Sept. 29, 1942. J. S. PAGE 2,297,020

CIRCULATING FLUID WASHER

Filed May 15, 1940

Fig. 1.

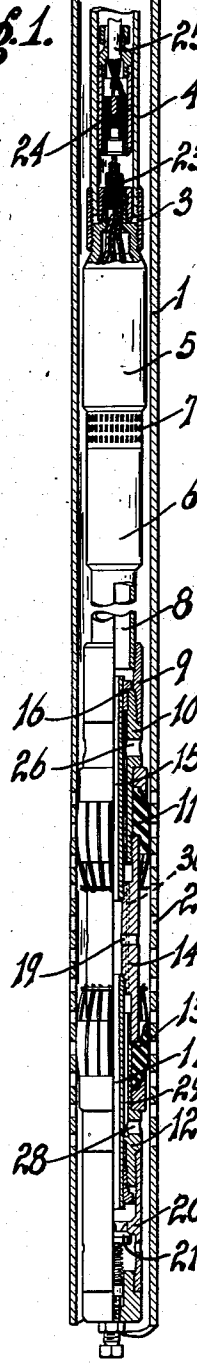



Fig. 2.

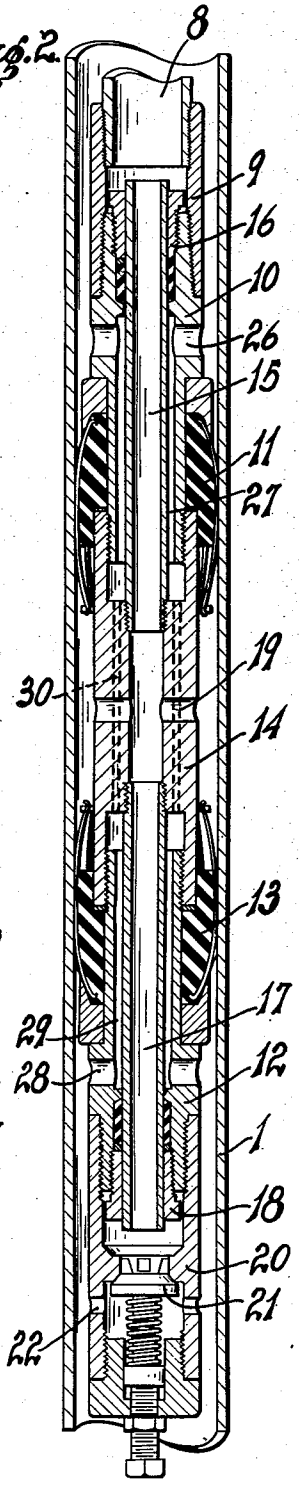
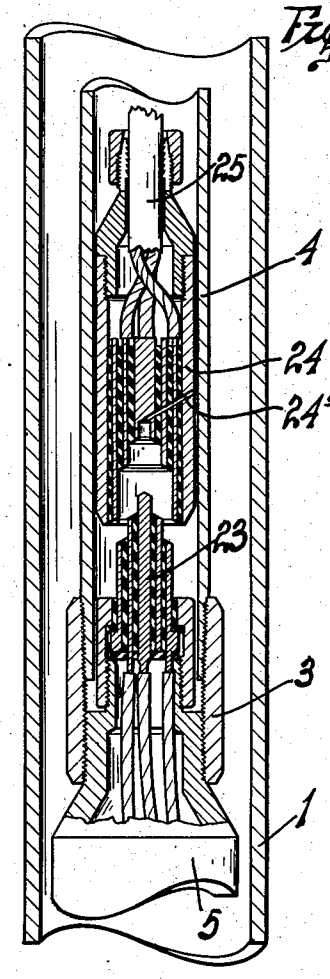



Fig. 3.




INVENTOR.
JOHN S. PAGE.
BY.
H. A. Duckman
ATTORNEY.

Patented Sept. 29, 1942 2,297,020

# UNITED STATES PATENT OFFICE

2,297,020

## CIRCULATING FLUID WASHER

John S. Page, Long Beach, Calif.

Application May 15, 1940, Serial No. 335,298

2 Claims. (Cl. 166—20)

This invention relates to a circulating fluid washer, particularly applicable to the cleaning of casing or perforations in the casing of an oil well.

An object of my invention is to provide a novel circulating fluid washer in which the motor and pump are a part of the tool which is run into the well, the pump being adapted to pick up fluid from within the casing and force this fluid under pressure between spaced packers and through the perforations in the wall of the casing.

Another object of my invention is to provide a novel circulating fluid washer provided with a by-pass around the packers so that the tool will move into and out of the casing with a minimum of effort.

Another object is to provide a novel circulating fluid washer of the character stated, provided with a novel pressure releasing means so that the spaced packers on the tool will not be injured due to excessive pressure of the fluid which may be forced between them.

A feature of my invention is to provide a novel contact means for the electrical conduit, which is engageable with the electrical plug after the tool has been run into the well.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description, and the appended claims.

In the drawing:

Figure 1 is a side elevation of my circulating fluid washer with parts broken away to show interior construction.

Figure 2 is a fragmentary, longitudinal, sectional view of the lower portion of my washer.

Figure 3 is a fragmentary, longitudinal, sectional view of the upper portion of the washer, including the electrical contacting means which is shown in disengaged position.

Referring more particularly to the drawing, the numeral 1 indicates the usual oil well casing, into which my fluid washer may be run. A part of this casing may be perforated as shown at 2, through which oil flows into the casing from the formation. These holes frequently become clogged with various materials and it is, therefore, necessary to clean them. My circulating fluid washer comprises an upper collar 3, into which the drill pipe 4 is threaded. An electrical motor 5 is attached to the collar 3, and this motor is of usual and well-known design and the details thereof form no part of this invention. A pump 6 is mounted below the motor 5, and this pump has intake ports 7, through which fluid passes into the pump, and an outlet pipe 8, which extends downwardly from the pump. A collar 9 screws onto the lower end of the pipe 8, and this collar also screws onto the upper end of a fitting 10. A packer 11 is fixedly mounted on the fitting 10, substantially in the manner disclosed in Figure 2. A second fitting 12 is spaced below the fitting 10, and a second packer 13 is mounted on the fitting 12 in the same manner as the packer 11 is mounted on the fitting 10. A conduit 14 connects the fittings 10 and 12, preferably by threading these fittings into the ends of the conduit.

A tube 15 extends through the fitting 10 and is threaded into the upper end of the conduit 14. A packing gland 16 seals the upper end of the pipe 15 within the fitting 10. A second pipe 17 is threaded into the lower end of the conduit 14, and extends through the fitting 12. A packing gland 18 surrounds the pipe 17 to prevent leakage around this pipe within the fitting 12. From the structure thus far described, it will be evident that a continuous passage is provided longitudinally through the washer from top to bottom, this passage being through the pipes 15, 17 and the conduit 14. The conduit 14 is provided with a plurality of laterally extending holes 19. These holes are arranged between the packers 11, 13 and fluid from the pump 6 is forced downwardly through the connector pipe 8, thence through the pipe 15, and thence out of the holes 19 under considerable pressure, so that the perforations 2 in the casing may be washed or cleaned.

A foot plug 20 screws onto the lower end of the fitting 12, and a spring loaded, upwardly pressed valve 21 is seated in the foot 20, normally closing the bottom of the tool against the flow of fluid. Relief ports 22 in the foot 20 provide an outlet for the fluid if the valve 21 is unseated due to excessive pressure which might be built up by the pump within the tool. When the tool is run on drill pipe, it might be desirable to first position the tool in the well and afterwards lower the electrical conduit. However, my tool may be run on a cable and in that event the conduit does not necessarily have to be of the detachable type, as hereinafter described.

A multiple contact plug 23 is fixedly mounted at the upper end of the tool, and as here shown, is within the collar 3. A socket 24 is of the slip type, and has a plurality of contacts to engage the plug 23. The electrical cable 25 is attached to the socket 24, and extends upwardly to the

surface of the ground. The socket 24 is of sufficient weight so that it will travel downwardly within the drill pipe 4, and will slide onto the plug 23 and make contact therewith. The plug 23 is electrically connected to the motor 5, and current is thus supplied to this motor to actuate the same. With this arrangement, the electrical conduit can be run into the well after the tool is in position, and also can be removed from the well before the tool is moved.

When the tool is moving into or out of the casing 1, it is desirable to by-pass fluid around the packers 11, 13 so that the tool will readily move. This fluid by-pass includes a plurality of radial ports 26 in the fitting 10, which communicate with an annular chamber 27 surrounding the pipe 15. The fitting 12 is similarly provided with a plurality of ports 28, which communicate with the annular chamber 29 surrounding the pipe 17. The chambers 27 and 29 both extend into the conduit 14, and a plurality of bores 30 extend longitudinally through the conduit 14, thus permitting fluid to pass from the ports 26 to the ports 28, by-passing the packers 11 and 13. It will be evident that fluid can flow in either direction through the ports, and annular chambers, as previously described.

In operation, the tool is first lowered to the point desired in the casing 1, and thereafter the motor 5 is started either by dropping the electrical cable 25 into the well to contact the plug 23, or if the electrical cable is fixedly attached, a switch is thrown to close the electrical connection to the motor. The motor 5 drives the pump 6, which picks up fluid already in the casing through the intake port 7, and forces this fluid under pressure downwardly through the connecter pipe 8, thence through the pipe 15, and out of the ports 19 between the packers 11 and 13. This fluid under pressure is then forced through the perforations 2 to effectively clean the same. If an excessive pressure is built up, the valve 21 will be unseated, thus permitting fluid to pass out through the relief ports 22.

A relief duct 24a extends through the wall of the socket 24 for the purpose of permitting fluid to be forced out of the socket when the plug enters the same.

Having described my invention, I claim:

1. A circulating fluid washer comprising an elongated hollow body, a packer mounted on the body, said body having an outlet port below the packer through which fluid under pressure may be forced, a pump means mounted above the body, the outlet of said pump opening into the body, an electric motor mounted above the pump, an electrical plug mounted above the motor, electrical conductors extending from the plug to the electric motor, and an electrical slip socket engageable with the plug, an electrical cable to which the slip socket is connected, the washer being suspended on pipe through which the socket moves to engage the plug, said socket engaging the plug after the washer is in operative position.

2. A circulating fluid washer comprising an elongated hollow body, a pair of spaced packers mounted on the body, said body having an outlet port between the packers through which fluid under pressure may be forced, a pump mounted on the body and adapted to force fluid under pressure into the body, and electric motor mounted above the pump and operatively connected thereto, said body having a fluid by-pass therein extending from below the lower packer to above the upper packer, an electrical plug above the motor, electrical conductors extending from the plug to the electric motor, an electrical slip socket engageable with the plug, said socket being mounted on and connected to an electrical cable, the washer being suspended on a pipe through which the socket is movable to engage the plug, said socket engaging the plug after the washer is in operative position.

JOHN S. PAGE.