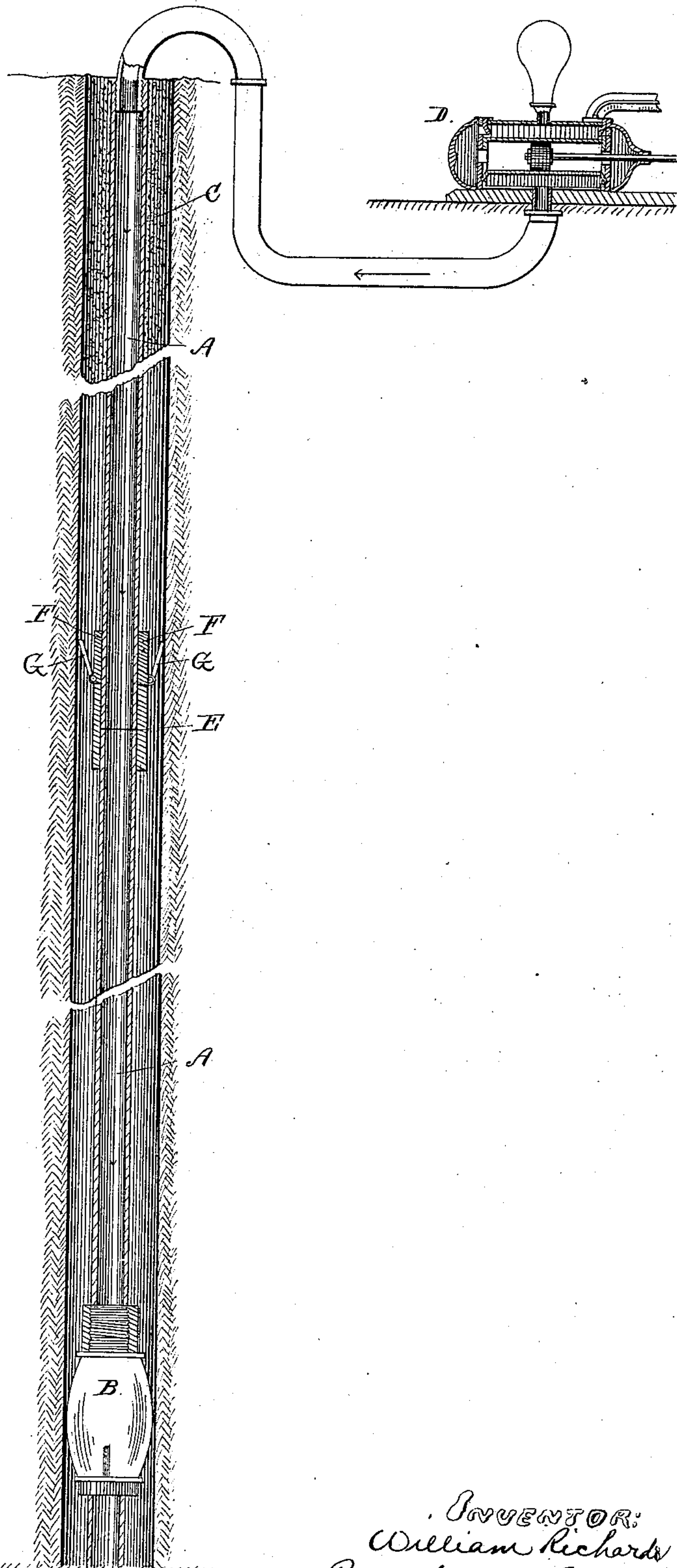


(No Model.)

W. RICHARDS.
EXTRACTING OIL FROM OIL WELLS AND OIL BEARING ROCK AND TUBE
THEREFOR.

No. 308,522.

Patented Nov. 25, 1884.



Attest:

E. Hough
C. E. Jones.

INVENTOR:
William Richards
By *Chas J. Gooch*
attorney

UNITED STATES PATENT OFFICE.

WILLIAM RICHARDS, OF BALLTOWN, PENNSYLVANIA.

EXTRACTING OIL FROM OIL-WELLS AND OIL-BEARING ROCK AND TUBE THEREFOR.

SPECIFICATION forming part of Letters Patent No. 308,522, dated November 25, 1884.

Application filed May 3, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM RICHARDS, a citizen of the United States of America, residing at Balltown, in the county of Forest and State of Pennsylvania, have invented certain new and useful Improvements in Tubes for Oil-Wells and Methods of Extracting Oil from Oil-Bearing Rock, &c., of which the following is a specification, reference being had therein to the accompanying drawing.

This invention consists in certain improvements in the construction of tubes for oil-wells, and in the method of extracting oil from oil-bearing rock or earth and increasing the productivity of oil-wells, as hereinafter described and claimed.

The drawing represents a sectional elevation of a well with my improved apparatus in position therein.

In the oil region each lease or holding has thereon several wells, through which the oil from the rock or earth in which such wells are bored or drilled is extracted. The rock within which the oil is contained is honey-combed, and the usual practice is to pass torpedoes or nitro-glycerine cartridges down the wells to and explode the same against the oil-bearing rock, and thus shatter the same and release the oil and gas therein, which done the gas forces the oil up the well, from which it flows to the usual tanks. This method is attended with great danger to the operatives, and also injury to the plant and to the oil, by reason of premature explosions, which in practice are common, as when such explosions occur it frequently happens that the casing and the plant are destroyed, and the oil in the well is spoiled by the admixture therewith of the debris of the casing and well appliances. So long as there is sufficient gas within the well to force the oil upward the flow thereof will be free; but as the gas within the well is constantly escaping the flow of oil will correspondingly decrease, necessitating the further shooting of the well or shattering of the rock, with the attendant dangers, and the employment of suction devices, which are slow and tedious in their operation and do not result in the extraction of nearly all the oil contained within the well and oil-bearing rock.

My improvements are designed to avoid all the difficulties and dangers above mentioned,

and to secure the complete extraction from the oil-bearing rock of all the oil therein, and increase the production of wells without resorting to the employment of torpedoes, nitro-glycerine, or other explosives, or in any manner breaking up the rock or earth within which the oil is contained, and this I accomplish by supplying the excavation with air, gas, or fluids in such a state of compression that the oil contained in the rock shall be forced therefrom to and upward within the wells from which it is to be drawn, thereby supplying the excavation with an efficient substitute for the gas that has already escaped therefrom, and by which the upward flow of the oil was secured, insuring the more perfect extraction of the oil within the rock than can possibly be accomplished by the customary method of shooting the well and depending upon the action of the previously confined gas, on its liberation, to project the oil upward.

In order to accomplish the results above mentioned, I anchor within one of the wells of the series in the lease—that well which is nearest the center being the usual one used for the purpose—a tube, A, which is packed by a rubber or other suitable packer, B, and by sand, iron shavings, or other material, C, packed within the space between the outer face of the tube and the sides of the well.

D represents a force-pump of ordinary construction, which is suitably supported in position at any desired point, and has communication with the top of the tube A. By means of this force-pump D compressed air, gas, or some suitable fluid at a pressure of one thousand pounds per square inch is forced down the tube A, from the lower end of which it passes to the oil-bearing rock. By thus supplying the air, gas, or fluid to the excavation in such a highly-compressed state the whole of the oil within the crevices and fissures of the oil-bearing rock will be expelled therefrom without in any manner injuring the formation thereof, and the oil as it is thus forced out of the rock surrounding the well within which the tube A is anchored will, by the continued application to the rear thereof of the highly-compressed fluid or gas, be forced outward to the wells surrounding that in which the tube is anchored. By this means the whole of the oil is extracted from the rock without the danger

to the operatives, injury to the plant, and to the oil-bearing rock or earth, and risk of spoiling the oil, which are common when explosives are employed. The oil is extracted more cheaply and safely than is the case where explosives are employed, and more thoroughly than is possible by the present systems, as by forcing the highly-compressed air, &c., down one tube or well the oil is entirely extracted from the rock, the value of each lease or holding is enhanced, the flow of the oil through the wells in the lease surrounding that down which the compressed air, &c., is forced, is freer, and the production of wells is largely increased.

Above the coupling E, securing the sections of the tube, with its lower edge resting against and supported thereon, is a band or ring, F, which is secured to said tube A by welding, rivets, or in any other approved manner. To this band or ring F, and on opposite sides thereof, are connected by hinges or pivots the lower edges of valves G. These valves are each of a length somewhat in excess of the width of the space between the sides of the tube and the sides of the well, said valves while at rest extending outward from the tube at an angle thereto, as shown in the drawing. As the tube A is inserted within the well, said valves will readily slide along the sides of the well, as their tendency will at such time be to close inward. When the compressed air, &c., is forced down the tube A and passes out at the lower end thereof, a portion thereof will impinge against the lower part of the packer B, and would, were said valves absent, force said packer and the tube A to which it is connected upward out of the well; but immediately upon the compressed air, on its release from the tube, coming in contact with the packer and exerting an upward pressure thereon, said valves will engage with the sides of the well and rigidly hold the tube in position and prevent its upward movement, and thus afford a firm anchorage therefor.

Whenever it is found necessary to withdraw the tube from the well the supply of compressed air, &c., thereto is cut off, and the valves can be readily released from engagement with the sides of the well by passing a hooked rod down between the tube and the well, whereupon said tube can be drawn up. Two or any larger number of such valves may be hinged to the band or ring F, as found desirable; but two secured in position on opposite sides have been found sufficient to withstand the pressure of the compressed air, &c., and hold the tube securely in position within a well.

By the method and means above described the oil can be got out more rapidly, cheaply, and entirely than by the method and means heretofore employed, a continuous and uniform pressure is maintained on the oil-bearing rock, thus insuring a regular supply of oil, and parties can clean up very easily and quickly.

I am aware that oil-wells have been provided with two tubes, one connecting with the oil in the well, and that air has been forced down the other tube, so as to raise the oil up the tube connecting with the oil in such well; but in such arrangement no provision is made for securing the perfect extraction of the oil from the rock surrounding the well and all the wells of a lease or holding.

I am not aware that it has ever, before my invention, been contemplated to stop up the central well of the series in a lease or holding and place a single tube therein and force the oil at the bottom of such closed well and that in the rock in the same outward and away therefrom to and up the other wells in the lease simultaneously.

By my improvement the great loss of oil that results from the heretofore-practiced methods is avoided. As heretofore, when the force of the natural gas has become spent, a considerable quantity of oil remains within the rock surrounding the same, which is entirely lost, there being no practicable method in use at present for extracting the same and bringing it to the surface. Consequently the oil contained in a lease or holding is now never entirely removed.

Having thus described my invention, what I claim is—

1. The herein-described improvement in the art of extracting oil from oil-bearing rock and earth and forcing the same to and up a series of wells simultaneously by means of a single forcing apparatus, consisting, first, in anchoring a tube within the central well of a series or lease and packing the space between the lower end of said tube and the sides of the well, then connecting the upper portion of said tube with a force-pump, and finally forcing air, gas, or fluids in a highly-compressed state down said tube, continuing such high-pressure supply until the oil in the bottom of the well and rock surrounding the same is forced outward to and up the wells surrounding that in which the tube is, substantially as and for the purpose set forth.

2. The apparatus herein described for supplying compressed air, gas, or fluids to oil-bearing rock or earth, consisting of a tube provided with an ordinary packer, and anchored in position within a well, and an upwardly-moving valve or valves hinged to said tube, for the purpose of holding the same in position within the well against the upward pressure of compressed air, substantially as and for the purpose set forth.

3. The tube for oil-wells herein described, consisting of a tube, A, having a ring or band, F, rigidly secured thereto, and a valve or valves hinged to said ring, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

Witnesses: WILLIAM RICHARDS.

CHAS J. GOOCH,
E. P. HOUGH.