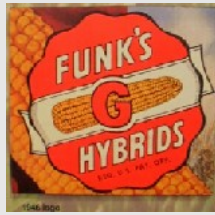


US Supreme Court, 16 February 1948, Funk v Kalo



PATENT LAW

Unpatentable qualities that are the work of nature

- The qualities of these bacteria, like the heat of the sun, electricity, or the qualities of metals, are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none. He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.
- Discovery of the fact that certain strains of each species of these bacteria can be mixed without harmful effect to the properties of either is a discovery of their qualities of non-inhibition. It is no more than the discovery of some of the handiwork of nature and hence is not patentable.

The aggregation of select strains of the several species into one product is an application of that newly-discovered natural principle. But however ingenious the discovery of that natural principle may have been, the application of it is hardly more than an advance in the packaging of the inoculants. Each of the species of root-nodule bacteria contained in the package infects the same group of leguminous plants which it always infected. No species acquires a different use. The combination of species produces no new bacteria, no change in the six species of bacteria, and no enlargement of the range of their utility. Each species has the same effect it always had. The bacteria perform in their natural way. Their use in combination does not improve in any way their natural functioning. They serve the ends nature originally provided and act quite independently of any effort of the patentee.

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US Supreme Court, 16 February 1948

(...)

333 U.S. 127

FUNK BROS. SEED CO.

v.

KALO INOCULANT CO.

No. 280.

Jan. 13, 1948.

Decided Feb. 16, 1948.

[ Funk Bros. Seed Co. v. Kalo Inoculant Co. 333 U.S. 127 (1948) ] [333 U.S. 127 , 128]

Mr. H. A. Toulmin, Jr., of Dayton, Ohio, for petitioner.

Mr. J. Bernhard Thiess, of Chicago, Ill., for respondent.

**Mr. Justice DOUGLAS delivered the opinion of the Court.**

This is a patent infringement suit brought by respondent. The charge of infringement is limited to certain product claims<sup>1</sup> of Patent No. 2,200, 532 issued to Bond on May 14, 1940. Petitioner filed a counterclaim asking for a declaratory judgment that the entire patent be adjudged invalid.<sup>2</sup> The District Court held the product claims invalid for want of invention and dismissed the complaint. It also dismissed the counterclaim. Both parties appealed. The Circuit Court of Appeals reversed, holding that the product claims were valid and infringed and that the counterclaim should not have been dismissed. 7 Cir., 161 F.2d 981. The question of validity is the only question presented by this petition for certiorari.

Through some mysterious process leguminous plants are able to take nitrogen from the air and fix it in the plant for conversion to organic nitrogenous compounds. The ability of these plants to fix nitrogen from the air depends on the presence of bacteria of the genus *Rhizobium* which infect the roots of the plant and form nodules on them. These root-nodule bacteria of the genus *Rhizobium* fall into at least six species. No one species will infect the roots of all species of leguminous plants. But each will infect well-defined groups of those plants.<sup>3</sup> Each species of root-nodule bacteria is made up of distinct strains which vary in efficiency. Methods of selecting the strong strains and of producing a bacterial culture from them have long been known. The bacteria produced by the laboratory methods of culture are placed in a powder or liquid base and packaged for sale to and use by agriculturists in the inoculation of the seeds of leguminous plants. This also has long been well known.

It was the general practice, prior to the Bond patent, to manufacture and sell inoculants containing only one species of root-nodule bacteria. The inoculant could therefore be used successfully only in plants of the particular cross-inoculation group corresponding to this species. Thus if a farmer had crops of clover, alfalfa, and soy beans he would have to use three separate inoculants.<sup>4</sup> There had been a few mixed cultures for field legumes. But they had proved generally unsatisfactory because the different species of the

<sup>1</sup> The product claims in suit are 1, 3, 4, 5, 6, 7, 8, 13, and 14. Claim 4 is illustrative of the invention which is challenged. It reads as follows: FC 'An inoculant for leguminous plants comprising a plurality of selected mutually non-inhibitive strains of different species of bacteria of the genus *Rhizobium*, said strains being unaffected by each other in respect to their ability to fix nitrogen in the leguminous plant for which they are specific.'

<sup>2</sup> The patent also contains process claims.

<sup>3</sup> The six well-recognized species of bacteria and the corresponding groups (cross-inoculation groups) of leguminous plants are:

*Rhizobium trifolii*, *Rhizobium meliloti*, *Rhizobium phaseoli*, *Rhizobium leguminosarum*, *Rhizobium lupine*, *Rhizobium japonicum*, Red clover, crimson clover, mammoth clover, alsike clover; Alfalfa, white or yellow sweet clovers; Garden beans, Garden peas and vetch, Lupines, Soy beans.

<sup>4</sup> See note 3, supra.

Rhizobia bacteria produced an inhibitory effect on each other when mixed in a common base, with the result that their efficiency was reduced. Hence it had been assumed that the different species were mutually inhibitive. Bond discovered that there are strains of each species of root-nodule bacteria which do not exert a mutually inhibitive effect on each other. He also ascertained that those mutually non-inhibitive strains can, by certain methods of selection and testing, be isolated and used in mixed cultures. Thus he provided a mixed culture of Rhizobia capable of inoculating the seeds of plants belonging to several cross-inoculation groups. It is the product claims which disclose that mixed culture that the Circuit Court of Appeals had held valid.

We do not have presented the question whether the methods of selecting and testing the non-inhibitive strains are patentable. We have here only product claims. Bond does not create state of inhibition or of non-inhibition in the bacteria. Their qualities are the work of nature. Those qualities are of course not patentable. For patents cannot issue for the discovery of the phenomena of nature. See *Le Roy v. Tatham*, 14 How. 156, 175. The qualities of these bacteria, like the heat of the sun, electricity, or the qualities of metals, are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none. He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end. See *Telephone Cases*, 126 U.S. 1, 532, 533, 780, 781; *De Forest Radio Co. v. General Electric Co.*, 283 U.S. 664, 684, 685, 568, 569; *Mackay Radio & Tel. Co. v. Radio Corp.*, 306 U.S. 86, 94, 431; *Cameron Septic Tank Co. v. Saratoga Springs*, 2 Cir., 159 F. 453, 462, 463.

The Circuit Court of Appeals thought that Bond did much more than discover a law of nature, since he made an new and different composition of non-inhibitive strains which contributed utility and economy to the manufacture and distribution of commercial inoculants. But we think that that aggregation of species fell short of invention within the meaning of the patent statutes.

Discovery of the fact that certain strains of each species of these bacteria can be mixed without harmful effect to the properties of either is a discovery of their qualities of non-inhibition. It is no more than the discovery of some of the handiwork of nature and hence is not patentable. The aggregation of select strains of the several species into one product is an application of that newly-discovered natural principle. But however ingenious the discovery of that natural principle may have been, the application of it is hardly more than an advance in the packaging of the inoculants. Each of the species of root-nodule bacteria contained in the package infects the same group of leguminous plants which it always infected. No species acquires a different use. The combination of species

produces no new bacteria, no change in the six species of bacteria, and no enlargement of the range of their utility. Each species has the same effect it always had. The bacteria perform in their natural way. Their use in combination does not improve in any way their natural functioning. They serve the ends nature originally provided and act quite independently of any effort of the patentee.

There is, of course, an advantage in the combination. The farmer need not buy six different packages for six different crops. He can buy one package and use it for any or all of his crops of leguminous plants. And, as respondent says, the packages of mixed inoculants also hold advantages for the dealers and manufacturers by reducing inventory problems and the like. But a product must be more than new and useful to be patented; it must also satisfy the requirements of invention or discovery. *[333 U.S. 127, 132]* *Cuno Engineering Cor. v. Automatic Devices Corp.*, 314 U.S. 84, 90, 91, 40, 41, and cases cited; 35 U.S.C. 31, 35 U.S.C.A. 31, R.S. 4886. The application of this newly-discovered natural principle to the problem of packaging of inoculants may well have been an important commercial advance. But once nature's secret of the non-inhibitive quality of certain strains of the species of *Rhizobium* was discovered, the state of the art made the production of a mixed inoculant a simple step. Even though it may have been the product of skill, it certainly was not the product of invention. There is no way in which we could call it such unless we borrowed invention from the discovery of the natural principle itself. That is to say, there is no invention here unless the discovery that certain strains of the several species of these bacteria are non-inhibitive and may thus be safely mixed is invention. But we cannot so hold without allowing a patent to issue on one of the ancient secrets of nature now disclosed. All that remains, therefore, are advantages of the mixed inoculants themselves. They are not enough.

Since we conclude that the product claims do not disclose an invention or discovery within the meaning of the patent statutes, we do not consider whether the other statutory requirements contained in 35 U.S. C. 31, 35 U.S.C.A. 31, R.S. 4886 are satisfied.

Reversed.

**Mr. Justice FRANKFURTER, concurring.**

My understanding of Bond's contribution is that prior to his attempts, packages of mixed cultures of inoculants presumably applicable to two or more different kinds of legumes had from time to time been prepared, but had met with indifferent success. The reasons for failure were not understood, but the authorities had concluded that in general pure culture inoculants were alone reliable because mixtures were ineffective due to the mutual inhibition of the combined strains of bacteria. Bond concluded that there might be special strains which lacked this mutual inhibition, or were at all events mutually compatible. Using techniques that had previously been developed to test efficiency in promoting nitrogen fixation of various

bacterial strains, Bond tested such efficiency of various mixtures of strains. He confirmed his notion that some strains were mutually compatible by finding that mixtures of these compatible strains gave good nitrogen fixation in two or more different kinds of legumes, while other mixtures of certain other strains proved mutually incompatible.

If this is a correct analysis of Bond's endeavors two different claims of originality are involved:

- (1) the idea that there are compatible strains, and
- (2) the experimental demonstration that there were in fact some compatible strains.

Insofar as the court below concluded that the packaging of a particular mixture of compatible strains is an invention and as such patentable, I agree, provided not only that a new and useful property results from their combination, but also that the particular strains are identifiable and adequately identified. I do not find that Bond's combination of strains satisfies these requirements. The strains by which Bond secured compatibility are not identified and are identifiable only by their compatibility.

Unless I misconceive the record, Bond makes no claim that Funk Brothers used the same combination of strains that he had found mutually compatible. He appears to claim that since he was the originator of the idea that there might be mutually compatible strains and had practically demonstrated that some such strains exist, everyone else is forbidden to use a combination of strains whether they are or are not identical with the combinations that Bond selected and packaged together. It was this claim that, as I understand it, the District Court found not to be patentable, but which, if valid, had been infringed.

The Circuit Court of Appeals defined the claims to 'cover a composite culture in which are included a plurality of species of bacteria belonging to the general *Rhizobium* genus, carried in a conventional base.' 7 Cir., 161 F.2d 981, 983. But the phrase 'the claims cover a composite culture' might mean 'a particular composite culture' or 'any composite culture.' The Circuit Court of Appeals seems to me to have proceeded on the assumption that only 'a particular composite culture' was devised and patented by Bond, and then applies it to 'any composite culture' arrived at by deletion of mutually inhibiting strains, but strains which may be quite different from Bond's composite culture.

The consequences of such a conclusion call for its rejection. Its acceptance would require, for instance in the field of alloys, that if one discovered a particular mixture of metals, which when alloyed had some particular desirable properties, he could patent not merely this particular mixture but the idea of alloying metals for this purpose, and thus exclude everyone else from contriving some other combination of metals which, when alloyed, had the same desirable properties. In patenting an alloy, I assume that both the qualities of the product and its specific composition would need to be specified. The strains that Bond put together in the product which he patented can be specified only by the

properties of the mixture. The District Court, while praising Bond's achievement, found want of patentability. The Circuit Court of Appeals reversed the judgment of the District Court by use of an undistributed middle—that the claims cover a 'composite culture'—in the syllogism whereby they found patentability.

It only confuses the issue, however, to introduce such terms as 'the work of nature' and the 'laws of nature.' For these are vague and malleable terms infected with too much ambiguity and equivocation. Everything that happens may be deemed 'the work of nature,' and any patentable composite exemplifies in its properties 'the laws of nature.' Arguments drawn from such terms for ascertaining patentability could fairly be employed to challenge almost every patent. On the other hand, the suggestion that 'if there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end' may readily validate Bond's claim. Nor can it be contended that there was no invention because the composite has no new properties other than its ingredients in isolation. Bond's mixture does in fact have the new property of multi-service applicability. Multi-purpose tools, multivalent vaccines, vitamin complex composites, are examples of complexes whose sole new property is the conjunction of the properties of their components. Surely the Court does not mean unwittingly to pass on the patentability of such products by formulating criteria by which future issues of patentability may be prejudged. In finding Bond's patent invalid I have tried to avoid a formulation which, while it would in fact justify bond's patent, would lay the basis for denying patentability to a large area within existing patent legislation.

**Mr. Justice BURTON, with whom Mr. Justice JACKSON concurs, dissenting.**

On the grounds stated by the Circuit Court of Appeals the judgment should be affirmed.

When the patentee discovered the existence of certain strains of bacteria which, when combined with certain other strains of bacteria, would infect two or more leguminous plants without loss of their respective nitrogen-fixing efficiencies, and utilized this discovery by segregating some of these mutually non-inhibitive strains and [333 U.S. 127, 136] combining such strains into composite inoculants, we agree with Mr. Justice FRANKFURTER that the combinations so produced satisfied the statutory requirements of invention or discovery.<sup>5</sup> These products were a prompt and substantial commercial success, filling a long-sought and important agricultural need.

However, we do not agree that the patent issued for such products is invalid for want of a clear, concise description of how the combinations were made and used. The statutory requirement is that the inventor or discoverer—

<sup>5</sup> R.S. 4886, as amended, 46 Stat. 376, 53 Stat. 1212, 35 U.S.C. 31, 35 U.S.C.A. 31.

'shall file in the Patent Office a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery.

\* \* \*

No plant patent shall be declared invalid on the ground of noncompliance with this section if the description is made as complete as is reasonably possible.<sup>6</sup>

The completeness and character of the description must vary with the subject to be described. Machines lend themselves readily to descriptions in terms of mechanical principles and physical characteristics. On the other hand, it may be that a combination of strains of bacterial species, which strains are distinguished from one another and recognized in practice solely by their observed effects, can be definable reasonably only in terms of those effects. In the present case, the patentee has defined the combinations in terms of their mutually inhibiting and non-inhibiting effects upon their respective abilities to take free nitrogen from the air and place it in the soil. These combinations were discovered by observation of these effects—they are in practice identified by these effects for the commercial uses for which they are made. It is these effects that differentiate them from the other bacteria heretofore generally identified only as common members of the same species and not commercially valuable for use with leguminous plants of more than one of the groups named in the opinion of the Court. The identification of the strains stated in the patent is that which the patentee used in making the novel combinations of them that have been shown to be highly useful. There appears to be no question but that the petitioners are now able to identify and use the strains in the manner described in the patent. The record thus indicates that the description is sufficiently full, clear, concise and exact to enable persons skilled in the art or science to which this discovery appertains or with which it is most nearly connected to make, construct, compound and use the same. There is no suggestion as to how it would be reasonably possible to describe the patented product more completely. The patent covers all composite cultures of bacterial strains of the species described which do not inhibit each other's ability to fix nitrogen. Bacteriologists, skilled in the applicable art, will not have difficulty in selecting the non-inhibitive strains by employing such standard and recognized laboratory tests as are described in the application for this patent. The statute itself shows that Congress has recognized

the inherent difficulty presented. While this patent may not be technically a 'plant patent' in the precise sense in which that term is used in this Section, the references in the Section to the differences in descriptions expected in mechanical patents and plant patents obviously support the position here taken. An inventor should not be denied a patent upon an otherwise patentable discovery merely because the nature of the discovery defies description in conventional terms. Terms ordinarily unsuitable to describe and distinguish products that are capable of description and distinction by their appearance may be the most appropriate in which to describe and distinguish other products that are not reasonably possible of identification by their appearance, but which are easily identified by their effects when being sought for or described by those skilled in the art.

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<sup>6</sup> R.S. 4888, as amended, 38 Stat. 958, 959, 46 Stat. 376, 35 U.S.C. 33, 35 U.S.C.A. 33.