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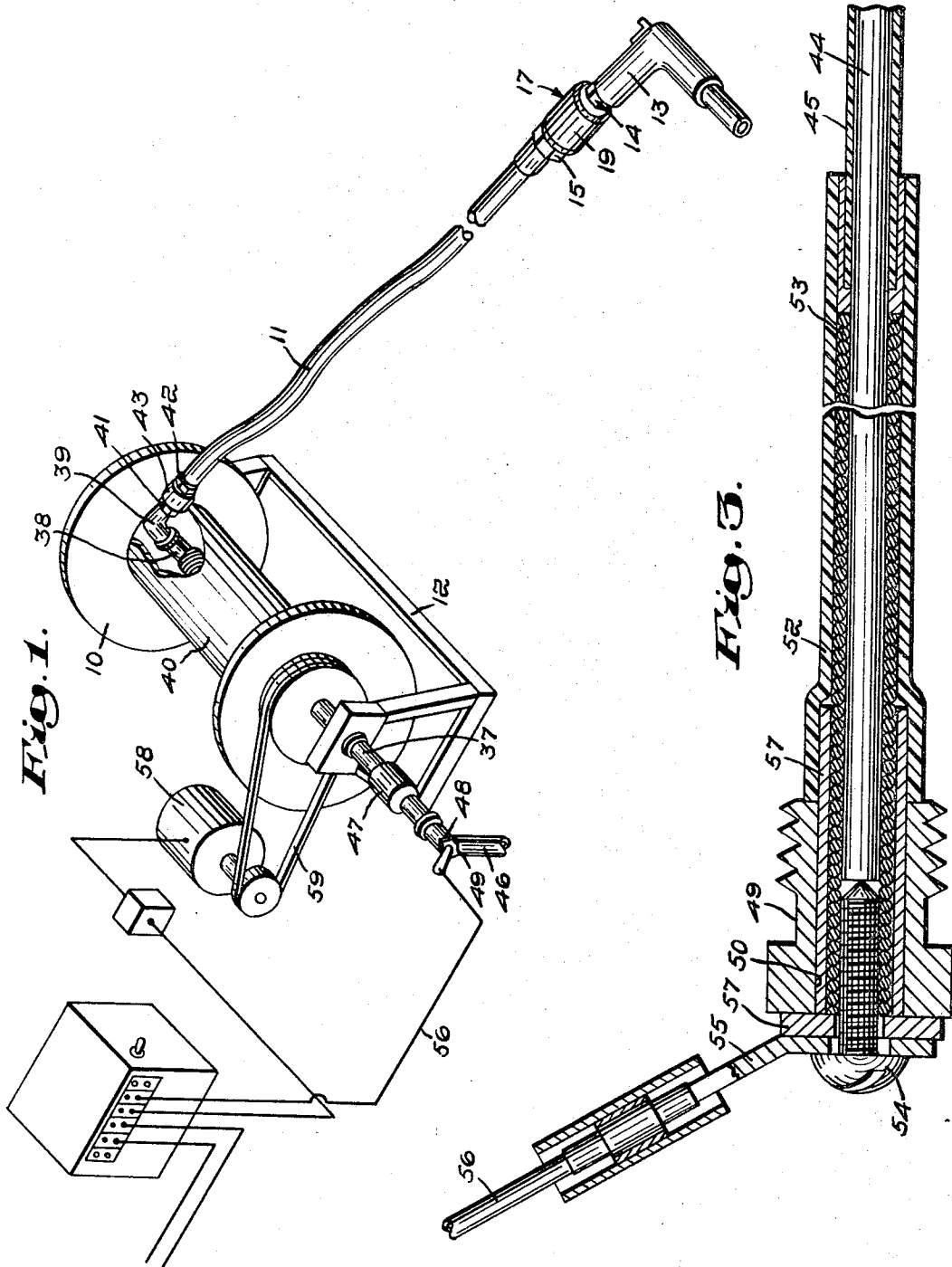
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NOZZLE SWITCHES FOR FLUID DELIVERY SYSTEMS

Original Filed Nov. 4, 1963

2 Sheets-Sheet 1



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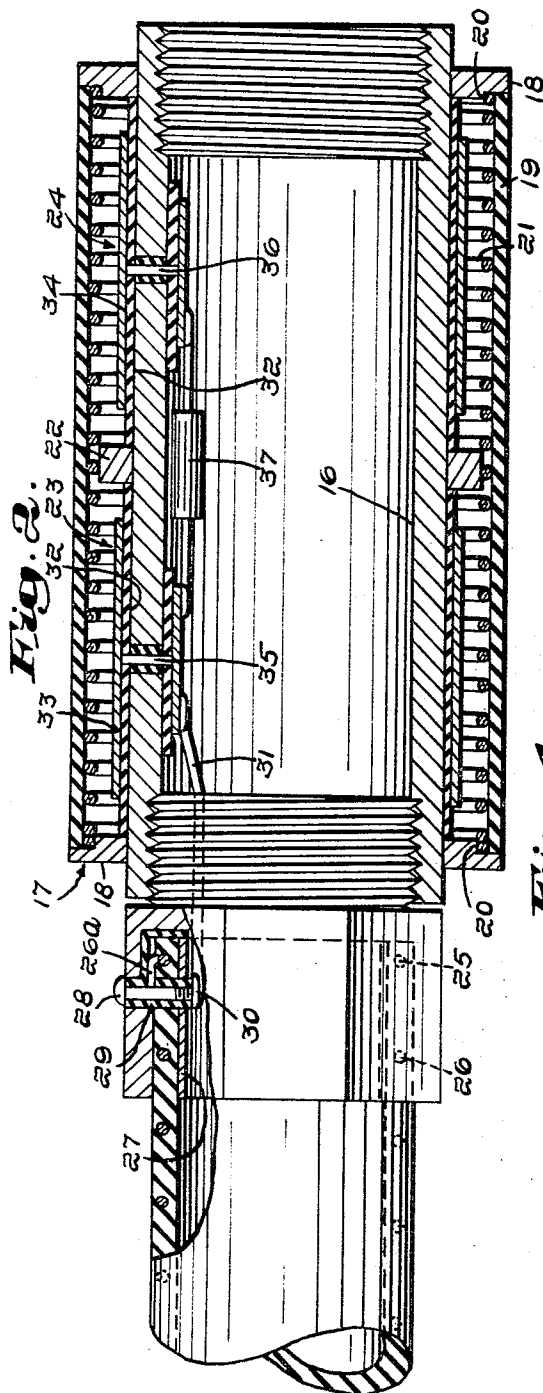
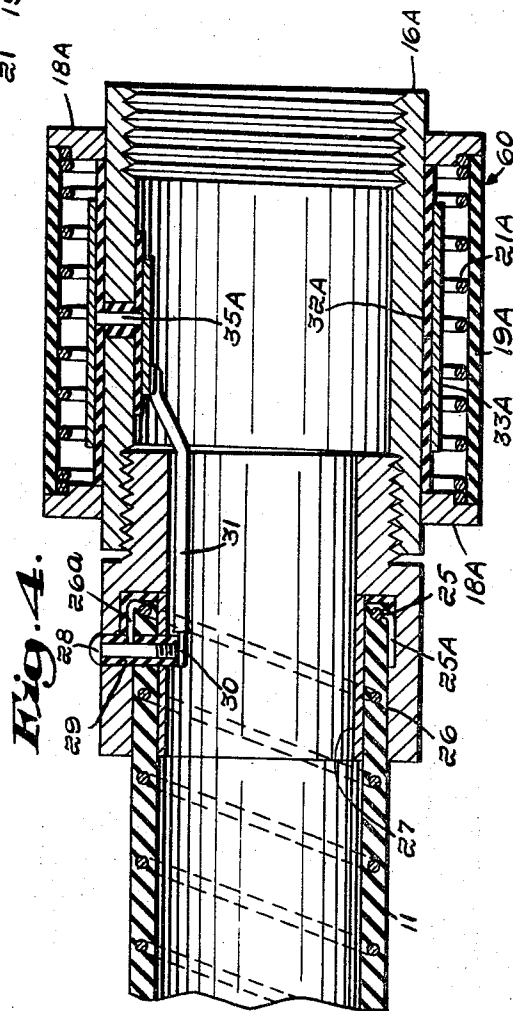
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NOZZLE SWITCHES FOR FLUID DELIVERY SYSTEMS

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Original application Nov. 4, 1963, Ser. No. 321,161, now
Patent No. 3,277,254, dated Oct. 4, 1966. Divided and
this application June 23, 1966, Ser. No. 559,935
2 Claims. (Cl. 222—75)

The present invention relates to switches and related circuitry for the nozzle of liquid delivery conduits and is a division of my co-pending application, Ser. No. 321,161, filed Nov. 4, 1963, now Patent No. 3,277,254 of Oct. 4, 1966.

While nozzle switches in accordance with the invention can be used in many fields for handling a wide range of fluids, problems involved in the delivery of residential fuel oil well illustrate the problems involved and the general objectives, novel features and advantages of the invention. In the delivery of fuel oil, the distance of the filler pipes, of the oil tanks from the nearest position to which the delivery truck can be driven varies considerably so that an oil delivery truck is customarily provided with a reel supporting a substantial length of hose.

The driver of the truck, while enabled thus to fill any tank on his route, has to pull out the required length of hose, fill the customer's tank, drag the hose back to the truck, and then rewind it on the reel. The truck engine is running with the pump in service until the driver returns to the truck. While the gasoline wasted at each stop is in itself an important factor, the difficulty that the driver has in hauling the hose around with the pump in operation are the problems with which the present invention is primarily concerned.

In accordance with the invention, these objectives are attained by providing each delivery hose with a switch at the nozzle end thereof, each switch to control at least one circuit, that controlling the reel motor circuit in either or both directions or that controlling the ignition and starter circuits, or both circuits, the hose having a pair of spirally disposed parallel conduits within its wall and insulated from each other.

Another objective of the invention is to provide a nozzle switch controlling a single circuit consisting of a conduit portion provided with a flexible insulating sleeve whose ends are connected to the conduit portion to provide a chamber. An insulated conductor includes a contact within the chamber supported by the conduit portion but insulated therefrom. Within the chamber there is a resilient, bare, conductor member in electrical contact with the conduit portion and normally spaced from the contact but engageable therewith when the sleeve is squeezed inwardly by the operator. Where two circuits are to be controlled, two such switches may be employed but it is preferred to provide a single nozzle switch with the chamber established by the flexible sleeve divided by an annular member to establish two separate chambers, each for the contact of a respective one of the two conductors and with each engageable by the resilient conductor means by squeezing the sleeve inwardly, forwardly, or rearwardly of the annular member.

In practice, one of the conductors of the hose is connected to the conduit portion of such a switch and the other extends within the conduit portion and is connected through it to the contact or contacts. Where two contacts are used, they are connected in series by an intermediate capacitor so that both alternating and direct current may be carried by the same conductor with the desired current flow being effected by squeezing the resilient conductor inwardly against the appropriate contact.

In the accompanying drawings, there are shown illus-

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trative embodiments of the invention from which these and other of its objectives, novel features, and advantages will be readily apparent.

In the drawings:

FIGURE 1 is a somewhat schematic view of the delivery hose and reel of an oil delivery truck, the hose including a nozzle switch in accordance with the invention for controlling both alternating and direct current circuitry,

FIGURE 2 is a longitudinal section, on an increased scale, of the nozzle switch,

FIGURE 3 is a longitudinal section, on an increased scale, of the connection between the part of the lead that rotates with the reel and a fixed part thereof, and

FIGURE 4 is a longitudinal section of another nozzle switch in accordance with the invention for controlling a single circuit.

In FIGURE 1, a reel 10 for the hose 11 is shown as rotatably supported on a base 12 which, in practice, is mounted in any desired manner on the body, not shown, of a fuel oil delivery truck.

The nozzle 13 and the free end of the hose 11 are provided with fittings 14 and 15, respectively, threaded into opposite ends of the conduit portion 16 of a generally indicated nozzle switch 17 shown in FIGURE 2.

The conduit portion 16 has a pair of annular supports 18 for the ends of a flexible, resilient, insulating sleeve 19, typically of rubber, and the supports 18 have shoulders 20 which support the ends of a coiled spring 21. The sleeve 19 and the spring 21 overlie an intermediate annular member 22 which divides the space between the sleeve 19 and the conduit portion 16 into chambers 23 and 24.

The hose 11 is shown as having a pair of spiralled and parallel insulated conductors 25 and 26 incorporated in its wall. The end of the hose 11 within the fitting 15 has an internal metal sleeve 27 and the conductor 25 has a bared end 25a turned back over the outside of the hose 11 and lodged against the fitting 15 to ensure good electrical contact therewith. As the fitting 15, the conduit portion 16 and its supports 18, and the spring 21 are conductors of electricity, any part of the spring 21 becomes a switch contact.

The conductor 26 is likewise exposed at that end of the hose 11 and has a bared end 26a turned back over the outside of the hose 11 and is connected to a screw 28 extending through the hose 11 and the sleeve 27 and insulated therefrom and from the fitting 15 as indicated at 29. A cap 30 on the screw 28 connects a lead 31 thereto which extends within the conduit portion 16.

Within the chambers 23 and 24 and supported on the outer surface of the conduit portion 16 by insulation 32 are sleeve-like contacts 33 and 34, respectively, each having an insulated connection extending into the interior of the conduit portion. The connection of the contact 33 is indicated at 35 and is connected to the lead 31. The connection for the contact 34 is indicated at 36 and a capacitor 37 connects its inner part to that of the connection 36.

It will be apparent that the operator, by squeezing the sleeve 19 inwardly on one or the other side of the intermediate member 22 can bring the spring 21 into engagement with underlying contact thus to close a circuit with the circuit immediately opening if the operator releases his grip.

It will be noted that the axial support of the reel 10 includes a conduit 37 extending into the reel and provided with a radially disposed part 38 including an elbow 39 whose outer end is exposed exteriorly of the reel cylinder 40 having a fitting 41 connected to a fitting 42 on the proximate end of the hose 11 by a coupling sleeve 43. The fittings 41, 42, and the sleeve 43 are the counterparts

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of the fittings 14 and 15 and the conduit portion 16 as to the conductors 25 and 26 within the wall of the hose 11 with the conductor 25 grounded by connecting an end to the fitting 41 in the same manner that its other end is connected to the fitting 15.

One end of the conductor 26 is brought within the fitting 41 in the same manner that its other end is brought within the fitting 15. In the case of the fitting 41, however, the end of the conductor 26 is joined to a wire rod 44 provided with an insulating sleeve 45.

The conductor 37 is connected to the delivery pipe 46 from the pump, not shown, by a swivel joint 47 and the delivery pipe 46 has an elbow 48 having a threaded bore to receive a threaded plug 49, see FIGURE 3.

The plug 49 has a bore 50 receiving a sleeve 51 of stock that is a non-conductor of electricity and of a length to protrude beyond the inner end of the plug 49 to provide means for holding an end of a flexible sleeve 52 of stock that is a non-conductor of electricity and that covers a length of coil spring 53 which receives the end of the wire rod 44, the received end being bare and in electrical contact therewith. In this connection, it will be understood that the rod 44 turns with the reel 10. It may be a rather free fit within the coil spring 53 because it is never straight enough to avoid contact with a few turns thereof so that a good electrical contact is ensured with negligible friction between the relatively moving parts.

A screw 54 extends through the connector 55 of the lead 56, an insulating washer 57, and into contact with the proximate end of the rod 44 and also anchoring the proximate end of the spring 53.

The lead 56 may be connected to both alternating and direct current sources in view of the nozzle switch thus described with one source, when its circuit is completed, operating ignition and starter circuits, for example, and the other circuitry for controlling the motor 58 which has a belted drive 59 for the reel 10.

With such a control, the operator not only has control of the oil delivery but also of the motor and of the reel while with the nozzle switch generally indicated at 60 in FIGURE 4, only one basis of control is provided. As the embodiment of the invention detailed in FIGURE 4 is the same as that detailed in FIGURE 2 except that it has but one chamber and one conductor, the same reference numerals are employed but these are distinguished by the

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suffix addition "A," it being understood that the conductor therein shown may be either for a direct or an alternating current source.

I claim:

1. In fuel oil or like delivery apparatus, a reel, a hose including a nozzle and wound on said reel, a conduit axially of said reel and including a swivel at one end and externally of the drum and a connection with said hose at the other end thereof, and a lead including a portion extending from end-to-end of said hose and including a switch attached to said nozzle, a portion externally of said reel, and a connection between said portions including a stationary tubular portion extending along said conduit, a rotatable rod part extending along said conduit through said swivel and connected to said lead portion contained within said hose, and a coil spring lodged within said tubular portion with the rod extending within it and frictionally engaged thereby.

2. In a liquid delivery apparatus, a reel, a delivery conduit including a hose including a nozzle and wound on said reel, a conduit portion axially of said reel and rotatable therewith, said conduit portion including a swivel at one end and externally of the drum and a connection between said hose and the other end of said conduit portion, said swivel comprising rotor and stator parts, and a lead including a portion extending to the end of said hose and including a switch attached to said nozzle, a portion extending through said conduit portion, a portion externally of said reel, and a swivel connection between said last two-named lead portions extending into said conduit and axially of said reel and including stator and rotor parts, the stator part of the swivel connection between said lead portions being attached to the stator part of the conduit swivel.

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