

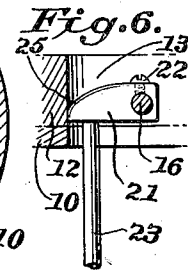
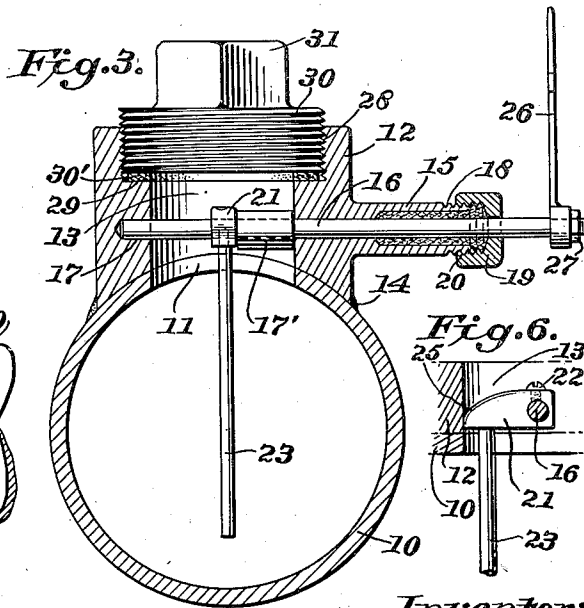
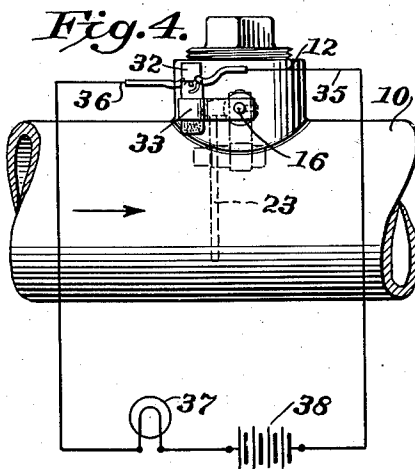
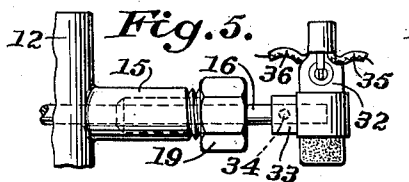
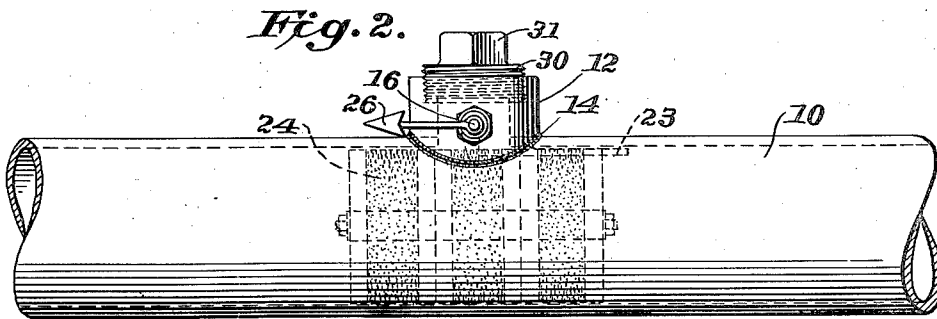
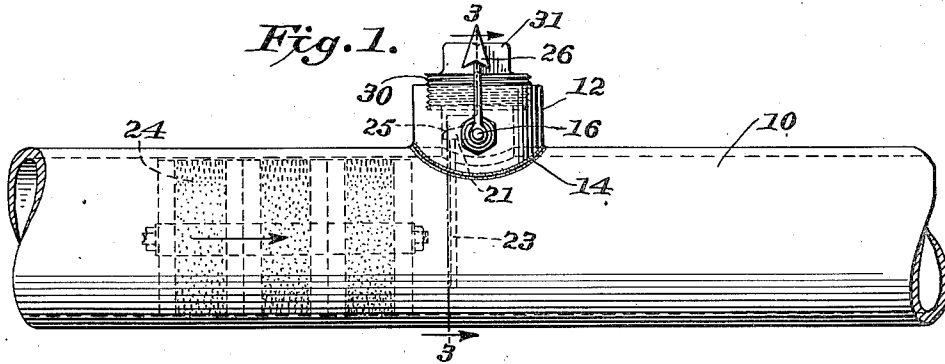
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2,371,251

INDICATOR FOR CONDUITS

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UNITED STATES PATENT OFFICE

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INDICATOR FOR CONDUITS

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2 Claims. (Cl. 177-311)

The present invention relates to indicators and more particularly to improved means associated with a conduit such as a fuel supply line for indicating when an element movable through the conduit reaches a predetermined point.

At present, gasoline, fuel oil, and other petroleum products are transported by means of underground steel pipe lines which vary in size from 6 to 24 inches in diameter. Along these lines are located pumping stations to accelerate the flow of the liquid passing through the line. Due to the fact that petroleum products corrode on the inside of the pipe line, it is necessary to force what is called a "scraper" through the pipe line to keep it clear and open. This scraper is put in the line at one pumping station and travels along the conduit a certain distance to another station, where, by means of a trap and a by-pass, it is removed and a clean one inserted so as to be forced through the line to the next station.

When the scraper is inserted in the pipe line a dispatcher advises the operator stationed at each of the intermediate stations between the entering station and the discharge station, approximately when the scraper will arrive at the respective stations. At present, the pipe line is exposed in an open pit at each of the intermediate stations, and it is necessary for the operator to listen until the scraper passes, since this is the only way he has of detecting when it passes. It is, of course, essential for the operator at each of the intermediate stations to cut off the booster pump that forces the fluid through the pipe, prior to the arrival of the scraper at his station. Due to inaccuracies in estimating the time of arrival of the scraper by the operator at a pumping station, not infrequently the station booster pump is closed for more than twenty minutes prior to the expected arrival of the scraper. This causes the fluid pressure in the line to be greatly reduced resulting in reducing the speed of the fluid through the line. At each pumping station between the intake line valve and the outgoing valve, there is a shut-off valve in the main line which controls and maintains the proper pressure to force the gasoline or fuel oil in the desired direction. Also, there is a distance of approximately 6 feet between the intake valve and the outgoing valve, and at this point the fluid goes through a by-pass pipe so as to be forced through the pumps. The average pressure on the fluid upon its arrival at an intermediate pumping station is from 50 to 75 pounds per square inch. It will, therefore, be seen that if the scraper should pass an intermediate station without the knowl-

edge of the operator, the pumps would remain off possibly until the scraper arrived at the next intermediate station. As the scraper travels at the rate of seven to eight miles per hour, should it pass a station unknown to the operator, the time thus lost will allow the pressure of the fluid to be materially lowered and, hence, the flow of the fluid would be much lower, with the result that the speed of flow and capacity of the line are greatly reduced.

It is, therefore, a primary object of the present invention to overcome the existing deficiencies in devices of this character, by providing simple, efficient, and economical means which obviates the uncertainty of determining when a cleaning element such as a scraper or the like reaches or passes a predetermined point in a conduit, and which requires the booster pump at each of the stations to be only momentarily cut off so that the fluid is pumped practically continuously through the line at maximum speed and capacity.

A further object consists in associating with a pipe line an indicating assembly arranged to be positioned at each of the intermediate pumping stations along the line, said assembly including a movable member normally positioned in the path of the scraper so as to be operable thereby. The movable member preferably has operatively connected thereto any suitable signalling means such as an arm, an electrical signalling device or the like, so that the signal means will indicate to the operator when the movable member is actuated by the scraper as the latter passes through the pipe line and reaches a predetermined point.

At present, should one of the scrapers become clogged in the line, it has been difficult to determine, with any degree of accuracy, its location. It is, therefore, a further object of the invention to provide means for enabling the operators of the pipe line to locate the scraper at a minimum expenditure of time and effort, should the scraper become fastened in the line between the stations.

Other objects and advantages of the invention will be apparent from the following description, when taken in conjunction with the accompanying claims and drawing.

Referring to the drawing in which are shown several preferred embodiments of the invention: Figure 1 is a side view of a section of a conduit or supply line having the indicating assembly mounted thereon and showing the normal position of the parts before they are actuated by the scraper.

Figure 2 is a view similar to Figure 1 showing

the position of the parts when actuated by the scraper.

Figure 3 is an enlarged sectional view taken substantially along the line 3—3 of Figure 1.

Figure 4 is a detailed side view of a modified form of the invention showing an electrical signalling device associated therewith.

Figure 5 is an enlarged detailed view of the electrical signalling device showing its connection with the indicator assembly, and

Figure 6 is an enlarged detailed sectional view of the operating finger and its associated parts.

As illustrating one of the many uses to which the invention may be applied, there is shown at 10 a section of an underground steel pipe line for conducting gasoline, fuel oil, or other petroleum products. Along the pipe line are provided spaced stations, and adjacent each station, the pipe or conduit 10 has an opening 11 (Figure 3) in the wall thereof. Preferably, a metal housing 12 having an axial bore or opening 13, is positioned on the pipe 10 and welded thereto as at 14, so that the opening 11 registers with the bore 13 of the housing. A tubular boss or arm 15 integral with the housing extends laterally therefrom. A rotatable shaft or rod 16 extends transversely through the housing 12 and the boss 15 above the opening 11 and has its inner end journaled in a bearing 17 and its outer end portion projecting from the boss 15. Packing 18 is inserted within the boss 15 to provide a tight bearing surface for the shaft 16 in order to prevent leakage of the fluid from the line through the boss. The packing 18 is retained in position by a nut 19 threaded as at 20 to the end of the boss 15.

Within the bore 13, the shaft 16 carries an arm 21 which is fastened thereto by any suitable means, such as the set screw 22. Carried by the arm 21 is a finger or depending member 23 which extends through the opening 11 into the pipe or conduit 10, so as to be positioned in the path of a scraper or other movable element 24 in order to be actuated by the latter when it reaches the station adjacent the housing 12. The arm 21 is preferably of such a length as to extend to one side of the wall of the bore 13 so that its outer end 25 (Figure 6) when the finger 23 is in its normal vertical position, will constitute a stop or abutment for the finger. Thus it will be seen that when the finger 23 is displaced or moved to the right by engagement with the scraper 24 (Figure 6) it will cause rotation of the shaft 16. Conversely, when the scraper passes the finger the latter, due to its rigid connection with the shaft 16 through the arm 21, will return by the force of gravity and the combined weight of the arm and the finger, to its normal vertical position and the end portion 25 of the arm 21 will contact with the adjacent wall of the bore 13, to further limit the swinging movement of the finger. A collar or sleeve 17' fixed to the shaft 16 between the arm 21 and the wall of the opening 13 acts as a spacer to maintain the parts in proper position. The finger or arm 23 extends into the conduit 10 so as normally to be positioned in the path of the fluid passing through the conduit, and is shaped and arranged so as not to be moved by the fluid or to substantially obstruct the movement of the fluid through the conduit. This finger, however, is responsive to the movement of the scraper 24 in order to actuate the signal means when the scraper reaches or passes a predetermined point.

Any suitable indicating means may be con-

nected to the shaft 16 to notify the operator that the finger 22 has been actuated. This means, as shown in Figure 1, is in the form of a signal arm or arrow 26 clamped to the outer end of the shaft 16 by the nut 27. The indicator arm 26 may normally assume a vertical position and is arranged to be moved to a horizontal position upon the actuation of the finger 22 by the scraper 24. The bore 13 preferably terminates in an enlarged outer threaded end portion 28 to form a stop shoulder 29. A plug or removable closure 30 is arranged to be threaded into the enlarged portion 28 of the bore to engage the shoulder 29, and has a polygonal shaped head 31 for receiving a suitable tool for securing the plug to the housing. A packing 30' is preferably interposed between the shoulder 29 and the plug 30 to provide a tight seal to prevent the fluid from leaking past the plug. This plug provides convenient means for obtaining access to the interior of the housing so as to inspect or repair the parts therein.

In operation, it will be assumed that the indicator assemblies are placed at spaced points along the pipe line between the dispatcher station and the station the scraper is to be removed from the line and a clean one inserted. When it is necessary to clean the line between the intermediate stations, the scraper 24 is inserted and the operators at the pumping stations along the line are notified so that they may be on the alert to notice by the movement of the arm 26 when the scraper reaches and passes the various stations. When the scraper 24 reaches the station adjacent the housing 12, it will contact and swing the finger 22 which, in turn, rotates the shaft 16 and moves the arm 26 from its vertical position as shown in Figure 1 to the horizontal position as indicated in Figure 2. When the scraper passes, the weight of the finger 22 assisted by the arm 21 will cause the parts to be returned to their normal positions. Thus each operator is able to determine with reasonable accuracy when it is necessary for him to cut off the pump and arrange for the passage of the scraper through the line. Since the pump at each station will only have to be closed momentarily to allow the scraper to pass, there will be little drop in pressure so that the pumps operate almost continuously to maintain the flow of the fluid through the line at maximum capacity and speed. Moreover, in the event the scraper should become clogged in any section, its location can be immediately determined at minimum expenditure of time and effort.

In the modification shown in Figs. 4 and 5, the arrow or signal 26 is replaced by an electrically operated indicating means for notifying the operator at each intermediate station when the scraper reaches and passes the same. This electrical indicator may comprise a mercury switch 32 carried by a clamp 33 which is secured as at 34 to the outer end of the shaft 15, so as normally to assume a vertical position. Leads 35 and 36 connect the switch in series to any suitable indicating means such as a light, bell, buzzer or audible signal 37 and the battery 38. It will be seen that when the mercury switch is in its vertical position, the circuit is open and the depending finger 22 is positioned in the path of the scraper. Upon the finger being actuated by the scraper, the shaft 15 is rotated, causing the switch to assume the horizontal position shown in dotted lines in Fig. 4, so that the mercury bulb forms a contact with the electric current and the

light or annunciator 37. Conversely, when the scraper passes the finger, the latter will return to its normal vertical position which likewise causes the rotation of the shaft 15 and the movement of the switch to its vertical position, thus again opening the circuit.

While the indicating assembly has been shown for the purpose of illustration associated with a fluid supply line, it will be manifest that it may be efficiently used with other types of conduits so as to be operable by a movable member to indicate the passage of fluid or other material therethrough. Moreover, the forms of the invention shown and described are merely illustrative of preferred embodiments and such changes may be made as come within the purview of one skilled in the art without departing from the spirit of the invention as claimed.

I claim:

1. In combination with a fluid supply pipe adapted to have a scraper or the like moved therethrough, said pipe having a side opening, an indicator assembly mounted on the pipe, said assembly comprising a housing enclosing said opening, a freely swinging member extending substantially across the inside diameter of the pipe, said member presenting a relatively small area

to the path of movement of the fluid through the pipe whereby the member is unaffected by normal fluid flow but is moved when engaged by a scraper passing through the pipe, said member having means adapted to engage the housing to maintain the same in operative position, and means operatively connected to said member to indicate when the latter is actuated by the scraper.

2. In combination with a fluid supply pipe adapted to have a scraper or the like moved therethrough, said pipe having a side opening, an indicator assembly mounted on the pipe, said assembly comprising a housing enclosing said opening, a freely swinging member extending substantially across the inside diameter of the pipe, said member presenting a relatively small area to the path of movement of the fluid through the pipe whereby the member is unaffected by normal fluid flow but is moved when engaged by a scraper passing through the pipe, said member having an offset portion adapted to engage the housing to limit the movement thereof in one direction, and an electrical signaling device operable by said member for indicating when the latter is actuated by the scraper.

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