Sept. 2, 1924. 1,507,193

H. E. MAY ET AL

CUT-OUT

Filed Sept. 9, 1922

Fig. 1.

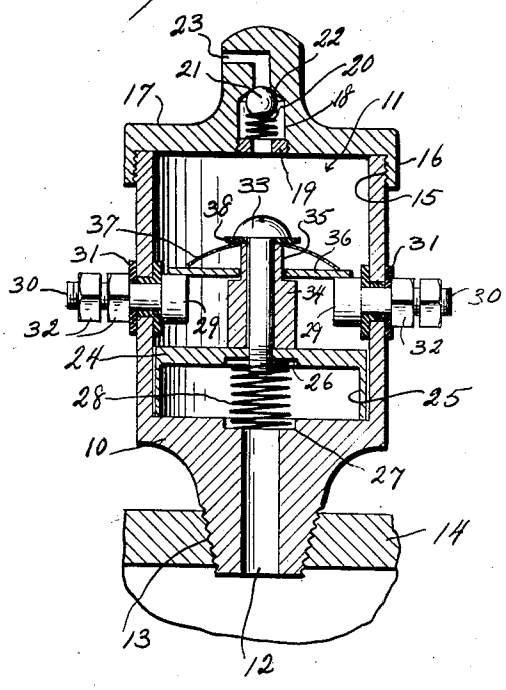
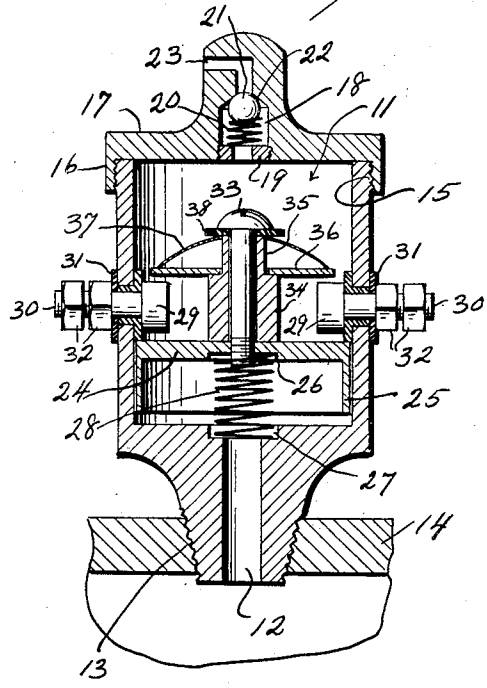


Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY E. MAY AND ROBERT W. SELLMAN, OF DETROIT, MICHIGAN.

CUT-OUT.

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To all whom it may concern:

Be it known that we, HENRY E. MAY and ROBERT W. SELLMAN, citizens of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Cut-Outs, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in cut-outs for the electrical circuits of internal combustion engines.

An important object of the invention is to provide a circuit breaker which automatically disconnects the circuit of the engine from its source when the engine is stopped and which connects the circuit of the engine with its source immediately upon actuation of the engine to start the same.

A further object of the invention is to provide a device of this character which is operated by the suction created within the cylinders of the engine during operation thereof.

A still further object of the invention is to provide a device of this character which is extremely simple in its construction, can be made very small so that it occupies but a small space and which is capable of application directly to the intake manifold of an engine.

These and other objects we attain by the construction and arrangement shown in the accompanying drawings wherein for the purpose of illustration is shown a preferred embodiment of our invention and wherein like reference characters designate like parts throughout.

In the drawings:—

Figure 1 is a vertical sectional view taken through a cut-out constructed in accordance with my invention showing the position assumed by the parts during the operation of the engine; and

Figure 2 is a similar view showing the position assumed by the parts when the engine is stopped.

Referring now more particularly to the drawings, the numeral 10 indicates a body portion preferably cylindrical in form and having an internal bore 11 opening through its upper end. The lower end of the body portion 10 has formed therein a port 12 opening through the bottom of the body portion and communicating with the bore 11. This lower end of the body portion is adapted, as at 13, for engagement in an opening formed through the wall of the intake manifold 14 of an internal combustion engine. The upper end of the body portion 10 has its wall exteriorly screw-threaded, as indicated at 15, for the reception of an internally threaded flange 16 of a closure cap 17. The cap has formed therein centrally a bore 18, the lower end of which is screw-threaded for the reception of an annular spring supporting ring 19 upon which the lower end of a spring 20 is seated, the upper end of this spring abutting a check ball 21 and forcing the same into engagement with a seat 22 formed at the junction of the upper end of the bore 18 with an outlet port 23 opening through the wall of the cap.

Slidably mounted in the lower end of the bore 11 of the body portion 10 is a piston 24 having a depending guide skirt 25, the engagement of which with the walls of the bore 11 is such that it will permit a very small amount of air to leak thereby. Formed in the lower face of the piston 24 and in the upper face of the lower wall of the chamber 10 are opposed spring seats 26 and 27 in which are seated the ends of a spring 28 acting to force the piston 24 upwardly within the bore 11. It will be seen that the chamber 10 taken together with its cap 17 forms a cylinder having a piston operating therein and provided in its opposite end walls with ports, one of which permits the entrance of air and prevents withdrawal and the opposite end of which permits of withdrawal of air from within the cylinder, means also being provided for urging the piston toward that end of the cylinder through which the incoming air is introduced.

The numeral 29 designates contacts having stems 30 extended through the wall of the chamber 10 and insulated therefrom, as indicated at 31, the upper ends of the stems having nuts 32 mounted thereon and forming binding posts for the attachment of lead wires of the circuit to be controlled. Mounted centrally in the upper surface of the piston 24 is a pedestal screw 33, the lower end of which is surrounded by a bushing 34 and the upper end of the bushing being reduced, as indicated at 35, and having slidably mounted therein a thin metallic disk 36 forming a switch arm. Upon the upper surface of the disk is mounted a spring 37 which is bowed and has

its ends engaging the disk and its central portion apertured for the reception of the reduced portion 35 of the bushing. Between the upper end of the bushing and the head of the pedestal screw 33 an insulatory washer 38 is disposed.

In the operation of the cut-out, when the engine is being started either by crank or starting motor, the suction created within the cylinders creates a vacuum below the piston 24 and the piston is drawn downwardly against the action of its spring 28, the ball 21 unseating against the action of its spring 20 to permit air to enter above the piston. When the piston reaches the lower limit of its travel, the disk 36 is brought into engagement with the contacts 29, electrically connecting the same, the spring 37 permitting a slight upward movement of the disk 36 upon its mounting and insuring the tensioned engagement of this disk with its contact. During the period when the piston is in that position shown in Figure 2, when the piston reaches the lower limit of its travel, the ball 21 will be seated by the action of its spring forming an air tight chamber above the piston and preventing the return of the same to normal position, particularly in view of the fact that this piston is at all times acted upon by the suction created within the engine and accordingly at all times during the operation of the engine the disk is held in engagement with the contacts. When the engine is stopped the piston 24 will be slightly lifted by its spring 28 and the contacts accordingly disconnected, eliminating possibility of current leakage from the battery during periods when the engine is not in operation. During this upward movement of the piston under the influence of the spring 28, the movement of the piston is retarded by the fact that the chamber above the same is air-tight and accordingly this movement is slow, permitting the engine to completely stop before the break of contact is made. During this slow upward movement the spring 37 maintains the contact 36 in engagement with the contacts 29 for a remote period of the movement and until the contact member 36 reaches the shoulder formed by the reduction of the member 34.

A device constructed as above set forth may be made very small in size without in any manner detracting from the operation thereof and it is believed that it will be obvious that such a device is particularly well adapted for the purpose for which it is intended in view of the fact that it may be employed to break the circuit without depending upon the usual hand operated switch, the operation of which is often neglected and which when in operative position often results in current losses from the battery at periods when the engine is idle. It will furthermore be obvious that the construction as hereinbefore set forth is capable of some change and modification without departing from the spirit of our invention and we accordingly do not limit ourselves thereto except as hereinafter claimed.

We claim:—

1. In a cut-out of the character described, a cylinder, ports formed in opposite end walls of the cylinder, means coacting with one of said ports for preventing withdrawal of air from within the cylinder, the other of said ports being adapted for connection for the source of suction a piston arranged within the cylinder and loosely fitting the same, means normally forcing said piston toward the end of the cylinder in which the last named port is disposed, contacts extended into and insulated from the walls of the cylinder, and a connecting member for said contacts carried by said piston and engaged with said contacts upon movement of the piston in a direction away from the end of the cylinder provided with the last named port.

2. In a cut-out of the character described, a cylinder, ports formed in opposite end walls of the cylinder, means coacting with one of said ports for preventing withdrawal of air from within the cylinder the other of said ports being adapted for connection for the source of suction, a piston arranged within the cylinder and loosely fitting the same, means normally forcing said piston toward the end of the cylinder in which the last named port is disposed, contacts extended into and insulated from the walls of the cylinder, and a connecting member for said contacts carried by said piston and engaged with said contacts upon movement of the piston in a direction away from the end of the cylinder provided with the last named port, the connection of said connecting member and said piston including a mounting for said connecting member carried by the piston and permitting limited relative movement of the connecting member and piston.

3. In a cut-out of the character described, a cylinder, ports formed in opposite end walls of the cylinder, means coacting with one of said ports for preventing withdrawal of air from within the cylinder, the other of said ports being adapted for connection for the source of suction a piston arranged within the cylinder and loosely fitting the same, means normally forcing said piston toward the end of the cylinder in which the last named port is disposed, contacts extended into and insulated from the walls of the cylinder, a connecting member for said contacts carried by said piston and engaged with said contacts upon movement of the piston in a direction away from

the end of the cylinder provided with the last named port, the connection of said connecting member and said piston including a mounting for said connecting member carried by the piston and permitting limited relative movement of the connecting member and piston, and means carried by said mounting resiliently urging said connecting member toward said piston.

In testimony whereof we hereunto affix our signatures.

HENRY E. MAY.
ROBERT W. SELLMAN.