

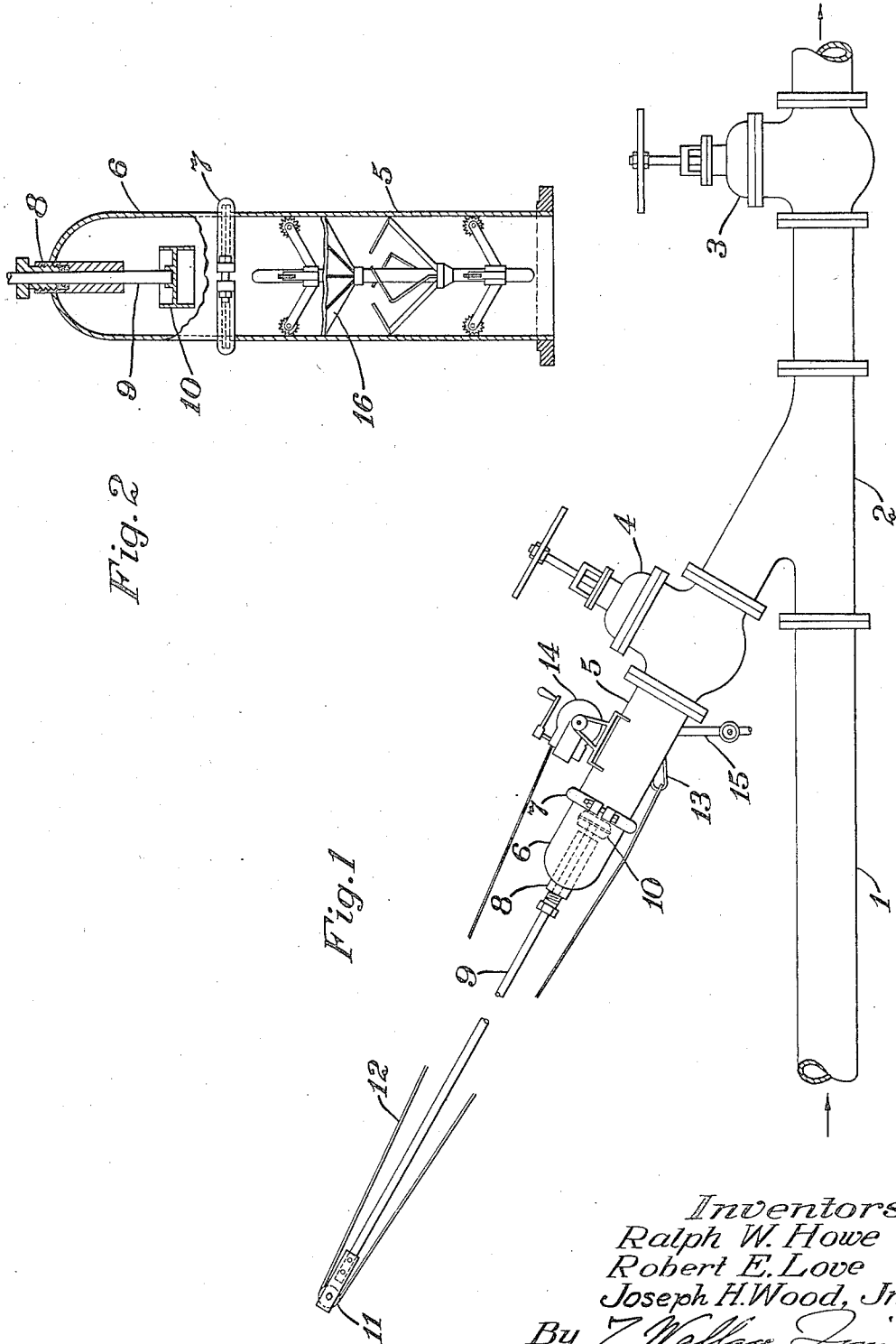
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APPARATUS FOR CLEANING PIPE LINES

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APPARATUS FOR CLEANING PIPE LINES

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The present invention relates to an apparatus for introducing a scraping or cleaning device into a pipe line or similar conduit. More particularly, this invention relates to a means whereby the scraping or cleaning device may be introduced into the pipe line without interrupting the flow of liquid therethru or without reducing the operating pressure thereon. The means of the present invention is particularly adapted for use in connection with pipe lines for transporting crude petroleum and petroleum products, but may be employed in conjunction with pipe lines for conveying other liquids.

Heretofore, in the cleaning of pipe lines, and particularly petroleum pipe lines, it has been the conventional practice to introduce a cleaning device into the line only after the line pressure has been relieved by a shut-down of the pumps. Generally, the pipe line is provided with a Y branch closed by a blank flange, and when it becomes necessary to clean the line, flow of liquid therethru is diminished or entirely stopped for sufficient time to remove the blank flange and insert the cleaning device thru the Y branch into the pipe line proper. The flange must then be replaced before liquid flow can again be established.

The methods for introducing a cleaning device into the pipe line heretofore employed, necessitate a complete cessation of flow through the line for periods of an hour or more, due to the labor involved in shutting down pumps, removing the blank flange, inserting the cleaning device and then reversing the process to put the line again in service. In those systems in which the liquid flowing thru the pipe line was simultaneously employed as a cooling medium in the engines driving the pumps, a shut-down of the pumps for long periods necessitated a shut-down of the engine due to the lack of circulation of the liquid as a cooling medium for said engines. Furthermore, those systems in which a blank flanged Y branch was employed for introducing the cleaning device into the pipe line, required the services of several operators for shutting down pumps, closing valves and removing and replacing the cumbersome blank flange.

In order to overcome these difficulties in introducing a cleaning or scraping device into a pipe line, we employ the apparatus hereinafter described.

Referring to the drawing, Fig. 1 shows a section of a pipe line provided with our apparatus for introducing a cleaning device thereinto, while

Fig. 2 shows, in cross-section, a cleaning or scraping device inserted in a part of our apparatus.

In Fig. 1, a pipe 1 leading from the discharge outlet of the pump (not shown) is provided with a Y branch 2 and a gate valve 3, which, in turn, is connected to the main pipe line. The Y branch 2 is provided with a gate valve 4 to which is attached a nipple 5 capped by a bull plug 6, such plug being held in position by the victallic coupling 7. The bull plug 6 is provided with a packing gland 8 through which the piston rod 9, carrying the piston 10, may pass in forcing the cleaning or scraping device from the nipple 5 through the valve 4 into the main pipe line. Upon the upper end of the piston rod 9 is mounted a pulley 11 which engages the cable 12. One end of cable 12 is fastened to the eye 13 on the nipple 5 and the other end is affixed to the drum of the winch 14. The nipple 5, to which the winch 14 is attached, is provided with a valve-controlled drain pipe 15, whereby pressure may be relieved and liquid may be withdrawn from the nipple prior to the removal of the bull plug 6, for insertion of the cleaning or scraping device.

When it becomes necessary to pass a cleaning or scraping device through the pipe line, the operation may be carried out, in accordance with our invention, without cessation of liquid flow therethrough and without the reduction of pressure thereon. In operation, the gate valve 4 is closed; liquid, if any, is withdrawn from the nipple 5 through valve-controlled pipe 15, the coupling 7 is loosened and the bull plug 6 carrying the piston rod 9 is removed. A cleaning or scraping device is then inserted in the nipple 5 and the bull plug 6 is replaced and clamped tight against the end of the nipple 5 by means of the coupling 7. The slack of the cable 12 is then taken up by the winch 14 and the piston 10 is brought into engagement with the end of the cleaning or scraping device contained in the nipple 5. The gate valve 4 is opened and pressure is brought to bear upon the piston 10 by winding in the cable 12 upon the drum of winch 14. The rod and piston is thus forced into the nipple 5, driving the cleaning or scraping device forward through the gate valve 4 into the Y branch 2 and thence into the stream of liquid flowing through the pipe 1 to the main pipe line. After the device has been introduced into the pipe line, tension on the cable 12 is relieved and the rod 9 carrying the piston 10 is withdrawn from the Y branch 2 and the gate valve 4 is closed. The scraping device is thereafter carried through the pipe line by the flow of liquid therethrough,

and may be removed from the line, by conventional means, at any desired point.

In Fig. 2, there is shown in detail, the nipple 5 containing a conventional cleaning or scraping device 16, of a type similar to that disclosed in U. S. Patent 332,910 to J. S. Klein.

It will be seen that, in accordance with our invention, a cleaning device may be introduced into a pipe line without interrupting the flow of liquid therethrough and without shutting down pumps and/or engines or taking the line out of service for extended periods of time, thus permitting the cleaning operation to be carried out with an economy not heretofore attainable.

What we claim is:

1. Means for inserting a cleaning device into a pipe line, which comprises a branch pipe connected to said pipe line and at an angle thereto, a valve connected to said branch pipe, a pipe nipple connected to said valve, a plug coupled to said nipple and means associated with said plug and nipple for forcing a cleaning device from said nipple into said pipe line.

2. Means for inserting a cleaning device into a pipe line, which comprises a Y-branch connected to said pipe line, a valve connected to the free leg of the Y-branch, a pipe nipple con-

nected to said valve and adapted to contain a pipe cleaning device, and a plug coupled to said nipple, said plug having a piston associated therewith for forcing a cleaning device from said nipple into said pipe line.

3. Means for inserting a cleaning device into a pipe line without interrupting the flow of liquid therethrough, which comprises a Y-branch connected to said pipe line, a valve connected to the free leg of the Y-branch, a pipe nipple connected to said valve, said nipple being adapted to contain a pipe cleaning device and being provided with a draining means, a plug coupled to said nipple, the closed end of said plug being provided with a packing gland, a piston rod passing through said gland, a piston disposed within said plug and attached to one end of said piston rod, a pulley affixed to the other end of said rod, a winch attached to said nipple and a cable attached to said winch and said nipple and engaging the aforesaid pulley, whereby pressure may be exerted upon said piston to force a cleaning device from said nipple into said pipe line.

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