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Patents - Patentable Subject Matter

E. Kears Pollock

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ably discussed in legal periodicals. Further legislation is needed to perfect the Act, for as Judge Hoffman stated:

These questions as well as others bound to arise are best settled by future legislative amendment, although in the absence of such action, it will be the duty of the courts to frame a solution based upon their interpretation of the statute as written. (Emphasis added.)

The instant case is evidence that the Act may, in close situations, be construed in favor of the landlord, thus rendering the purpose of the Act almost meaningless. It is anticipated that the amendment now being formulated will be adopted by the Legislature in the near future in order to partially fulfill the inherent potential of the Act.

Stephen G. Walker

PATENTS—PATENTABLE SUBJECT MATTER—The Court of Customs and Patent Appeals has held that the mere fact that elements of a claimed method for the reduction of data may be accomplished using the mind or a general purpose digital computer properly programmed does not invalidate the claim as a process within the meaning of 15 U.S.C. § 101. The court has further raised substantial doubt as to the unpatentability of “mental step” claims generally and has applied the distinction of functions occurring in nature being accomplished by methods outside nature to mental functions.


Applicant—appellants, Prater and Wei, in 1961 applied for a patent entitled “Reduction of Data From Spectral Analysis” by disclosing a method and apparatus to determine, with minimum error, the con-

21. See, Comments, Substandard Housing: The New Pennsylvania Rent Withholding Act; (5) situations where the premises are so unfit that imminent danger exists.


concentration of components of a mixture where the components are known but the number of concentration—related peaks of the spectra—exceed the number of components. The novel feature of the process disclosed by the applicants was the discovery that the optimum set of peaks for accurate concentration determination might be isolated from the much larger family of possible sets of peaks by finding the set of equations (an equation set being related to each peak set) having the largest determinant among all the possible sets. This novel feature was embodied in a machine also disclosed by appellants. The machine specifically utilized an electrical circuit to generate a graphic representation of all determinants on an oscilloscope, a servo-operated photo-electrical device to detect the represented determinant of greatest magnitude, and a series of meters to read the resultant signals for individual components when the optimum determinant had been detected. Both the method and the machine were claimed. The applicants revealed that the functions accomplished by the disclosed machine, ap-

2. The spectra which is the subject of analysis consists of an analog signal characterized by a relatively level base line interrupted by bumps or peaks of varying heights. These peaks are individually related to single components or combinations of components. Consider, for example, a mixture containing only two constituents but which has a spectra containing five peaks. The peak heights could be represented by:

\[
Y_1 = a_{11}X_1 + a_{12}X_2 \\
Y_2 = a_{21}X_1 + a_{22}X_2 \\
Y_3 = a_{31}X_1 + a_{32}X_2 \\
Y_4 = a_{41}X_1 + a_{42}X_2 \\
Y_5 = a_{51}X_1 + a_{52}X_2
\]

Y's are peak heights
X's are concentrations
a's are coefficients

It is evident that ten combinations of two equations are possible for solution of the concentrations. Obviously, in more complex mixtures with more interaction peaks, which is the usual case, the possible number of combinations could be extremely large and the investigator would be faced with the formidable and tedious task of trying each set.

The determinant for the first pair of equations in this example is:

\[
A_{12} = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix} = a_{11}a_{22} - a_{21}a_{12}
\]

and:

\[
X_1 = (Y_1a_{22} - Y_2a_{12})/A_{12}
\]

Thus:

\[
X_2 = (Y_1 - a_{11}X_1)/a_{12}
\]

This same analysis can be repeated for each of the remaining nine pairs of equations and a total of ten values for the concentrations would result. The experimenter would then be confronted with the problem of selecting which of the ten sets of concentration values most accurately represented the mixture.

The applicants here discovered that the values associated with the determinant of greatest magnitude most closely represent the mixture. With this discovery in hand the aspects of solution just presented, being conventional mathematical techniques, may be readily found in many elementary mathematics texts.
appropriately classified as an analog computer, might also be accomplished by a digital computer.\(^3\)

The examiner rejected both the applicants' method and machine claims, basing his decision on the ground that the claims failed to comply with 35 U.S.C. §§ 101, 102, 103, and 112.\(^4\) In regard to the method claim the examiner concluded that the claim, if within any statutory class enunciated under 35 U.S.C. § 101, must be a process, and the process claimed by the applicants constituted a mental process for the calculational procedure claimed could be accomplished in the mind of man. In support of this conclusion, the examiner relied on *In re Abrams*\(^5\) which held that claims for mental processes are outside the classes of invention authorized patent protection by Congress. Alternatively, the examiner argued that even if the claim included matter within the statutory class, the presence in the claim of portions relating to a mental process invalidated the entire claim on the ground of failing to particularly point out and distinctly claim the invention under 35 U.S.C. § 112.

In rejecting the apparatus claims, the examiner argued that following derivation of their calculational procedure it would be obvious within the meaning of 35 U.S.C. § 103 to one skilled in the art of computer programming to so modify a general purpose digital computer that it could carry out the procedure. Further, the examiner argued that even if the analog computer specified by the applicants were patentable, the claim by use of the broad terminology "means" to describe the calculational element necessarily included a general purpose digital computer and thus the claim failed to particularly point out a machine invention under 35 U.S.C. § 112.

The Patent Office Board of Appeals affirmed the decision of the

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3. Inclusion of the suggestion that the process might be accomplished by an alternate means was apparently to avoid application of the "inherent function" doctrine which was overruled just a few months prior to the instant decision in the case of *In re Tarczy-Hornoch*, 397 F.2d 856 (C.C.P.A. 1968).


5. 188 F.2d 165 (C.C.P.A. 1951).
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examiner in regard to all claims contained in the application. In their decision, the Board of Appeals agreed with the examiner that the process disclosed was a mental calculation procedure outside the statutory patentable process class and that the machine would be unpatentable since it was a mere apparatus counterpart of the unpatentable method. The Board further concluded that the machine would be an obvious step, in relation to the calculational procedure.

It may be observed at this point that all rejection arguments were necessarily dependent upon the conclusion that the process disclosed was not a process within the meaning of 35 U.S.C. § 101.

The applicants appealed to the United States Court of Customs and Patent Appeals pursuant to 35 U.S.C. § 141. That Court reversed, holding that the fact that steps of a method may alternatively be carried out in the human mind or by a general purpose digital computer will not invalidate the claims where the inventor has disclosed an apparatus for accomplishing the steps without human intervention. The court did not go so far as to hold that all novel mental steps are within the statutory class of processes which may be patented. The court, by distinguishing Abrams rather than overruling it, avoided holding that a novel mental process disclosed without an accompanying disclosure of a novel non-human means for its accomplishment would be patentable. Therefore the court was not required to reach a decision concerning the situation in which the only claim for the means of carrying out the process was a general purpose digital computer.

When enacted, the 1952 Patent Act codified existing law by establishing a statutory class of process to be afforded patent protection. The Supreme Court in 1877, in the case of Cochrane v. Deener stated that it was beyond dispute that a process could be the subject of a patent. The definition of a process in Cochrane as "a mode of treatment of cer-

6. In re Yuan, 188 F.2d 377 (C.C.P.A. 1951). Where not an apparatus for carrying out a process, but an article of manufacture resulting from a claimed process and described in terms of the process was claimed and the claim rejected for the article, aside from its method of production, was old.
7. 35 U.S.C. § 141 (1964), provides that, "An applicant dissatisfied with the decision of the Board of Appeals may appeal to the United States Court of Customs and Patent Appeals."
8. Process is defined in 35 U.S.C. § 100 (1964), as a "process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."; and as this was drafted in the light of existing judicial definitions the Patent Office has published in its Guidelines to Examination of Programs the assertion that, "Mathematical formulas are not included within 35 USC 101 since they are not a process, a machine, a manufacture, a composition of matter, or useful improvements thereof.", 829 Official Gazette 865, August 16, 1966.
9. 94 U.S. 189 (1877).
tain materials to produce a given result'" 10 was apparently cited by the Board of Appeals as a limitation upon process patentability, but the instant court emphatically denied this view. With reference to a later sentence in Cochrane, that "[t]he process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence," 11 Judge Smith logically concluded that the purpose of the definition or statement was not to limit the meaning of "process" but to show that, "a process is not limited by the means used to perform it." 12

Relying on a statement from the Supreme Court case of Tilghman v. Proctor 13 which referred to a process as "an act, or mode of acting" and as, "a conception of the mind, seen only by its effects when being executed or performed," 14 Judge Smith expressed the view that "process" must be more extensive than the "definition" in Cochrane and that the mental aspect of process inventions (presumably all process inventions) requires particular attention in the course of a determination of patentability. 15 While these two earlier cases involved processes acting to change matter (Cochrane was a flour making process, Tilghman was a fatty acid and glycerine process), the protection of the patent system was attached to processes acting on energy in the Telephone Cases 16 decided in 1887 involving the basic patents of Alexander Graham Bell.

In 1935 the Supreme Court upheld a process claim for accomplishing a function which occurs naturally—the incubation of eggs. In Waxham v. Smith 17 the court stated that since the claimed process accomplished the function occurring in nature by a means which had never occurred in nature, the process was patentable. In the present case the court said, "[a]lthough appellants' novel calculations performed in the mind of a man might possibly be considered to be in nature, performance of the process of these novel calculations on a computer is by 'a means which had never occurred in nature.' " 18

It is imperative to discuss Waxham and a possible distinguishing characteristic existing between it and the instant case not indicated in

10. Id. at 141.
11. Id.
13. 102 U.S. 279 (1881).
14. Id. at 283.
15. In re Prater at —. (All citations are to the slip opinion.)
18. Prater at 25.
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the present opinion. In *Waxham*, although the function or resultant effect might have occurred naturally, the process did not occur in nature. The process as claimed by Smith and found valid and infringed in *Waxham* was not hatching eggs by the application of heat; for if stated so broadly it would have included natural incubation; it was hatching eggs by arranging them in a chamber of particular design, applying a current of heated air in such a manner that heat transferred from eggs at a more advanced stage of incubation to those in a less advanced stage.\(^{19}\) The process disclosed in that case for the incubation of eggs constituted a sequence of occurrences which would not have occurred in nature—in the sense that the intervention of the inventor was required to bring the separate elements, each governed by nature, together in a new way to accomplish the same result that would occur naturally with improved efficiency. If calculations performed in the mind of man are in nature as the court suggests, and the same calculations are performed on a general purpose digital computer according to standard programming conventions, then it becomes difficult to conclude that the accomplishment of the entire natural thought process (as it may be communicated from one human to another in mathematical form) by a prior art machine is a patentable contribution no matter how novel the discovery or development of the calculational procedure. It must be remembered that while the result and function in *Waxham* occurred in nature the claimed process did not. But a process in which information is being acted upon might logically be considered to be in nature unless the calculational procedure could be demonstrated to be inherently outside the capability of a human mind. While the court in the instant case indicated an awareness of the relevance of the question whether a calculational procedure occurs in nature, it made no attempt to resolve this question, which may be the most crucial question necessary to a determination of patentability of processes that act upon information rather than material or energy.

The instant court said, "we find nothing to indicate an intent of Congress or the courts to deny patent protection to process claims

\(^{19}\) U.S. Patent No. 1,262,860.

The method of hatching a plurality of eggs by arranging them at different levels in a closed chamber having restricted openings of sufficient capacity for the escape of foul air without undue loss of moisture and applying a current of heated air, said current being created by means other than variations of temperature, and of sufficient velocity to circulate, diffuse and maintain the air throughout the chamber at substantially the same temperature, whereby the air will be vitalized, the moisture conserved and the units of heat will be carried from the eggs in the more advanced stage of incubation to those in a less advanced stage for the purpose specified.
merely because they could alternatively be read on a process performed through the mind by the use of aids such as pencil and paper." If the negative implication of this statement is construed to mean that a rejection would obtain for claims for a process unaccompanied by means for carrying it out other than use of the mind assisted by aids available to the art, then the obvious question will arise. Is the computer for accomplishment of the process a mere aid like pencil and paper? If so, a claim for information processing accompanied by a means claim consisting of logic to program a general purpose digital computer should be rejected unless the process put the machine to an unanticipated use and was written not to include use of the human mind. Such digression serves to demonstrate what the court did not hold. It did not, despite comments in the general business press, hold that computer programs are patentable. But by failing to make the distinction as per Waxham and failing to resolve to some extent whether calculational procedures are "in nature," the court missed an opportunity to bring some order to this developing area of patent activity.

The instant court's analysis of Abrams attached significance to the distinction that in the present case there was a disclosure of a means for performance of the process; while in Abrams no means had been disclosed to avoid accomplishing the process by mental effort. Judge Smith in discussing Abrams pointed out that,

Abrams disclosed no means whatever for performing the claimed steps (5) and (6), of calculation and comparison. Certainly no analog computer for carrying out these calculations is disclosed in Abrams' specification and at the time Abrams filed (April 28, 1944), programmable general purpose digital computers for calculations of this nature were still in the future. Thus, Abrams disclosed a claimed process including steps which could only be performed in the mind insofar as the teachings of the application were concerned.

22. Abrams' claims related to a method for oil prospecting. 188 F.2d at 165.
4. measuring the rate of pressure rise per unit area of surface available for diffusion of subsurface gases into said borehole for a number of timed intervals.
5. determining the rate of pressure rise in said borehole at a standard reference pressure from the values obtained in step (4),
6. comparing the rates determined in step 5 for the different boreholes to detect anomalies which are indicative of the presence of petroliferous deposits.
23. Prater at 17.
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That the court did not overrule Abrams suggests that the doctrine of nonpatentability of "mental step" claims is still alive. Despite the care with which Judge Smith demonstrated that the Abrams rules had never been adopted by the court, it is quite plain that the court in Abrams considered mental steps alone unpatentable. And a careful reading of Abrams in conjunction with Halliburton reveals that the claims of Abrams were indeed rejected for being "mental steps" though the court did ultimately decide Abrams by direct application of Halliburton. Since the court in Abrams conceded the issue of novelty to the applicant, the rejection of the claimed invention was necessarily for failure to be included in any of the statutory categories of patentable subject matter (no other issues being raised) whether determined by the rules proposed by Abrams' counsel or by application of Halliburton. The quote from Halliburton in the instant case that "these mental steps, even if novel, are not patentable" if taken in context with that court's affirmance of the trial court finding that the method patent in issue was invalid for "its novelty lay only in the performance of certain mental steps" leads to a conclusion that the Halliburton court did not need to determine novelty for it considered "mental steps" unpatentable rather than to the conclusion of the instant court which interpreted the words to mean that lack of novelty destroyed the claim's validity and determination of "mental step" patentability was unnecessary.

The instant court's deliberate choice to avoid application of the so called Abrams' Rules to decide the present case may prove significant

24. Counsel for Abrams sought to have the court formally adopt these rules:
1. If all the steps of a method claim are purely mental in character, the subject matter thereof is not patentable within the meaning of the patent statutes.
2. If a method claim embodies both positive and physical steps as well as so-called mental steps, yet the alleged novelty or advance over the art resides in one or more of the so-called mental steps, then the claim is considered unpatentable for the same reason that it would be if all the steps were purely mental in character.
3. If a method claim embodies both positive and physical steps as well as so-called mental steps, yet the novelty or advance over the art resides in one or more of the positive and physical steps and the so-called mental step or steps are incidental parts of the process which are essential to define, qualify or limit its scope, then the claim is patentable and not subject to the objection contained in 1 and 2 above. 188 F.2d at 166.
25. "Citation of authority in support of the principle that claims to mental concepts which constitute the very substance of an alleged invention are not patentable is unnecessary. It is self-evident that thought is not patentable." 188 F.2d at 168.
26. Halliburton Oil Well Cementing Co. v. Walker, 146 F.2d 817 (9th Cir. 1944).
27. "Inasmuch as no prior art was cited below, it would appear that an advance in the art is conceded so far as the tribunals of the Patent Office are concerned . . . the sole question is whether the novelty thus assumed is the result of a physical act or is simply a mental concept." 188 F.2d at 167.
28. 146 F.2d at 821.
to the development of the law concerning patentability of "mental step" claimed. Had the court applied the Abrams rules it seems likely that the present case would have been decided against rather than for the applicants as to their process claims which appear to be characterized by Abrams rule two.\textsuperscript{29}

While under this decision, systems involving elements which may be accomplished by alternative natural means are not outside the statutory class of process, no general conclusion as to the patentability of computer programs (representing thought processes to be processed by aid of a general purpose digital computer) is now possible. The sufficient elements comprising this system were a method of analysis, a means of data acquisition, and a means of processing. If all three are necessary, as well, those programs of a data processing or scientific nature (other than those inherently outside the capability of the human mind) would seem not to be covered.

The approach of the instant court to tie together a process claim and a machine claim to validate the process claim is of course contrary to the Halliburton result (although separate patents were involved there) and is perhaps the most disquieting feature of the opinion. The instant court has permitted a process claim to be patented where the inventors' novel discovery was a mathematical concept which if claimed alone without an apparatus to do the calculations directly apparently would not have been patentable (else why the great effort to distinguish Abrams?). The method claim\textsuperscript{30} read alone clearly covers doing the

\textsuperscript{29} See note 22 supra.
\textsuperscript{30} Compare these claims with the Smith claim, note 19 supra; and the Abrams claims, note 22 supra.

The method of determining with minimum error from the spectra of spectral analysis the concentration of the components of a mixture where the components are known and the concentration-determining peaks of the spectral analysis are present in number exceeding the number of said components, which comprises generating physical representations of the magnitudes of the coefficients of simultaneous linear equations defining the concentrations of said components as functions of the heights of said peaks of said spectral analysis, generating from said physical representations of the magnitudes of said coefficients the magnitude of the determinant of a plurality of sets of said simultaneous equations, the number of equations of each of said sets being equal in number to the number of said components, comparing said physical representations of the magnitudes of said determinants of said sets of equations for identification of the set of said equations whose determinant has the largest magnitude, and generating physical representations of the concentration of each said component of said mixture from said physical representations of the magnitudes of said coefficients of said set of simultaneous equations having determinants of largest magnitude and from said heights of said peaks included in said last-names [sic] set of equations. (Emphasis as added by the court.)

Prater at 7.
calculations by hand using pencil and paper, and if the claim is valid and another does use the procedure, the patentee could successfully sue for infringement despite the fact that the patented apparatus or its equivalent had not been used. It seems illogical to tie the method and machine together and look at them as a whole to find the method claim valid when the effect is that infringement of the method claim alone could result. This is not to say that no method claim could be drafted that would cover the appellants' process if the court's view were not adopted but merely that an acceptable claim should then be limited to the process as it occurs "outside nature."

Although the instant case was decided without resolving the questions posed earlier regarding the role of digital computers in the current art of mathematical analysis and information processing, these questions and others, including the basic question of the nature of analytical procedures in the light of patent law objectives must be answered soon. And the impetus this case is likely to have upon the filing of new applications covering information processes shall hasten the time when those questions must be answered.

_E. Kears Pollock_