Feb. 6, 1934. W. W. BRYANT 1,946,304

OIL WELL APPARATUS

Filed Dec. 17, 1931

Fig. 3.

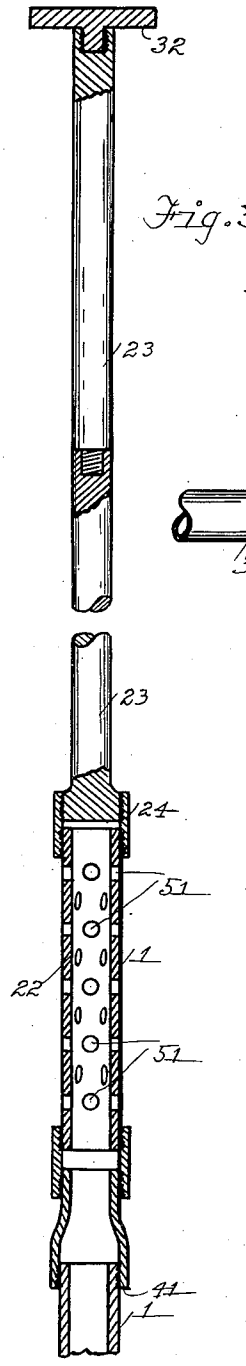


Fig. 1.

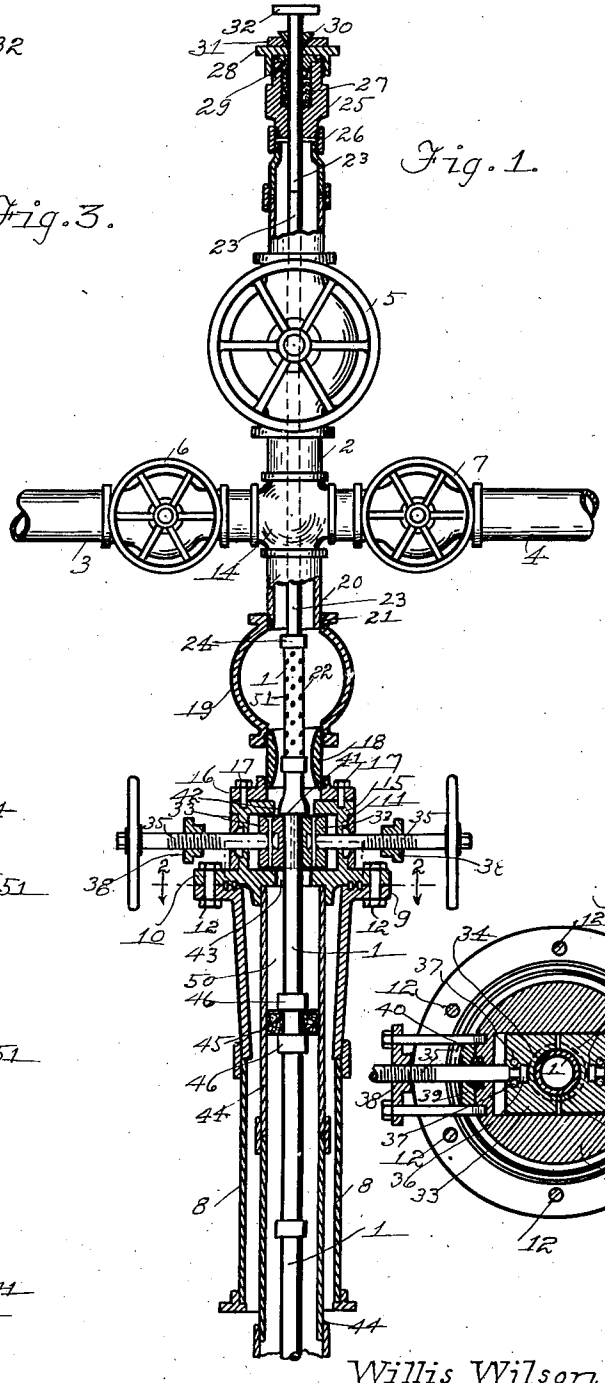


Fig. 2.

Witness:
O. C. Hedding

Inventor
Willis Wilson Bryant
By Rice and Rice
Attorneys

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OIL WELL APPARATUS

Willis Wilson Bryant, Chatsworth, Calif.

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Serial No. 581,631

16 Claims. (Cl. 166—14)

The present invention relates to oil well apparatus; and its object is to provide an improved apparatus of that character whereby the oil-delivering pipe or tubing may be raised or lowered without plugging the same or suspending or interfering with the flow of oil therethrough in the regular manner; and more particularly, to provide in such apparatus, having the usual oil-discharging head or "Christmas tree", means for thus raising or lowering the oil-pipe or tubing; and further, to provide means for holding such pipe or tubing in desired raised or lowered position; and further, to provide such apparatus and holding means with a downward tubular extension through which said pipe or tubing extends, provided with a dam or packing preventing gas from passing upwardly into the oil, etc.; and further, to provide such pipe or tubing with an upwardly extending rod having detachable sections for raising the pipe or tubing.

These and any other or more specific objects hereinafter appearing are attained by, and the invention finds preferable embodiment in, the structure and devices particularly described in the body of this specification and illustrated by the accompanying drawing forming part thereof, in which:

Figure 1 is an elevational view, partially in axial section, of an oil well pipe with discharge-controlling means and an embodiment of my invention applied thereto;

Figure 2 is a transverse sectional view thereof taken on line 2—2 of Figure 1; and

Figure 3 is an elevational view (enlarged) of the upper portion of said pipe with its strainer section and lifting rod extension secured thereto.

In the drawing is illustrated apparatus for oil wells and the like, comprising a pipe or tubing designated generally 1 through which the oil passes from the well and is discharged through vents or branching discharge pipes 2, 3, 4 controlled by suitable valves having the operating hand wheels 5, 6, 7 respectively. An upright tubular support 8 contains this pipe 1 and has at its top a radial flange 9 carrying on its upper side a device for holding said pipe in desired vertical position (as hereinafter explained), the circular bottom plate 10 of the casing 11 of said device being secured to flange 9 by bolts 12 passing through these parts, suitable packing rings 13 being interposed therebetween.

The discharge head or "Christmas tree" designated generally 14 (comprising the discharge pipes 2, 3, 4 and their controlling valves) is mounted on the upper side 15 of casing 11 by hollow threadedly-connected members or sections—the circular ring 16 secured as by bolts 17 to said upper end, the section 18 and the diametrically enlarged section 19 to which the lower hollow end 20 of the discharge head 14 is threadedly-connected at 21. The oil-carrying pipe 1 extends upwardly through the casing 11 and said sections 16, 18 and 19, spacedly therefrom, the oil being discharged from this pipe through the vents or holes 51 of the strainer section 22 and passing thence through the discharge head 14 and its valve-controlled branches.

I provide a rod extension for the oil pipe 1 comprising a required number of threadedly-connected sections 23, the lower one being connected to the pipe's strainer section 22 by a threaded collar 24, said rod extension passing upwardly through the vertical branch 2 of the discharge head 14.

Said branch is provided with a hollow extension 25 connected thereto by a threaded collar 26 and containing a packing or gland 27 with a compressing plate 29 secured in place by a threaded cap 28, carrying on its upper side a conical collar 30 seating in a corresponding depression in a collar 31 on the upper side of the cap 28. Suitable means for engaging the oil pipe's rod extension 23 for raising this pipe to desired position, are provided, so that the oil pipe may be adjusted to the vertical position and at the depth at which the oil will flow therethrough in the desired manner and to the best advantage.

Such means, as shown, is the top member 32 threaded into the uppermost section 23 of the rod extension. Suitable lifting tackle (not shown) may be connected to this top member. I provide suitable means for holding the oil pipe or tubing 1 in the vertical position to which it has been thus raised. In the particular form of such holding means illustrated in Figures 1 and 2, slidable clamp members 33 holdingly engage the pipe 1 on its opposite sides, having concave inner surfaces 34 contacting said sides. These members 33 are slid into and out of pipe-holding position by screws 35 whose heads 36 turnably engage between pins 37 on said members and which are threaded in the arms 38 of the casing 11 and pass through the plates 39, having compressible members 40 at their inner sides. The shoulder 41 of the pipe's strainer section 22, or threaded collars connecting pipe sections, may be brought to resting position on the upper sides of the clamp members 33 thus positively holding the pipe 1 in elevated position, the openings 42, 43 through the horizontal sides of the casing 11 being large

enough to permit the passing of said shoulders, etc. therethrough.

I provide a vertical tubular member 44 extending inside the support 8 and down into the well to a required depth, this member containing the oil pipe 1 spacedly therefrom, as shown in Figure 1. A suitable packing element 45 surrounds the oil pipe 1 and moves vertically therewith being held thereon as by collars 46. This packing member presses between oil pipe 1 and tubular member 44 closing the space 50 between them and preventing gas from passing up through said member 44 and through the opening 43, in the bottom plate 10 of the casing 11, etc. and thus into the stream of oil discharged through the head 14.

The apparatus is operated as follows to raise or lower the oil pipe 1 to a desired depth in the well and without suspending or interfering with the regular flow of oil through the discharge head or Christmas tree 14. The shoulder 41 of the oil pipe's strainer section 22 being in resting position on the clamp members 33 and the member 25 (which contains the gland 27) having been screwed on the top of the discharge head 14, the oil pipe extension rod (i. e. a sufficient number of its threadedly-connected sections 23) is pushed down inside the vertical arm 2 of the head 14 and the gland 27 and screwed into the strainer section 22 or its top collar 24 (as shown in Figure 3); the lifting tackle (not shown) being applied to the top member 32 of the extension rod and the clamp members 33 released from the pipe 1 and shoulder 41, the tackle is operated to lower the pipe 1 to the desired depth in the well, the packing member 45 sliding down with the pipe to prevent gas rising above it as hereinbefore explained, etc. The strainer section 22 now lowered into the tubular member 44 functions as it does in the section 19, the oil passing out of the strainer section into the space 50 between the pipe 1 and surrounding tubular member 44 and above the member 45, and through the openings 43, 42 through the casing 11 and through the discharge head 14.

By thus raising and lowering the pipe 1 (with its strainer section through which oil passes therefrom), to different positions, the best vertical position for the oil pipe may be ascertained, whereupon it may be clamped at some point in its length or in the length of its rod extension in that ascertained best position.

The extension rod being marked to indicate said position, the pipe 1 may be permanently secured therein by suitable supporting means. The process of lowering and raising the oil pipe to thus ascertain the depth at which oil will flow therethrough to the best advantage (with the tendency to change the oil and gas ratio) is thus carried on without removing the discharge head 14 or plugging the oil pipe with the attendant losses, dangers and inconvenience—and without suspending or interfering with the flow of oil from the discharge head in the regular manner. The strainer section 22 may be drawn out of the section 19 for cleaning the same, etc.

Means are provided for preventing the upper sections of the oil pipe or of its extension rod against unscrewing from lower sections (thus leaving such lower sections in the structure), such as providing looser or coarser or more readily released threaded-connections between lower sections than between the upper ones.

The invention being intended to be pointed out in the claims, is not to be limited to or by details of construction of the particular embodiment thereof illustrated by the drawing or hereinbefore described.

I claim:

1. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent through its side adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving the oil from its vent and having a discharge vent, the pipe being vertically movable in the casing; releasable means for holding the pipe in moved position.

2. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent through its side adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving the oil from its vent and having a discharge vent, the pipe being vertically movable in the casing; releasable means for holding the pipe in moved position; a member below the pipe's vent closing the space between the pipe and the casing.

3. In oil well apparatus: a vertically extending and vertically movable oil-delivering pipe including a portion having an oil vent adjacent the pipe's upper end; a tubular casing spacedly surrounding the pipe, receiving the oil from said vent and having at its upper end a lateral discharge vent and a discharge vent aligned with the pipe, said portion having a limited vertical movement with the pipe inside the casing; an extension rod aligned with the pipe and adapted to be secured to its upper end for moving the same vertically.

4. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving the oil from its vent and having at its upper end a lateral discharge vent and a discharge vent aligned with the pipe, the pipe being vertically movable in the casing; an extension rod aligned with the pipe and adapted to be secured to its upper end for moving the same vertically; releasable means for holding the pipe in moved position.

5. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving the oil from its vent and having at its upper end a lateral discharge vent and a discharge vent aligned with the pipe, the pipe being vertically movable in the casing; an extension rod comprising detachable sections aligned with the pipe and adapted to be secured to its upper end for moving the same vertically.

6. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving oil from its vent and having a discharge vent, the pipe being vertically movable in the casing; a hollow casing secured to the lower end of said tubular casing and containing releasable means for holding the pipe in moved position; a tubular casing spacedly surrounding the pipe and secured to the lower end of the casing containing said pipe-holding means.

7. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving oil from its vent and having a discharge vent, the pipe being vertically movable in the casing; a hollow casing secured to the lower end of said tubular casing and containing releasable means for holding the pipe in moved position; a tubular casing spacedly surrounding the pipe and secured to the lower end of the

casing containing said pipe-holding means; a member closing the space between the pipe and the last-mentioned casing.

8. In oil well apparatus; a vertically extending oil-delivering pipe having an oil vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving oil from its vent and having a discharge vent, the pipe being vertically movable in the casing; a hollow casing secured to the lower end of said tubular casing and containing releasable means for holding the pipe in moved position; a tubular casing spacedly surrounding the pipe and secured to the lower end of the casing containing said pipe-holding means, said pipe-holding means comprising clamp members slidably movable into holding engagement with the pipe's opposite sides.

9. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving oil from its vent and having a discharge vent, the pipe being vertically movable in the casing; a hollow casing secured to the lower end of said tubular casing and containing releasable means for holding the pipe in moved position; a tubular casing spacedly surrounding the pipe and secured to the lower end of the casing containing said pipe-holding means, said pipe-holding means comprising clamp members slidably movable into holding engagement with the pipe's opposite sides; screws for thus moving the clamp members.

10. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving oil from its vent and having a discharge vent, the pipe being vertically movable in the casing; a hollow casing secured to the lower end of said tubular casing and containing releasable means for holding the pipe in moved position; a tubular casing spacedly surrounding the pipe and secured to the lower end of the casing containing said pipe-holding means; a member closing the space between the pipe and the last-mentioned casing and movable with the pipe.

11. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving the oil from its vent and having a discharge vent, the pipe being vertically movable in the casing; releasable means for holding the pipe in moved position; a member below the pipe's vent closing the space between the pipe and the casing and movable with the pipe.

12. In oil well apparatus: a vertically extending oil-delivering pipe having a strainer section adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving the oil from its strainer section and having a discharge vent, the pipe being vertically movable in the casing; releasable means for holding the pipe in moved position.

13. In oil well apparatus: a vertically extending and vertically movable oil-delivering pipe including a portion having an oil vent adjacent the pipe's upper end; a tubular casing spacedly surrounding the pipe, receiving the oil from said vent and having a discharge vent, said portion having a limited vertical movement with the pipe inside the casing; an extension rod fittingly slidable in the upper end of the casing, aligned with the pipe and secured to its upper end for moving the same vertically.

14. In oil well apparatus: a vertically extending oil-delivering pipe having an oil vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving the oil from its vent and having a discharge vent, the pipe being vertically movable in the casing; an extension rod fittingly slidable in the upper end of the casing, aligned with the pipe and secured to its upper end for moving the same vertically; releasable means for holding the pipe in moved position.

15. In oil well apparatus: a vertically extending oil-delivering pipe having a strainer vent adjacent its upper end; a tubular casing spacedly surrounding the pipe, receiving oil from its vent and having a discharge head on its upper end comprising a lateral discharge vent and a discharge vent aligned with the pipe, the pipe being vertically movable in the casing; an extension rod comprising detachable sections aligned with the pipe, fittingly slidable in the discharge head and adapted to be detachably secured to the pipe's upper end for moving the same vertically; a hollow casing secured to the lower end of said tubular casing and containing releasable means for holding the pipe in moved position; a tubular casing spacedly surrounding the pipe and secured to the lower end of the casing containing said pipe-holding means, said pipe-holding means comprising clamp members slidably movable into holding engagement with the pipe's opposite sides and having screws for moving said members; a member closing the space between the pipe and the last-mentioned casing and movable with the pipe.

16. In oil well apparatus: a vertically extending oil-delivering pipe having a strainer vent adjacent its upper end, a tubular casing spacedly surrounding the pipe, receiving oil from its vent and having a discharge head on its upper end comprising a lateral discharge vent and a discharge vent aligned with the pipe, the pipe being vertically movable in the casing; an extension rod comprising detachable sections aligned with the pipe, fittingly slidable in the discharge head and adapted to be detachably secured to the pipe's upper end for moving the same vertically; a hollow casing secured to the lower end of said tubular casing and containing releasable means for holding the pipe in moved position; a tubular casing spacedly surrounding the pipe and secured to the lower end of the casing containing said pipe-holding means, said pipe-holding means comprising clamp members slidably movable into holding engagement with the pipe's opposite sides and having screws for moving said members; a member closing the space between the pipe and the last-mentioned casing and movable with the pipe; a hollow supporting member containing the last-mentioned casing and supporting the apparatus.

WILLIS WILSON BRYANT.