T. J. MURPHY.

TIME SWITCH.

APPLICATION FILED AUG. 5, 1914.

1,152,433.

Patented Sept. 7, 1915.

Fig. 1.

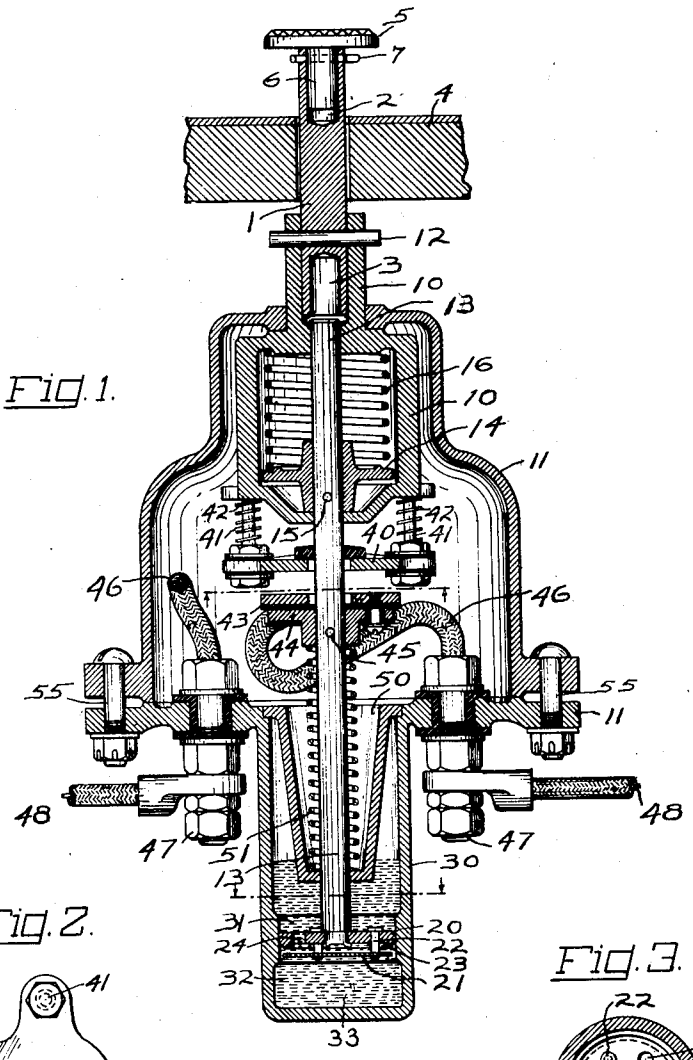


Fig. 2.

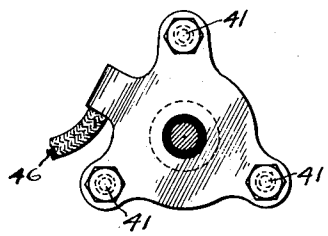
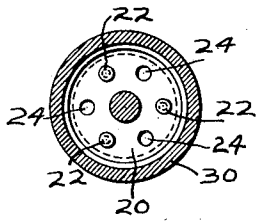


Fig. 3.



WITNESSES:-

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TIME-SWITCH.

1,152,433. Specification of Letters Patent. Patented Sept. 7, 1915.

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To all whom it may concern:

Be it known that I, THOMAS J. MURPHY, a subject of the King of Great Britain, and a resident of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Time-Switch; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to time switches, and it particularly is applicable to an electric motor starter for an automobile engine.

It has for is object to provide a switch which may be closed for a short interval of time and at the expiration of the interval will be automatically opened by the continuation of the closing movement or pressure of the switch.

The invention may be contained in many forms of constructions usable for different purposes all of which come within the purview of my claims hereafter appended. To show the practicability of my invention I have selected one of such constructions as an example and shall describe it hereinafter. The construction selected is illustrated in the accompanying drawings.

Figure 1 illustrates a vertical sectional view of the particular switch selected. Fig. 2 is a view of a contact plate shown also in Fig. 1. Fig. 3 is a transverse section showing the buffer piston for regulating the interval in which the piston is closed.

1, Fig. 1, is an actuating member which may be of any form. As shown in the illustration it is a short rod having in its end sockets 2 and 3. It may extend through a floor 4 of an automobile and be actuated by a pedal 5 having the hub or spindle 6 which is secured in the socket 2 in the upper end of the rod 1 by means of the pin 7. The switch may be operated by the operator pressing his foot upon the pedal 5.

The lower end of the rod 1 is secured to a housing 10 movable in a shell 11, by means of a pin 12. The upper end of a rod 13 is slidably movable in the housing 10 and the socket 3 located in the lower end of the rod 1. A disk 14 is secured by the rod 13 by means of a pin 15. A spring 16 is located intermediate the upper end of the housing and the disk 14. The spring 16 tends to keep the disk 14 at the lower end of the housing and elastically holds the rod 13 down to the farthermost point, depending upon the location of the disk 14 on the rod 13. The rod 13 is connected to a detent for temporarily holding it so that the contacts will be held closed for a short time. The detent is in the form of a buffer having a piston 20.

A valve disk 21 is supported on movable pins 22 below the piston 20 and is adapted to seat on the circular ridge 23 located on the bottom of the piston 20. The piston 20 is also provided with openings 24 which are closed by the disk 21. This forms a clap valve which resists the downward movement of the piston 20, but allows a free upward movement of the piston. The piston 20 is located in a cylinder 30 forming a part of the lower end of the shell 11. The piston moves in a contracted portion 31 of the cylinder 30 and detains the piston 20. The part 32 of the cylinder below the contracted portion is enlarged so as to permit the buffer material such as air, oil, or glycerin, to pass freely around the periphery of the piston when the piston is moved into said lower part 32. The two parts of the shell 11 are secured together by the bolts 55.

A contact plate 40 is supported by means of pins 41 below the lower end of the housing 10, so as to permit vertical movements of the contact 40 relative to the housing 10. The plate 40 and the pins 41 are elastically held away from the lower end of the housing 10 by the springs 42. A coacting contact plate 43 is secured to the rod 13 by means of the hubbed disk 44, and the pin 45. The contacts 40 and 43 are suitably insulated from the other parts of the switch. Each contact is connected through the insulated wires 46 and binding posts 47 with an external circuit 48.

An inverted thimble 50 is located on and depends from the top of the cylinder 30, and is shouldered in the upper end of the cylinder. A spring 51 having a lighter resisting pressure than the spring 16 is located between the lower end of the thimble 50 and the disk 44. The spring 51 presses upon the

rod 13 in a direction opposite to the pressure produced by the spring 16, but the spring 51 having a lighter resisting pressure the disk 14 connected to the rod 13 is held at the bottom of the housing 10.

When the housing 10 is pushed downward by the pedal 5 the contacts 40 and 43 immediately close, the rod 13 being held up by the piston 20 as the valve disk 21 is immediately closed. The spring 16 is compressed and tends to drive the rod 13 and the piston 20 downward. The valve disk 21 being closed the fluid seeps by the piston 20 very slowly and consequently allows the piston 20 to descend very slowly. Meantime the external circuit 48 through the binding post 47 is closed. When the piston 20 reaches the enlarged portion 32 where the fluid will freely pass around the periphery of the piston, the spring 16 will snap or throw the piston 20 to the bottom of the cylinder 30 consequently separating the contacts 40 and 43, thereby breaking the external circuit by the operation of the spring 16. The contact 43 will be held away from the contact 40 notwithstanding the fact that the pedal 5 may be held down by the foot of the operator, the movement of the pedal being limited by the pin 12. When the pedal is released the spring 51 operates to lift the housing 10, the rod 13 and the piston 20. The valve disk 21 thereby being removed from its seat 23, the piston 20 and the other parts freely move upward. The piston 20 again enters the contracted portion 31 of the cylinder 30 and when the pedal 5 is again pressed downward the valve disk 21 is closed, contact is made between the contacts 40 and 43 and the spring 16 being compressed operates to slowly force the piston 20 down the contracted portion 31 of the cylinder 30 whereupon rod 13 is released and the circuit is opened. When the spring 16 has been compressed by movement of the pedal 5 a short distance it will continue to move the piston 20 notwithstanding the fact that there is no further downward movement of the pedal by the foot. Under such conditions the spring 16 continues to operate the rod 13 and piston 20 after the foot has moved the pedal but a short distance by reason of the fact that the piston acting as a buffer delays the operation of the spring 16 consequently, if time is given for the operation of the spring 16, the rod will continue to be moved by the spring 16.

The pins 41 and the springs 42 may be so constructed as to slightly tilt the upper contact 40 so that when the circuit is broken there will be a slight shearing movement of the contacts relative to each other and break any welding that might occur by reason of the increased current formed in the breaking of the circuit.

The construction selected and described may be greatly varied in the arrangement and manufacture of its parts and in the substitution of elements having equivalent functions and such modifications may be used for many varied purposes and still contain the invention.

What I claim as new and desire to secure by Letters Patent is as follows:

1. The combination of a housing, a contact connected to the housing, a rod movable in the housing, a spring for actuating the rod in one direction relative to the housing, a second contact secured to the rod, a releasable buffer secured to the rod and a second spring for returning the housing, contacts and the rod to their normal positions.

2. The combination of a pair of contacts, a member for closing the contacts, one of the contacts secured to the member, a yielding member connecting the first member to the other contact and means for regulating the time interval in which the contacts are closed.

3. The combination of a pair of contacts, a closing member for closing the contacts, a spring connecting the closing member with one of the contacts, a detent released in the closing operation of the closing member for permitting the said spring to open the contacts.

4. The combination of a pair of contacts, a closing member for closing the contacts, a spring connected between the contacts for separating the contacts and a detent for temporarily holding the contacts in closed relation.

5. The combination of a pair of contacts, a closing member for closing the contacts, a spring located intermediate the contacts for opening the contacts and a spring for returning the contacts to their normal positions and a detent for permitting the contacts to be temporarily retained in their closed positions.

6. The combination of a pair of contacts, a closing member, a spring located intermediate the contacts, one of the contacts connected to the closing member, the other contact connected to the spring and a buffer connected to one of the contacts for holding the contacts closed against the opening operation of the spring.

7. The combination of a pair of contacts, a member for closing the contacts, one of the contacts connected to the member, a yielding means located intermediate the contacts, a buffer connected to the other of the contacts for holding the contacts closed against the operation of the yielding means, a second yielding means for returning the contacts to their normal positions.

8. The combination of a pair of contacts, a member for closing the contacts, one of the contacts connected to the member, a

yielding means located intermediate the contacts, a buffer connected to the other of the contacts for holding the contacts closed against the operation of the yielding means, a yielding means for returning the buffer, the closing member and the contacts to their normal positions.

In testimony whereof, I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

THOMAS J. MURPHY.

Witnesses:

ROBERT B. COCHRAN,

EDWARD MILLER.