UIC John Marshall Journal of Information Technology & Privacy Law

Volume 8
Issue 1 *Computer/Law Journal - Winter 1987*

Article 3

Winter 1987

Texas Instruments v. ITC: Insight or Aberration?, 8 Computer L.J. 43 (1987)

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TEXAS INSTRUMENTS v. ITC: INSIGHT OR ABERRATION?

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The decision of the United States Court of Appeals for the Federal Circuit in *Texas Instruments, Inc. v. United States International Trade Commission*[1] surprised the United States patent law community. The decision appears to depart from well-established law defining the scope given to means-plus-function claims in United States patents. The permissible scope of means-plus-function claims is important particularly to patents within rapidly changing technologies in electronics and computer art. Although the decision applies only in rare cases, it creates substantial uncertainty in the law of patent infringement.[2]

In *Texas Instruments, Inc.*, Texas Instruments (TI) appealed an International Trade Commission (ITC) decision that the importation and sale of portable electronic calculators by a number of Hong Kong companies did not infringe on any claims of U.S. Patent 3,819,921 held by TI. The ITC ruled that the claims of U.S. patent 3,819,921 were valid, but that "complainant (TI) does not produce calculators in accordance with the claims in issue of the '921 patent. . ."[3] The ITC's non-infringement ruling was affirmed by the Court of Appeals for the Federal Circuit. TI has petitioned the court for a rehearing *en banc*. The petition is supported by the American Intellectual Property Law Association (AIPLA)[4] and by the Michigan Patent Law association.[5]

The '921 patent, titled "Miniature Electronic Calculator," was issued on June 25, 1974 to inventors Kilby, Merryman and Van Tassel, and assigned to TI. The court considered the patent, through a series of

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1. 231 U.S.P.Q. 833 (Fed. Cir. 1986).

2. Twenty-one companies were named in the original complaint. Three companies settled during the course of the proceeding, and three appeared at the hearing; one of them subsequently settled.

3. *Texas Instruments*, 231 U.S.P.Q. at 833. The administrative law judge held that no domestic industry exists.

4. Amicus Brief filed on December 17, 1986.

5. Letter to Judge Markey filed on December 16, 1986. No decision to grant a rehearing has yet been rendered as of March 1988.

continuation applications, to be on a pioneering invention.[6] Claim 1 of the patent is representative:

> 1. A miniature, portable, battery operated electronic calculator comprising:
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> a. input means including a keyboard for entering digits of numbers and arithmetic commands into said calculator and generating signals corresponding to said digits and said commands, the keyboard including only one set of decimal number keys for entering plural digits of decimal numbers in sequence and including a plurality of command keys;
>
> b. electronic means responsive to said signals for performing arithmetic calculations on the numbers entered into the calculator and for generating control signals, said electronic means comprising an integrated semiconductor circuit array located in substantially one place, the area occupied by the integrated semiconductor array being no greater than that of the keyboard, said integrated semiconductor circuit array comprising:
>
> i. memory means for storing digits of the numbers entered into the calculator,
>
> ii. arithmetic means coupled to said memory means for adding, subtracting, multiplying and dividing said numbers and storing the resulting answers in the memory means, and
>
> iii. means for selectively transferring numbers from the memory means through the arithmetic means and back to the memory means in a manner dependent upon the commands to effect the desired arithmetic operation,
>
> c. means for providing a visual display coupled to said integrated semiconductor circuit array and responsive to said control signals for indicating said answer, and
>
> d. the entire calculator including keyboard, electronic means, means for providing a visual display, and battery being contained within a "pocket sized" housing.[7]

The specification of the patent contains a detailed description of the then-preferred means of performing each step of the claims.

During the seventeen years between the first filing of the patent application and the filing of the complaint with the ITC, however, the field of electronics underwent such change that each of the functions set forth in the patent claims was carried out in the subject calculators by a means different than the corresponding means disclosed in the specification.[8] First, the keyboard input means of the claims described

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6. A prototype of the calculator is part of the Smithsonian Institution's Museum of History and Technology.

7. 231 U.S.P.Q. at 834, (*quoting* U.S.Patent 3,819,921, "*M*iniature Electronic Calculator," issued June 25, 1974).

8. *Id.*

in the specification uses a conductive underlayer on each key that, when manually depressed, produces a unique signal that is encoded by calculator memory logic and transmitted to electronic circuitry for processing. The keyboards of the subject calculators use a different mechanism to respond to keyboard operations. A scanning matrix encoder, subsequently developed by TI, scans the keyboard at clock intervals to determine which key is depressed. Second, the electronic means claimed as an integrated circuit array is described in the specification as an array of four bipolar integrated semiconductor circuits or, alternatively, as a bipolar array on a single semiconductor wafer. Bipolar technology represented the best mode known to the inventors at the time the application was filed. The corresponding means was implemented in the subject calculators by a single integrated circuit using MOSFET technology not commercially available when the application was filed. Third, the display means claimed in the application and described in the specification was a thermal printer. The display means used in the subject calculator was a liquid crystal display (LCD).

The ITC found that the subject calculators did not infringe the claims of the patent literally or under the doctrine of equivalents. The ITC's rationale was that the functions required in the claims were carried out in the subject calculators by means not equivalent to those described in the specification.[9] TI argued that the invention embodied in the subject calculators is fundamentally the same as that of the claims. TI claimed that the patent represents a giant step in the development of semiconductor technology and that the claims should not be restricted to the preferred embodiments which existed at the time of the filings of the patent application.[10] TI emphasized that a basic patent on a pioneering invention is entitled to broad interpretation.[11] Under established law it is not necessary for the specification to have described, or the inventors to have foreseen, each specific means used to perform each of the functions of the claims. The issue brought before the court involved basic principles of claim interpretation: to what extent, if any, should embodiments described in the specification or equitable considerations limit the scope of means-plus-function type claims in a pioneer patent not limited by any prior art and within a rapidly moving technology?

Analysis of patent infringement entails two inquiries: (1) a determination of the scope of the claim and (2) a factual finding of whether

9. *Id.*

10. Appellant's Petition for Rehearing at 6; *Texas Instruments*, 231 U.S.P.Q. 833 (Fed. Cir. 1986).

11. *Texas Instruments*, 231 U.S.P.Q. at 834.

properly construed claims encompass the accused structure.[12] The inquiries apply whether claims are infringed literally or by application of the doctrine of equivalents. Literal infringement requires that the accused device embody every element of the claim as properly interpreted.[13] If the claim describes a combination of functions, and each function is performed by a means described in the specification or by an equivalent of such means, then literal infringement exists.[14]

The particular means does not have to be the same as the means described in the specification.[15] The inventor is entitled to protection without a catalogue of alternative embodiments in the specification. The scope of permissible equivalents depends upon the extent and nature of the invention, and may be interpreted more generously for a basic invention than for a less dramatic technological advance.[16] The existence of a permissible equivalents under 35 U.S.C. § 112 (1975) para. 6 is a question of fact taking into consideration claim language, specification, prosecution history, other claims, and expert testimony.[17] Equivalence "is determined as of the time infringement takes place;"[18] it is not required that those skilled in the art knew, at the time the patent application was filed, of the asserted equivalent means of performing the claimed functions. Patented modifications nevertheless may infringe the claims of a basic patent under the doctrine of equivalents.[19]

If literal infringement of claims by the accused device is found, an analysis is required to confirm that the literal infringement is not fortuitous. A fortuitous infringement occurs when the accused device is not covered by the literal words of the claims, but achieves the same result in a substantially different manner. If the literal infringement is fortuitous, the accused device escapes infringement under the "reverse doctrine of equivalents."[20] If there is no literal infringement of claims because each claim limitation is not found in the accused device, there still may be infringement of the claims under the "doctrine of equivalents" if the claims as a whole perform substantially the same task, in substantially the same way, to achieve substantially the same

12. Mannesmann Demag Corp. v. Engineered Metal Products Co. 230 U.S.P.Q. 45, 46 (Fed. Cir. 1986).

13. *Id.* at 46.

14. *D.M.I., Inc.*, 225 U.S.P.Q. 236 at 239 (Fed. Cir. 1985).

15. *King Instrument Corp.*, 226 U.S.P.Q. 402 at 408 (Fed. Dir. 1985), *cert. denied*, 106 S. Ct. 1197 (1986).

16. *See Hughes Aircraft Co. United States*, 219 U.S.P.Q. 473 at 481 (Fed. Cir. 1983).

17. *Palumbo*, 226 U.S.P.Q. 5, 8 (Fed. Cir. 1985).

18. Atlas Powder Co. v. E. I. du Pont de Nemours & Co.. 224 U.S.P.Q. 409, 417 (Fed. Cir. 1984).

19. *Id.* at 417.

20. SRI Int'l v. Matsushita Elec. Corp. of America, 227 U.S.P.Q. 577 (Fed. Cir. 1985); *i.e.* Caterpillar Tractor Co. v. Berco., S.p.a., 219 U.S.P.Q. 185 (Fed. Cir. 1983).

result as the accused device.[21] This doctrine, like the literal infringement analysis under 35 U.S.C. § 112 (1975) para. 6, is based upon equitable considerations and prevents an accused device that embraces the "gist of an invention while avoiding the literal words of the claims, from escaping liability under the patent."[22] The scope of equivalents to be afforded each claim as a whole depends upon the scope of the invention, *i.e.*, the claims on a pioneer invention are entitled to a broader scope of equivalents than of the claims of an improvement patent, taking into account the prior art and the prosecution history of the application.[23]

The Court of Appeals for the Federal Circuit agreed with the position of TI that every function required by the patent claims was performed by the subject calculators, and disagreed with the position of the ITC which in effect limited each means claimed to the embodiment shown in the specification. Although the court recognized that the claims must be construed under 35 U.S.C. § 112, (1975) para. 6 beyond the embodiments disclosed in the specification, the court introduced a new equitable consideration that now must be made in assessing the scope of means-plus-function claims in patents within rapidly emerging technologies. Whereas 35 U.S.C. § 112 (1975) para. 6, has been applied only to broaden the scope of means-plus-function claim limitations beyond the embodiments described in the specification, a new test based upon an "invention as a whole" analysis must be taken into account during assessment of infringement:[24] "while the scope of patent claims under section 112 paragraph 6, is a legal determination, it is not devoid of equitable considerations, particularly when determining the breadth of 'means' claims on complex and rapidly-evolving technologies."[25] The court thus added an "outer boundary" beyond which the scope of claims under 35 U.S.C. § 112 (1975) para. 6 will not be extended to find literal infringement. The outer boundary occurs when "the total of the technological changes beyond what the inventors disclosed transcends the equitable limits illustrated, for example in *Graver Tank, D.M.I., Hughes Aircraft,* and *Atlas Powder* and propels the accused device beyond a just scope of the '921 claims."[26]

The new test finds no infringement even if all functions claimed are found in the accused device when:

(1) the invention is a pioneer, in that, there is no significant prior art that otherwise would limit the scope of the invention claimed;

21. Graver Tank & Manufacturing Co. v. Linde Air Products Co., 339 U.S. at 608.

22. Westinghouse v. Boyden Power Brake Co., 170 U.S. 537 (1898).

23. Hughes Aircraft Co. v. United States, 219 U.S.P.Q. 473.

24. *Texas Instruments*, 321 U.S.P.Q. at 831.

25. *Id.*

26. *Id.* at 841.

(2) all significant functions are defined in means-plus-function claim language; and

(3) all of the claimed functions are performed in the accused device by subsequently developed or improved means.[27]

The Court did not consider to what extent each means embodied in the accused device must be changed from that disclosed in the specification, nor whether all means in every case must be changed to avoid what otherwise would constitute literal infringement: "[W]hen each changed means is considered separately, as part of the overall device as described by the inventors, substantial evidence may not support the finding that the resultant device is not an infringement of the '921 claims. However, this is not the situation before us."[28]

The new test accordingly requires that *all* means in the accused device be changes or improvements over those disclosed in the specification. This condition together with the condition of pioneer status of the invention with all significant functions claimed in means-plus-function language would as a practical matter only rarely occur. For example, consider a modification of the TI case in which only the integrated circuit in the accused calculators is an improvement over the bipolar integrated circuit array disclosed in the patent. If this were enough to invoke the new test, claims drafted in means-plus-function language under 35 U.S.C. § 112, (1975) para. 6, would, according to *Texas Instruments*, "emasculate electronics patents by limiting the scope of their claims to the specific embodiments disclosed in the specification."[29]

The new test, however, probably would not be invoked: "[w]ere the electronics means of clause b the only change, the record may not contain substantial evidence in support of the ALJ's finding of non-infringement. But viewing all of the modifications in the accused devices, we conclude that they reflect more than mere substitution of 'an embellishment made possible by [improved] technology' . . ."[30] Simply updating a patented invention, for example from an analog implementation to a digital one, will invoke a finding of infringement under the new test. The changes in the implementation of the invention as a whole must constitute more than those which would ordinarily occur as a result of improved technology.[31] However, the instant infringement occurs is impossible to ascertain in advance under *Texas Instruments, Inc.*,

27. *Id.*

28. *Id.* at 840.

29. *Id.*

30. *Id.*

31. *See, e.g.*, Decca Ltd. v. United States, 191 U.S.P.Q. 439 (Ct. Cl. 1976), *aff'd in part, modified in part, and rev'd in part*, 209 U.S.P.Q. 52 (Ct. Cl. 1980), *cert. denied*, 454 U.S. 819 (1981).

which begins to introduce new uncertainties into the law of patent infringement.

The new test in *Texas Instruments, Inc.* extends beyond the issue of literal infringement. Normally, even if there were no literal infringement of the *Texas Instruments, Inc.* claims by the accused calculators, there nevertheless might be infringement under the doctrine of equivalents since the patent, directed toward a pioneer invention, entitles the claims to enjoy a broad range of equivalents. It is argued easily in this case that the accused calculators, and the claims as a whole, do substantially the same task, in substantially the same way, to achieve substantially the same result. However, the Court dismissed applicability of the doctrine of equivalents where literal infringement under the new test is not found. When the invention claimed is a pioneer, all significant functions are claimed in means-plus-function language, and all corresponding functions in the accused device are carried out by improved means, equivalence of the claimed means under 35 U.S.C. § 112, para. 6 and equivalence of the claim as a whole under the doctrine of equivalents merge. Under these special circumstances, no difference is perceived between an analysis of the scope of the individual functions of a claim under 35 U.S.C. § 112, para. 6 and an analysis of the claim as a whole under the doctrine of equivalents.

The *Texas Instruments, Inc.* test is absolute. The patentee is not saved by the doctrine of equivalents if the claim elements under the test do not all read literally on the accused device. The reason is that the *Texas Instruments, Inc.* test is equitable if it is, based upon only the totality of change in the accused device from the device described in the specification.

The scope of the *Texas Instruments, Inc.* case currently is unclear. The facts involve a pioneer invention covered by a patent with claims having all primary elements recited in means-plus-function format, and all corresponding means in the accused devices different from those disclosed in the specification. The "totality of change" in this case is significant enough to justify a finding under the *Texas Instruments, Inc.* test that the claims are not infringed by the accused devices.

The *Texas Instruments, Inc.* case leaves many questions unanswered. How does the totality change with a reduction of the means-plus-function clause density whereby only most, or possibly only some, of the principal elements of the claim are drafted in means-plus-function format? And how much does each means have to be changed to avoid infringement under *Texas Instruments, Inc.*? Does the technological advancement of each element of the accused device over that disclosed in the specification of the patent asserted have to be substantial, or will any change do? How will one doing work in rapidly emerging technologies, such as in applications of artificial intelligence and super-

conductors, know whether and when his work will constitute an infringement of a third party pioneer patent? And conversely, how can the owner of such a patent assess with any confidence the scope of his claims?

These questions all remain unanswered. In the meantime, it is likely that the decision in the *Texas Instruments, Inc.* case will either be modified to conform more closely with established law of patent infringement, or simply will not be followed. Although there is precedent for reversal of a Court of Appeals for the Federal Circuit decision on reconsideration[32], courts in the United States occasionally allow a decision based upon law widely deemed misguided to remain dormant.[33] To do otherwise in this case will infuse substantial uncertainty into well-established law of patent infringement.

32. *See e.g. In re* Prater and Wei, 415 F.2d 1393 (C.C.P.A. 1969), *superseding*, 415 F.2d 1378 (C.C.P.A. 1968).

33. *See e.g.* Parker v. Flook, 437 U.S. 584 (1978).