July 21, 1931. C. T. MANSUR 1,815,415

STARTING SWITCH FOR AUTOMOBILE ENGINES

Filed Feb. 4, 1927 2 Sheets-Sheet 1

Fig. 1.

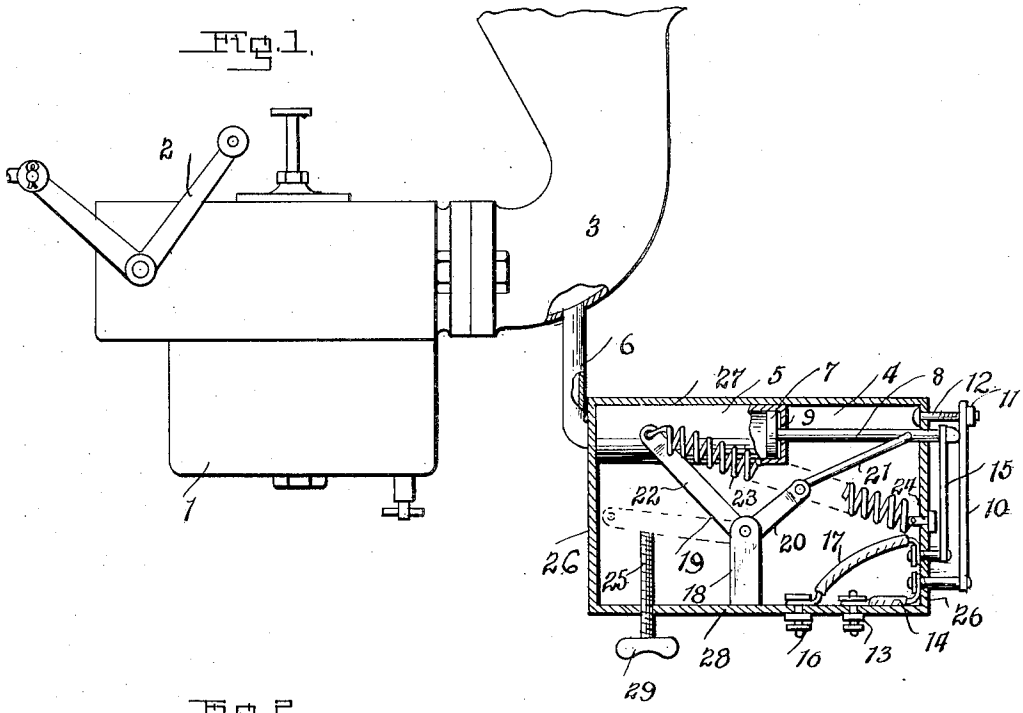
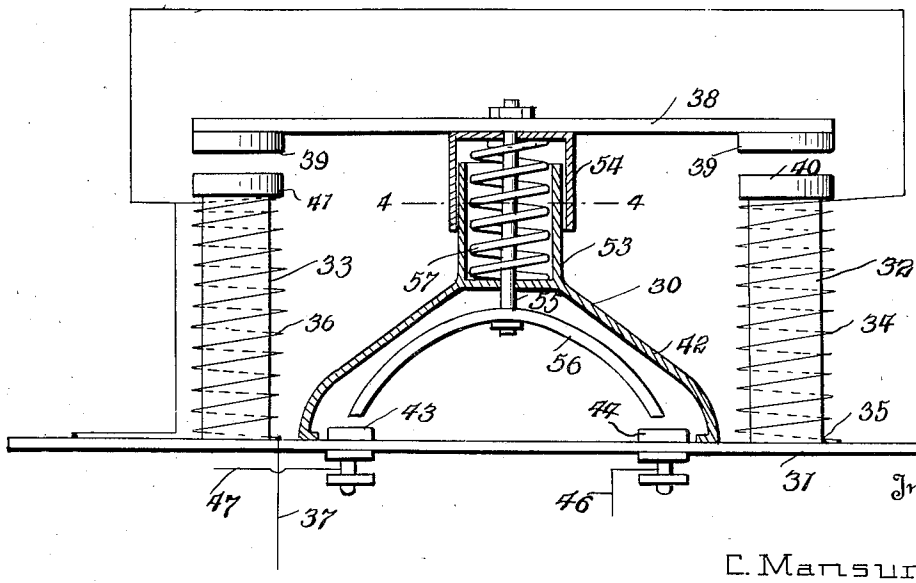


Fig. 2.



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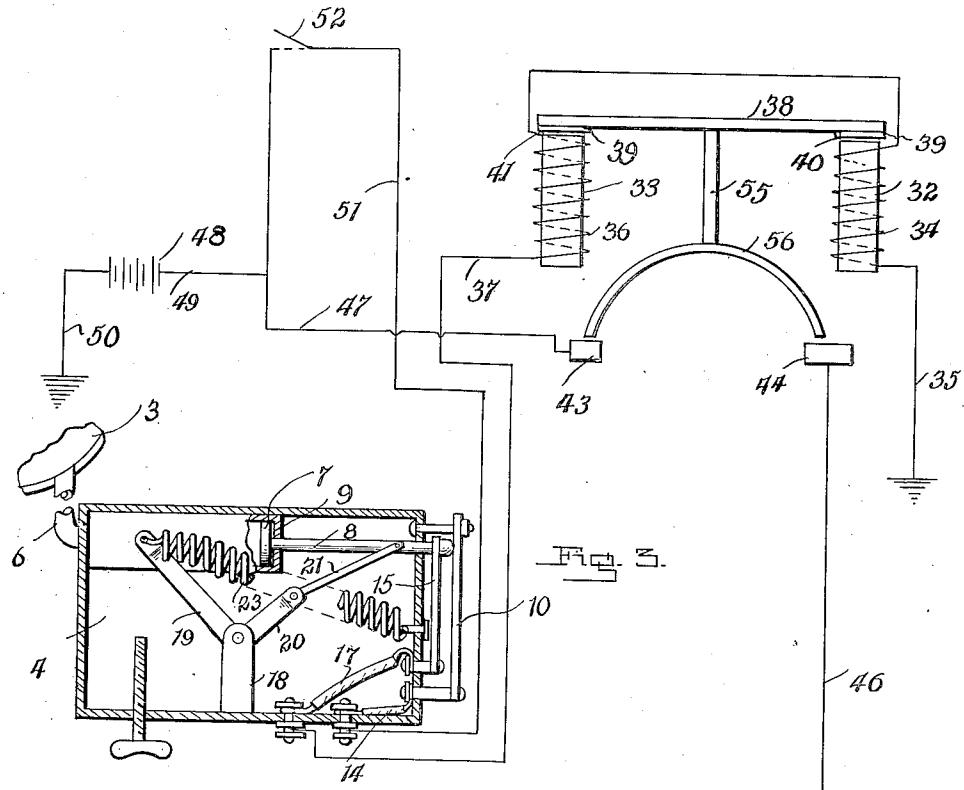


Fig. 3.

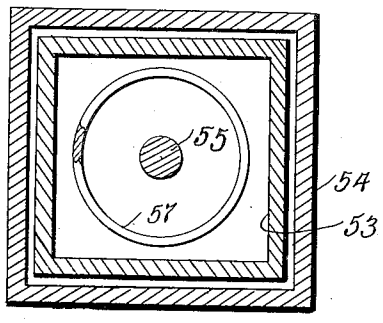


Fig. 4.

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UNITED STATES PATENT OFFICE

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STARTING SWITCH FOR AUTOMOBILE ENGINES

Application filed February 4, 1927. Serial No. 165,968.

The present invention is directed to improvements in starting switches for automobile engines.

The primary object of the invention is to provide a device of this character so constructed that when the ignition switch is closed the starting motor will be placed in operation, thereby starting the engine without the necessity of actuating a starting button, or the like, as is now customary.

Another object of the invention is to provide a device of this character so constructed that the vacuum created in the intake manifold of the engine will automatically control the operation of the starting motor, whether initially starting the automobile or should the same become stalled in traffic.

In the accompanying drawings:

Figure 1 is a side elevation of the device showing the same associated with the intake and carbureter of a motor vehicle.

Figure 2 is a view, partly in section, showing the switch controlled by the construction shown in Figure 1.

Figure 3 is a view of the wiring circuit.

Figure 4 is a sectional view on line 4—4 of Figure 2.

Referring to the drawings, 1 designates a carbureter and 2 the throttle valve operating lever, the mixture from the carbureter, as customary, entering the intake manifold 3.

Fixed to the engine, not shown, or on any other part of a motor vehicle is a frame 4, having fixed thereto a cylinder 5, said cylinder being in communication with the manifold 3 through the pipe 6. Slidable in the cylinder is a piston 7, the rod 8 fixed thereto being extended through the head 9 of said cylinder.

A relatively rigid contact plate 10 is supported by the frame 4 and may be adjusted, if desired, through the medium of the nut 11 and threaded shaft 12, the inherent resiliency of said plate operating to this end. This plate is in circuit with the binding post 13 through the conductor 14, and also supported by the frame 4 is a resilient contact arm 15 in circuit with the binding post 16 through the conductor 17. A post 18 is supported by the frame 4 and pivotally supported thereby is a bell crank lever 19, the arm 20 of which is pivotally connected to the piston rod 8 by a link 21. The arm 22 of the lever has the rear terminal of the coil spring 23 connected thereto, the forward end of which is secured to the frame 4 by an adjustable screw 24. The spring normally holds the contact arm 15 in contacting relation with the plate 10. To limit the rocking movement of the lever 19 in one direction a screw 25 is carried by the frame and obviously arrests the movement of the arm 22, as indicated in dotted lines in Figure 1. The frame 4 is preferably formed with end flanges 26 and top and bottom flanges 27 and 28, the screw 24 being engaged in one end flange, while the post 18 is supported by the lower flange, as is the screw 25, which is provided with a head 29 to facilitate the adjustment thereof.

The starting motor switch is designated generally by the numeral 30 and comprises a metallic plate 31 adapted to be attached in any suitable manner upon the motor vehicle. The plate has fixed thereto electro-magnets 32 and 33, the coil 34 of the former being grounded through the wire 35, while the coil 36 of the latter is in circuit with the post 16 through the conductor 37.

The armature 38 has contacts 39 upon its ends for contact with the contact heads 40 and 41 of the respective magnets.

Supported upon the plate 31 is a housing 42, contact plates 43 and 44 being carried by said plate and located in the housing. The contact plate 44 is in circuit with the starting motor 45 through the conductor 46. The contact plate 43 has leading therefrom a conductor 47 which is in circuit with the battery 48 through the wire 49, the battery being grounded through the wire 50. The circuit is completed through the arm 15 and plate 10 through the conductor 51 when the ignition switch 52 is closed.

Upon the housing 42 is mounted a casing 53, and telescopically engaged therewith is a casing 54, said casings being rectangular in cross section, to prevent rotation of the armature 38 to which the casing 54 is fixed. Having its upper end fixed centrally to the armature 38 is a bolt 55, the lower end of which

slidably extends through the bottom of the casing 53 and is fixed to the contact bar 56, the terminals of which are adapted to contact with the plates 43 and 44 at certain times.

As shown in Figures 1 and 3 the arm 15 is in contact with the plate 10, the tension of the spring 23 being sufficient to overcome the tension of the said arm. When the ignition switch 52 is closed the circuit will be closed through the conductors 37 and 51 and arm 15 and plate 10, thus energizing the magnets 32 and 33 to attract the contacts 39, whereupon the terminals of the contact bar 56 will engage the contact plates 43 and 44, completing the circuit to the starting motor 45, whereupon the engine, not shown, is turned over. This action creates a suction in the intake manifold 3 and a partial vacuum is created in the cylinder 5 through the pipe 6, thus drawing the piston 7 outwardly against the tension of the spring 23. The retraction of the rod 8 obviously permits the arm 15 to flex, thus breaking the circuit through said arm and plate 10. This operation, of course, deenergizes the magnets 32 and 33 whereupon the spring 57, mounted in the casings 53 and 54, will lift the armature 38 to elevate the bar 56, instantly stopping the starting motor 45. It will be understood that as soon as the engine is in motion sufficient suction is present in the cylinder 5 to pull the piston 7 rearwardly a sufficient distance to withdraw the arm 15 from contact with the plate 10, thus breaking the circuit as long as the engine is running. Obviously when the engine stops suction in the cylinder ceases, whereupon the spring 23 acts to move the arm 15 into contact with the plate 10.

Having thus described the invention, I claim:

1. A circuit breaker of the character described comprising a frame, contacts carried by said frame, one contact being movable towards and away from the other and normally remaining in engagement therewith, cylinder carried by said frame having one end adapted for connection with suction exerting means, a piston slidable in said cylinder, a rod extending from said piston through the other end of said cylinder and connected to the movable contact whereby the movable contact may be moved out of engagement with the other contacts when the piston is moved by suction created in said cylinder, a lever pivotally connected with said frame, a link connecting said lever with the piston rod, and a spring having one end connected with said frame and its other end with said lever and serving to yieldably resist pivotal movement of the lever in one direction and normally retain the movable contact in engagement with the other contact.

2. A circuit breaker of the character described comprising a frame having upper and lower flanges and end flanges, contacts connected with one end flange, one contact being stationary and the other movable towards and away from the stationary contacts, a cylinder carried by said frame and extending longitudinally of the upper flange and having its outer end adapted for connection with a source of suction, a piston slidable in said cylinder, a rod extending from said piston through the other end of said cylinder and slidably passing through the first mentioned end flange and attached to the movable contact whereby the movable contact may be moved out of engagement with the stationary contact when the piston is acted upon by suction in the cylinder, a support carried by lower flange, a bell crank lever pivoted to said support, a link connecting one arm of said lever with the piston rod, and a spring having one end connected to the first mentioned end flange of said frame and its other end connected to the other arm of the bell crank lever and serving to yieldably resist pivotal movement of the lever and normally retain the movable contact in engagement with the stationary contact.

In testimony whereof I affix my signature.

CECIL T. MANSUR.