)_and_footnotes(n61);.FTNT n61 The scope of a means-plus-function element is interpreted based on its description in the specification.

Moreover, an element defined in means-plus-function language is within the scope of the prior art under several conditions: 1) if the prior art element can perform the identical functions as expressed in the claim; 2) if that prior art element has similar structure, material, or acts as the meansplus-function element; or 3) if the means-plus-function element can be easily substituted by the prior art element.40_IDEA_319)_and_footnotes(n62);.FTNT n62 This interpretation likely complies with sections 2181-2184 of the U.S. Patent and Trademark Office Manual of Patent Examining Procedure and with recent U.S. court decisions about the scope of means-plus-function claims.40_IDEA_319)_and_footnotes(n63);.FTNT n63

E. Challenges

Section V of the Taiwanese Guidelines sets the state of current protection by listing six conditions that must be satisfied before a claimed invention can be deemed non-obvious.40_IDEA_319)_and_footnotes(n64);.FTNT n64 These six conditions are from the Japanese Guidelines,40_IDEA_319)_and_footnotes(n65);.FTNT n65 and reflect the TIPO's conservative attitude toward software patenting. The Taiwanese Guidelines includes examples with explanations throughout to help one understand how the requirements should be applied. According to the conditions of "General Effects Accompanying Computerization"40_IDEA_319)_and_footnotes(n66);.FTNT n66 and the application of Example 10,40_IDEA_319)_and_footnotes(n67);.FTNT n67 it is unclear whether methods of doing business would be patentable under the Taiwanese Guidelines. It is difficult to apply these six conditions to the technological arts claimed by the invention. For instance, one may not easily distinguish between Example 940_IDEA_319)_and_footnotes(n68);.FTNT n68 and Example 10. In Example 9, practical application is likely the only reason the second claim is patentable. However, it is hard to explain how practical application does not also support the patentability of Example 10.

Another vague condition is "Software Implementation That Provides Functions Otherwise Performed by Hardware."40_IDEA_319)_and_footnotes(n69);.FTNT n69 Software inventions are viewed either as computer processes or as programmed computers with specific functionality, such as computer-controlled flight systems or vehicle cruise-control systems. In these inventions, software substitutes for what was accomplished using hardware circuits. In modern inventions, the distinction between hardware and software implementation blurs. Sometimes decisions to replace hardware with software depend on cost and performance concerns. It is difficult to understand why software is unpatentable while functionally equivalent hardware is patentable. Moreover, if a new method can be implemented with hardware, is the claimed method a hardware invention or a software invention? Actually, hardware and software are not distinct because a software invention is a series of electronic operations performed by a computer, while an application-specific hardware device is a special purpose computer. Therefore, software inventions that could be implemented as hardware should not be rejected simply on the basis of obviousness.

IV. COMPARISON WITH U.S. CASE LAW

The differences between the Taiwanese and the U.S. Guidelines can be illustrated by examining recent U.S. case law in light of the Taiwanese Guidelines. A computer software-related invention is either defined in the form of process or a product, ranging from pure hardware to pure software. Intermediate points along the spectrum involve inventions that may be described as special purpose computers, which combine elements of hardware and software, especially when claims recite mathematical formulas.

A. Mathematical Algorithms Per Se: Benson, Flook, Schrader

The first category of unpatentable subject matter refers to mathematical algorithms per se. The U.S. case law in this category includes: Gottschalk v. Benson,40_IDEA_319)_and_footnotes(n70);.FTNT n70 Parker v. Flook,40_IDEA_319)_and_footnotes(n71);.FTNT n71 and In re Schrader.40_IDEA_319)_and_footnotes(n72);.FTNT n72

In Benson, the invention disclosed a computer software algorithm for converting binary-coded decimal numbers into pure binary numerals.40_IDEA_319)_and_footnotes(n73);.FTNT n73 Example 8 of the Taiwanese Guidelines uses Benson's claim as an example for explaining why such a claim is unpatentable.40_IDEA_319)_and_footnotes(n74);.FTNT n74 Benson claimed a mathematical algorithm per se, which is not limited to any practical application.

In Flook, the invention disclosed a formula for computing an updated alarm limit during a catalytic conversion process.40_IDEA_319)_and_footnotes(n75);.FTNT n75 According to the Taiwanese Guidelines, Flook's claim would be rejected for nonenablement because Flook failed to teach how to apply the formula to the catalytic conversion process, including, for example, how to measure the variables, how to select the appropriate margin of safety, and how to assign the weighting factor.40_IDEA_319)_and_footnotes(n76);.FTNT n76 Furthermore, Flook intended to render the formula computation result patentable, this preempts the formula per se, and is therefore unpatentable.40_IDEA_319)_and_footnotes(n77);.FTNT n77

In Schrader, the invention disclosed a competitive bidding method where simply summing was found to be a mathematical algorithm.40_IDEA_319)_and_footnotes(n78);.FTNT n78 Example 9 of the Taiwanese Guidelines uses Schrader's two claims to distinguish statutory subject matter from non-statutory subject matter.40_IDEA_319)_and_footnotes(n79);.FTNT n79 According to the explanation of Example 9, the first claim is a mathematical algorithm, and is therefore unpatentable.40_IDEA_319)_and_footnotes(n80);.FTNT n80 Conversely, the second claim recites the practical application of summing bids and uses hardware resources, and is therefore patentable.

B. Computer Algorithms for Controlling or Operating the Hardware: Alappat and Lowry

A second subject matter category deals with computer algorithms designed for controlling or operating hardware. Many cases address this subject, including: In re Freeman,40_IDEA_319)_and_footnotes(n81);.FTNT n81 In re Alappat,40_IDEA_319)_and_footnotes(n82);.FTNT n82 In re

Warmerdam,40_IDEA_319)_and_footnotes(n83);.FTNT n83 and In re Lowry.40_IDEA_319)_and_footnotes(n84);.FTNT n84 To illustrate the concerns of the Taiwanese Guidelines, Alappat and Lowry are discussed below.

Alappat's invention related to a means for creating a smooth waveform display in a digital oscilloscope.40_IDEA_319)_and_footnotes(n85);.FTNT n85 Controversy surrounded the Alappat case because the claim recited means-plus-function language. Consequently, when the means are interpreted as steps, the claims as a whole appear to be a mathematical concept. However, according to the Taiwanese Guidelines, the examiner should define the scope of meansplus-function language by reference to the specification.40_IDEA_319)_and_footnotes(n86);.FTNT n86 On the other hand, mathematical subject matter is patentable only if it has a practical application. For this reason, inventions similar to Alappat are likely patentable under the Taiwanese Guidelines.

In Lowry, the inventive subject matter involved an objectoriented data structure that defined functional relationships between the elements in a computer memory based on an "attributive data model."40_IDEA_319)_and_footnotes(n87);.FTNT n87 This data model represented information in terms of its characteristics and relationships to other information.40_IDEA_319)_and_footnotes(n88);.FTNT n88 According to the Taiwanese Guidelines, a data structure is per se non-statutory subject matter.40_IDEA_319)_and_footnotes(n89);.FTNT n89 However, the claimed data structures of Lowry have functional relationships with the computer to facilitate access to the data stored in the structures.40_IDEA_319)_and_footnotes(n90);.FTNT n90 For that reason, if the claimed subject matter is a computer-readable storage media, then the claim would be statutory because of the functional relationship with the computer.40_IDEA_319)_and_footnotes(n91);.FTNT n91

C. Processes or Apparatus that Use Computer Programs: Diehr, Trovato, Abele, Arrhythmia

The category of inventions referring to processes or apparatus that use computer programs as a component of an overall invention are patentable under either the U.S. Guidelines or Taiwanese Guidelines. These cases are so-called safe harbors. Applicable cases in this category include: Diamond v. Diehr,40_IDEA_319)_and_footnotes(n92);.FTNT n92 In re Trovato,40_IDEA_319)_and_footnotes(n93);.FTNT n93 In re Abele,40_IDEA_319)_and_footnotes(n94);.FTNT n94 In re Iwahashi,40_IDEA_319)_and_footnotes(n95);.FTNT n95 and Arrhythmia Research Technology, Inc. v. Corazonix Corp.40_IDEA_319)_and_footnotes(n96);.FTNT n96 Diehr and Trovato are discussed below to illustrate the perspective of the Taiwanese Guidelines.

Diehr disclosed a process for curing synthetic rubber.40_IDEA_319)_and_footnotes(n97);.FTNT n97 The Taiwanese Guidelines use this example for explaining post-computer process activity.40_IDEA_319)_and_footnotes(n98);.FTNT n98 Diehr's claims used hardware resources and had practical application, and were therefore held patentable even though the claims recited an equation.40_IDEA_319)_and_footnotes(n99);.FTNT n99

According to the Taiwanese Guidelines, reciting a mathematical equation in the claims will not necessarily render the claimed invention unpatentable, as long as the claim does not preempt the mathematical formula.40_IDEA_319)_and_footnotes(n100);.FTNT n100 The Taiwanese Guidelines state that the examiner should refer to the specification to determine if the invention has a practical application and should view the claims as a whole in identifying what has been invented.40_IDEA_319)_and_footnotes(n101);.FTNT n101

In Trovato, the inventive subject matter in two related applications involved a mathematically-based linear programming technique that determined the optimal path between two locations, in terms of distance, cost, time or other criteria.40_IDEA_319)_and_footnotes(n102);.FTNT n102 The invention modeled possible object movements in the real world, the so-called "physical task space," by a graphical abstraction called the "configuration space," which was stored in a data structure.40_IDEA_319)_and_footnotes(n103);.FTNT n103 The specifications included flowcharts and program code, but no hardware implementation.40_IDEA_319)_and_footnotes(n104);.FTNT n104 According to the Taiwanese Guidelines, the invention in Trovato is categorized as post-computer physical process activity because it involves physical acts performed outside the computer.40_IDEA_319)_and_footnotes(n105);.FTNT n105 More particularly, these acts are done independently of and after the steps performed by the computer. The physical transformation involves connecting the graph nodes with edges, indicating the cost of transfer from one state to another, and finding an optimal or least-cost path between states.

D. Protection of Business or Financial Services Software: State Street

Computer-driven financial services software is patentable even if the software does little more than calculate numbers used to manage assets. In State Street Bank & Trust Co. v. Signature Financial Group Inc.,40_IDEA_319)_and_footnotes(n106);.FTNT n106 the Court of Appeals for the Federal Circuit, noted that "laws of nature, natural phenomena and abstract ideas" are not patentable, but stressed two important principles.40_IDEA_319)_and_footnotes(n107);.FTNT n107 First, although a mathematical algorithm is unpatentable to the extent that it represents an abstract idea, a system that inputs, calculates, stores, and outputs numbers is patentable, if it is otherwise a machine or process that provides a "useful, concrete and tangible result."40_IDEA_319)_and_footnotes(n108);.FTNT n108 Second, a system or process is not rendered unpatentable merely because it is directed to a business method.40_IDEA_319)_and_footnotes(n109);.FTNT n109

In State Street, the patented invention was directed to a data processing system for managing an investment structure -- assigned the proprietary name Hub and Spoke<registered> -- "whereby mutual funds (Spokes) pool their assets in an investment portfolio (Hub) organized as a partnership."40_IDEA_319)_and_footnotes(n110);.FTNT n110 The patented data processing system: 1) determined the percentage share of each Spoke fund in the Hub portfolio; 2) calculated daily activity affecting the portfolio's assets; 3) allocated gains, losses, and expenses to each of the Spoke member funds; and 4) tracked data necessary to determine aggregate year-end income, gains, losses, and expenses, for accounting and tax purposes.40_IDEA_319)_and_footnotes(n111);.FTNT

n111 The single independent claim of the patent was directed to a computer, programmed to carry out these calculations, with each of the claim elements expressed in meansplus-function format.40_IDEA_319)_and_footnotes(n112);.FTNT n112

In Taiwan, a processing system for managing an investment structure is patentable subject matter, as it is not listed as unpatentable subject matter under Article 21 of the Taiwan patent law. However, the data processing system could be rejected under the nonobviousness requirement of the Taiwanese Guidelines, unless the practical application is a significant part of the invention.40_IDEA_319)_and_footnotes(n113);.FTNT n113 More particularly, the computerized transformation of data representing discrete dollar amounts through a series of mathematical calculations into a financial share price would likely be unpatentable as a result of foreseeable computerization of a human transaction.40_IDEA_319)_and_footnotes(n114);.FTNT n114

V. CONCLUSIONS

In many respects, the Taiwanese Guidelines mirror practice under the U.S. Guidelines. Nevertheless, under U.S. patent practice, an applicant must disclose the best mode for practicing an invention.40_IDEA_319)_and_footnotes(n115);.FTNT n115 In contrast, Taiwanese patent practice requires only that an applicant's disclosure be enabling, and does not require the best mode to be disclosed.40_IDEA_319)_and_footnotes(n116);.FTNT n116 Moreover, Taiwanese patent applications translated into English often serve as U.S. applications, so the possibility exists that some U.S. patents based on Taiwanese priority fail to meet the best mode requirement under the U.S. Guidelines.

Still, a U.S. applicant filing a Taiwanese application, based on a U.S. patent application, may rely on the U.S. application to establish a priority date. However, the Chinese translation of the U.S. patent specification becomes the officially filed version in Taiwan.40_IDEA_319)_and_footnotes(n117);.FTNT n117 Therefore, when translation accuracy is questionable between English and Chinese versions of a specification, a well-prepared drawing can be used to support amendments for correcting a poor translation that could diminish the otherwise proper scope of the invention.40_IDEA_319)_and_footnotes(n118);.FTNT n118

The number of software-related patent applications has increased rapidly in the past few years and continues to grow at a remarkable speed in the United States. The situation is expected to be the same in Taiwan since Taiwan's information industry has been ranked the third largest in the world.40_IDEA_319)_and_footnotes(n119);.FTNT n119 Therefore, computer software owners should seriously contemplate the addition of patent protection in Taiwan to their worldwide portfolio. To this end, the following suggestions are offered to facilitate patent acquisition in Taiwan:

(1) If means-plus-function limitations appear in the claims, add a few more preferred embodiments in the specification that describe equivalent structures or materials, and draft additional dependent claims for each of the embodiments disclosed in the specification. This can help protect the scope of the patent, especially when potential infringement is expected.

(2) When a claim recites a mathematical algorithm, disclose how to measure the relevant variables, and explain how the invention uses the algorithm to achieve the desired technical effects. The disclosure should also state the invention's practical application and distinguish in detail between the present invention and the prior art.

(3) If a claimed invention relates to a computerized system that can otherwise be performed by a human being, explain the inventive steps involved and the significant differences between the invention and the prior art. The Taiwanese Guidelines strictly apply the general effects accompanying computerization requirement.

(4) When a claimed invention is a precomputer or a postcomputer process claim, distinctly state the relationship between the software and the hardware. If the specification does not describe any hardware implementation, then describe the tangible and concrete results of the process or physical transformation performed by the process.

(5) The importance of good drawings in any U.S. priority-based, Taiwanese software application cannot be overstated. The drawings are part of the Taiwanese specification and may be used to demonstrate the scope of the original specification. Also, one can broaden the claim scope before publication for the pre-grant opposition procedure, so every drawing sheet should be prepared meticulously.

(6) The specification should be prepared from an anticounterfeiting, anti-designaround perspective. If the applicant can provide related prior art, he should carefully distinguish those references from the claimed invention in view of potential infringement. As with U.S. practice, claim scope will be determined de novo at the time of infringement.

n1 See Taiwan Patent Law, arts. 19, 21 (1994).

n2 Agreement on Trade-Related Aspects of Intellectual Property Rights, Marrakesh, Apr. 15, 1994. Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, *33 I.L.M. 1143* Annex 1C, 1199 (1994)[hereinafter TRIPS].

n3 See Taiwan Patent Law, art. 21 (1997).

n4 Executive Yuan is Taiwan's Cabinet, the name of which is translated from its meaning in Chinese.

n5 Taiwan is predicted to be admitted into the WTO by the end of 2000.

n6 Act of May 31, 1790, ch. 15, 1 Stat. 124 (current version at *17 U.S.C. § § 101-*1332 (1994 & Supp. IV 1998)).

n7 *17 U.S.C. § § 101-*1332 (1994 & Supp. IV 1998).

n8 See *Lotus Dev. Corp. v. Paperback Software Int'l, 740 F. Supp. 37, 60-61 (D. Mass. 1990).*

n9 See, e.g., *Baker v. Selden, 101 U.S. 99 (1879); Computer Assocs. Int'l Inc. v. Altai, Inc., 982 F.2d 693 (2d Cir. 1992); Bateman v. Mnemonics, Inc., 79 F.3d 1532 (11th Cir. 1996).*

n10 The TIPO (formerly National Bureau of Standards ("NBS")) is governmentally organized in a manner similar to the U.S. Patent and Trademark Office. The TIPO is under the Ministry of Economic Affairs -- Taiwan's equivalent to the U.S. Department of Commerce. The TIPO has been authorized to handle patent matters since 1950 and was officially established to replace the NBS on January 26, 1999.

n11 See TAIWAN INTELLECTUAL PROPERTY OFFICE (former NATIONAL BUREAU OF STANDARDS), MINISTRY OF ECONOMIC AFFAIRS, EXAMINATION GUIDELINES FOR COMPUTERRELATED INVENTIONS at 15 [hereinafter Old Guidelines].

n12 See TAIWAN INTELLECTUAL PROPERTY OFFICE, MINISTRY OF ECONOMIC AFFAIRS, EXAMINATION GUIDELINES FOR COMPUTER SOFTWARE-RELATED INVENTIONS (1998) [hereinafter Taiwanese Guidelines]. The Taiwanese Guidelines have been translated into English by the author and are provided for the reader's reference in Appendix I, infra pp. 343-91.

n13 APIPA is a Taiwan-based patent database and is available online. See Asia Pacific Intellectual Property Association (visited Jan. 20, 2000) <http://www.apipa.org.tw>.

n14 See Taiwan Invention Patent No. 092082 & 082574.

n15 The concept of hardware resources originated in examination guidelines from the Japan Patent Office. See JAPAN PATENT OFFICE, EXAMINATION GUIDELINES FOR INVENTIONS IN SPECIFIC FIELDS, ch. 1, (June 1993) (Chapter 1 is entitled Computer Software Related Inventions). An updated version of Chapter 1 is available on the Internet. See infra note 42.

n16 See Agreement on Trade-Related Aspects of Intellectual Property Rights, supra note 2 ("Patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application." (emphasis added)).

n17 PATENT & TRADEMARK OFFICE, DEPARTMENT OF COMMERCE, MANUAL OF PATENT EXAMINING PROCEDURE, § 2106 (orig. 7th ed. 1998).

n18 See Taiwan Administrative Procedure Law, arts. 150, 154, 157 (1999). The law was published on Feb. 3, 1999 and will be effective on Jan. 1, 2001. However, its legal principles should be applied from now on. See MANUAL OF PATENT EXAMINING PROCEDURE, supra note 17, § 2106 (I), regarding the legal effect of the U.S. Guidelines.

n19 See Taiwan Patent Law, arts. 19, 21 (1994).

n20 See TAIWANESE GUIDELINES, supra note 12, app. I, at 349.

n21 Article 56, Paragraph 3 as amended on May 7, 1997 states:

Unless otherwise provided for in this Law, the owner of a product patent shall have a right to exclude others from manufacturing, selling, using, or importing the patented products for above purposes without his prior consent.

Unless otherwise provided for in this Law, the owner of a manufacturing process patent shall have a right to exclude others from using said manufacturing process and from using, selling, or importing for above purposes, the products manufactured based on a direct use of said manufacturing process without his prior consent.

The scope of an invention patent shall be determined based on the claims set forth in the specification. If necessary, the specification and drawings may be considered as reference.

Taiwan Patent Law, art. 56, Paragraph 3 (1997) (quotation translated by the author).

n22 See TAIWANESE GUIDELINES, supra note 12, app. I, at 349.

n23 See id. app. I, at 353.

n24 See id. app. I, at 358.

n25 See id. app. I, at 355.

n26 See id. app. I, at 355.

n27 Article 21, Paragraph 1, Taiwan Patent Law as enforced January 23, 1994 states:

The following items shall not be granted an invention patent:

1. New species of animals and plants, except the cultivation and growth processes of new plant species;

2. Diagnostic, curative or operative methods for diseases afflicting humans or animals;

3. Scientific principles or mathematical theorems;

4. Rules or methods of games and sports;

5. Methods or plans which can be implemented only by means of human reasoning and memory; and

6. Any invention which is detrimental to public order, good custom or hygiene.

Taiwan Patent Law, art. 21, Paragraph 1 (1994) (quotation translated by the author).

n28 See TAIWANESE GUIDELINES, supra note 12, app. I, at 355.

N29 See id. app. I, at 364.

n30 See id.

n31 See id. app. I, at 368.

n32 Id.

n33 See id. app. I, at 379.

n34 See id.

n35 See id. app. I, at 383.

n36 See id. app. I, at 383.

n37 See id.

n38 See id.

n39 See id. app. I, at 384.

n40 See id.

n41 See NATIONAL BUREAU OF STANDARDS, MINISTRY OF ECONOMIC AFFAIRS, GENERAL EXAMINATION GUIDELINES OF PATENT APPLICATION (Oct. 1994).

n42 JAPAN PATENT OFFICE, IMPLEMENTING GUIDELINES FOR INVENTIONS IN SPECIFIC FIELDS (Feb. 1997) (Chapter 1 is entitled Computer Software Related Inventions), available at <http://www.jpomiti.go.jp/infoe/sisine.htm>.

n43 KOREAN INTELLECTUAL PROPERTY OFFICE, KOREAN GUIDELINES (Aug. 1998), available at <http://www.kipo.go.kr/english/index-e.html>.

n44 See supra text accompanying note 27.

n45 See TAIWANESE GUIDELINES, supra note 12, app. I, at 379.

n46 See MANUAL OF PATENT EXAMINING PROCEDURE, supra note 17, § 2106 (IV)(B)(2).

n47 See TAIWANESE GUIDELINES, supra note 12, app. I, at 355.

n48 The recording of computer software on media is constructively deemed a physical item in Taiwanese legal reasoning on statutory patentable subject matter. However, computer software can exist intangibly and is not necessarily stored on media.

n49 Article 56, Paragraph 2 of the Taiwan Patent Law protects only the end product of the claimed processes, not the intermediate software. So to make the intermediate software per se patentable, it should be claimed as computer-readable storage media.

n50 See TAIWANESE GUIDELINES, supra note 12, app. I, at 369.

n51 See MANUAL OF PATENT EXAMINING PROCEDURE, supra note 17, § 2106 (IV)(B)(2)(b)(ii). In the U.S. Guidelines, the two safe harbors that define statutory process claims are preand post-computer process activity.

n52 Compare MANUAL OF PATENT EXAMINING PROCEDURE, supra note 17, § 2106 (IV)(B)(2)(b)(i) with TAIWANESE GUIDELINES, supra note 12, app. I, at 378.

n53 See TAIWANESE GUIDELINES, supra note 12, app. I, at 372.

n54 Taiwan Patent Law, art. 1 (1994) (quotation translated by author).

n55 See Taiwan Patent Law, art. 20 (1994).

n56 See TAIWANESE GUIDELINES, supra note 12, app. I, at 361.

n57 See id. app. I, at 345.

n58 Compare MANUAL OF PATENT EXAMINING PROCEDURE, supra note 17, § 2106 (II) with TAIWANESE GUIDELINES, supra note 12, app. I, at 345.

n59 *409 U.S. 63, 175 U.S.P.Q. (BNA) 673 (1972).*

n60 See TAIWANESE GUIDELINES, supra note 12, app. I, n.8 at 350.

n61 See id. app. I, at 349.

n62 See id.

n63 See, e.g., *Chiuminatta Concrete Concepts Inc. v. Cardinal Indus. Inc., 145 F.3d 1303, 46 U.S.P.Q.2d (BNA) 1752 (Fed. Cir. 1998); In re Donaldson Co., 16 F.3d 1189, 29 U.S.P.Q.2d (BNA) 1845 (Fed. Cir. 1994).*

n64 See TAIWANESE GUIDELINES, supra note 12, app. I, at 382.

n65 See EXAMINATION GUIDELINES FOR INVENTIONS IN SPECIFIC FIELDS, ch. 1 § 2.3, supra note 42.

n66 See TAIWANESE GUIDELINES, supra note 12, app. I, at 384.

n67 See id.

n68 The example is identical to the examination procedures flowchart for Schrader, claim 1-D of the U.S. Guidelines. See MANUAL OF PATENT EXAMINING PROCEDURE, supra note 17, § 2106 (IV)(B)(2)(c).

n69 See TAIWANESE GUIDELINES, supra note 12, app. I, at 383.

n70 *409 U.S. 63, 175 U.S.P.Q. (BNA) 673 (1972).*

n71 *437 U.S. 584, 198 U.S.P.Q. (BNA) 193 (1978).*

n72 *22 F.3d 290, 30 U.S.P.Q.2d (BNA) 1455 (Fed. Cir. 1994).*

n73 *Benson, 409 U.S. at 73, 175 U.S.P.Q. at 683.*

n74 See TAIWANESE GUIDELINES, supra note 12, app. I, at 372.

n75 *Flook, 437 U.S. at 596-97, 198 U.S.P.Q. at 205.*

n76 See TAIWANESE GUIDELINES, supra note 12, app. I, at 352.

n77 See id. app. I, at 361.

n78 *In re Schrader, 22 F.3d 290, 293, 30 U.S.P.Q.2d (BNA) 1455, 1458 (Fed. Cir. 1994).*

n79 TAIWANESE GUIDELINES, supra note 12, app. I, at 378.

n80 See id.

n81 *573 F.2d 1237, 197 U.S.P.Q. (BNA) 464 (C.C.P.A. 1978).*

n82 *33 F.3d 1526, 31 U.S.P.Q.2d (BNA) 1545 (Fed. Cir. 1994).*

n83 *33 F.3d 1354, 31 U.S.P.Q.2d (BNA) 1754 (Fed. Cir. 1994).*

n84 *32 F.3d 1579, 32 U.S.P.Q.2d (BNA) 1031 (Fed. Cir. 1994).*

n85 See *Alappat, 33 F.3d at 1544, 31 U.S.P.Q.2d at 1563.*

n86 TAIWANESE GUIDELINES, supra note 12, app. I, at 349.

n87 *Lowry, 32 F.3d at 1580, 32 U.S.P.Q.2d at 1032.*

n88 See *Lowry, 32 F.3d at 1583-84, 32 U.S.P.Q.2d at 1035.*

n89 TAIWANESE GUIDELINES, supra note 12, app. I, at 379.

n90 *Lowry, 32 F.3d at 1579, 32 U.S.P.Q.2d at 1034.*

n91 See TAIWANESE GUIDELINES, supra note 12, app. I, at 379.

n92 *450 U.S. 175, 209 U.S.P.Q. (BNA) 1 (1981).*

n93 *42 F.3d 1376, 33 U.S.P.Q.2d (BNA) 1194 (Fed. Cir. 1994).*

n94 *684 F.2d 902, 214 U.S.P.Q. (BNA) 682 (C.C.P.A. 1982).*

n95 *888 F.2d 1370, 12 U.S.P.Q.2d (BNA) 1908 (Fed. Cir. 1989).*

n96 *958 F.2d 1053, 1059, 22 U.S.P.Q.2d (BNA) 1033, 1038 (Fed. Cir. 1992).*

n97 See *Diehr, 450 U.S. at 175, 209 U.S.P.Q. at 1.*

n98 TAIWANESE GUIDELINES, supra note 12, app. I, at 371.

n99 See *Diehr, 450 U.S. at 175, 191, 209 U.S.P.Q. at 1, 10.*

n100 TAIWANESE GUIDELINES, supra note 12, app. I, at 361.

n101 Id. app. I, at 349.

n102 See *In re Trovato, 42 F.3d 1376, 1377, 33 U.S.P.Q.2d (BNA) 1194, 1194-95 (Fed. Cir. 1994).*

n103 Id.

n104 See id.

n105 TAIWANESE GUIDELINES, supra note 12, app. I, at 371.

n106 *149 F.3d 1368, 47 U.S.P.Q.2d (BNA) 1596 (Fed. Cir. 1998).*

n107 *Id. at 1374, 47 U.S.P.Q.2d at 1603-04.*

n108 *Id. at 1373, 47 U.S.P.Q.2d at 1602.*

n109 *Id. at 1374, 47 U.S.P.Q.2d at 1603-04.*

n110 *Id. at 1370, 47 U.S.P.Q.2d at 1598.*

n111 *Id. at 1373, 47 U.S.P.Q.2d at 1601.*

n112 *Id. at 1371, 47 U.S.P.Q.2d at 1599.*

n113 TAIWANESE GUIDELINES, supra note 12, app. I, at 382.

n114 See id. app. I, at 384.

n115 See *35 U.S.C. § 112,* Paragraph 1 (1994); MANUAL OF PATENT EXAMINING PROCEDURE, supra note 17, § 2106.01.

n116 See Taiwan Patent Law, art. 20, 71 (1994).

n117 See Enforcement Rules of the Taiwan Patent Law, art. 14 (1994).

n118 See Taiwan Patent Law, art. 56 Paragraph 3 (1997) ("The scope of an invention patent right should be limited to the scope of claims in the specification. The specification and drawings of the invention may be referred to, if necessary." (emphasis added)).

n119 See Economic Daily News (Taiwan), Oct. 4, 1999, at 39.