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PATENT LAW—PATENTABILITY AS AFFECTED BY THE LAW OF NATURE RULES—THE KALO DOCTRINE—Kalo Company sued Funk Brothers for equitable relief in a federal district court, alleging infringement of product claims to a bacteria inoculant. The district court found infringement of the claims, but held them invalid for want of invention. The circuit court of appeals reversed, holding that the product claims were valid and infringed. On certiorari, the Supreme Court reversed, stating that the newly discovered law of nature, that is, that

¹ The patent here involved claimed a bacteria inoculant for leguminous plants composed of a mixture of mutually noninhibitive strains of different species of the genus *Rhizobium*. Before the existence of this patent, general practice had been to sell inoculants containing one species of bacteria. Inoculants composed of mixed bacteria for general application had been unsuccessful because the different species had an inhibitory effect on each other.

² Kalo Inoculant Co. v. Funk Bros. Seed Co., (C.C.A. 7th, 1947) 161 F. (2d) 981.

certain strains of each species of bacteria are mutually compatible, was not patentable, although a practical application of this law might be. The majority opinion also stated that for purposes of determining whether the level of invention was reached, the law of nature and its practical application must be looked at separately rather than as a unit, even though the two are the closely related results of the one person's research. Thus the practical application, apart from the discovery of the law of nature, must itself show inventive genius. The Court admitted that in this case the discovery of the law of nature was ingenious, but held that once the law was known its practical application merely required the exercise of ordinary skill.³

The doctrine here announced by the Court appears to be an extension of the "law of nature" rule, long resorted to by the Court. The resurrection of this rule by highest authority to strike down a product patent which the majority of the Supreme Court admitted was ingenious, useful, commercially successful, and adequately described, makes consideration of past judicial treatment of the rule itself appropriate.

A. Laws of Nature and Products of Nature in Relation to Patentability

Dean Pound has defined "laws of nature" as "generalized predictions from human experience of the course of events." As thus defined, it seems that a "law of nature" probably should not be patentable. In the first place, a law of nature is not included within the terms of the patent statute, which limits patentable subject matter to the classifications of art, machine, manufacture, composition of matter, and new variety of plant. Secondly, an exclusive monopoly on a law of nature *might* result in an undesirable restriction on scientific and industrial progress. In

³ Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 68 S.Ct. 440 (1948). Justices Burton and Jackson, in a dissenting opinion, stated that the patent was both valid and infringed. Justice Frankfurter, in a separate concurring opinion, agreed with the dissenters that there was invention, but agreed with the majority that the patent was invalid because he thought that the strains of bacteria were not adequately identified and therefore the claims were too indefinite. For discussions of "invention," see Glascock and Stringham, Patent Law, §§ 1380, 1400 (1943); Stedman, "Invention and Public Policy," 12 Law and Contem. Prob. 649 (1947).

⁴ Pound, The Task of Law 41 (1944). The few fragmentary definitions in

⁴ POUND, THE TASK OF LAW 41 (1944). The few fragmentary definitions in decisions are incorporated by Dean Pound. "Laws of nature," as thus defined, change as human experience grows (p. 40). Cf. Ruby, "Are True Chemical Compounds, as such, Inherently Unpatentable Subject Matter?" 15 TEMPLE UNIV. L.Q. 27 at 39 (1940). For an interesting discussion of changes in the laws of theoretical physics, see Barnett, "The Universe and Dr. Einstein," HARPER'S MAGAZINE (April, 1948).

^{5 35} U.S.C. (1946) § 31.

⁶ The importance of the restriction would depend on the breadth and importance of the law involved, since the term "law of nature" covers a multitude of sins, varying in breadth from such fundamental ones as Planck's quantum theory and Einstein's photoelectric law to such narrow ones as that involved in the Kalo case. There seems little

the third place, an exclusive monopoly on a law of nature might well be unenforceable, since it would seem to be virtually impossible, as well as undesirable, to prevent scientists and technicians from using known laws of nature in their mental processes, calculations, and research.

Yet in spite of the apparent logic of the rule, the decisions lend weight to Justice Frankfurter's objection in the *Kalo* case to the use of terms such as "laws of nature," because "these are vague and malleable terms infected with too much ambiguity and equivocation."

1

An analysis of the cases reveals the following reasons for the unprecise use of the term, "law of nature," by the courts:

- (1) The courts use the term but seldom define it, except by inclusion or exclusion of particular cases. The few attempted definitions have used such vague terms as "principle," "fundamental cause," and "phenomenon," as synonyms.⁸
- (2) In the last few decades, there have been few attempts to patent actual laws of nature, as such, although endeavors have been made to gain monopolies over laws of nature by means of process or product patents written or construed by counsel in such general terms that the patents would, as a practical matter, result in such monopolies. The courts have upheld or struck down such patents with equal facility, using for a convenient crutch the law of nature syllogism (as it is usually stated, that a law of nature is not patentable but that a practical application thereof may be).
- (3) The "law of nature" rule has, through the years, acquired a good deal of sanctity through constant judicial repetition, generally as dicta, 10 but in some cases as the *ratio decidendi*. 11 This acquired respectability (and the persuasiveness of counsel) is an important reason for the use of the rule by courts in many questionable cases. 12

doubt, in the light of the Kalo case, that a monopoly covering even the narrowest law of nature would be objectionable today, at least to the Supreme Court. See note 43, infra.

7 333 U.S. 127 at 135, 68 S.Ct. 440 (1948).

⁸ LeRoy v. Tatham, 14 How. (55 U.S.) 156 at 175 (1852).

⁹ In this latter category fall such cases as O'Reilly v. Morse, 15 How. (56 U.S.) 62 (1853); Tilghman v. Proctor, 102 U.S. 707 (1880); Morton v. New York Eye Infirmary, (C.C. N.Y. 1862) 5 Blatch. 116; and Treibacher-Chemische Werke v. Roessler and Hosslacher Chemical Co., (C.C.A. 2d, 1914) 219 F. 210. For a discussion of many similar cases see Ruby, "Are True Chemical Compounds, as Such, Inherently Unpatentable Subject Matter?" 15 TEMPLE UNIV. L.Q. 27 (1940).

Lowell v. Lewis, (C.C. 1st, 1817) 1 Mason 182; Le Roy v. Tatham, 14 How.
 U.S.) 156 (1852); Mackay Radio & Telegraph Co. v. Radio Corp. of America,

306 U.S. 86, 59 S.Ct. 927 (1939).

¹¹ Wall v. Leck, (C.C.A. 9th, 1895) 66 F. 552. For further cases see note 9, supra. ¹² In re Kemper, (C.C. D.C. 1841) 14 Fed. Cas., No. 7687; Wall v. Leck, (C.C.A. 9th, 1895) 66 F. 552. See also Ruby, "Are True Chemical Compounds, as Such, Inherently Unpatentable Subject Matter?" i5 TEMPLE UNIV. L.Q. 27 (1940).

In general, the "law of nature" rule has been used to invalidate objectionably broad patent claims which would result in undesirable monopolies. However, modern courts have come to recognize the inadequacy of that rule, and it is likely that today such patents would be held invalid for insufficient disclosure and description of the claim. Since General Electric Co. v. Wabash Appliance Corp., this "indefinite claim" rule, which seems ideally suited to the invalidation of objectionably broad patents, has been widely used. The resurrection of the "law of nature" doctrine of the Supreme Court in the Kalo case has provided an alternative method for invalidating a patent in cases where the majority of the Supreme Court is unwilling to hold the patent invalid because of indefiniteness.

2

A discussion of the "law of nature" rule would be incomplete without some reference to the "product of nature" rule since the two are closely related.¹⁸

There is some authority for the rule that products of nature are not patentable. Like the "law of nature" rule this proposition, too, is used

¹⁸ Cases cited supra, note 9. See also STRINGHAM, OUTLINE OF PATENT LAW, § 1107 (1937); GLASCOCK AND STRINGHAM, PATENT LAW, § 1107 (1943). In many cases involving very broad claims, where the "law of nature" rule was discussed but the patent upheld as a patentable application, it is clear that a different result would be reached today.

Such cases are Tilghman v. Proctor, 102 U.S. 707 (1880); The Telephone Cases, 126 U.S. 1, 8 S.Ct. 778 (1888); and Treibacher-Chemische Werke v. Roessler & Hasslacher Chemical Co., (C.C.A. 2d, 1914) 219 F. 210.

14 See Dennis v. Pitner, (C.C.A. 7th, 1939) 106 F. (2d) 142 at 145.

15 304 U.S. 364, 58 S.Ct. 899 (1938).

¹⁶ See also United Carbon Co. v. Binney & Smith Co., 317 U.S. 228, 63 S.Ct. 165 (1942). For a complete discussion of the above rule see Woodward, "Definiteness and

Particularity In Patent Claims," 46 MICH. L. REV. 755 (1948).

¹⁷ In General Electric Co. v. Wabash Appliance Co., 304 U.S. 364 at 371, 58 S.Ct. 899 (1938), the "indefinite claim" rule is broadly stated "... a patentee may not broaden his product claims by describing the product in terms of function." Courts have often used this rule to require that claims be quantitatively definite. [See Application of Kniel, (C.C.P.A. 1948) 169 F. (2d) 820.] But the injustice of applying the rule strictly is obvious in cases where a quantitative description is impossible, and the product can only be described in terms of effects or functions. This would seem to account for the failure of the majority of the Court to apply the "indefinite claim" rule in the Kalo case (see the dissenting opinion).

¹⁸ Treibacher-Chemische Werke v. Roessler & Hasslacher Chemical Co., (C.C.A. 2d, 1914) 219 F. 210; Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 68 S.Ct. 440 (1948). Cf. Dennis v. Pitner, (C.C.A. 7th, 1939) 106 F. (2d) 142 at 146.

¹⁹ General Electric Co. v. De Forest Radio Co., (C.C.A. 3d, 1928) 28 F. (2d) 641, cert. denied, 278 U.S. 656, 49 S.Ct. 180 (1928); In re Marden, (C.C.P.A. 1931) 47 F. (2d) 957; In re Marden, id. 958; concurring opinion of Sparks, J., in Dennis v. Pitner, (C.C.A. 7th, 1939) 106 F. (2d) 142.

without first being defined. Probably the chief reason for its ambiguity is that the rule as to unpatentability of products of nature was laid down most emphatically in cases involving patents on ductile and pure forms of tungsten, uranium, and vanadium, all of which were held to be unpatentable products of nature, although they actually do not occur in nature.²⁰ There was evidence in these cases of a large amount of effort, research, and originality expended by inventors in man-making them.²¹ Therefore, if a definition of the term "product of nature" were adopted from these decisions, it would be so broad that the "product of nature" rule would seriously if not completely curtail patentability of products of any sort.

Other cases indicate, however, that the true definition of "product of nature" is much narrower. It appears from these decisions that, as generally defined,²² a product of nature is one occurring on the earth in a form that has not been changed by any act of a human being.

As defined above, a product of nature may be unpatentable. In the first place, a product of nature may not be new. This is invariably the case where the product has been known to occur in nature before patentee applied for his product-patent.²³ The fact that a product actually does occur on the earth, unknown to humanity, would seem to have no effect on patentability, since the product would still be novel. Innumerable patents have been issued on chemical compounds, alloys, and other compositions of matter,²⁴ and so far as is known, none of these patents has been invalidated because of a later discovery of the product's natural occurrence.

Secondly, many times "products of nature" fall outside of the patentable categories listed by the statute. Until the 1930 amendment, 25 plants were unpatentable; and bacteria are still unpatentable, it having been held that for purposes of patentability bacteria are not plants. 26

²¹ See dissenting opinion, General Electric Co. v. De Forest Radio Co., (C.C.A. 3d, 1928) 28 F. (2d) 641.

²² Cochrane v. Badische Anilin & Soda Fabrik, 111 U.S. 293, 4 S.Ct. 455 (1884); Dennis v. Pitner, (C.C.A. 7th, 1939) 106 F. (2d) 142. See list of other cases in GLASCOCK AND STRINGHAM, PATENT LAW, §§ 1226, 1227 (1943).

²⁸ In re Macallum, (C.C.P.A. 1939) 102 F. (2d) 614 (a composition of calcium phosphate and hormone was unpatentable because not new, since it was known to exist naturally in the duodenum); Cochrane v. Badische Anilin & Soda Fabrik, 111 U.S. 293, 4 S.Ct. 455 (1884); The Wood-Paper Patent, 23 Wall. (90 U.S.) 566 (1874).

²⁴ Application of Jones, (C.C.P.A. 1945) 149 F. (2d) 501; Maurer v. Dickerson, (C.C.A. 3d, 1902) 113 F. 870. For other cases see 9 GEo. Wash. L. Rev. 86 at 90,

note 20 (1940).

²⁵ Note 5, supra. See Allyn, The First Plant Patents (1934).

²⁶ In re Arzberger, (C.C.P.A. 1940) 112 F. (2d) 834. See also Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 68 S.Ct. 440 (1948).

²⁰ Ibid.

Thirdly, a known product of nature may have been man-altered in an uninventive way.²⁷ Such a product, though no longer a product of nature, would be unpatentable for lack of invention.²⁸

Fourthly, an exclusive monopoly on certain products of nature such as water, oil or any of the essential minerals would be an undesirable restriction on scientific and industrial progress. An industrial nation such as the United States probably could not tolerate a seventeen year monopoly on any save the most unessential products. Obviously also, in the case of a basic "product of nature," a monopoly might well be unenforceable.

In general, the cases involving actual products of nature have not propounded a "product of nature" rule. These decisions have been rested on more orthodox grounds such as lack of novelty ²⁹ and unpatentability of the subject matter involved. ³⁰ The important cases laying down a rule as to the unpatentability of products of nature have been unsound, since, without exception, no actual products of nature were involved in these cases ³¹

3

Some of the actual decisions involved in the above cases (for example, that product patents on chemical elements such as pure tungsten, vanadium, and uranium are invalid ³²) will probably be followed. In spite of the large number of decisions in inferior federal courts upholding product patents on chemical compounds, ³⁸ independent of the processes by which these are produced, and in spite of recent Supreme Court dicta ³⁴ that products can be patented apart from the processes by which the patentees have made them if the product is adequately identified

²⁷ See Stringham, Outline of Patent Law, § 1226 (1937); also the cases cited in Glascock and Stringham, Patent Law, §§ 1226, 1227 (1943).

³⁰ In re Arzberger, (C.C.P.A. 1940) 112 F. (2d) 834.

Supra, note 19.Supra, note 24.

²⁸ American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 51 S.Ct. 328 (1931). In this case the Court, speaking through Justice McReynolds, held invalid a product patent on citrus fruit, the rind of which had been impregnated so as to be blue-mold resistant, on the ground that the natural product was not changed sufficiently to be termed a "manufacture." A more substantial ground, lack of novelty, also was present.

²⁹ Dennis v. Pitner, (C.C.A. 7th, 1939) 106 F. (2d) 142; In re Macallum, (C.C.P.A. 1939) 102 F. (2d) 614; The Wood-Paper Patent, 23 Wall. (90 U.S.) 566 (1874); Cochrane v. Badische Anilin & Soda Fabrik, 111 U.S. 293, 4 S. Ct. 455 (1884).

⁸¹ General Electric Co. v. De Forest Radio Co., (C.C.A. 3d, 1928) 28 F. (2d) 641; In re Marden, (C.C.P.A. 1931) 47 F. (2d) 957, 958; American Fruit Growers, Inc. v. Brogdex, 283 U.S. 1, 51 S.Ct. 328 (1930).

³⁴ General Electric Co. v. Wabash Appliance Corp., 304 U.S. 364, 58 S.Ct. 899 (1938).

aside from the process, recent Supreme Court decisions indicate that broad product patents, apart from the patentees described processes for making these substances, probably will not be upheld by that Court. In pursuance of its anti-monopoly policy, the present Court has been particularly diligent in invalidating patents likely to supply patentees with monopolies broader than their actual inventions. The court has been particularly diligent in invalidating patents likely to supply patentees with monopolies broader than their actual inventions.

A recent case indicative of the trend and the reasons behind the trend is *United Carbon Co. v. Binney and Smith Co.*³⁸ In that case patentee claimed a patent on a product independent of process. The process described by patentee for producing the product was a relatively crude one, and the product did not become commercially successful until improved processes were invented. Since the end product of all of the processes was covered by the patent, the patentee's monopoly blanketed processes which he had not in fact invented. The Supreme Court held the patent invalid because of the indefiniteness of the claims.

Ît is interesting to notice that in the recent Kalo case, Justice Frankfurter suggested in his separate concurring opinion that the bacteria inoculant patent there involved also be declared invalid on account of indefiniteness. The dissent of Justices Burton and Jackson, and the fact that the majority saw fit to coin a new formula to strike down this patent, suggest that the bacteria inoculant patent was a little beyond the high tide of the present Court's application of the "indefinite claims" doctrine. It is therefore somewhat doubtful whether a chemical compound claim would be invalidated because of indefiniteness. Nevertheless it seems certain that, one way or another, any product claim to a chemical compound or element independent of patentee's described process would be nullified at the present time by the Supreme Court.

In summary, it may be said that both of the "nature" rules have received such ambiguous treatment by the courts that they furnish much

⁸⁵ In Goodyear Tire & Rubber Co. v. Ray-O-Vac Co., 321 U.S. 275, 64 S.Ct. 593 (1944), a narrow product patent on a leak-proof flashlight dry cell was held valid and infringed, four justices dissenting. This is one of the very few recent patents held valid and infringed by the present Supreme Court. Broader product patents have invariably been struck down. See cases listed in notes 2, 15, and 16. For a compilation of cases, and an excellent discussion, see Smith, "Recent Developments In Patent Law," 44 MICH. L. REV. 899 (1946).

⁸⁶ While it seems highly probable that the Supreme Court would invalidate any product patent on a chemical compound, it is certain that, at the present time, the patent office is issuing chemical compound patents, and it is very probable that many inferior federal courts would uphold such patents. At the present time there are three standards of patentability: (1) the standard of the patent office, which is the lowest; (2) the standard of many inferior federal courts, which is higher than the standard of the patent office; and (3) the standard of the Supreme Court, which is the highest of all.

⁸⁷ Note 35, supra.

⁸⁸ 317 U.S. 228, 63 S.Ct. 165 (1942). ⁸⁹ Note 17, supra.

less definite standards than are usual even in the field of patent law. Both rules have been used by the courts to effectuate an anti-monopoly policy. Both rules also have been displaced to a large extent in recent years by the less conceptual but equally effective "indefinite claim" doctrine.

B. The Kalo Doctrine

In the Kalo case the majority held that even though a law of nature and its practical application were discovered by the same person, the two must be considered separately in order to determine whether the level of invention was reached. The practical application, apart from the discovery of the law of nature, must itself show inventive genius. This doctrine, though related in subject matter to the above discussed "nature" rules, is completely distinct from them in its effect. It is the burden of this paper to show that this doctrine is actually contrary to previous authority and to the policy of the patent statute.

1. Authority. In De Forest Radio Co. v. General Electric Co.,40 Iustice Stone stated:

"That the high vacuum tube was an improvement over the low vacuum tube of great importance, is not open to doubt. Even though the improvement was accomplished by so simple a change in structure as could be brought about by reducing the pressure in the well known low vacuum tube by a few microns, still it may be invention. Whether it is or not depends upon a question of fact, whether the relationship to the degree of vacuum within the tube, to ionization, and hence to the stability and effectiveness of discharge passing from cathode to anode was known to the art when Langmuir began his experiments. If that relationship was then known, it required no inventive genius to avoid ionization and secure the desired result by creating the vacuum in a De Forest tube or other form of low vacuum discharge device."

Thus Justice Stone was willing to find inventive genius "in the discovery of the natural principle itself," though Justice Douglas in the Kalo case states that this cannot be done "without allowing a patent to issue on one of the ancient secrets of nature now disclosed." That Justice Stone's was the proper test is made clear by many other cases decided in the federal courts.⁴²

^{40 283} U.S. 664, 51 S.Ct. 563 (1931).

⁴¹ Id. at 678. Italics supplied.

⁴² The opinions in LeRoy v. Tatham, 14 How. (55 U.S.) 156 (1852), and 22 How. (63 U.S.) 132 (1859), indicate clearly that the only invention involved lay in finding the natural principal. In Guaranty Trust Co. of N.Y. v. Union Solvents Corp., (D.C. Del. 1931) 54 F. (2d) 400, affd. on opinion below, (C.C.A. 3d, 1932)

2. Policy. In terms of today's needs, our patent system should be designed to promote research and scientific progress insofar as this may be done without impairing our free competitive system.⁴⁸ It is generally recognized that fundamental or pure research is of extreme importance, at least as much so as applied research.⁴⁴ Yet most of the achievements of fundamental research are discoveries of "laws of nature" which, as has been shown, are unpatentable primarily because monopolies on such discoveries would be extremely undesirable.⁴⁵

Practical applications of natural laws, if stated narrowly enough, are patentable because monopolies on the practical applications do not necessarily result in objectionable monopolies on the natural principles. A simple application or a complicated application could be equally free of the monopoly objection. In addition, the discovery of a natural law plus a simple application could be far more valuable than a more complicated application of a known natural law. From these premises it is obvious that the *Kalo* doctrine, by artificially separating the discovery of the natural law from its application for purposes of determining the presence of the quality of invention, needlessly discriminates against basic, in favor of applied, research.

C. Conclusion

The Kalo doctrine, if literally applied, could have a far-reaching effect in invalidating patents. Since every patent involves the practical application of one or more laws of nature, it would seem necessary to test all cases by the doctrine. Yet it is unlikely that the Supreme Court will apply the Kalo doctrine literally, any more than it has literally applied the "law of nature" rule. It seems more likely that, as in the past, all of the "nature" rules will be used by the Court as convenient rules of thumb to aid in reaching decisions which policy considerations make desirable. A conceptual approach to patent law by the Supreme Court at this late date is especially unlikely in view of the ever growing tendency of "policy" cases to squeeze out "ordinary legal" cases from the Supreme Court docket.⁴⁷

- 61 F. (2d) 1041, cert. denied, 288 U.S. 614, 53 S.Ct. 405 (1932), a bacteriological fermentation process for the production of acetone and butyl alcohol was held valid, the court indicating that the discovery of the particular bacteria was the important element. See also Dennis v. Pitner, (C.C.A. 7th, 1939) 106 F. (2d) 142.
- ⁴⁸ 12 L. AND CONTEM. PROB. 645-806 (1947) contains an excellent discussion of the patent system. See, especially, Stedman, "Invention and Public Policy" at 649.
 - 44 Id. at 650, note 5, also 661, 662.
- ⁴⁵ See Kreeger, "The Control of Patent Rights Resulting from Federal Research," 12 L. AND CONTEM. PROB. 714 at 732 (1947).
 - 46 All inventions would seem to involve the application of one or more natural laws.
 - ⁴⁷ Curtis, Lions Under The Throne (1947).

The doctrine, however, may have a much more unfortunate effect on patent law cases decided by the inferior federal courts. These courts decide many more legal cases than policy cases, and, consequently, are more likely to attempt to apply the *Kalo* doctrine literally.

On its facts, and in the light of attending circumstances, the Kalo decision is not surprising. Possibly the most potent "background" factor leading up to the decision was the extremely pungent evidence revealed in United States v. United States Gypsum Co.,40 an anti-trust case decided the following week, which showed with detailed clarity how patents can assist in the cartelization of an industry. It is possible that the majority of the Court will look with slightly more tolerance on the present patent system when the Gypsum case has receded into the background. More tolerance by the Court would be certain if needed legislative reforms in the patent system were forthcoming.50

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⁴⁸ Few patent cases ever reach the Supreme Court, most of them being finally adjudicated in the inferior federal courts.

⁴⁹ 333 U.S. 364, 68 S.Ct. 525.

⁵⁰ See Stedman, "Invention And Public Policy," 12 L. AND CONTEM. PROB. 649 (1947); Davis, "Proposed Modifications in the Patent System," 12 L. AND CONTEM. PROB. 796 (1947).