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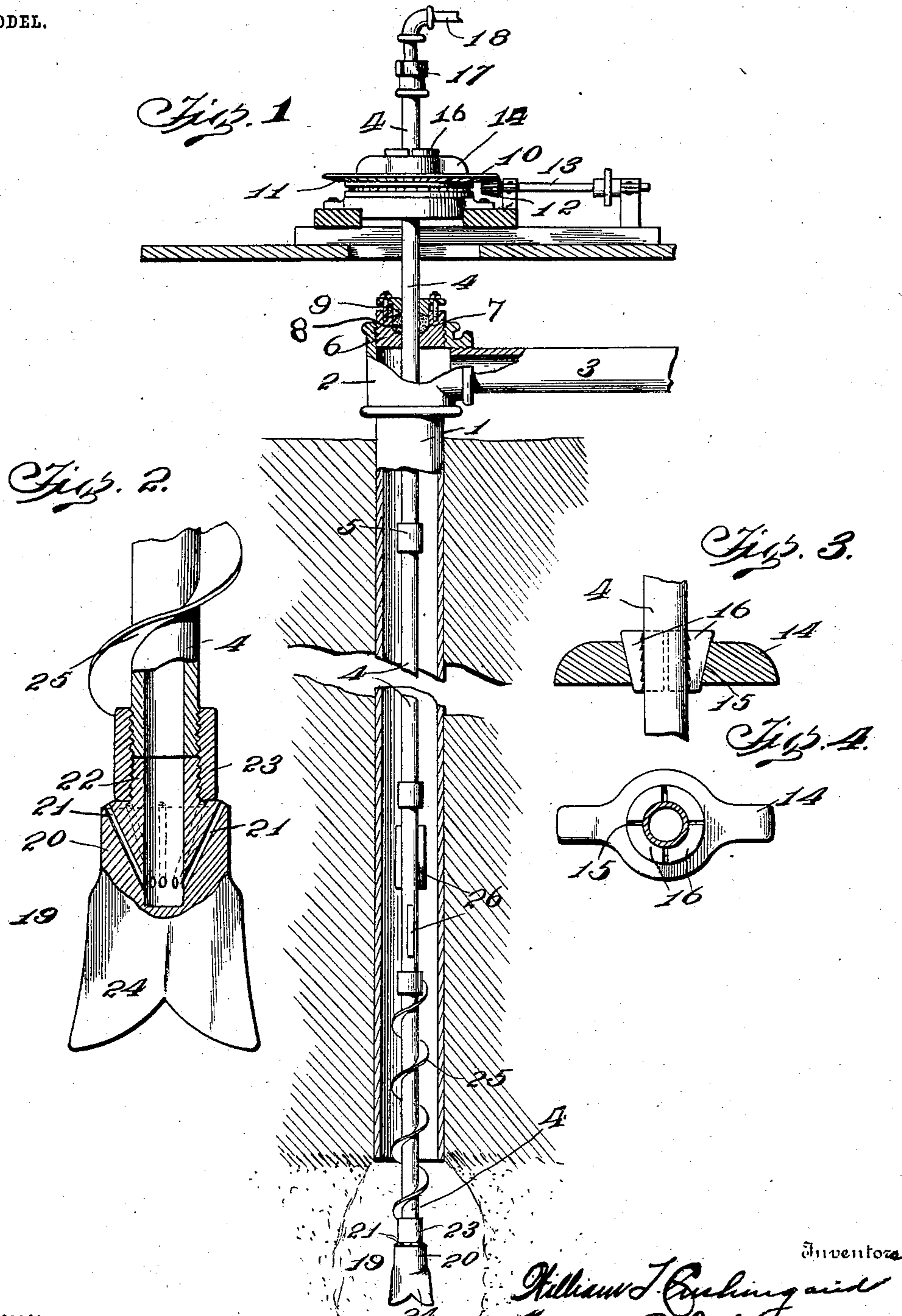
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APPARATUS FOR MAINTAINING A CONTINUOUS FLOW OF SAND CARRYING
OIL FROM WELLS.

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NO MODEL.



Witnesses

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MAINTAINING A CONTINUOUS FLOW OF SAND-CARRYING OIL FROM WELLS.

SPECIFICATION forming part of Letters Patent No. 762,808, dated June 14, 1904.

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To all whom it may concern:

Be it known that we, WILLIAM T. CUSHING and HORACE G. JOHNSTON, citizens of the United States, residing at Corsicana, in the 5 county of Navarro and State of Texas, have invented certain new and useful Improvements in Apparatus for Maintaining a Continuous Flow of Sand-Carrying Oil from Wells; and we do hereby declare the following to be a 10 full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in 15 apparatus for producing and maintaining a continuous flow of oil from wells in which the oil is mixed or laden with floating or quick sand or other foreign material, so as to prevent the sand or other foreign substances from 20 settling in the bore of the well and finally clogging the same.

It consists in means inserted in the bore of a well for agitating the materials passing upward through said well-bore and for supplying 25 compressed air, gas, or other fluids to assist in driving the oil to the surface.

The invention further consists in an apparatus comprising a rotatable pipe which extends into the casing of a well and carries agitating means which are moved within said casing and means for rotating the said pipe. 30

It also consists in an apparatus for causing the continuous flow of sand-carrying oils from a well made up of a well-casing, a hollow revolvable rod extending downwardly into said casing, a packing-gland surrounding the revolvable hollow rod or pipe and making a tight joint between the upper end of the casing and the said pipe, means for rotating the pipe, and 40 means for delivering air, gas, or the like under pressure to said rod, which is thereby led to the bottom of the well-bore, so as to assist in agitating the materials expelled from the well.

It also consists in certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a view, partially in elevation and partially in 50 section, of an apparatus for insuring the delivery of oil from an oil-well, the said apparatus being properly arranged with respect to the bore of said well. Fig. 2 is an enlarged detail view of the lower end of the oil agitating and forcing mechanism. Figs. 3 and 4 55 are detail views, respectively, in section and top plan of means for gripping the rotating pipe of the oil-producing mechanism, and thus securing the said pipe to means for turning it. 60

In some parts of certain great oil-producing regions the oil is found mixed with fine or quick sands and other foreign materials which have been the cause of stopping the production of many good wells. In these wells the 65 production of oil when the wells were first sunk was maintained for a while by the pressure of the gases accompanying the oil. After the pressure of such gases has diminished somewhat there is a tendency for the fine sands 70 carried by the oil to settle in the bore of the wells, clogging the same and finally completely stopping them. In such instances it has been common heretofore to remove the well-casing and clean the same, removing the stoppage 75 before oil could be obtained from the well. This is an expensive method and has made it impractical to keep the wells in a producing condition in many localities.

The present invention is designed to supply 80 an apparatus of a simple and practical character which is capable of maintaining wells containing such quicksands in a continuous state of production, preventing the possibility of any clogging or stoppage by the settling of the sand or other foreign materials. 85

Referring to the accompanying drawings, a practical manner of carrying our invention into effect will be found illustrated, in which 1 designates a casing for the bore of a well, 90 the said casing extending from the oil at the bottom to a suitable distance above the surface of the ground. The upper end of the casing 1 is provided with a suitable head, which is preferably a T 2. The T connects 95 the well-casing 1 with a lateral delivery-pipe

3 for leading the oil to any suitable point—as, for instance, to tanks, reservoirs, and the like.

Extending into the well-casing 1 from the upper end thereof is a pipe 4 made of a suitable length to reach to the oil beyond the lower end of the casing 1. The pipe 4 can of course be made of any suitable length by securing enough sections of piping together by the usual pipe-couplings 5 to enable the said pipe to reach to the bottom of the well-bore. At the point where the pipe 4 extends out of the upper end of the T 2 a suitable plug and packing-gland is provided. The plug 6 is provided with external screw-threads, so that it may be snugly screwed into place in the upper end of the T, the said plug being also provided with a central bore through which the pipe 4 passes. A recess 7 is also provided in the plug for receiving suitable packing material 8, the packing being held in position by a gland-cap 9, which is drawn downwardly upon the packing material by suitable screw bolts and nuts, as shown in Fig. 1 of the drawings. The pipe 4 is preferably turned quite smooth and polished, if desired, at the point where it is engaged by the packing-gland, so that a very tight joint can be made at this place.

The pipe 4 projects a sufficient distance above the packing-gland to be engaged by a proper mechanism for rotating it. This mechanism, as shown in the drawings, may consist of a rotating table 10, having a central aperture and provided with a gear 11, which is engaged by a beveled pinion 12, carried by a shaft 13. Any suitable source of power may be connected with the shaft 13 for imparting movement to it and therefrom to the plate 10.

The plate or table 10 may be mounted on any suitable bearings for permitting of its proper rotation. The pipe 4 is preferably rigidly secured to the table 10 by suitable gripping means. In the present instance the gripping mechanism comprises a bridging-piece 14, which extends across the aperture in the table 10 and is secured thereto so as to turn with it. The piece 14 is formed with a tapering aperture 15, through which the pipe 4 passes, and a series of wedge-shaped segmental gripping-blocks are placed in said aperture around the pipe 4. The gripping-blocks 16 are preferably serrated upon their inner surfaces for gripping the surface of the pipe 4. In this simple manner the pipe may be driven by rotating the table 10.

The upper end of the pipe 4 extends a short distance above the table 10 and is connected by a swivel-joint 17, of any suitable type, with a stationary pipe 18. The pipe 18 is connected with any suitable source of pressure, preferably an air-compressor of an ordinary type, such as may be commonly found on the market. By this means air, gases, or liquids may be forced downwardly through the pipe 4

while the same is rotated by means of the table 10.

The tube 4 carries at its lower end a suitable bit or point 19 and is preferably so constructed that it may in addition to being capable of agitating the sand in the oil be also capable of directing the air fed through the pipe 4 upwardly through the bore of the well. For this purpose we construct the point 19 with a body portion 20, provided with upwardly and outwardly inclined air-passages 21, so as to lead the air from the inside of the pipe 4 and direct it back through the casing 1. The point is also formed with a hollow externally-threaded shank or stem 22, which may be connected by means of a pipe-collar 23 with the lower end of the pipe 4. The lower end of the point may be formed like a fish-tailed bit, as at 24, so that the said point will assist in the agitation of the materials carried by the oil. The pipe 4 also carries other agitating means—as, for instance, a spiral fin 25, arranged around the lower end of the said pipe for a suitable distance. The pipe 4 may also be provided with laterally-projecting straight fins 26 at suitable intervals.

From the above description it will be evident what the operation of the device is, the oil and sand in the well being continually agitated and forced upwardly in the bore of the well by the rotation of the pipe 4, carrying its point, the fins 25 and 26, and also by the compressed air escaping through the passages 21 in the point or bit. In this manner all chance for the settling and collecting of fine quicksand within the casing 1 is effectually obviated, and the producing of the well may be extended indefinitely.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. An apparatus for facilitating the production of oil-wells, comprising hollow pressure-conducting agitating means projecting into the well, means for holding the said agitating means against longitudinal movement but permitting of its rotation, and a pressure-conduit in communication therewith.

2. An apparatus for assisting in the flow of oil-wells, comprising a hollow agitating and pressure-delivering pipe adapted to be connected with a source of pressure-supply, and held against longitudinal movement, but capable of rotation, and means for rotating the said pipe in the bore of the well for agitating and assisting materials in passing therefrom.

3. An apparatus for insuring the flow of sand-laden oil from oil-wells, comprising a combined agitating and pressure-delivering means, extending into the bore of the well and held against longitudinal movement therein, the said means being capable of directing the pressure upwardly through the well.

4. An apparatus for insuring the flow of sand-laden oils from wells, comprising a rota-

table pipe extending into the well, means for preventing vertical movement of said pipe, means for delivering air, gas or the like under pressure to said pipe, and means carried by the pipe for directing the same upwardly in the bore.

5. An apparatus for facilitating the flow of sand-laden oils from wells, comprising a rotatable pipe extending into the bore of the well, means for holding said pipe against vertical movement, a point or bit carried by the lower end of said pipe having upwardly-inclined discharge apertures or nozzles for directing air, gases or the like upwardly through the bore of the well, and means for supplying such air, gas or the like to the point under pressure.

6. An apparatus for facilitating the flow of sand-laden oils from wells comprising a well-casing forming a conduit leading from the well, a rotatable pressure-delivering pipe extending downwardly through the said well-casing, a packing-gland in said casing engaging said rotating pipe for forming a tight joint between the parts, means for gripping and rotating the pipe, the said means preventing the longitudinal movement thereof, and means carried by the pipe for agitating the materials passing through the casing in addition to the agitation produced by the pressure which is delivered through the rotating pipe.

7. An apparatus for facilitating the flow of sand-laden oils from wells, comprising a rotating blast-conducting pipe extending into the bore of the well, agitating means carried thereby, a turn-table mechanism for actuating the pipe, means carried by the table for gripping the pipe, comprising a bridging-plate having a tapering aperture, and taper-

ing wedge-blocks for gripping the pipe when forced into said tapering aperture around the same, substantially as described.

8. An apparatus of the character described, comprising a rotatable blast-conducting tube extending into the bore of the well, laterally-projecting fixed fins carried by the said tube for agitating the material passing through the bore of the well, spiral fins also carried by said tube and means for rotating the said tube, substantially as described.

9. An apparatus of the character described, comprising a revoluble pipe arranged to project into the bore of a well, an agitating bit or point carried by the lower end of the pipe, a spiral fin secured to the pipe, and lateral straight fins also carried by the pipe all for agitating the material in the bore of the well, substantially as described.

10. An apparatus of the character described, comprising a rotatable blast-conducting tube arranged to project into the bore of a well, means for connecting the upper end of the tube with a source of pressure, means to prevent longitudinal movement of said tube, a point carried by the lower end of the tube and formed with oblique upwardly-extending passages for directing the pressure from the tube backwardly up the well-bore, and means for rotating the said pipe, substantially as described.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

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Witnesses:

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