Aug. 19, 1941. W. S. GARLAND 2,253,425

ELECTRIC SWITCH

Filed July 28, 1939

Fig. 1.

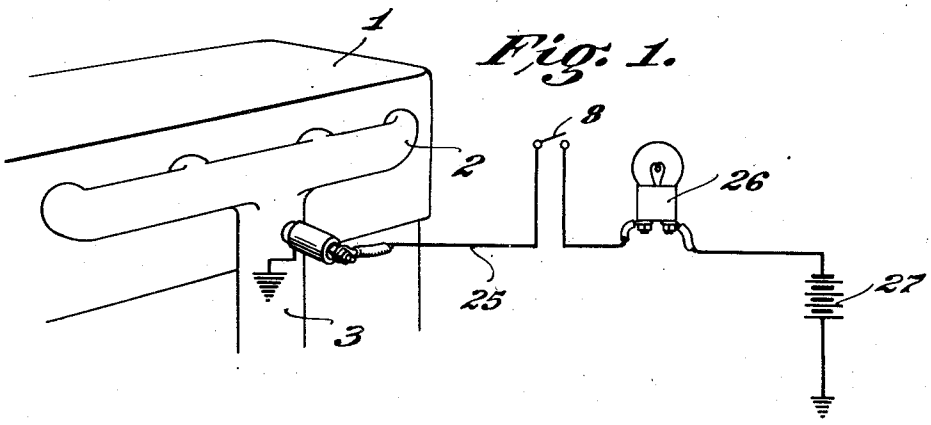


Fig. 2.

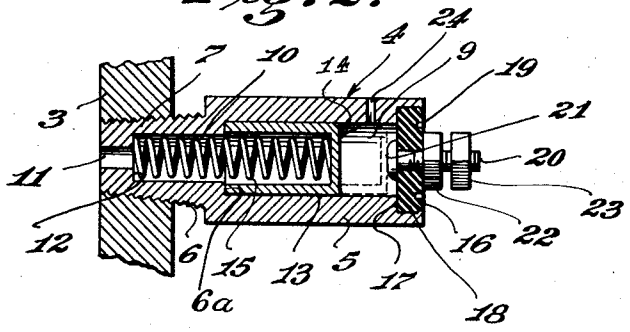
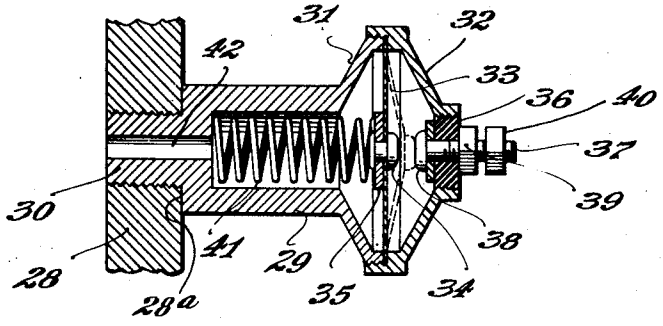


Fig. 3.



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ELECTRIC SWITCH

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1 Claim. (Cl. 200—82)

This invention relates to an improved electric switch and seeks, among other objects, to provide a device of this character which is adapted for use with internal combustion engines and which will operate for indicating below normal operating efficiency of the engine.

Another object of the invention is to provide an electric switch having a beacon light connected therewith which will be illuminated upon failure of the vacuum in the manifold of the engine to retain a normal operating efficiency, so that an operator may be warned of such subnormal operating efficiency of the motor to the end that corrective measures may be taken.

A further object of the invention is to provide an electric switch, the use of which will permit the operator of the motor to secure greater fuel economy and engine efficiency.

A further object of the invention is to provide a switch of this character which will be of simple construction and which may be installed with the utmost facility.

Other and incidental objects of the invention not mentioned hereinbefore will become apparent during the course of the following description.

Reference is now had to the accompanying drawing, wherein:

Figure 1 is a perspective view, partly in diagram, showing my improved electric switch as it would appear installed on an engine manifold,

Figure 2 is a longitudinal sectional view of the switch, and

Figure 3 is a longitudinal sectional view showing a slightly modified embodiment of the switch.

Referring now more particularly to the drawing, wherein like numerals of reference will be seen to designate like parts throughout the various views, the numeral 1 indicates a motor of the internal combustion type which may be of any suitable design. The motor has a conventional intake manifold 2 which is provided with a main intake pipe 3.

In carrying my invention into effect, I provide a switch member 4 which includes a valve or cylinder 5 having a reduced portion 6 at one end. The reduced portion 6 defines a shoulder 6a. The reduced portion 6 is further reduced to define an externally threaded neck 7 which is to be screwed into the pipe 3 near its upper end, or in any other convenient location. The cylinder 5 is provided throughout the major portion of its length with a bore 9. The bore 9 is reduced in diameter near its inner end to define a spring-receiving portion 10. A passage 11, disposed axially of the neck 7, leads from the inner end of the spring-receiving portion 10 to the interior of the manifold, said passage defining a spring base 12.

Snugly but slidably mounted in the bore 9 is a piston 13. The piston is provided with an end portion 14 and is hollow throughout its length. The piston is normally urged outwardly, that is to say, away from the manifold, by a coiled spring 15 which is mounted in the bore and spring-receiving portion.

In order to close the outer end of the cylinder and the bore, I provide an end wall 16 which is of insulating material. The end wall 16 is fitted into the end of the cylinder and engages against a shoulder 17 defined at the outer end of the bore 9 by said bore and a flange 18. The flange 18 is upset at diametrically opposed portions of its free edge for holding the wall 16 in place. Spanner openings 19 are provided for the outer surface of the wall 16 so that ready engagement by a spanner wrench will be permitted when it is desired to remove the wall 16. The end wall 16 has mounted therein a contact bolt 20 which has a contact head 21 thereon, the contact head 21 being adapted for engagement by the end portion 14 of the piston 13. Screwed on the contact bolt 20 is a lock nut 22, which lock nut, of course, secures the bolt 20 in position on the wall 16. A securing nut 23 is screwed on the bolt 20 and provides means whereby a wire may be effectively connected to the switch member.

Formed in the cylinder 5 of the member 4 is a vent opening 24 which will permit escape of air confined between the outer portion 14 of the piston and the inner surface of the end wall 16. The opening 24 may be located in the wall 16 if desired.

After the device has been installed, as shown in Figures 1 and 2, a conductor 25 has one of its ends connected to the contact bolt 20. The other end is connected to one terminal of an ignition switch 8, the other terminal of said switch 8 being connected to a warning device, such as the signal light 26. The other terminal of the warning device 26 is connected to one terminal of the battery 27. The other terminal of the battery is connected to the frame of the vehicle, as is the cylinder 5 of the switch member 4. If desired, a single pole switch may be interposed in the wiring for cutting the device in and out of the circuit. Of course, in actual use, the device will be connected to the ignition switch of the motor vehicle or motor so that said device will not become operative until the switch is turned on. When the switch has been turned to the "on" position, the

light 26 will burn. When the motor is started, however, vacuum created in the intake manifold by the movement of the cylinders will cause the piston 13 to be drawn in the cylinder 5, away from the end wall 16. The end portion 14 will thus be kept out of engagement with the contact head 21. The circuit to the warning device 26 will thus be opened. This condition will prevail so long as the vacuum in the manifold is maintained at a proper level. In the event that the vacuum in the manifold drops to a sub-normal position, such as would be caused by stalling of the motor, or poor vacuum condition, the spring 15 will urge the piston in the cylinder until the end portion 14 engages the head 21. The circuit will then be completed to the warning device 26 and the same will be illuminated, or sounded, as the case may be, for indicating to the operator that the vacuum condition is sub-normal or that the motor has stalled. Fuel waste may be reduced to a minimum. It should be understood that the tension of the spring will be predetermined so that said spring will operate when a predetermined vacuum condition exists. It will now be understood that, by the use of my improved electric switch, it will be possible for an operator to maintain a motor running at maximum efficiency.

Referring now to the modification of the invention as shown in Figure 3, the numeral 28 indicates a portion of a manifold. A cylinder 29 has a neck 30 which is screwed into the manifold. A shoulder 28a limits inward movement of the cylinder. The cylinder 29 is provided with an enlarged portion 31 which is externally threaded to receive an enlarged circular cap 32. Confined between the cap and the portion 31 is a diaphragm 33 on which is mounted a contact 34, said contact being mounted on a disk 35. Mounted in the cap 32 is a plug 36 of insulating material, and secured to the plug is a contact bolt 37. A contact head 38 is carried on the contact bolt, and said contact bolt is held in place by a nut 39. A securing nut 40 provides means for securing a conductor to the device.

Mounted in the cylinder 29 is a spring 41. A bore 42 leads from the cylinder 29 to the interior of the manifold 28. In operation, a suitable vacuum condition in the manifold will result in the retention, by said vacuum, of the diaphragm 33, away from the cap 32. The contact 34 will be retained away from the head 38 and the electric circuit will be broken. Should the condition of vacuum fall to sub-normal, the spring 41 will overpower the vacuum condition and will urge the diaphragm toward the cap 32 so that the contact 34 will engage the head 38 for closing the electric circuit. The wiring in the modified form is identical with that of the preferred form.

Having thus described the invention, what is claimed as new is:

An electric switch including a switch member having a sleeve formed with a bore, said bore being reduced to define a shoulder and a spring receiving portion, a piston slidable in the bore and having a closed outer end portion and an open inner end portion, an end wall of insulating material closing the bore at its outer end, said bore having an opening defining a vent, a contact bolt carried on the end wall and having a contact head within the bore, and a spring carried in the spring receiving portion and extending within the piston and normally urging the end portion of the piston into engagement with the contact bolt, said piston being shiftable against the tension of the spring for disengaging the end portion from the contact head by suction from an intake manifold, said shoulder engaging the open inner end of the piston and limiting inward movement thereof, said piston defining a guide for said spring and said vent admitting air to the bore for allowing movement of the piston therein.

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