May 14, 1963 J. T. COBB 3,089,544

OIL WELL CLEANER

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FIG. 1

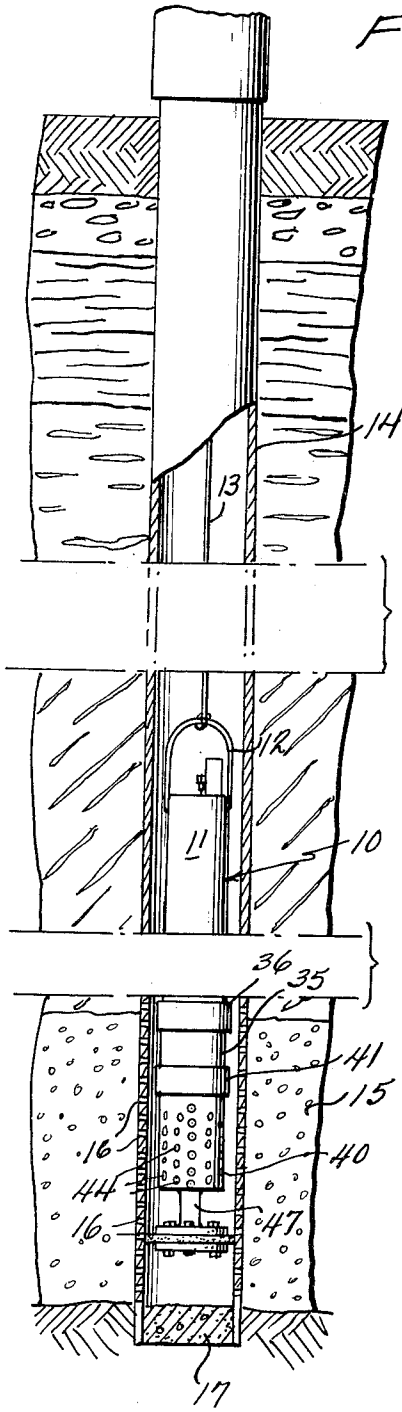


FIG. 2

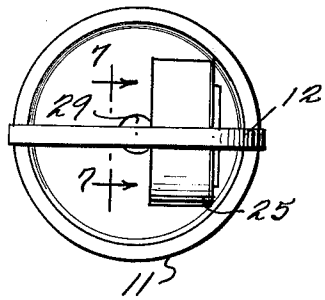


FIG. 6

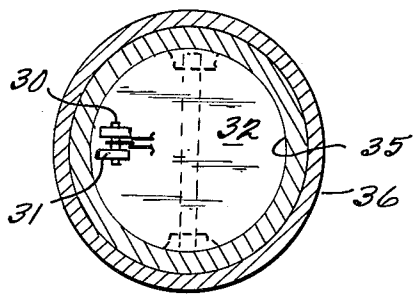
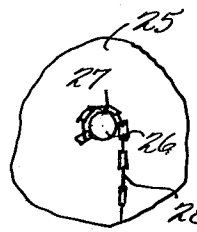


FIG. 7



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FIG. 3

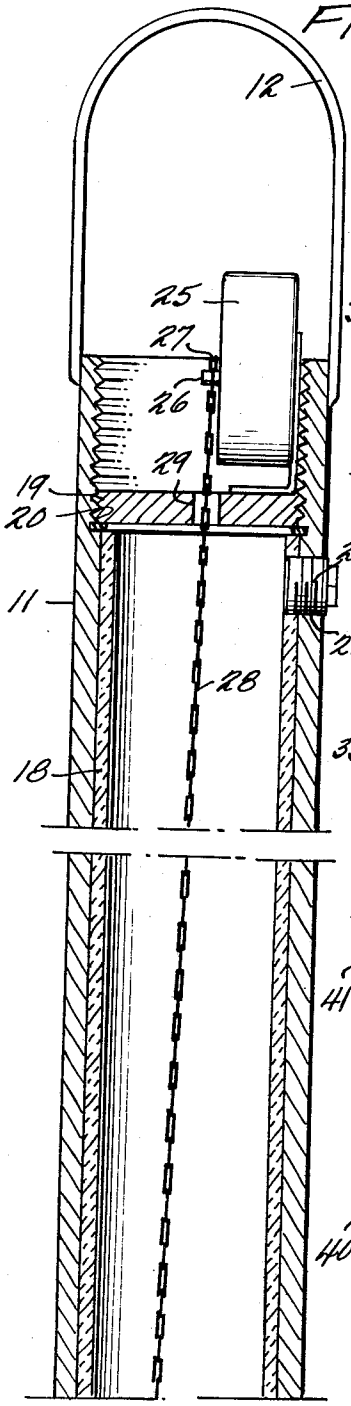


FIG. 4

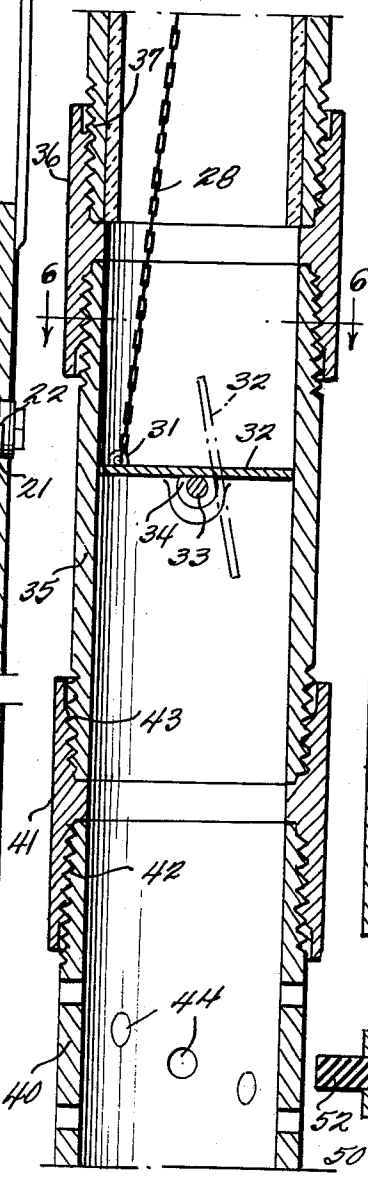
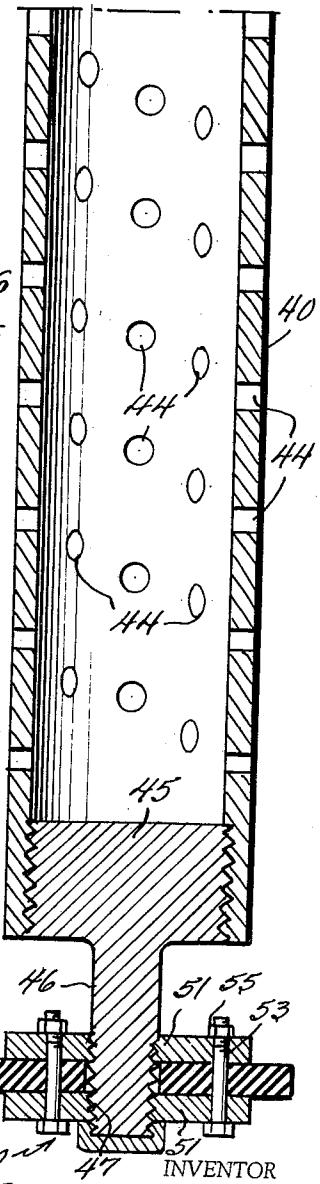


FIG. 5



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OIL WELL CLEANER

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1 Claim. (Cl. 166—162)

This invention relates to an oil well cleaner and has as its primary object the provision of an improved apparatus for cleaning the perforations or apertures extending through a well casing into an oil bearing strata.

An additional object of the invention is the provision of a device which may be lowered into a well casing to any desired depth and clean the perforations or openings immediately adjacent thereto, and then subsequently lowered to a succeeding depth to clean the entire length of the casing in the strata.

An additional object of the invention is the provision of a device of this character wherein sand, melted paraffin, and other material clogging the openings is washed to the bottom of the well, from which it may be cleaned by conventional means.

A more specific object of the invention is the provision of a device of this character which may be utilized to employ water at a high temperature for such cleaning purposes, or which may alternatively employ chemicals or solvents either alone or in combination.

A further object of the invention is the provision of a device of this character provided with a timing means and a dump valve, the dump valve being actuated by the timer so as to actuate the cleaning mechanism at a predetermined depth of the well.

A more specific object of the invention is the provision, in association with such means of a sealing gasket which may be used to seal the well bore immediately below the device so as to permit solvents or chemicals to soak into the material embedded in the perforations of the well casing.

Still another object of the invention is the provision of a device of this character which is sturdy and durable in construction, reliable and efficient in operation, and relatively simple and inexpensive to manufacture, and utilize.

Still other objects reside in the combinations of elements, arrangements of parts, and features of construction, all as will be more fully pointed out hereinafter and disclosed in the accompanying drawings wherein there is shown a preferred embodiment of this inventive concept.

In the drawings:

FIGURE 1 is a schematic sectional view through a well casing showing the device of the instant invention in position therein.

FIGURE 2 is a top plan view of the device of FIG. 1 on an enlarged scale.

FIGURE 3 is an enlarged vertical sectional view taken through the top part of the device.

FIGURE 4 is an enlarged vertical sectional view comprising a continuation of FIG. 3 through the central portion of the device.

FIGURE 5 is an enlarged vertical sectional view comprising a continuation of FIG. 4 taken through the lower portion of the device.

FIGURE 6 is a sectional view taken substantially along the line 6—6 of FIG. 4 as viewed in the direction indicated by the arrows; and

FIGURE 7 is a fragmentary sectional view taken substantially along the line 7—7 of FIG. 2 as viewed in the direction indicated by the arrows.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Having reference now to the drawings in detail, the

device of the instant invention is generally indicated at 10 and comprises an upper pipe or casing 11 to which is secured a bridle 12. The bridle 12 is suspended by means of a cable 13 or the like in the casing 14 of an oil or similar well bored in the earth. The lower portion of the casing which extends into the oil bearing strata 15 is provided with a series of perforations or openings 16 in the conventional manner, and has at its lower extremity the usual closure plug 17 of cement.

Referring now to FIG. 3, the casing 11 comprises an elongated section of pipe of any desired length, but which may be up to 30 or 40 feet in length, which is provided interiorly with insulation 18, and which is closed at its upper end with a threaded plug 19 which is also insulated as at 20. A filler opening 21 is provided in the side wall and closed by a threaded plug 22.

A conventional timer 25 is mounted on cover plug 19, and includes an operating shaft 26 about which is wound the end 27 of a chain 28 (see FIG. 7). The chain extends through a suitable opening 29, in closure 19, and is secured as by a pin 30 between a pair of eyes 31 mounted in offset relation on the upper surface of a dump valve 32. The dump valve is pivotally mounted on a shaft 33 which extends between a pair of depending lugs 34 on opposite sides of the valve 33, the shaft 33 having its ends journalled for rotation in the side walls of an intermediate casing section 35. Intermediate or valve section 35 is secured to pipe 11 by means of the usual internally threaded collar 36 engaging external threads 37 and 38 on the lower and upper ends of sections 11 and 35, respectively. The insulation 18 terminates well above the valve 33 at the lower end of section 11 so that when the timer is actuated for a purpose to be more fully described hereinafter, the valve is free to move suddenly to dump the contents of pipe or casing 11, the valve serving when in closed position to retain fluid thereabove, as will be more fully pointed out hereinafter.

A lower section 40 is secured as by a collar 41 engaging upper external threads 42 thereon and lower external threads 43 to section 35. Lower section 40 is provided with a plurality of openings 44 positioned annularly thereof and is closed at its lower end by means of a plug 45 from the outer or lower face of which depends a stem 46 which is externally threaded at its lower extremity 47 for a purpose to be more fully described hereinafter.

A lower sealing gasket 50, to be more fully described hereinafter, is threaded on the threads 47 under certain conditions of operation, to be described hereinafter, but is normally omitted under the operating conditions now to be described.

In the normal use of the operation, the device is pulled to the top of the well, and filled with extremely hot water through opening 21 by removal of filler plug 22. The water may range in temperature up to 212° F. and is retained in a highly heated condition by the insulated casing. The timer is set in accordance with the depth at which it is desired to actuate the device. For example, it will take the device approximately three minutes to drop from the well mouth to a depth of 1200 feet. The timer is then set for three and a half or four minutes and the device allowed to drop into the well. At the expiration of the time the timer 25 is actuated and pulls the chain 28 suddenly to open the dump valve 32. The water then drops into the lower pipe section 40 and is forced by gravity outwardly through the openings 44 against the walls of the casing 14 and serves to melt any paraffin in the openings 16. At the same time the circulation of the water under the pressure of gravity and its own head effects a washing action to wash the sand from the interior of the casing and perforate into the

pores and cleanse them thoroughly. All material washed or melted from the pores then drops to the bottom of the well, from which it is removed, after removal of the device by a conventional baler.

A section of pipe corresponding to the length of the section **40** is thus treated, and the device withdrawn and refilled, and lowered to the next successive depth. The oil sand is thus washed from the top down and the paraffin melted out of the perforations, effecting a thorough cleansing action all the way to the bottom of the casing.

Under certain circumstances it is desirable to employ chemicals or solvents or similar materials in the tank, either individually or in various combinations, and in such instances the plug or seal **50** is threaded onto the threads **47** of stem **46**. The plug consists of a pair of metal plates **51**, of substantially the same diameter as the device **10**, which, it is to be noted, is of a diameter sufficient to clear the interior of the casing, being preferably approximately one-half inch to an inch less in diameter than the interior diameter of the casing. A rubber sealing washer or gasket **52** is interposed between the plates **51**, the assembly being secured in position by means of bolts **53** and nuts **54**. Gasket **52** closely approximates the interior diameter of the well casing **14**, and effectively provides a seal below the section **40**. Under these instances when the solvent is dumped by means of the valve **33**, it remains held in position between the section **40** and the gasket **52**, for a desired length of time, to permit the chemical action or solvent action to penetrate the perforations **16** and thoroughly cleanse the same.

From the foregoing it will now be seen that there is herein provided an oil well cleaner which accomplishes

all the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative, and not in a limiting sense.

I claim:

An oil well cleaner comprising an elongated pipe of a diameter less than the casing of an oil well to be cleaned adapted to be lowered to a desired depth in the well casing, a closure for the top of said pipe, a dump valve located at an intermediate point in said pipe, a plug in the bottom of said pipe, a timer carried by said pipe, a connection between said timer and said dump valve, the section of said pipe between said dump valve and said plug being provided with a plurality of annular perforations to permit cleansing fluid contained above the valve and released to impinge against the casing to be cleaned, and insulation on the interior of said pipe above said valve, said plug having a depending stem and a sealing gasket carried by said stem below said pipe to permit cleaning fluid ejected from said perforations to remain in contact with a section of the casing to be treated.

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