June 8, 1943. E. E. JOHNSON 2,321,212

ELECTRIC SWITCH MEANS

Filed July 23, 1940 2 Sheets-Sheet 1

Fig. 1.

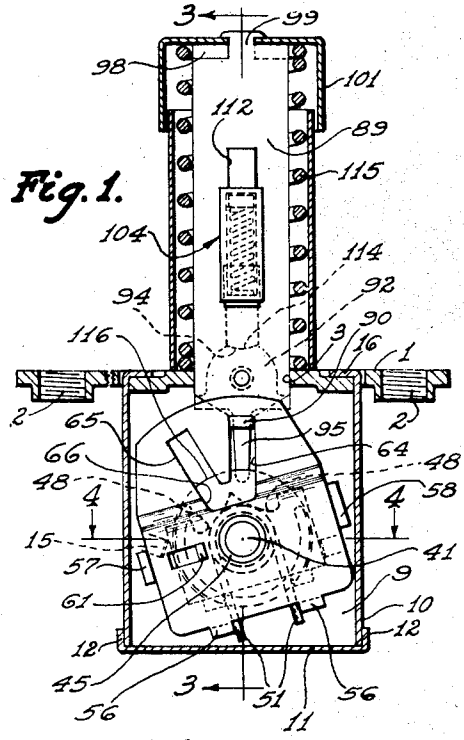


Fig. 2.

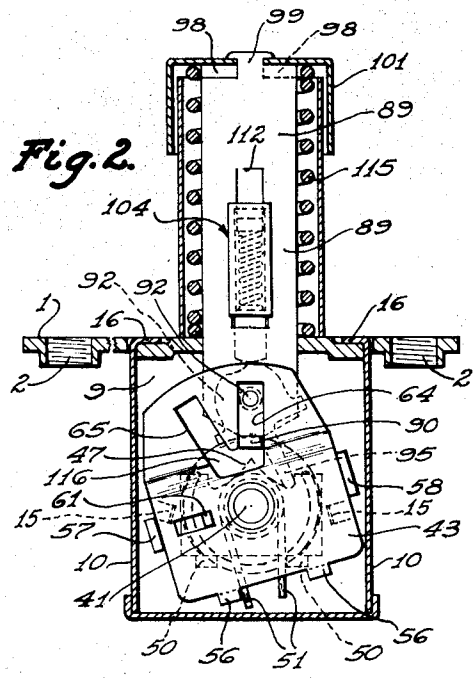


Fig. 3.

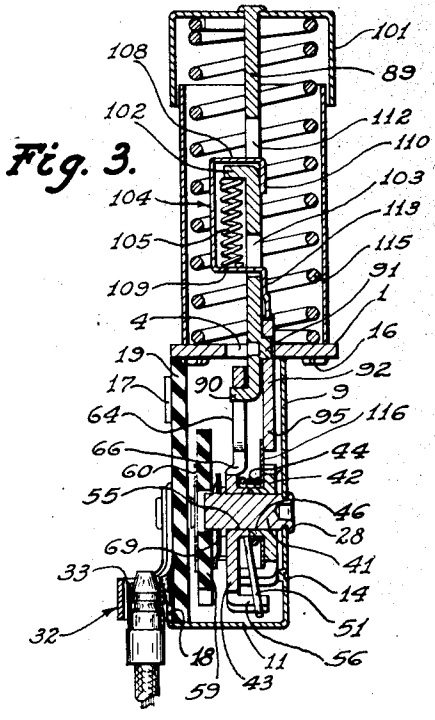


Fig. 4.

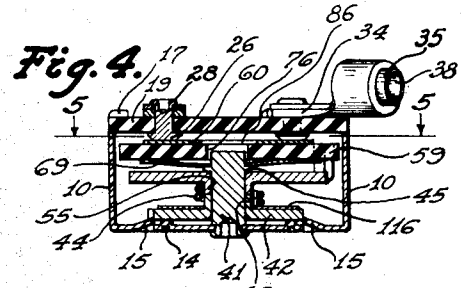
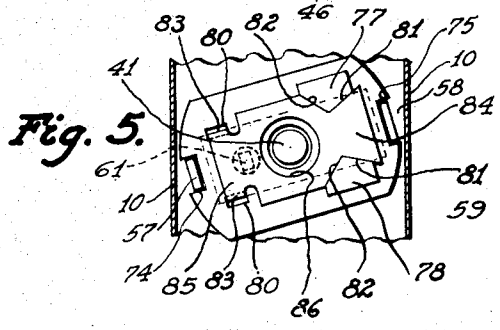


Fig. 5.



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Fig. 6.

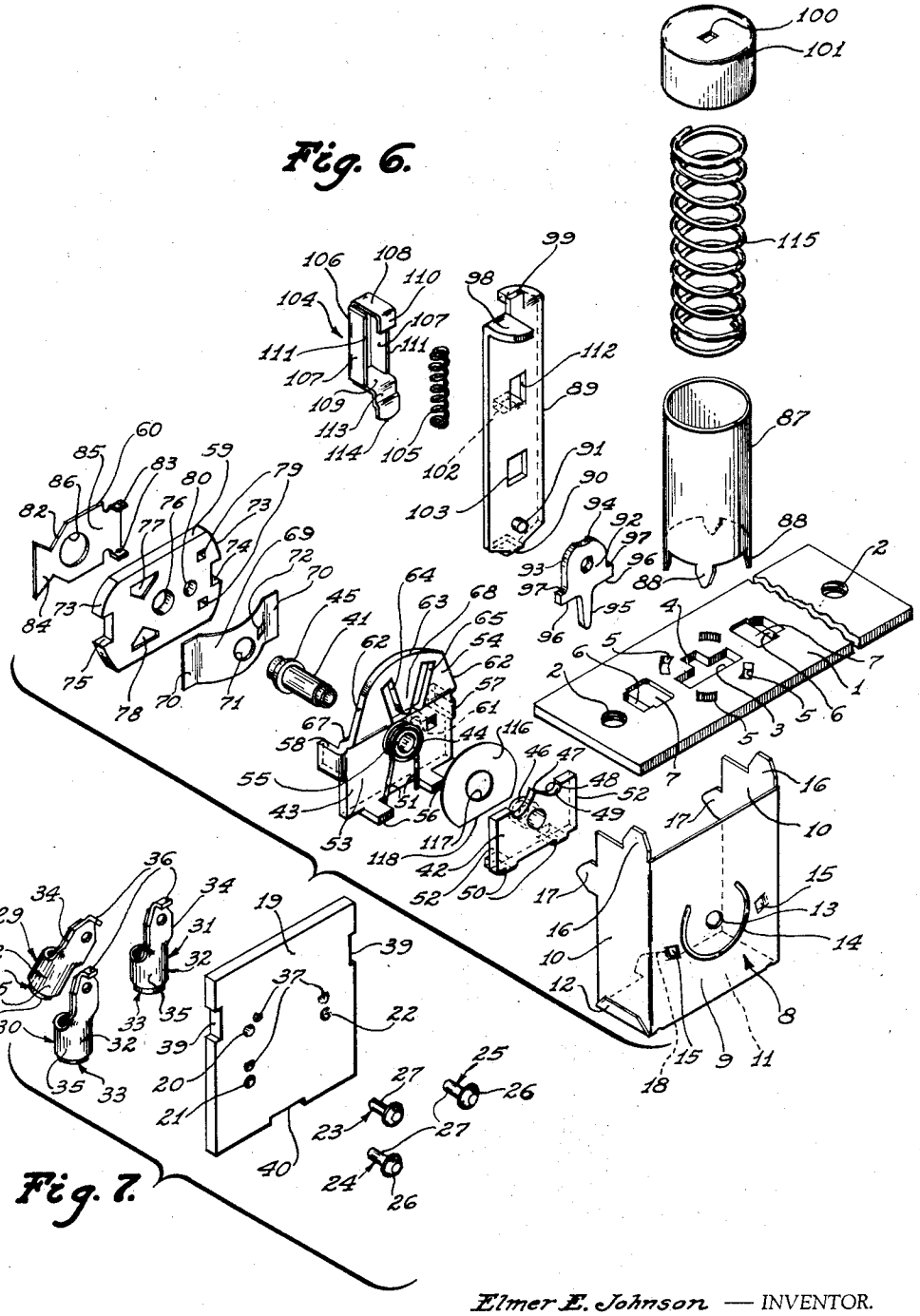


Fig. 7.

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2,321,212

ELECTRIC SWITCH MEANS

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Application July 23, 1940, Serial No. 347,033

17 Claims. (Cl. 200—6)

This invention relates to electrical control means, more particularly to the type of control means suitable for use with an automotive vehicle, and the principal object of this invention is to provide new and improved means of this character.

In the drawings accompanying this specification and forming a part of this application, I have shown, for purposes of illustration, one form which my invention may assume, and in these drawings:

Figure 1 is a longitudinal sectional view of my invention, parts being broken away to better accommodate the view to the sheet;

Figure 2 is a sectional view similar to Figure 1, but showing certain parts of the embodiment in a different relation;

Figure 3 is a longitudinal sectional view corresponding substantially to the line 3—3 of Figure 1;

Figure 4 is a transverse sectional view corresponding substantially to the line 4—4 of Figure 1;

Figure 5 is a fragmentary sectional view corresponding substantially to the line 5—5 of Figure 4;

Figure 6 is a disassembled perspective view of the parts comprising my invention; and

Figure 7 is a perspective view of additional parts.

The control means or switch comprises an oblong generally plane plate 1, which is provided with apertures 2 at its longitudinal extremities, to provide for the attachment of the plate to a suitable support, as for instance a part of an automotive vehicle. Formed on the longitudinal axis of the plate 1 is an elongated slot 3, one longitudinal margin of the slot being provided with a rectangular recess 4, as best shown in Figure 6. Spaced from the longitudinal margins of the slot 3 are arcuate slots 5 circumferentially arranged and spaced from the transverse margins of the slot are apertures 6, each of the apertures 6 communicating with a recessed well portion 7 formed in the upper surface of the plate 1.

A housing or casing 8 is adapted for securement to the plate 1, the housing, as shown in Figure 6, being preferably formed of a single piece of sheet metal and generally box shaped. The housing is provided with a front wall 9, relatively narrow side walls 10 formed by bending inwardly extensions of the wall 9, and an end wall 11, the latter wall having extremities upwardly bent as shown at 12 to overlap an adjacent portion of the side walls 10. The front wall 9, substantially near its central portion, is provided with a hole 13, which is preferably partially surrounded by a circular inwardly extending corrugation 14. This wall is also provided with inwardly extending angular projections or stops 15, arranged substantially diametrically opposite each, and exteriorly of the corrugation. The purpose of these parts will hereinafter appear. Each of the upper extremities of the side walls 10 is provided with an extending ear 16. The free longitudinal margins of the side walls are each provided with a reduced tapered ear 17, and the end wall 11 is provided with an ear 18 integrally formed therewith.

Cooperable with the housing 8, and adapted to close off the open side of the housing opposite the front wall 9, is a supporting member or carrier 19, formed of suitable insulating material, and provided with a pair of round apertures 20 and 21, circumferentially arranged with respect to the center of the carrier and adjacent one side thereof. Adjacent its other side and slightly closer to said center is a similar aperture 22. The apertures 20 and 21 are also disposed on the opposite sides of the transverse or minor axis of the carrier, while aperture 22 is located on said axis.

Fitting within the apertures 20, 21, and 22, are the contact means 23, 24, and 25, respectively, preferably in the form of rivets. Each contact has a frustro-conical head portion 26 exposed on the inner face of the carrier for contact with bridge means, and a shank portion 27, which is of a length to extend through an aperture and beyond the outer face of the carrier where it is headed over as indicated at 28 to secure electrical connection means, in form of a plug conductor terminal receptacle. The contacts 23 through 25 secure receptacles 29 through 31, respectively to the carrier 19. Each receptacle is preferably comprised of two members, a relatively rigid outer member 32 and an inner member 33 fitted within 32. Member 32 includes a substantially planar base portion 34, a tubular part 35, and an angular extremity 36 in the form of a lug which projects into an adjacent hole 37 to prevent each terminal receptacle from turning on the carrier 19. Each inner member includes a substantially planar portion superimposed upon the base portion 34 of each outer member, and a split cylindrical resilient portion 38 is disposed in the tubular part 35 for receiving a plug conductor of the snap type, shown in Figure 3. A detent is provided in each of the portions 38 to cooperate with the groove provided in each plug. The

shanks of the contacts 23 through 25 extend through suitable holes provided in the planar portions of the receptacle.

As best shown in Figures 6 and 7, the longitudinal margins of the supporting member or carrier 19 are provided with notches 39, and the lower transverse margin with a notch 40. These notches receive the ears 17 and 18, respectively, which are bent over upon the outer surface of the carrier for holding the latter in tight assembly with the casing 8 to close off its open side.

A stub shaft 41 is disposed transversely within the switch casing 8 to support certain parts of the switching mechanism; and is provided with a reduced extremity which is fitted into the hole 13 provided in the wall 9 of the casing and then spun over to anchor the shaft permanently in place. This shaft supports a member 42 driven by the plunger or driving mechanism of the switch, a member 43 actuated by the driven member 42, and a spring member 44 interposed between members 42 and 43. These members 42, 43, and 44 are held in assembly within the switch casing by providing an annular abutment 45 intermediate the extremities of the stub shaft near its free end, which abutment may bear against the outer face of member 43.

The driven member 42 will now be described. This member is generally oblong or rectangular in shape having a centrally disposed tubular stud 46 extruded from the member, the stud being of a size to receive the cylindrical portion of the stub shaft 41 so that said member may oscillate regularly about said shaft. The longitudinal margins of member 42 are preferably interrupted, and as shown in Figure 6 the top margin is recessed to provide a generally inverted V shaped portion 47 having cam surfaces 48. The lower extremity of each of the sloping cam surfaces 48 is rather abrupt whereby to form limiting portions 49 for the opposite sides of the cam surfaces. The bottom or lower margin of member 42 is provided with a pair of spaced apart lugs 50, which are formed by bending portions of the member outwardly in the same direction as the stud 46 whereby to provide a bifurcation which receives the legs 51 of the coiled spring 44. The flat side of driven member 42 opposite that side from which the stud and lugs project is adapted to bear against the inwardly extending circular corrugation 14 formed in the wall 9 of the switch casing to alleviate friction, and oscillation of driven member 42 is limited by the stops 15 which are alternately engaged by the ends 52 of this member.

The actuated member 43 is provided with a substantially rectangular flat portion 53 from which extends an offset relatively planar portion 54. The portion 53 is provided with a substantially centrally disposed tubular stud 55 extruded from said portion and receives the stub shaft 41, above referred to. A pair of spaced apart projections 56 extend outwardly with respect to portion 53 in the same direction as stud 55 to provide a bifurcation which receives under tension the legs 51 of the spring 44. As clearly shown in Figures 3 and 4, the studs 46 and 55 may normally engage each other so as to properly space apart the members 42 and 43 whereby to receive the spring 44. These studs also provide a bearing for the coils of the spring. During assembly, the coils of the spring are first placed over the stud 55 and the legs 51 of the spring are then contracted or pressed together and forced into the bifurcation formed by the projections 56 to place the spring under tension, after which members 42, 43, and 44 are permanently secured to the shaft within the casing by spinning over one end of the shaft as indicated at 28 in Figure 3. As will be described later, when these members are permanently secured in place by the shaft 41, the plunger or driving mechanism of the switch will also be locked in assembly.

One end of the flat portion 53 of actuated member 43 is provided with an outwardly extending finger 57, and the other end with a similar finger 58, the latter of which is of a width slightly greater than the former so that the carrier 59 for the bridge member 60 may be assembled with member 43 in only one position. Member 43 is also provided with a struck up portion 61 located more or less between the stud 55 and finger 57.

The offset planar portion 54 of the actuated member 43 is preferably formed with converging ends 62 and a rounded marginal top side 63 whereby to clear the side walls 10 of the switch casing and the under surface of the mounting plate 1, respectively, when member 43 is oscillated by the plunger or driving means. The offset 54 is provided with a pair of rectangular slots 64 and 65 which converge and intersect each other near the center of member 43 to provide a passage 66 connecting the inner extremities of the slots, the passage 66 terminating within the junction 67 which joins portions 53 and 54. The slots 64 and 65 are separated substantially throughout their entire length by a tapered partition 68, and the outer extremities or ends of the slots terminate short of the rounded side 63.

A leaf spring 69 is carried by the actuated member 43, and is disposed between said member and the carrier 59 for normally pressing or urging the bridge means 60 on carrier 59 in a direction to engage the contacts such as 23 through 25 provided on the switch back or carrier 19. This spring 69 is provided with a bowed central portion and substantially flat end portions 70. The central portion is provided with a circular aperture 71 which receives the free extremity of the shaft 41, above referred to, the material about said aperture engaging the annular abutment 45 on the shaft, while the flat ends of the spring engage the inner face of carrier 59. This spring is held against rotation between the fingers 57 and 58 by the part 61, the latter of which extends into an off-center hole 72 provided in the spring. The spring 69 is constructed and arranged with respect to the actuated member 43 and carrier 59 so that there is no likelihood of the spring coming in contact with the bridge means 60 and the pressure exerted thereby is well balanced so that the pressure of the bridge member 60 against the contacts 23 through 25 is well distributed.

The carrier 59 supporting the bridge 60 is preferably oblong in shape and provided with rounded ends 73 so that the member will clear the side walls 10 of the switch casing when the actuated member is oscillated. One end of carrier 59 has a notch 74 and the other a larger notch 75, which receive the fingers 57 and 58, respectively, the notch 75 being of a width slightly greater than notch 74 so as to receive the wider tongue 58 whereby the carrier can be assembled with the actuated member 43 in but one position. A hole 76 is provided in the center of carrier 59, and a pair of spaced apart bosses 77 and 78 are provided on the outer face of the carrier substantially between the larger notch 75 and the center

hole 76. These bosses are preferably formed by striking or pressing out portions of the insulating material from which the carrier is made, or if found desirable the carrier may be moulded so as to provide such portions. A pair of apertures 79 are provided in the carrier 59 between the center hole and the smaller end notch 74; and a small hole 80 is provided between the apertures 79 and center hole 76. The portion 61 of the actuated member 43 projects into the hole 72 of leaf spring 69, and also into hole 80 in the carrier so as to hold the spring and carrier against rotation with respect to member 43. If found desirable non-rotation could be effected by providing notches adjacent the ends of the spring 69 to receive the fingers 57 and 58 on the actuated member 43.

As clearly shown in Figure 5, the opposed faces 81 of bosses 77 and 78 form substantially obtuse angles. The bridge member 60 is substantially rectangular in shape and engages the outer face of the carrier 59. The longitudinal sides of member 60 near one end are provided with V shaped notches 82 which receive the opposed angular faces 81 of bosses 77 and 78, while the corners of the other end are provided with a pair of lugs 83 which fit into the apertures 79. The height of the bosses 77 and 78 is equivalent to the thickness of the bridge means 60 so that the triangular contacting surface 84 of the bridge means is substantially flush with the flat surface of the bosses. The bosses adjacent each side of the contacting portion 84 provide rests which are adapted to be alternately engaged by the contacts 23 and 24 provided on the switch back 19, all of which will be described more in detail later. These bosses and lugs 83 also act to prevent rotation of the bridge relative to the carrier 59. The said other end of the bridge 60 has a contacting face 85 which is adapted to continuously engage the contact 25 on the carrier 19. A relatively large hole 86 of a diameter somewhat larger than the hole 76 in the carrier is provided in the bridge 60 so that the bridge will not engage the stub shaft 41. The bridge is so arranged and secured on the carrier 59 that the bridge will not engage any metal other than the contacts just referred to.

Adapted to extend upwardly from the mounting plate 1 is a generally cylindrical tubular member 87 having spaced apart ear portions 88 extending from its lower margin, the ear portions being adapted to pass through the arcuate slots 5 formed in the plate, and be clinched against the under surface of the plate.

An actuating or drive member 89 for operating the switch is arranged to extend longitudinally substantially within the cylindrical member 87 and through the T shaped opening formed in the plate 1 by the slot 3 and recess 4. The lower end of driver 89 is provided with a laterally extending locking finger 90 which is adapted to be alternately received by the rectangular converging slots 64 and 65 formed adjacent the upper extremity of the actuated member 43 for locking or latching said latter member at the end of each oscillation. The width of the finger 90 is slightly less than the widths of slots 64 and 65 so that it will reciprocate freely yet properly within the slots with a minimum of friction. Provided on the driver and spaced from and extending in a direction opposite from the locking finger 90 is an extruded pivot 91 which pivotally supports a pawl 92 which is adapted to oscillate the driven member 42 including the bridge member 60.

The upper extremity of the pawl 92 is formed with a rounded portion 93 having an arcuate recess 94, and with a tapering tongue 95 at its lower extremity. The tongue 95 is relatively narrow with respect to the rounded portion 93 to form shoulders 96, the shoulders 96 being somewhat wider than the rounded portion and merging with the rounded portion by means of curved surfaces 97.

The upper end of the driver 89 is provided with oppositely extending integral shoulder portions 98 and a reduced ear 99 intermediate said shoulder portions, the ear 99 fitting within an aperture 100 provided in the end wall of a metal cap member 101. The extremity of the ear 99 is over set on the outer surface of the end wall of the cap, and shoulder portions 98 bear against the inner surface of said end wall. Intermediate the ends of the driver 89 is a struck out integral portion 102 projecting in a direction corresponding to that of locking finger 90; and a substantially rectangular opening 103 is provided between the projection 102 and pivot 91. It is to be noted that the finger 90, pivot 91, opening 103, projection 102, and the ear 99, are all located substantially on the longitudinal axis of the drive member 89.

A spring actuating device generally designated 104 for engaging the pawl 92 is detachably connected to the driver 89. This device includes a rectangular box-like member and a helical spring 105 which fits therein. The box has a bottom wall 106 from which extends side walls 107 and end walls 108 and 109. The end wall 108 is provided with an inturned portion 110 arranged in spaced apart relation to the free longitudinal marginal edges 111 of the side walls 107, the space being of a size slightly larger than the thickness of the metal from which the driver 89 is made so as to receive a portion of the latter as clearly shown in Figure 3. The inturned portion 110 fits within a rectangular aperture 112 the latter of which is provided as a result of forming the projection 102. The inturned portion is of a length slightly less than the length of the aperture 112 so that the device generally designated 104 may be easily and quickly assembled to the driver 89. The end wall 109 of the box is provided with an offset integral portion 113 which extends in the same direction and in line with the inturned portion 110. The portion 113 is of a width slightly less than the width of the opening 103 so as to fit nicely therein, and is also longer than the opening. When the device 104 is properly assembled with the driver 89 the spring 105 is placed under compression so that one end engages the projection or stop 102, and its other end engages the end wall 109 of the box so as to normally urge the device in a longitudinal direction with the rounded end 114 of the integral portion 113 of the pawl normally disposed in the arcuate recess 94 formed in said pawl. In order that the rounded end 114 will effectively engage the pawl, the extremity of the portion 113 is slightly offset as clearly shown in Figure 3.

The drive member 89 is normally maintained in a retracted or extended position, as clearly shown in Figure 3, by a relatively large helical spring 115, which spring is placed under compression in the tubular part 87 and cap 101, and encircles the driver 87 with one end engaging the cap 101 and the other end engaging the top surface of the mounting plate 1.

When the parts are properly assembled as shown in Figure 3, the driver 89 including the pawl 92 associated therewith slide within the slot 3 when the driver is driven downwardly, and since the locking finger 90 on the driver is at all times located within one or the other of the slots 64

and 65 of the actuated member 43, the driver 89, pawl 92, and spring 115 are held in assembly, this being directly accomplished by the stub shaft 41 which as mentioned above, locks the driven member 42, actuated member 43, and the spring 44 in place.

Assuming that the parts of the switch are in the position shown in Figures 1, 3, 4, 5, the driver 89 when depressed as by force supplied by an operator carries the pawl 92 toward the portion 47 formed on the driven member 42, it being appreciated that the spring actuated device generally designated 104 yieldably resists any swinging or pivotal movement of the pawl until the tongue 95 of the pawl engages the right hand cam surface 48, whereupon the pawl will be moved about its pivot 91 until the extremity of the finger 95 is disposed adjacent the limiting portion 49 of the engaged surface 48. Further movement of the driver 89 will cause the driver member 42 to swing or pivot clockwise about the shaft 41 and press the right hand leg 51 of spring 44 toward the other leg as indicated in Figure 2 to thereby gradually compress the spring 44 and pre-load same, and while the spring 44 is being compressed to the desired extent the locking finger 90 on the driver 89 which has been riding downwardly in the slot 64 of the actuated member 43 finally enters the passage 66 connecting the slot 64 and 65, thereby releasing the finger from slot 64, whereupon the actuated member 43 is quickly snapped in a clockwise direction to cause the contacting face 84 to engage the contact 23 to close an electrical circuit. When the operator removes the force applied to the driver 89, the driver is automatically moved upwardly by the spring 115, and during this upward movement the finger 90 of the driver rides into the slot 65 to lock the actuated member 43 against further movement until it is again oscillated. The pawl 92 which is held in an angular position by the spring device 104 clears the cam surface 48 including portion 47 when the driver first begins its upward movement, and just before the driver 89 completes its final upward stroke or before the finger 90 engages the upper end wall of the slot 65, the right hand curved surface 97 provided on the shoulder 96 of the pawl 92 engages the under surface of the mounting plate 1 adjacent the end of the slot 3 and cams the pawl back into its normal longitudinal upright position. When the pawl is in an angular position its rounded upper surface on either side of the recess 94 is engaged by the rounded end 114 of the offset part 113 of the device 104 and when it is in its normal longitudinal position the end 114 is received within the recess 94.

Considering more in detail the movements of the driven member 42, actuated member 43, and the spring 44, and assuming that the members are in the position shown in Figure 2, the right lug 50 of member 42 presses the right leg 51 of the spring 44 toward the other leg and said other leg against the left projection 56 on actuated member 43, whereupon the left leg of spring 44 becomes disengaged from the left lug 50 of the driven member 42. Accordingly, it is apparent that the driven member 42 actuates member 43 through the agency of the spring 44. Moreover, it will be evident that when the locking finger 90 clears the lower end of the partition 68 which separates the slots 64 and 65 the actuated member is oscillated by the spring 44 to a tilted position so that the slot 65 assumes a vertical position in place of the slot 64, which latter slot takes a position at the right of slot 65. When the actuated member 43 is oscillated to the right to close an electrical circuit, the left end of the passage 66 connecting the slots 64 and 65 strikes the finger 90 which acts as a stop to limit the extent of the oscillation of the member 43, and the right end wall of the passage strikes the finger 90 when member 43 is oscillated in the opposite direction. When the bridge is oscillated in the opposite direction, the contacting face 84 engages the contact 24 to close another electrical circuit. As previously mentioned above, the oscillatory movement of the driven member 42 is limited by the stops 15 which are alternately engaged by the ends of said member.

In order to more completely insure an arrangement whereby the tongue 95 of the pawl is properly positioned at all times to engage the cam portions 48 on the driven member 42, a relatively thin metal disc 116 is disposed between the spring 44 and the member 42. This disc has a hole 117 which receives the tubular stud 46 on the driven member, and the disc is of a size whereby to normally extend along side the member 42, and between the driver 89 and the pawl when the switch is operated, as clearly illustrated. The lower extremity of the disc is preferably cut away to provide a side 118 so that the side may rest upon the lugs 50.

In view of the foregoing description it should be clearly evident that I have provided an electric switch which embodies improved principles of design and construction.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of the invention; and therefore, I do not wish to be understood as limiting myself to the exact form, construction, arrangement, and combination of parts, herein shown and described.

I claim:

1. An electric switch, including a housing, a driven member and a member actuated by said driven member both pivotally mounted in said housing, lugs provided on said members, a coiled spring the extremities of which are operatively related to the lugs of said driven and said actuated members, bridge means carried by said actuated member, insulating means supporting contact means carried by said housing, and driving means directly connected to said actuated member and arranged for oscillating said driven member to compress said spring by pressing at least one of its extremities toward the outer extremity to cause the spring to oscillate said actuated member whereby said bridge means may engage said contact means.

2. An electric switch, including a housing, a shaft provided in said housing, a driven member, an actuated member and a spring disposed between said driven and said actuated members all pivotally mounted on said shaft, an insulator supporting contact means carried by said housing, bridge means carried by said actuated member adapted to engage said contact means, driving means operatively related to said driven member including a pawl pivotally mounted on said driving means, said driving means also being directly connected to the actuated member and when operated being adapted to cause said pawl to engage said driven member in a manner whereby to oscillate the latter and simultaneously compress said spring to a certain extent whereupon said actu-

ated member is snapped into a predetermined position to place said bridge means in a position to engage said contact means, means provided on said driving means cooperating with said actuated member for locking the latter in predetermined positions, and spring pressed means acting axially on said pawl for normally maintaining same in alignment with said driving means.

3. An electric switch, including a housing, a driven member and an actuated member pivotally mounted in said housing, a spring pivotally mounted in said housing with its extremities providing a connection between said driven member and said actuated member, an insulator supporting contact means carried by said housing, spring pressed bridge means carried by said actuated member, said actuated member having a plurality of slots communicatively connected together, a driver including a pawl carried by said driver operatively related to said driven and said actuated members, said pawl being adapted to oscillate said driven member to press the extremities of said spring toward each other to cause said spring to actuate said actuated member and said bridge means so that the latter may engage said contact means, and said driver having a part adapted to alternately cooperate with said slots whereby to lock said actuated member in predetermined positions.

4. Switching mechanism including a stationary shaft, a driven member pivotally mounted on said shaft, an actuated member pivotally mounted on said shaft in spaced apart relation with respect to said driven member, a pair of abutments provided on said driven member and a pair of abutments provided on said actuated member projecting toward the abutments on said driven member, a spring carried by the actuated member and arranged between said driven and said actuated members, said spring including a pair of leg portions disposed between said pairs of abutments in a manner whereby movement of said driven member relative to said actuated member will cause one of the abutments on said driven member to positively engage one of said leg portions and move said leg portion away from one of the abutments on the actuated member and simultaneously cause the other leg portion of the spring to become disengaged from the other abutment on said driven member whereby to compress the said leg portions of said spring when said actuated member is held against movement for a predetermined period.

5. An electric switch, including a housing, a shaft attached to said housing, a driven member and an actuated member pivotally mounted on said shaft, cooperating means provided on said actuated member, a spring including a coiled part mounted on said shaft and with legs extending outwardly therefrom engaging portions of said driven and said actuated members, an insulator supporting contact means carried by said housing, bridge means carried by said actuated means adapted to engage said contact means, driving means for pivoting said driven member whereby to compress the legs of said spring together whereby to obtain a predetermined pressure whereupon said actuated member is pivoted, and means provided on said driving means connecting said driving means to said actuated member and engageable with the cooperating means on said actuated member for locking said driving means in place.

6. An electric switch, including a housing, a shaft provided in said housing, a driven member and an actuated member pivotally mounted on said shaft, a spring pivotally mounted with respect to said shaft arranged between and connecting said driven and said actuated members, an insulator supporting contact means carried by said housing, bridge means carried by said actuated member, said actuated member having a pair of slots communicatively connected together by a passage, driving means including a reciprocating driver and a pawl pivotally carried by said driver operatively related to said driven and said actuated members, said pawl when carried forward by said driver being adapted to engage and pivot said driven member to compress said spring and cause said spring to actuate said actuated member and said bridge means to engage said contact means, and said driver having a part adapted to ride in one of said slots for holding said actuated member against pivotal movement until said spring is compressed and said part enters said passage.

7. An electric switch, including substantially stationary contact means; pivotally mounted: bridge means, actuated member, a driven member, and a coiled spring means; lugs on said members; said spring having extremities cooperating with said lugs; and a reciprocating driver directly connected to said actuated member; said driver being operable to oscillate the driven member to compress said spring by pressing at least one of its extremities toward the other extremity to oscillate said actuated member after said driven member has been oscillated to some extent to cause said bridge means to engage said contact means.

8. An electric switch, including a housing, a shaft secured within said housing, a driven member and an actuated member pivotally mounted on said shaft, cooperating means provided on said actuated member, a spring member operatively related to said driven member and said actuated member, an insulator supporting contact means carried by said housing, bridge means carried by said actuated means for engaging said contact means, driving means for said switch, said driving means including a driver and a pawl, resilient means exerting axial pressure on said pawl for normally maintaining same in a predetermined position with respect to said driver, said pawl when carried forward by said driver being adapted to engage and pivot said driven member and simultaneously compress said spring whereby the latter when compressed sufficiently will actuate said actuated member, and means provided on said driver engageable with the cooperating means on said actuated member for locking said driving means to said actuated member.

9. An electric switch, including a housing, a driven member and an actuated member pivotally mounted in said housing, a spring pivotally mounted in said housing assisting to provide a lost-motion connection between said driven member and said actuated member, an insulator supporting contact means carried by said housing, spring pressed bridge means carried by said actuated member, said actuated member having a plurality of slots communicatively connected together, a driver including a pawl carried by said driver operatively related to said driven and said actuated members, said pawl being adapted to oscillate said driven member to compress said spring and cause said spring to actuate said actuated member and said bridge means so that

the latter may engage said contact means, means arranged alongside said driven member and said pawl whereby to assist in predetermining the position of the pawl with respect to said driven member when said driver is driven toward said driven member, and said driver having a part adapted to slide in said slots for locking the actuated member in predetermined positions.

10. An electric switch, including a housing, a driven member and a member actuated by said driven member pivotally mounted independently of each other in said housing, bridge means carried by said actuated member, insulating means supporting contact means carried by said housing, driving means for operating said driven member whereby said driven member actuates said actuated member to cause said bridge means to engage said contact means, and means disposed between said driven member and said actuated member assisting to guide the driving means toward said driven member.

11. Switching mechanism for an electric switch, including a shaft, an actuated member carried by said shaft, said actuated member including a central tubular portion, and a pair of abutments spaced from said tubular portion, a spring having a coiled part supported on said tubular portion and leg portions placed under tension between said abutments, spaced apart means provided on said actuated member whereby a carrier supporting bridge means may be detachably connected to said actuated member, and a plurality of converging slots communicatively connected together adjacent their inner extremities to provide a passage, said slots and said passage being adapted to cooperate with other switching mechanism for locking said actuated member in predetermined positions with respect to said shaft.

12. Driving means for an electric switch, including a driver, a pawl pivotally mounted on one side of said driver, and spring pressed reciprocating means mounted on the other side of the driver and having a part engaging a portion of said pawl for maintaining said pawl in alignment with said driver.

13. Driving means for an electric switch including a driver, a pawl pivotally mounted adjacent one side of said driver, a pair of spaced apart apertures provided in said driver, an abutment provided on said driver extending outwardly from the opposite side from which said pawl is mounted, a reciprocating member carried by said driver and having a pair of portions extending through said apertures for securing said reciprocating member to said driver, one of said portions being positioned whereby same may engage a portion of said pawl, and a spring engaging said reciprocating member and said abutment for urging said one portion of said reciprocating member to normally engage said pawl whereby to maintain said pawl in alignment with said driver.

14. Driving means for an electric switch, including a driver, a pawl pivotally mounted on one side of said driver, one extremity of said pawl being provided with a finger adapted to engage a part of the switching mechanism of the switch and its opposite extremity having a rounded portion with a recess in said rounded portion, and means arranged on the other side of the driver having a part located on said one side cooperable with said rounded portion of said pawl for maintaining said pawl in an angular position with respect to the longitudinal axis of said driver, and said part when engageable with said recess acting to maintain said pawl in alignment with said longitudinal axis.

15. An electric switch including, a housing, a driven member and a member actuated by said driven member pivotally mounted on said housing, bridge means carried by said actuated member, insulating means supporting contact means carried by said housing, driving means for operating said driven member whereby said driven member actuates said actuated member to cause said bridge means to engage said contact means, and means in the form of a disc disposed adjacent one side of the driven member assisting to guide the driving means with respect to said driven member.

16. In an electric switch, a housing, switch mechanism mounted in said housing, an opening provided in said housing, driving means for the switch, said means including a driver having a pawl pivotally mounted adjacent one side thereof for assisting in the actuation of said switch mechanism, an aperture provided in the driver, spring pressed means disposed on the other side of the driver having a part projecting through said aperture for engaging a portion of said pawl whereby to maintain said pawl in predetermined positions with respect to the driver and to the switch mechanism.

17. In an electric switch, a housing, switching mechanism mounted in said housing, an opening provided in said housing, driving means for the switch, said driving means including a generally flat driver member provided with a transverse aperture, a pawl pivotally mounted on said driver assisting to actuate said switching mechanism, and resilient means caught in said aperture and acting on said pawl whereby to maintain the latter in predetermined positions with respect to the driver and the switch mechanism.

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