

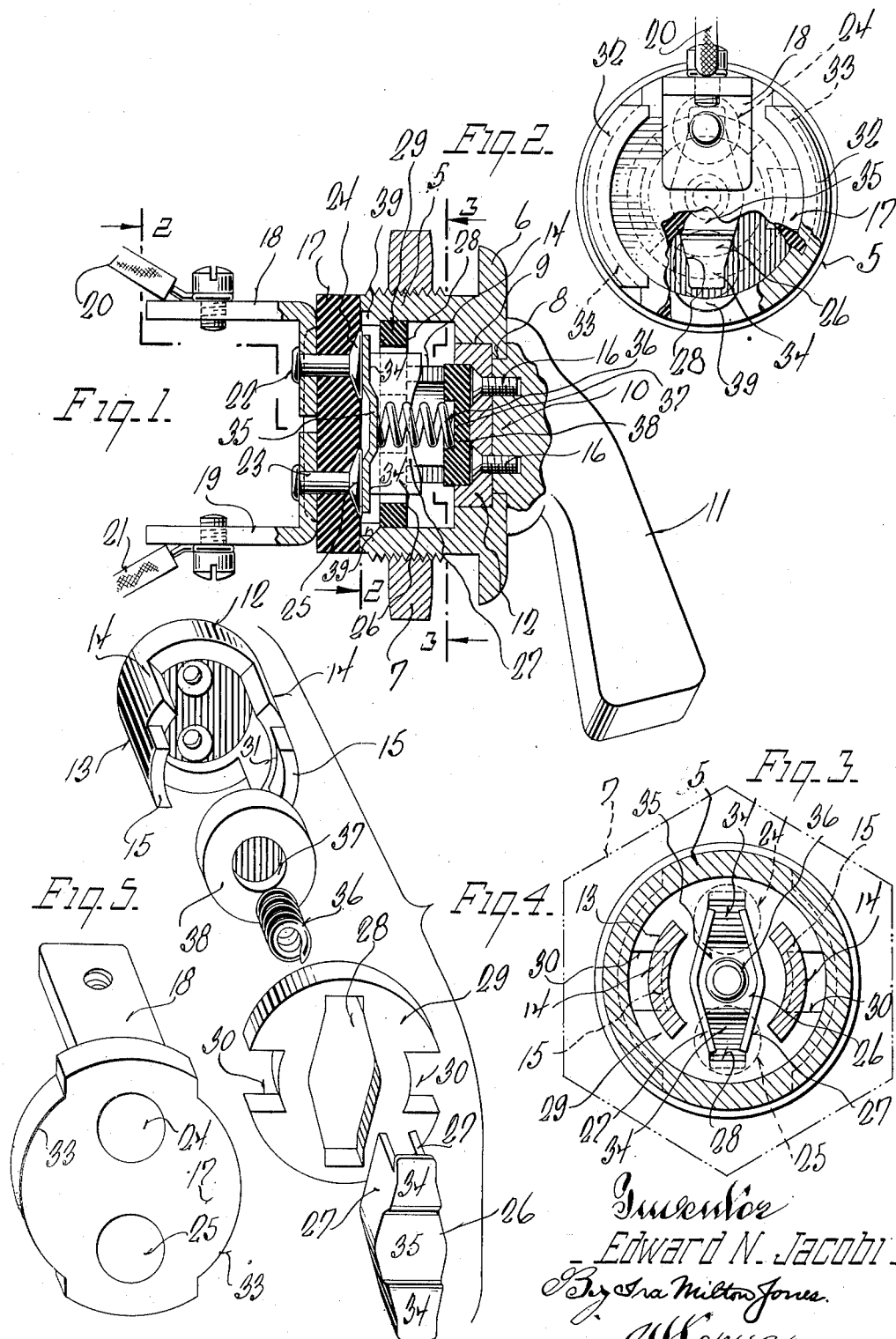
June 6, 1933.

E. N. JACOBI

1,912,982

SWITCH

Filed Nov. 4, 1929



Inventor
Edward N. Jacobi
By Ira Milton Jones
Attorney

UNITED STATES PATENT OFFICE

EDWARD N. JACOBI, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO BRIGGS & STRATTON CORPORATION, OF MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

SWITCH

Application filed November 4, 1929. Serial No. 404,670.

This invention relates to certain new and useful improvements in switches, particularly to the type designed for making and breaking the ignition circuit of an automotive vehicle, although it is not limited to such use, and is a continuation in part of my application filed April 2, 1929, Serial No. 357,118 now Patent Number 1,842,451.

The primary object of this invention is to simplify the construction of a switch of this type, reduce the number of its parts, afford maximum strength, and assure ease of operation and good electrical contact between its contacts.

Another object of this invention resides in the provision of an actuator for driving the movable contactor and the novel manner of connecting it with the movable contactor whereby a positive drive is assured and the application of relatively strong spring pressure to the contactor is facilitated.

Another object of this invention resides in the provision of a switch of the character described wherein the movable contactor is stamped from a single sheet of metal and is approximately channel shaped with enlargements thereon forming contact points.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawing, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a transverse sectional view with parts in elevation taken through a switch embodying my invention;

Figure 2 is an end view partly in elevation and partly in section taken through Figure 1 on the plane of the line 2—2;

Figure 3 is a transverse sectional view

taken through Figure 1 on the plane of the line 3—3;

Figure 4 is a perspective view of the movable contactor assembly with the component parts thereof in disassembled position; and

Figure 5 is a perspective view of the terminal carrying head and stationary contacts carried thereby.

Referring now more particularly to the accompanying drawing in which like numerals designate like parts throughout the several views, the numeral 5 represents a housing or casing which in the present instance is approximately cup-shaped having its outer closed end flanged as at 6 to engage the outer face of a mounting panel, not shown, in an aperture of which it is secured by a clamp nut 7 threaded on the casing.

The outer closed end of the casing has a central bore 8, counterbored at its inner end as at 9. An annular boss 10 projected from an actuating handle 11 is rotatably received in the bore 8 and is held in position by the inner closed end 12 of a switch actuator 13 secured thereto to be rotatable with the handle by screws 16 or the like. The side walls of the actuator are grooved or cut away to provide a pair of diametrically opposed lugs 14 from the ends of which driving ears or projections 15 protrude, to provide means for imparting the handle controlled movements of the actuator to a movable contactor as will be later described.

The inner open end of the housing 5 is closed by a terminal head 17 carrying terminals 18 and 19 with which suitable conductors 20 and 21 may be respectively connected, the terminals being secured to the head 17 by rivets 22 and 23 respectively, the heads 24 and 25 of which are embedded in the inner face of the terminal head to form the stationary contacts of the switch. The contacts 24 and 25 are adapted to be electrically bridged, to complete the circuit in which the switch is incorporated, by a movable contactor 26 whose position is controlled by the handle 11.

The movable contactor, as best illustrated in Figure 4 is stamped from bendable metal and is of substantially elongated and approximately diamond shape having side flanges

27 extended laterally from its sides to be freely slidably received in a similarly shaped aperture 28 in a drive member 29. The drive member 29 is preferably in the form of a disc of insulating material mounted in the bore of the casing or housing and has diametrically opposite peripheral notches 30 to receive the ears 15 of the actuator. The actuator is thus non-rotatably but axially movably connected with the drive member, the inward movement of the drive member being limited by the shoulders 31 formed by the ends of the lugs 14 from which the ears 15 protrude.

Outward displacement of the drive member is prevented by the terminal head 17 which is secured over the open end of the housing 5 by spaced projections 32 extended therefrom and spun over the outer face of the terminal head as best shown in Figure 2, the periphery of the terminal head being reduced in diameter at opposite sides as at 33 to receive the projections 32.

The ends 34 of the movable contactor extend beyond its medial portion 35 to form raised contact portions and to provide sufficient electrical clearance between the stationary contacts when the contactor is in its "off" position. A good electrical contact between the ends 34 of the movable contactor and the stationary contacts 24 and 25 is insured by the action of an expansive spring 36 confined between the medial portion of the contactor and an insulated spring seat 38 nested within the actuator 12, the spring being guided at one end by the side flanges 27 of the contactor and at its other end by a recess 37 in the insulated seat 38.

To obtain maximum contact area it is essential that the stationary contacts be of considerable diameter which brings them close to the wall of the housing 5, and to provide the necessary electrical clearance without increasing the size of the housing, the inner wall is notched opposite each stationary contact as at 39, see Figures 1 and 2.

The movable contactor 26 being of approximately channel and diamond shape can receive considerable pressure and consequently the spring 36 may be comparatively strong to insure a good wiping contact as it is moved onto and off of the contacts, and as the contactor is free to move axially in the drive member, and the spring turns with the movable elements, it is evident that the switch may be compacted into a small convenient size, without undue friction to oppose its movements and produce excessive wear.

What I claim as my invention is:

1. In a switch structure, a casing, a stationary contact carried by the casing, a movable contactor adapted to be engaged with the stationary contact, a drive member having an irregular aperture in which the movable contactor is freely axially movable but otherwise held against relative movement

with respect to the drive member, an actuating member, means connecting the drive member with the actuating member whereby movement thereof moves the drive member to move the movable contactor into and out of engagement with the stationary contact, and means yieldably urging the movable contactor in an axial direction toward the stationary contact.

2. In a device of the character described, a casing, a terminal head carried by the casing, a stationary contact on said terminal head, a movable contactor of irregular shape and engageable with the stationary contact, an actuating member movable in the casing, projections extended from the actuating member, and a drive member having a central opening to non-rotatably receive the movable contactor and having notches to receive the projections extended from the actuating member whereby the movable contactor is rotatable with the actuating member.

3. In a device of the character described, a casing, an actuating member rotatable therein, a terminal head closing the casing, stationary contacts on the terminal head, a movable contactor of irregular shape within the casing and adapted to bridge the stationary contacts, a drive member having a correspondingly shaped central opening to non-rotatably receive the movable contactor, projections extended from the adjacent end of the actuating member and received in recesses formed in the drive member, whereby rotation of the actuating member is imparted to the movable contactor, and spring means extended through the opening in the drive member and bearing against the movable contactor and the actuating member to yieldably urge the movable contactor through the opening in the drive member and toward the terminal head.

4. In a device of the character described, a casing, an actuating member rotatable therein, a terminal head closing the casing, stationary contacts on the terminal head, a movable contactor of irregular shape within the casing, a drive member, a correspondingly shaped central opening to non-rotatably receive the movable contactor and rotatable in the casing to guide the movement of the movable contactor, projections extended from the actuating member and received in recesses formed in the drive member whereby rotation of the actuating member is imparted to the movable contactor, spring means extended through the opening in the drive member and bearing against the movable contactor and the actuating member to yieldably urge the movable contactor through the opening in the drive member and toward the terminal head, and a spring seat of insulating material carried by the actuating member to receive the adjacent end of the spring means

to insulate the movable contactor from the actuating member.

5. In a device of the character described, a casing, a terminal head carried by the casing, a stationary contact on said terminal head, a movable contactor of elongated shape engageable with the stationary contact, a drive member having a correspondingly shaped aperture to receive the movable contactor, operating means within the mounting member and engaged with the drive member whereby the movable contactor is rotatable with the operating means, and spring means urging the movable contactor toward the terminal head, the movable contactor being free to move in the drive member aperture under the influence of said spring means.

6. The combination with a switch structure of the character described, of an elongated movable contactor substantially U shaped in cross section and stamped from a single piece of bendable metal, and a drive member having an elongated central opening to receive the movable contactor with its side walls engaged with the sides of the opening whereby the movable contactor is non-rotatably but axially slidably connected with the drive member.

7. In a switch device of the character described, a terminal head, spaced stationary contacts carried by the terminal head, an elongated movable contactor adapted to be moved to and from a position electrically bridging the stationary contacts, the medial portion of the movable contactor being wider than the distance between the stationary contacts and the ends of the contactor which engage the stationary contacts being in a plane outwardly of that of the medial portion thereof whereby electrical clearance between the stationary contacts and the movable contactor when the same is in a position at which its ends are disengaged from the contacts is provided, means for actuating the movable contactor, and means yieldably urging the movable contactor toward the terminal head.

8. The combination with a switch device of the character described, including spaced contacts, of an elongated movable contactor substantially U shaped in cross section mounted for movement to and from a position engaging its ends with the stationary contacts, and spring means for urging the movable contactor ends into intimate engagement with the stationary contacts when the contactor is moved to its position bridging the same, the sides of the movable contactor being directed toward each other at the ends of the contactor to form a restricted chamber in which the spring means is received and guided.

9. In a switch of the character described, a terminal head having spaced stationary con-

tacts, a substantially elongated diamond shaped movable contactor having laterally directed side walls so that the contactor is U shaped in cross section, said side walls converging toward the ends of the contactor with the diamond shape thereof to form a chamber on one side of the contactor, a drive member having a central opening corresponding in shape to the movable contactor to non-rotatably receive the same with the side walls of the opening engaging the said walls of the contactor, an actuator non-rotatably connected with the drive member for imparting rotation to the movable contactor to move the same to a position bridging the stationary contacts, and spring means having one end seated in the chamber formed by the side walls of the contactor and its other end bearing against the actuator for yieldably urging the contactor toward the terminal head.

10. In an electric switch, a bored mounting member, a rotatable switch element, and means for supporting the switch element for rotation about the axis of the mounting member bore and for axially sliding movement comprising, a member having a snug but freely movable engagement directly with the wall of the bore and an opening in which the switch element is axially slidably received.

11. In an electric switch, a bored mounting member, a rotatable switch element, and means for supporting the switch element for rotation about the axis of the mounting member bore and for axially sliding movement comprising, a member having a snug but freely movable engagement directly with the wall of the bore, and means connecting the switch element with said member, said means permitting free axial sliding of the switch element with respect to said member but preventing relative rotation of said parts.

12. In an electric switch, a mounting member having a bore, a rotatable switch element, and means supporting the switch element for rotation about the axis of the mounting member bore and for axial sliding movement within the mounting member bore comprising, a disc having its outer periphery directly engaged with the wall of the bore and having an opening in which the switch element is axially slidably received.

13. In an electric switch, a bored mounting member, a rotatable switch element having a part of non-circular cross section, and means for supporting the switch element for rotation about the axis of the mounting member bore and for axially sliding movement in the bore, comprising a disc of insulating material having its outer periphery contacting directly with the wall of the bore and an opening therein to receive said non-circular part of the switch element.

14. In an electric switch, a bored mount-

ing member, a rotatable switch element having a non-circular part, and means for supporting the switch element for rotation about the axis of the mounting member bore and for axially sliding movement within the mounting member comprising a disc of insulating material having substantial thickness and having its periphery contacting directly with the wall of the bore whereby the disc is rotatably supported in the mounting member independent of other means, and said disc having an opening to receive the non-circular part of the switch element.

15. In an electric switch, a cylindrical casing, a rotatable switch element, and a driver for the switch element having an opening to non-rotatably but slidably receive the switch element and being rotatably mounted in the cylindrical casing by contracting directly with the inner wall thereof.

16. In an electric switch, a bored mounting member, a stationary contact, a rotatable switch element within the mounting member bore and engageable with the stationary contact, a driver mounted for rotation within the mounting member bore by contacting directly with the wall of the bore, said driver having an opening to non-rotatably but slidably receive part of the switch element, yieldable means independent of the driver for providing contact pressure for the switch element, and an actuator non-rotatably connected with the driver.

17. In an electric switch, a mounting member having a bore, an actuator supported from the mounting member for rotation about the axis of the bore, a rotatable switch element having a non-circular part, and means for mounting the switch element within the mounting member bore and for imparting rotation from the actuator to the switch element comprising, a member having an opening receiving the non-circular part of the switch member and contacting directly with the wall of the bore, and a non-rotatable connection between said member and the actuator.

18. In an electric switch, a bored mounting member, an actuator carried by the mounting member and rotatable about the axis of the bore, a rotatable switch element in the mounting member bore and having a non-circular part, and means for supporting the switch element in the mounting member bore and for imparting rotation from the actuator to the switch element comprising, a disc of substantial thickness having an opening to receive the non-circular part of the switch element and having its periphery contacting directly with the wall of the bore, and a non-rotatable connection between the actuator and said disc, said non-rotatable connection being readily separable upon axial movement of the disc away from the actuator beyond a predetermined degree.

19. As a new article of manufacture, a channel-shaped contactor having flanges on its long sides constituting guide surfaces and provided in its central web with contacts.

In testimony whereof I have hereunto affixed by signature.

EDWARD N. JACOBI.