any property purchased in part or wholly out of such payments.' This more detailed provision was substituted for that of the earlier Act and was expressly made applicable to payments theretofore made. We think it clear that the provision of the later Act was intended to clarify the former rather than to change its import and it was with that purpose that it was made retroactive. . . . The provision of the Act of 1935 that the exemption should not apply to property purchased out of the moneys received from the Government shows the intent to deny exemption to investments, as was ruled in the *Trotter* case."

The questioned judgment must be

Affirmed.

HONOLULU OIL CORP. ET AL. *v.* HALLIBURTON ET AL.*

CERTIORARI TO THE CIRCUIT COURT OF APPEALS FOR THE NINTH CIRCUIT.

No. 466. Argued March 3, 6, 1939.—Decided April 17, 1939.

Claims 8 to 19 of Simmons' Patent No. 1,930,987 (claims 8 and 18 being method claims, and the others apparatus claims), for a method and apparatus for testing productivity of formations encountered in drilling oil and other deep wells by the rotary method, *held* invalid for want of invention. Pp. 559, 562.

98 F. 2d 436, reversed in part; affirmed in part.

WRITS of certiorari issued on cross-petitions, 305 U. S. 591, to review a decree which, reversing in part a decree of the District Court, 18 F. Supp. 58, held certain apparatus claims of a patent invalid and certain method claims valid and infringed.

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* Together with No. 479, *Halliburton et al.* v. *Honolulu Oil Corp. et al.*, also on writ of certiorari to the Circuit Court of Appeals for the Ninth Circuit.

Mr. A. W. Boyken, with whom *Mr. A. J. Hill* was on the brief, for Honolulu Oil Corp. et al.

Messrs. Leonard S. Lyon and *William H. Davis,* with whom *Messrs. Frederick S. Lyon, Henry S. Richmond,* and *Ben F. Saye,* for Halliburton et al.

MR. JUSTICE BUTLER delivered the opinion of the Court.

This suit presents questions of validity and infringement of Patent No. 1,930,987 applied for February 10, 1926 by Simmons and, after assignment, issued October 17, 1933, to Halliburton. It is for a method and apparatus for testing productivity of formations encountered in oil and other deep wells drilled by the rotary method.

The writs were granted, on petition of defendants Honolulu Oil Corporation, Ltd. et al. and cross-petition of plaintiffs Halliburton, et al., to review a decree [1] of the circuit court of appeals for the ninth circuit holding that the method claims are valid and infringed and to that extent reversing a decree [2] of the district court of southern California holding that the method and apparatus claims are invalid.

There was an earlier suit for infringement of the same patent brought by these plaintiffs in the federal court for the eastern district of Texas against other defendants. That court sustained the patent and found it infringed. The circuit court of appeals for the fifth circuit reversed.[3] It held the method claims invalid for lack of invention and that, while the apparatus claims may define a simplifying improvement upon which a combination patent might rest, the apparatus was not of such character as to be infringed by the accused tool of defendants.

[1] 98 F. 2d 436.
[2] 18 F. Supp. 58.
[3] 88 F. 2d 270.

In recent years rotary drilling has been widely used in sinking deep oil wells. Boring is done by rotation of a bit attached to a steel pipe which when so used is called a "drill stem." A smaller bore, called "rat-hole," sometimes precedes, and is reamed out to obtain, the full size hole. To aid operation, drilling fluid (mud-laden water) is pumped into the upper end of the drill stem and escapes into the well at high velocity through holes in the bit. It rises through the space between the pipe and the earth walls of the well and carries to the surface cuttings made by the bit. It holds back and seals the penetrated formations. Hydrostatic pressure of the drilling fluid is very great and the fluid in a penetrated formation will not flow into the well unless it is under greater pressure. It is often desirable to secure a sample of the fluid within a stratum in the bottom of the well without removing the drilling fluid. The patent in suit is for a method and apparatus intended to accomplish that purpose.

The method claims are 8 and 18. Claim 8 is as follows: "A method of testing the productivity of a formation encountered in a well containing drilling fluid, which includes lowering an empty string of pipe into the well through the drilling fluid to adjacent the formation, the pipe carrying a packer [4] and having a valved inlet at its lower end which is closed while the pipe is being lowered, setting the packer above the formation to seal off the drilling fluid from the formation, opening the valved inlet after the packer is set to permit cognate fluid [5] from the formation to enter the pipe, closing the valved inlet against the entrance of fluid from the well by movement of the pipe, raising the pipe so closed to remove an en-

[4] Webster's New International Dictionary, 2nd ed., 1935: "*packer* . . . A device to pack the space between the wall of a well and the pipe or between two strings of pipe in a well."

[5] That is, oil, gas, water, or other fluid encountered in formations penetrated by the bit.

trapped sample and the packer from the well." Claim 18 is printed in the margin.[6]

The apparatus claims in suit are 9 to 17 inclusive and 19. Claim 15 is typical: "Apparatus for testing the productivity of a formation encountered in a well containing drilling fluid, comprising a single empty string of pipe to be lowered into the well through the drilling fluid to adjacent the formation to be tested, a packer lowered into the well by said string of pipe for sealing off the drilling fluid from the formation to be tested, said packer adapted to be positively pressed against the walls of the formation to seal off the same, means at the lower end of said string of pipe to receive fluid from said formation including an inlet opening into said pipe below said packer and a valve structure for controlling the inlet, said valve structure having a relatively stationary part connected to the packer and a relatively movable part connected to the pipe."

Sustaining the claims in suit, the district court for eastern Texas found: Plaintiffs have a large business under the patent in suit. Prior to the discovery there was no apparatus or method in use for testing productivity of formations in wells containing drilling fluid except by putting in a casing and removing the fluid. This patent

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[6] "18. A method of testing the productivity of a formation encountered in a well containing drilling fluid involving the insertion of only a single string of pipe into the well to make a test, which includes lowering a test string into the well through the drilling fluid with a packer carried by the string and a valve inlet at the lower end of the string closed against the entrance of fluid from the well, setting the packer above the formation and opening the valve to permit cognate fluid from the formation to enter the inlet, closing the valve to prevent the subsequent entrance of fluid from the well through the inlet and releasing the packer, and raising the test string with the inlet closed against entrance of fluid from the well to remove an entrapped sample."

first disclosed testing apparatus and method requiring only a single string of pipe.

In this suit the trial court found: The Franklin Patent No. 263,330, dated August 29, 1882, anticipates both the method and apparatus covered by the patent in suit. The use of a packer is necessarily implied from the language of the Franklin patent. Without one, that device could not perform the functions attributed to it. Plainly, it may be used as a tester; for by its use the contents of the producing stratum, sealed off from the rest of the well and unimpeded in its entry into the rat-hole by pressure of the rotary mud, can be brought undiluted to the surface by a mechanism almost duplicating that shown by the patent in suit. A packer to separate one stratum of the oil well from another is old in the art.

And it also found: The Cox Patent No. 1,347,534, dated July 27, 1920, and the Edwards Patent No. 1,514,-585, dated November 4, 1924, substantially disclose the method and device claimed in the patent in suit. The object of these patents, like that of the one in suit, was to ascertain productivity of the stratum being drilled. There was no actual commercial use of the device disclosed and claimed in the patent in suit. It was impractical, due to difficulty in operating at increased length. The inventor himself was employed to devise improvements in the valve structure. If valid at all, the patent must be restricted to its precise form. The method claims are invalid for want of invention. In important respects, defendants' devices differ in operation from the device disclosed and claimed by the patent in suit; they are not infringements of it.

And that court decreed that as to all claims in suit, the patent is invalid.

The opinion of the circuit court of appeals for the fifth circuit considers the questions of invention here involved. In substance, it says:

Method claim 18, taken as typical, assumes familiar apparatus and claims a monopoly on a new use of the old apparatus to achieve a result in a better way. That apparatus includes a single string of pipe lowered into the well, a packer on the string, and a valve at the lower end. These simple and well-known elements are to be used by lowering the pipe into the well with the valve closed against the drilling fluid until the packer is set, then by opening the valve to admit cognate fluid below the packer, then by closing the valve so as to prevent the drilling fluid from entering when the packer is released and the pipe drawn up with its contents. No novelty and certainly no invention can be claimed for the method.

Packers and pipes with valves in them have long been in use to get what is below the packer free from what is above and without removing what is above. Whether a large quantity from a finished well or a simple sample from an unfinished well does not materially alter the method. Water has always been encountered in oil wells; the drilling fluid is only very muddy water voluntarily put and kept in the well for special reasons. Expansible and removable packers with pipes through them to reach the oil, gas, or other desired fluid beneath and rat-hole packers set by the weight of the pipe pressing them down and removable by simply lifting them are shown in earlier patents.[7]

The simplicity of the method in suit along with all its operations, was reasonably disclosed in the old patent to Franklin. There is the single pipe with a packer mentioned, but function esteemed so familiar as to need no emphasis, capable of being lowered into and withdrawn from a well, with the entrance into or escape from the pipe

[7] The opinion refers to Stewart, No. 171,589, December 28, 1875; Stewart, No. 230,080, July 13, 1880; Koch, No. 208,610, October 1, 1878; Bloom, No. 785,933, March 28, 1905; McCready, No. 1,522,197, January 6, 1925; and Cooper, No. 1,000,583, August 15, 1911.

to be controlled by a valve operated from above while the pipe is lowered or withdrawn. The importance of Franklin to this method claim is that he describes the use of a packer on a single string of pipe with a valve in the pipe in the very operation of putting them in and taking them out of the well. Franklin discloses a packer. Evidently one must be used for without it oil would not flow through the pipe as desired and there would be no use of the valve to control the flow. The packer is necessary to prevent escape of gas and to build up pressure to make the oil flow.

Franklin did not intend to get a sample by raising the pipe, but intended to keep from getting a sample by making the valve a leaky one that would let the contents escape as the pipe is raised. He expected to get what was below by natural flow just as Simmons, applicant for the patent in suit, says that is to be preferred. It would be no invention to substitute a valve that would not leak for one that was intended to and does leak on withdrawal. It would be no invention to use the Franklin device to sample a well instead of using it to flow the well. Especially after the disclosure of Cox and Edwards in the art of testing by sample taken through the drill stem with their somewhat complicated devices, recurrence for this new use to what is in substance the simple apparatus of Franklin ought not to be the foundation for the broad method claims here put forth. While perhaps not anticipated, they involve no such invention as entitles to monopoly.

The apparatus claims have a different status. They propose a new machine to better accomplish the useful result. They were rewritten to state for the first time that only a single string of pipe is to be used. In view of the oil well art, the omission of the Edwards second pipe to maintain circulation involves no such invention as to give a monopoly of all single string testers as is here

claimed. It may be a simplifying improvement on which to rest a combination patent but it is not a basic and pioneer invention. Positive pressure of the packer against the well walls, also written into the claims, appears to refer to the weight of the pipe on the rat-hole packer, but that is the way a rat-hole packer has always worked. The claims in suit can not be sustained in all their breadth but must be limited to the form of the apparatus disclosed.

The circuit court of appeals for the ninth circuit, upon considerations in substance the same as those suggested in the opinion of the circuit court of appeals for the fifth circuit, held that the apparatus claims of the patent in suit were anticipated by the patent to Franklin. But, holding that invalidity of apparatus claims does not negative discovery of method or process, that court in substance said:

The Franklin patent directs the pipe to be lowered into the well and the valve to be operated by movement of the pipe so as to control the flow of oil. It teaches that the tube can be kept empty by closing the valve while it is being lowered and that it should be closed prior to its removal. The device is to be used in a flowing well which, of course, contains no drilling fluid. At the time of that patent the rotary method of drilling was unknown. Its purposes were to provide a method of keeping the tubing closed while being lowered into or removed from the well and means of temporarily closing the tubing to allow the gas in the well to obtain sufficient head so that the well would flow. There is disclosed no use for taking entrapped samples from unfinished wells containing drilling fluid. There is no suggestion of this last step of the patented process; the device was evidently intended to be permanently attached to the tubing of the well.

Simmons, applicant for the patent in suit, faced the problem of providing a method of testing an oil well with-

out removing hydrostatic pressure necessary for support of the formation in question. He met it by a method operating so quickly that the suspension of the circulation of drilling fluid was not substantially greater than that frequently necessary in drilling operations. Franklin neither considered nor solved this problem.

The Simmons discovery constituted invention. It disclosed what had not been thought possible in the art, that is, that such a device could be set in a well containing drilling fluid not in circulation long enough to make the test; it substituted a much better process than had been in use. The discovery was that a well could be safely tested by lowering a single string of pipe equipped with a valve packer and strainer and that it was not necessary to set the casing permanently and bail out the drilling fluid; or, if a test were attempted without permanently setting the casing, it was not necessary to provide an extra string of pipe for circulation of the drilling fluid.

1. Plaintiffs, insisting that the apparatus claims are not invalid for lack of invention, emphasize the fact that the Franklin apparatus was intended to be used to govern flow of a finished well and not for testing productivity of formations encountered in drilling; they maintain that it is not adapted to the last mentioned use without significant changes and they suggest that even a very slight change is enough to give patentability to the changed apparatus if the change is foreign to the purposes of the Franklin apparatus and dictated by those of the apparatus in suit. They say that the essential features of the latter, not found in the Franklin patent, are a packer so related to the inlet that it may seal off the formation to be tested from the hydrostatic pressure of the mud-laden fluid standing in the well during the testing operation, a valve so positioned with respect to the packer inlet that when closed it will entrap the entire flow of the cognate fluid to result from natural pressure in the formation

when relieved from pressure of the drilling fluid, and so constructed that it will hold and bring to the surface the entrapped sample uncontaminated and undiminished.

The specification of Franklin's patent states that his invention consists in providing a device which can be connected with the tubing of the well above a "packer." On ample evidence, the trial and appellate courts found that packers to separate the producing strata from the others were old in the art, and that the use of a packer, substantially as the same exists today, is necessarily implied from the language of the Franklin patent. Detailed description by Franklin was unnecessary. *Loom Co.* v. *Higgins,* 105 U. S. 580, 586.

Franklin's specification states that the device containing the valve should be "preferably . . . above the packer" and that "it may be placed deep in the well and thereby obtain considerable advantage." This indicates a valve just above the packer as is true with respect to the patent in suit. But even assuming the contrary, in view of prior art as disclosed by the Cox and Edwards patents, the location of the valve as indicated by the patent in suit is mere mechanical contrivance and not invention. *Hollister* v. *Benedict & Burnham Mfg. Co.,* 113 U. S. 59, 73.

It is assumed, as claimed by plaintiffs, that the valve of the Franklin device was made so that it would let the contents of the pipe escape while it was being taken out of the well. But by mere substitution of a tight valve for a leaky one the device would be made to hold and bring up samples from the formation below the packer. The difference between the Franklin valve, leaking while being drawn from the well, and that of the patent in suit, purposely made to close tightly, is not an essential or patentable element.

In wells where there exists natural pressure in the formation below the packer sufficient to force the fluid to

the surface, either device, the Franklin or the one in suit, may be used to control flow of the well and so disclose the productivity of that stratum. It is equally plain that, in the absence of adequate pressure to carry to the surface, the Franklin device with a valve effectively closed would, if operated in accordance with the method claimed in the patent in suit, similarly receive, hold, and bring to the surface samples from the formation.

The apparatus claims are invalid.

2. As used in the statute,[8] "useful art" includes method which in this case is used interchangeably with process; "machine" includes apparatus.[9] Having held the apparatus not new, we come to the question whether claims 8 and 18 cover any new method or process.[10] These claims relate to "a method of testing." The claims relating to the device call it an "apparatus for testing." In the method claims [11] and in some relating to apparatus,[12] the phrases just quoted are followed by identical words: "the productivity of a formation encountered in a well containing drilling fluid." [13] The elements to be employed in taking the steps constituting the method are essentially the same as those constituting the apparatus. The process consists of "lowering an empty string of pipe," "setting the packer," "opening the valved inlet," "closing the valved inlet," "raising the pipe so closed to remove an entrapped sample and the packer from the well." The result to be achieved by the method claimed to be new is precisely the same as that for the attainment of which the apparatus found to be old was contrived.

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[8] 35 U. S. C. § 31.

[9] *Corning* v. *Burden*, 15 How. 252, 267.

[10] See *Risdon Locomotive Works* v. *Medart*, 158 U. S. 68, 77, 79. *Expanded Metal Co.* v. *Bradford*, 214 U. S. 366, 383. *Tilghman* v. *Proctor*, 102 U. S. 707.

[11] Claims 8 and 18.

[12] Claims 13, 14, 15, 16, 17, 19.

[13] Footnote on opposite page.

[13] To show identical subject matter in the two sets of claims, defendants present an analysis of method claim 18 and apparatus claim 19 in parallel arrangement as follows:

18.	19.
A method of testing the productivity of a formation encountered in a well containing drilling fluid involving	An apparatus for testing the productivity of a formation in a well containing drilling fluid, comprising
the insertion of *only a single string of pipe* into the well to make a test,	*a string of pipe*
which includes lowering *a test string* into the well through the drilling fluid	[*a string of pipe*] to be lowered into the well through the drilling fluid to adjacent the formation . . . and to be raised out of the well to remove the entrapped sample, . . .
with *a packer* carried by the *string* and a *valve inlet* at the lower end of the *string* closed against the entrance of fluid from the well,	*a packer* carried by *the pipe* as the pipe is lowered into the well . . . *an inlet* to *the pipe* communicating with the well below the point at which the *packer* seals off the well,
setting *the packer* above the formation . . .	[*the packer is*] adapted to be seated by manipulation of *the pipe* to seal off the well above the formation, *said packer* adapted to be positively pressed against the walls of the formation to seal off the same,
closing *the valve* to prevent the subsequent entrance of fluid from the well through *the inlet* and releasing *the packer,* and raising the test string with the inlet closed against entrance of fluid from the well to remove an entrapped sample.	and means for controlling *the inlet* to permit fluid from the formation to enter *the pipe* while *the packer* is set and to prevent fluid from entering *the pipe* after *the packer is released* and *the pipe* is being raised out of the well [to remove the entrapped sample].

As already shown the Franklin apparatus served to bring out uncontaminated the oil yielded by the stratum below the packer. The method practiced by its use includes in the same order all the steps, except the last one, that constitute the process in question. That step is the raising of the pipe containing the entrapped sample. As the Franklin device was to control flow and not to test productivity of strata reached before completion of wells, the final movement to be taken in the process under consideration was not involved or described. But that movement is substantially disclosed by the Cox and Edwards patents. No discussion, in addition to the convincing exposition by the circuit court of appeals for the fifth circuit, is required to show that the method claimed in suit was clearly indicated in the prior art. It cannot reasonably be held that anything more than mechanical skill of men familiar with known methods of obtaining oil from formations below packers would be required to suggest the raising of the pipe containing fluid entrapped and held by effective closing of the valve.

The method claims are invalid.

The part of the decree of the circuit court of appeals brought up by defendants' petition is reversed. The part brought up by plaintiffs' petition is affirmed. The decree of the district court is affirmed.

No. 466, reversed.
No. 479, affirmed.

The CHIEF JUSTICE took no part in the consideration or decision of this case.