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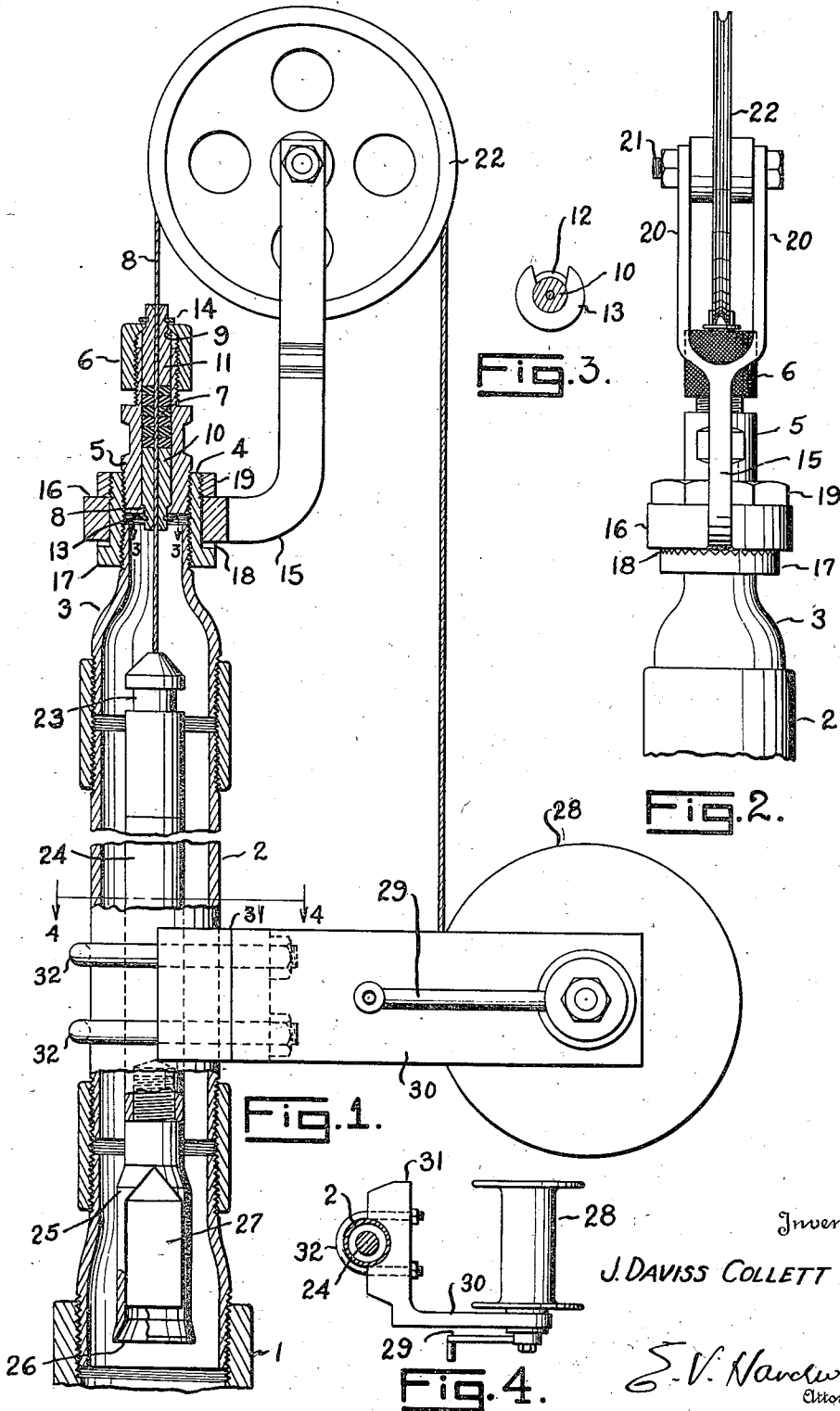
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2,283,048

CLEANING APPARATUS FOR WELLS

Filed June 10, 1940

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

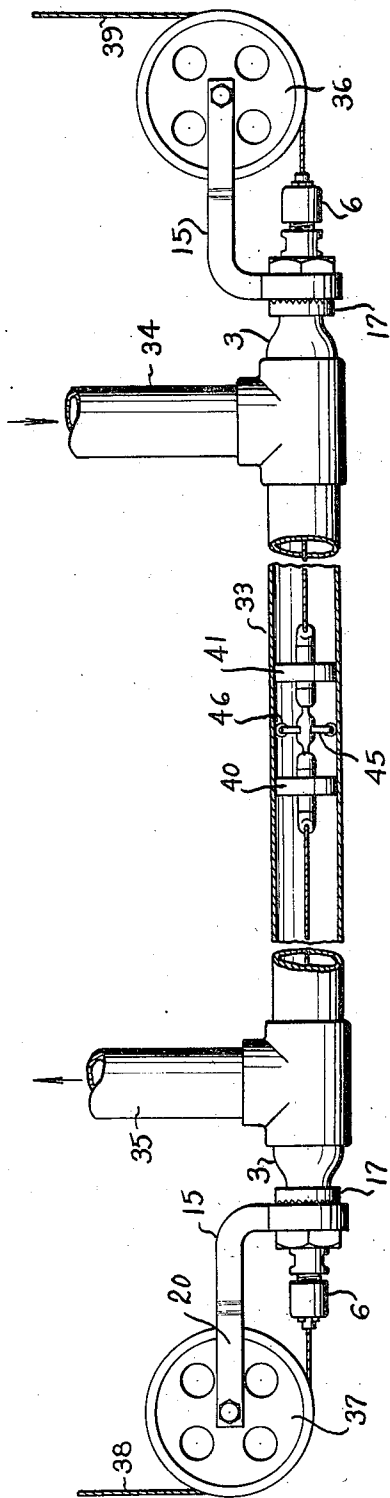


Fig. 5.

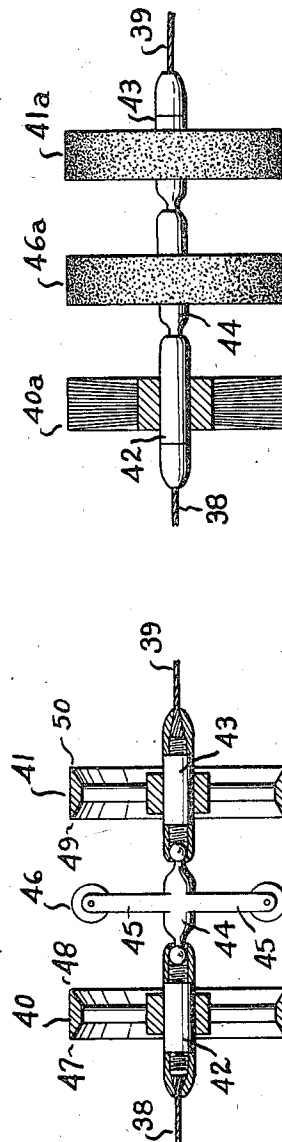


Fig. 7.

Fig. 6.

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CLEANING APPARATUS FOR WELLS

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1 Claim. (Cl. 166—18)

This invention relates to cleaning apparatus for wells and has been specially designed for cleaning paraffin from well pipes either located within the well or located at the ground surface for conducting the oil from the wells.

An object of the invention is to provide equipment of the character described which is of such construction that it may be readily mounted on the well head of individual wells and thus maintained, at all times, ready for immediate use in case of necessity.

Another object of the invention is to provide, in equipment of this character novel types of paraffin cutters or removers which will effectively remove from the pipe paraffin coatings which may collect thereon.

It is a further object of the invention to provide equipment of the character described which, applied to the flow line from the well, may be readily and positively, operated in either direction.

The invention also embodies a novel type of wire line stuffing box.

It is to be understood that while the equipment disclosed has been primarily designed for removing paraffin it is equally efficient for removing other objectionable coatings that may adhere to the inside wall of the pipe.

With the above and other objects in view the invention has particular relation to certain novel features of construction, operation and arrangement of parts, examples of which are given in this specification and illustrated in the accompanying drawings, wherein:

Figure 1 shows a fragmentary, side elevational view, partly in section, of a well head illustrating one form of the cleaning apparatus mounted thereon.

Figure 2 shows a fragmentary, side elevation taken at right angles to the view shown in Figure 1.

Figure 3 shows a cross-sectional view taken on the line 3—3 of Figure 1.

Figure 4 shows a fragmentary, cross-sectional view taken on the line 4—4 of Figure 1.

Figure 5 shows a fragmentary, plan view, partly in section, of another embodiment of the invention.

Figure 6 shows a sectional view of a cutter assembly employed, and

Figure 7 shows an elevational view, partly in section, illustrating another embodiment of the paraffin removed.

Referring now more particularly to the drawings wherein like numerals of reference designate

the same parts in each of the figures, the numeral 1 designates the upper end of a conventional well head, in the present instance being the upper end of the Christmas tree forming a part of said head. Attached to and upstanding from the Christmas tree there is shown the tubular housing 2 whose upper end is formed with the reducing nipple 3. The upper end of the nipple 3 is shown screwed into the lower end of a special coupling 4 into the upper end of which the tubular gland 5 is screwed.

The upper end of the gland 5 is reduced and externally threaded to receive the clamp nut 6 which is screwed thereon. Within the gland 5 there is wire line packing 7 shaped to form a seal about the wire line 8 working through the packing. The lower end of the gland 5 and the upper end of the nut 6 have, respectively, the inside, annular shoulders 8 and 9. Within the gland on opposite sides of, and abutting, the packing are the followers 10, 11 through which the wire line 8 passes axially. They have external, annular shoulders which abut the corresponding shoulders 8, 9. They are reduced beyond said shoulders and extend each way below the gland and above the nut 6, respectively. Said extending ends have the annular, external grooves as 12 to receive the arcuate keys 13, 14.

High pressure in the well exerted against the lower follower 10 will have a tendency to place the packing under compression but the movement of said follower is restrained by the lower key 13 engaging against the end of the gland 5 so that the packing cannot be compressed too tightly against the wire line. It is to be noted that the followers 10, 11 are interchangeable.

There is a yoke 15 one end of which is formed with a ring or collar 16 which surrounds the coupling 4. The lower end of this coupling has an outwardly extended annular flange 17 whose upper side is serrated forming the teeth 18 against which the collar 16 rests. Screwed onto the upper end of the coupling 4 and abutting the collar 14 there is a clamp nut 19 which when screwed down tightly against the collar 16 will cause the teeth 18 to bite into the lower side of the collar and hold the yoke 15 very securely in its selected position. The upper end of the yoke 15 is bifurcated forming a bracket having side arms 20, 20 which support a suitable transverse spindle 21 on which the sheave 22 is rotatably mounted. The wire line 8 operates over said sheave and one end of it is connected to the rope socket 23 which supports the shank 24 to the lower end of which the paraffin cutter 25 is connected.

The lower end of this cutter is of the general annular shape terminating in a downwardly directed, annular cutting blade 26 which is downwardly and outwardly flared as shown in Figure 1 and is of an overall transverse dimension to fit rather closely within the well pipe to be cleaned. The cutter 24 has the side windows 27. As the cutter moves downwardly through the well pipe blade 26 will shear off the paraffin, or other coating, on the well pipe and the cuttings will be washed by the upwardly flowing stream of oil up through the windows 27 on up through the well tubing and out through the flow connections of the Christmas tree.

As stated the wire line 8 connected to the socket 23 passes over the sheave 22 and its other end is wound on the reel 28. This reel is of conventional construction and is operable by means of the crank 29. As is well known it embodies a brake which may be set or released at will by an appropriate manipulation of the crank 29. The reel 28 is mounted to rotate on a horizontal axis on the outwardly extended arm 30 of the bracket 31 which may be clamped about the housing 2 by means of conventional clamp bolts 32, 32. The selected depth to which the cutter is to be lowered into the well may be indicated by a suitable marker on the line 8 and when the line is unwound from the line until the marker appears the selected depth will have been reached and the rotation of the reel may then be reversed and the cutter pulled upwardly into its position within the housing 2 and the reel brake set and the equipment maintained in that position until it is desired to use the same again.

It will be thus seen that the equipment as installed is at all times ready for instant use.

The oil is delivered from the well through a flow line as 33 which may be connected with the well through the connection 34 and with the delivery tank through the connection 35. The flow line 33 may be of any length. It is apparent that its inner wall will also become coated with paraffin or other objectionable coating substances so as to interfere with the flow of the liquid therethrough. As illustrated in Figure 5 this line is equipped, beyond the connections 34 and 35, with the stuffing box arrangement, illustrated in Figure 1, and embodying the parts 3 to 7, 9 to 14 and 16 to 19, inclusive. On each of the special couplings 4 of Figure 5 there is mounted a yoke as 15, said yokes being outwardly turned with sheaves as 36, 37 between their side arms over which the

respective wire lines 38, 39 operate. These wire lines 38, 39 extend through the respective stuffing boxes and their inner ends are connected to cutter or cleaner assemblies as will be more specifically hereinafter described.

The outer ends of the lines 38, 39 are wound around the conventional wire line reels such as illustrated in Figures 1 and 4 and which may be suitably mounted on any fixed support. The cutter assembly to which the lines 38, 39 are shown connected, as illustrated in Figures 5 and 6, comprise the spaced, annular cutters 40, 41 which are fastened, by radiating spokes, onto the corresponding hubs 42, 43 to the outer ends of which the respective cables 38, 39 are connected. The inner ends of the hubs 42, 43 are connected by a link 44 whose ends have universal connections with the corresponding ends of said hubs. The link 44 has the oppositely extended radial arms 45 whose outer ends have rotatable discs 46 mounted thereon which ride against the inner side of the line 33 so as to guide the cutters 40, 41 particularly when the cutter assembly is passing around sharp turns or curves in the flow line. The cutters 40, 41 are outwardly flared in each direction as clearly illustrated in Figure 6 thus providing the oppositely directed, annular cutting edges 47, 48 and 49, 50, respectively, so that they will remove the paraffin from the flow line, or pipe, 33 as moved in either direction. It is obvious that they may be moved in either direction as desired by manipulation of the reel to which one of the lines is connected and releasing the other reel.

The cleaning assembly may be modified as shown in Figure 7, the modification consisting only of the substitution of cylindrical steel brushes as 40a, 41a and 46a for the cutters 40, 41 and the guide discs 46, respectively. These brushes will sweep along the walls of the flow line 33, upon manipulation of the operating cables, and will effectively clean out the flow line.

The drawings and description are illustrative merely, while the broad principle of the invention will be defined by the appended claim.

What I claim is:

In cleaning apparatus for well pipes, a housing having a wire line stuffing box at one end, a coupling for connecting the stuffing box to the housing, a yoke having one end around the coupling, a sheave for supporting a wire line mounted on the yoke and clamp means on the coupling for clamping the yoke thereon.

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