Sept. 23, 1941. G. P. METESKY 2,257,059

SOLENOID PUMP

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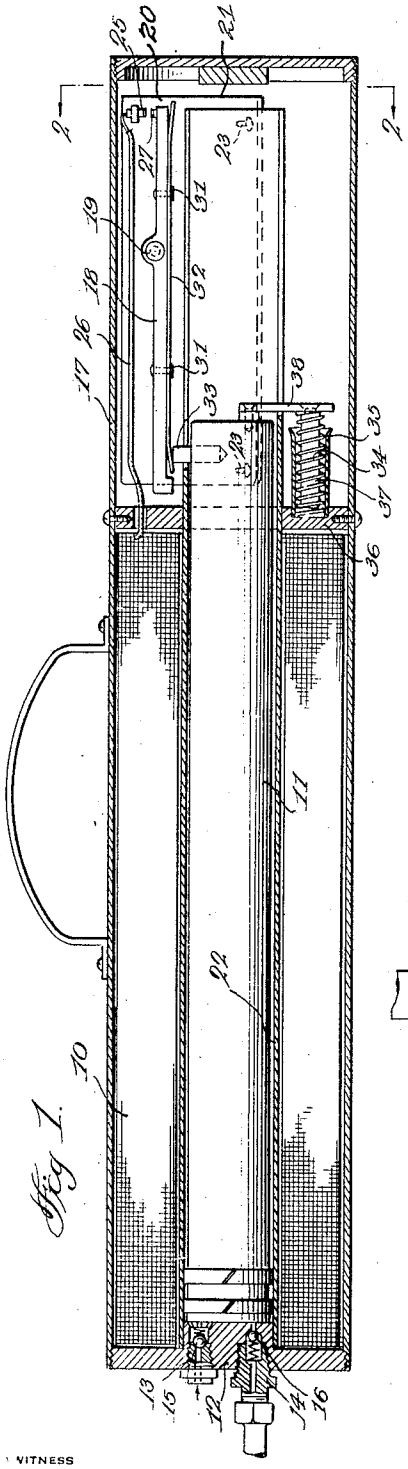


Fig. 1.

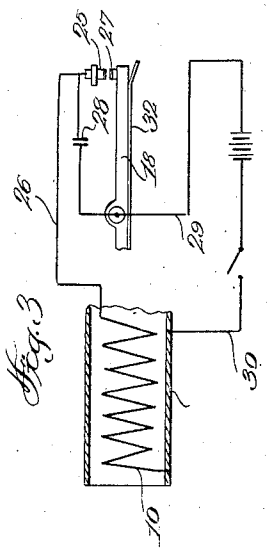


Fig. 3

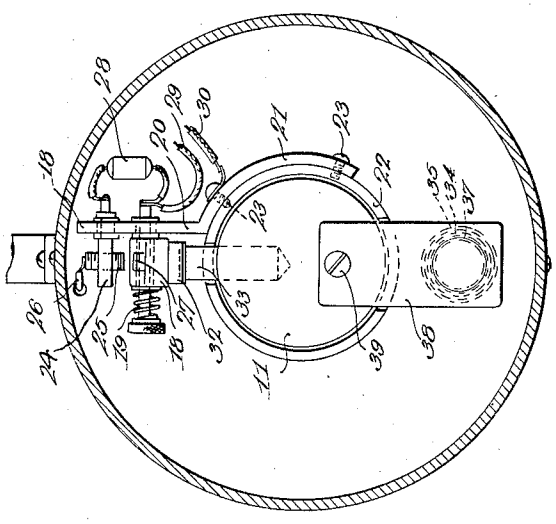


Fig. 2

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WITNESS

UNITED STATES PATENT OFFICE

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SOLENOID PUMP

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Application July 19, 1938, Serial No. 220,082

1 Claim. (Cl. 172—126)

This invention relates to solenoid pumps and has for an object to provide a device of this character having a reciprocating circuit breaker for positively making and breaking the circuit to the solenoid.

A further object is to provide a device of this character in which the circuit breaker is solenoid operated to closed circuit position and is spring retracted to open circuit position after each operation of the solenoid.

A further object is to provide a device of this character which will be formed of a few strong simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claim without departing form the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing forming part of this specification,

Figure 1 is a longitudinal sectional view of a solenoid pump constructed in accordance with the invention.

Figure 2 is an enlarged cross sectional view of the solenoid pump taken on the line 2—2 of Figure 1.

Figure 3 is a diagrammatic view showing the electrical connections of the pump.

Referring now to the drawing in which like characters of reference designate similar parts in the various views, the solenoid pump is shown to comprise a solenoid 10 having a core 11 in the form of a pump piston. One end of the solenoid is sealed by a plug cap 12 which is provided with an air intake valve 13 and an air outlet valve 14, these valves being provided with respective ball checks 15 and 16.

The housing 17 of the solenoid extends beyond the winding thereof and contains make and break switch mechanism comprising a lever 18 which is pivoted intermediate its ends on a pivot pin 19 carried by an arm 20 one end of which is provided with a curved attaching foot 21 which is secured to the pump cylinder 22 upon which the solenoid is wound and through the medium of screws 23 in Figure 2.

Secured to a lug 24 which projects from the outer end of the arm 20 is a contact point 25 which is connected by a conductor wire 26 to one end of the winding of the solenoid. The opposite end of the winding is grounded on any of the metal parts such as the pump cylinder 22 or housing 17. The contact point 25 coacts with a similar contact point 27 on the outer end of the pivoted lever to complete the circuit to the solenoid. A condenser 28 is connected across the contact points 25 and 27 as best shown in Figure 2 to prevent arcing. Circuit wires 29 and 30 are connected respectively to the contact point 27 and to the attaching foot of the arm 20 and may be connected to any suitable source of electric current.

Secured on the underside of the lever 18 through the medium of rivets 31 is a flat leaf spring both ends of which are curved outwardly away from the lever. The pump piston is provided adjacent its rear end with a projecting fiber cam lug 33 which, when the piston is drawn into the solenoid, engages the curved rear end of the spring 32 and causes the pivoted lever 18 to swing and break contact between the points 25 and 27. When contact is broken between the points 25 and 27 the piston is forced outwardly to initial position through the medium of a helical compression spring 34 which is housed in a casing 35 which is secured in any preferred manner to the end wall 36 of the solenoid. The spring is sleeved upon a plunger 37 carried by an arm 38 which is secured to the end of a piston through the medium of a screw 39, best shown in Figure 2. The spring 34 is compressed against its housing 35 during movement of the piston into the solenoid and immediately returns the piston to initial position after the solenoid is de-energized.

Good contact between points 25 and 27 is maintained by magnetic action of the solenoid core 11 pulling at the enlarged end 39 of the lever 18.

When the piston is returned by the spring to initial position the cam lug 33 engages the curved outer end of the leaf spring 32 and again swings the lever 18 to effect engagement of the contact points 25 and 27 for closing the circuit to the solenoid to again energize the solenoid and move the piston to its compression stroke.

Since the operation of the device has been described as the description of the parts progressed it is though that the invention will be fully understood without further explanation.

What is claimed is:

A reciprocating circuit breaker comprising a solenoid, a housing for the solenoid projecting at one end beyond the solenoid, a casing in the solenoid concentric with and projecting into the projecting end of the housing, there being a longitudinal slot in the projecting end of the casing, a

core for the solenoid movable in one direction into the solenoid and movable in the opposite direction into the slotted end of the casing, a lug of insulating material on one end of the core projecting through said slot, a metal lever pivoted intermediate its ends in the projecting end of the housing and extending longitudinally of the slot in the casing, a stationary contact point carried by the casing, a movable contact on one end of the lever, said contacts being electrically connected to the solenoid for closing a circuit through the solenoid, a leaf spring secured to and extending longitudinally of the lever having its ends curved away from the lever and adapted to be alternately engaged by said lug to move the contact points to open circuit and to closed circuit position, an enlarged end on the lever adjacent to the end of the solenoid attracted by the solenoid when energized to hold the contacts in good electrical engagement, there being a second longitudinal slot in the projecting end of the casing, an arm secured to the end of the score near said lug and projecting through the second slot, and a compression spring between the arm and solenoid adapted to be compressed when the core is drawn into the solenoid for returning the core to its outward limit of movement beyond the solenoid to move said contacts into circuit closing position.

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