

UNITED STATES PATENT OFFICE

2,258,586

ELECTROMAGNETICALLY OPERATED
PETROL SUPPLY PUMPKarl Glässing, Stuttgart, Germany, assignor to
Robert Bosch Gesellschaft mit beschränkter
Haftung, Stuttgart, GermanyApplication March 22, 1939, Serial No. 263,574
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7 Claims. (Cl. 172—126)

The invention relates to electromagnetically operated petrol supply pump of the type wherein a snap spring, which carries a contact, opens and closes the circuit dependently upon the armature movement.

In known fuel supply pumps of this type, the ends of the snap spring are disposed unyieldingly, so that in action the spring bends into an S shape, and consequently the drive must be placed near one end of the spring, and the operating contact near the other end. This results in complexity of construction.

The object of the invention is to try to eliminate this disadvantage and to increase the life of the spring.

According to the invention, in an apparatus of the type set forth, the snap spring is mounted in a longitudinally resilient manner, and a contact is disposed substantially centrally of the spring through which contact the movement of said spring is influenced by means of a counter contact associated with the armature.

An example of construction in accordance with the invention is shown in the accompanying drawing:

Figure 1 shows a full length section along the line I—I of Figure 2.

Figure 2 a full length section along line II—II of Figure 3.

Figure 3 a partial cross-section along line III—III of Figure 1.

Figures 4 and 5 are sectional views of the device in two different working positions.

The roughly cylindrical component 1a of the pump shell, which is closed at the top and provided with a threaded support 1 for connecting the fuel outlet pipe, is closed at the lower end by the component 2, which is held in position by the screw 3. The component 2 is provided with a threaded support 4, for holding the fuel inlet pipe, and a sieve 5. Between the shell components 1a and 2 are clamped a bed plate 6 and washers 7. On the underside of the plate 6, which is bored through the middle, is disposed a valve seating 8 to take the inlet valve 9. A core 10, having a boring which widens towards the top, is seated on the plate 6 and has a ring-shaped shoulder 11 on its inner periphery, on which a spring 11a is supported. The core 10 is surrounded by the non-magnetic brass guiding sleeve 12, around which is concentrically disposed the magnet coil 13, which in turn is enclosed in a soft iron sleeve 14. To two opposite points on the outer periphery of this sleeve 14 are attached (though insulated from the sleeve) two plate springs 15,

each of which reaches above the sleeve, and one of which is connected through a spring contact 17 with a leading in terminal 16. The upper ends of the springs 15 form the seating of the snap spring 18. This snap spring carries in the middle of its upper side a contact 19.

In the sleeve 12 there is a movable armature 20, constructed as a piston, which at its lower end tapers off downwards (23), and which is forced upwards by the spring 11a. The axially bored piston 20 has at its upper end a seating for the outlet valve 21 and an angular stirrup 22 which bends over the snap spring 18 and carries the counter-contact 22a for the contact 19. The counter-contact is insulated from the stirrup 22 and connected through a wire 22b with the coil 13. A lug 24 mounted on the end facing of the sleeve 14, which is closed at the top, limits the upward push of the piston 20. The shell component 1a which encloses the magnet coil consists, in cross-section of two arc-shaped cover pieces 25 joined together by two projecting pieces 26 (Figure 3). The parts 26 enclose the springs 15 and the means of fastening them to the sleeve 14. One of these shell parts 26 contains also the spring contact 17, which carries the current, and the end of the leading in terminal 16. The arc shaped shell parts 25 enclose the outer sleeve 14 of the magnet coil, allowing a little play.

The operation of the pump is as follows:

In the rest position, the piston 20 is pressed by the spring 11a against the stop 24. Both valves 9 and 21 are closed. The snap spring 18 is deflected upwards, its contact 19 lying against its counter contact 22a. There is then a conducting contact from the terminal 16 through the springs 17, 15, 18 and contact 19 to the counter-contact 22a, and from there through the wire 22b and the spool 13 to the mass of the casing. When the current is switched on the piston 20 is drawn into the spool 13 against the action of the spring 11a. The middle of the snap spring 18 with the contact 19 is pushed downwards by the contact 22a which descends with the piston 20. The snap spring now approaches its fully stretched position, as the plate springs acting as its seating bend outwards. At the same time, the valve 21 opens, and the fuel inside the piston passes into the casing 1a. When the piston has almost reached its lower stop position, i. e., the core 10, which acts as a stop, the snap spring 18 is stretched out straight by the descending counter-contact piece 22a (Figure 4). The next moment the spring 18, under the sideways pressure of the plate springs 15, snaps through into the down-

armature through which said electromagnet system is energised, in combination with a snap spring mounted at its ends in a longitudinally resilient manner, and a second contact abutable with the contact aforesaid and carried by the snap spring substantially centrally thereof by means of which second contact movements of the snap spring are influenced by the other contact borne by the displaceable armature.

6. An apparatus according to claim 4, in which there is a terminal contact piece supported by said shell and a terminal contact spring attached to one of said plate springs and arranged to resiliently abut the aforesaid terminal contact piece, and in which the shell is provided with projecting wall parts which provide laterally extending recesses to enclose said plate springs.

7. In a fuel pump, an electromagnet, an armature displaceable by said electromagnet, a con-

tact carried by said armature, a flat snap spring, means for resiliently supporting said snap spring at its ends to yieldingly permit longitudinal movement of said ends, said armature being formed to provide a reciprocable pump piston mounted between said resilient supporting means, and a second contact carried by said snap spring substantially centrally thereof and adapted to be engaged and moved by said first-mentioned contact to control a circuit through said electromagnet, said armature carrying means including said first-mentioned contact adapted to engage alternately opposite sides of said spring whereby said spring is engaged and moved in one direction by direct engagement of the armature with said spring and moved in the other direction by said armature through the contact carried thereby.

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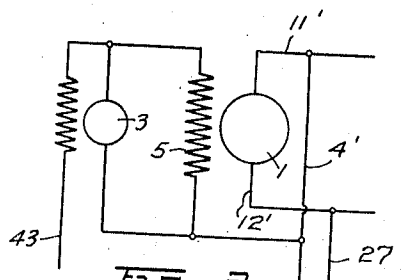
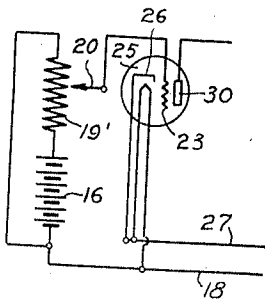
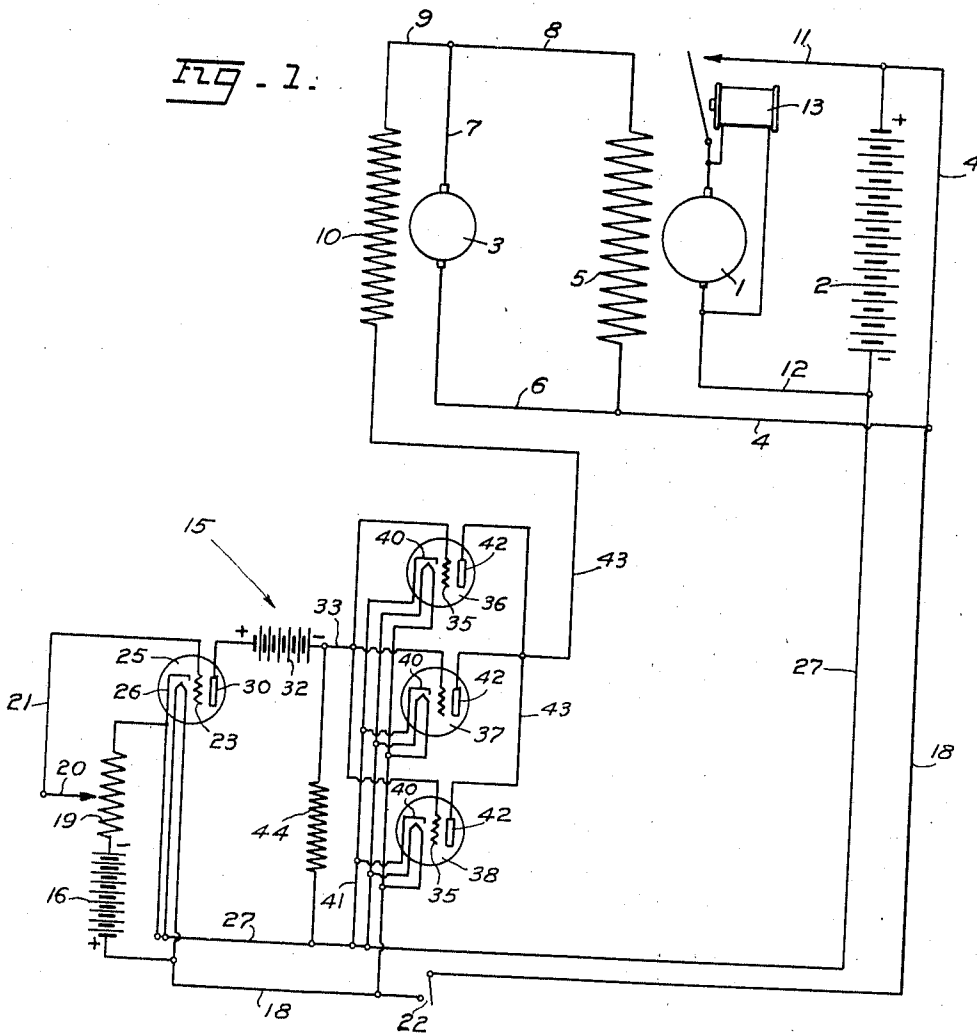
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VOLTAGE REGULATOR

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INVENTOR

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