

Aug. 18, 1959

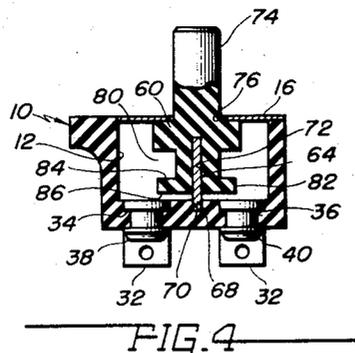
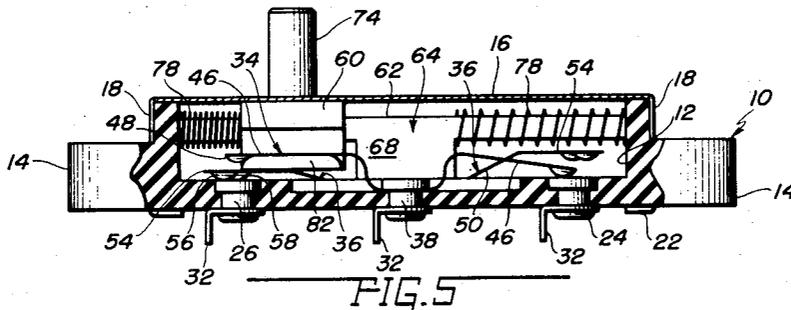
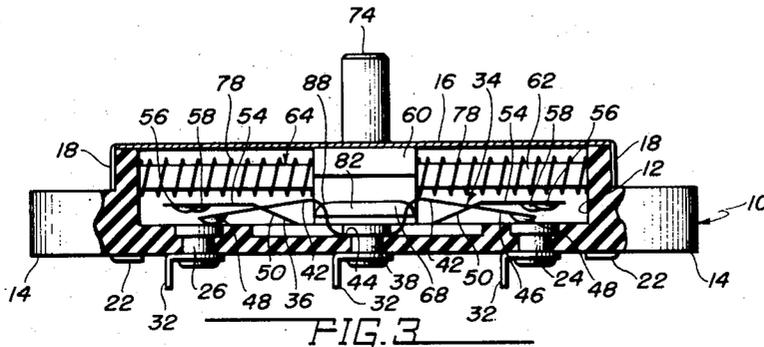
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2,900,460

ELECTRIC SWITCH

Filed March 24, 1958

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

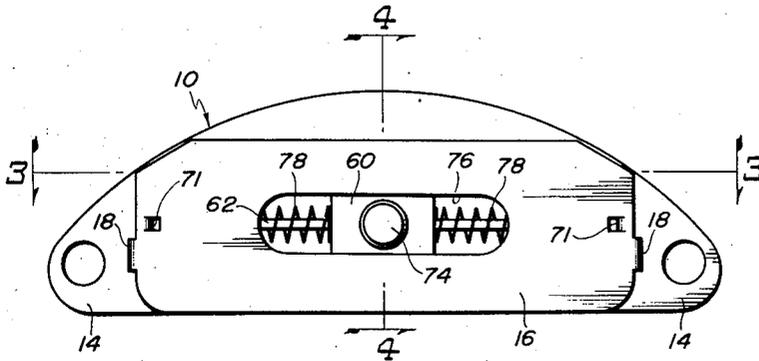


FIG. 1

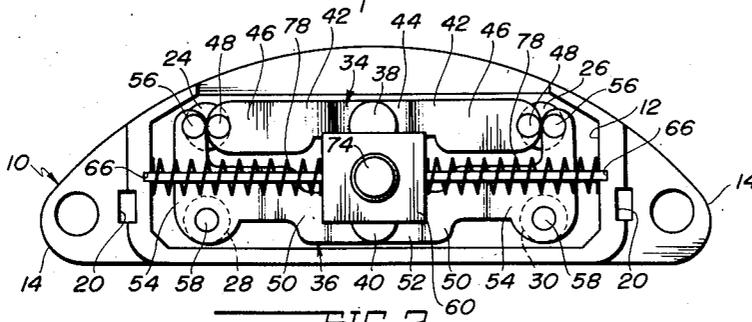


FIG. 2

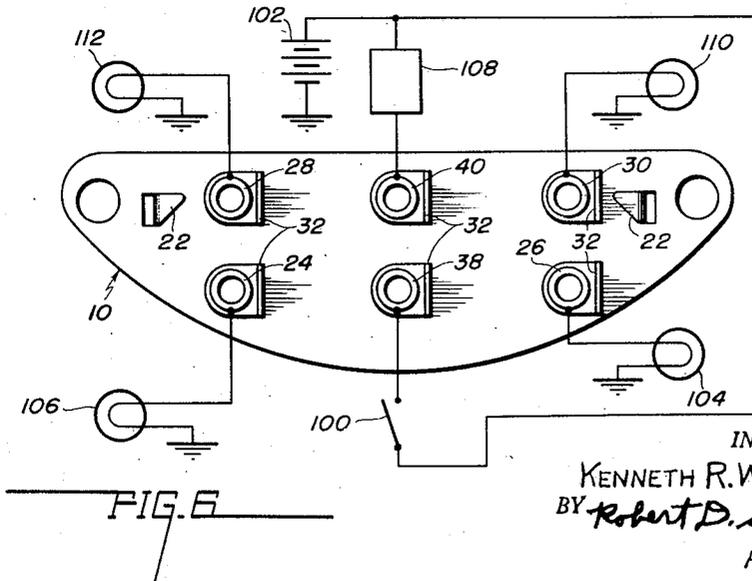


FIG. 5

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1

2,900,460

ELECTRIC SWITCH

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Application March 24, 1958, Serial No. 723,449

5 Claims. (Cl. 200—6)

My invention relates to electric switches and more particularly to an electric switch of the type commonly employed in the direction indicating signal system of an automotive vehicle.

Automotive vehicles are now commonly equipped with indicating lamps at each side of the vehicle on both the front and rear of the vehicle which are selectively energized to indicate when a turn is to be made or when the vehicle brakes are being operated. Such direction indicating signal systems presently employ a multiple contact switch for selectively connecting the lamps to a flasher switch and a brake-operated stop light switch. This multiple contact switch is generally actuated by a turn indicating lever normally mounted upon the steering post of the vehicle and operated by the driver of the vehicle. My invention is concerned primarily with switches for use in such signalling systems although it will be understood that the switches may have other uses.

It is an object of my invention to provide a multiple contact switch of the above character that may be readily produced at a considerably lower cost than heretofore known switches for effecting like functions.

Another object of my invention is to provide a multiple contact switch which is readily adapted to be economically assembled from inexpensive components capable of being massed produced.

A further object of my invention is to provide a simple and inexpensive switch which operates smoothly at all times and which is dependable in operation.

According to my invention in a direction indicating signal system of the type described, an electric switch comprising a recessed case is provided with two bridging members having flexible arms deflectable for cooperation with stationary contacts. An actuator member mounted upon a guide member supported at its end by slots in opposed walls of the recess has two cam projections which upon movement of the actuator in either direction from the central position deflect the flexible arms of the bridging members to open one circuit while closing another. A cover having a slot through which the operating stud of the actuator projects is provided with struck-out ears to retain the guide member in position while the actuator is retained between the guide member and the cover.

Other objects, features, and advantages of the invention will be apparent from the consideration of the following description taken in connection with the accompanying drawing in which:

Figure 1 is a plan view of the switch;

Figure 2 is a view similar to Figure 1 but with the cover removed;

Figure 3 is a sectional view taken substantially on line 3—3 of Figure 1;

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 1;

Figure 5 is a view similar to Figure 3 but with the contact operating actuator in another operating position;

Figure 6 is a bottom view of the switch illustrating

2

the connection thereof in a direction indicating signal system.

Referring now to the drawing, the switch is illustrated as comprising a generally arcuate-shaped case 10 of insulating material, such as a molded thermosetting resin or other plastic material, having a relatively large generally rectangular recess 12 for the reception of the moveable parts of the switch mechanism and other parts cooperating therewith. Apertured ears 14 extend from either end of the case 10 to provide mounting means for the switch. The recess 12 is closed by a metallic cover 16 having two arms 18 depending from the side edges of the cover to lie within recesses 20 of the case. The bent over ends 22 of the arms 18 firmly engage the case 10 to retain the parts of the switch in their assembled relation.

The floor of the case recess 12 is provided with openings to accommodate the shanks of rivets 24, 26, 28 and 30, the heads of which form the stationary contacts of the switch. The shank of each rivet extends through the opening of a terminal 32 and by means of its upset end serves to secure the terminal to the case. Two contact springs 34 and 36 formed from a thin strip of spring metal such as a copper-tin alloy are secured at the midpoint of the length of the floor of the case 10 by rivets 38 and 40, respectively, which by their upset ends also secure their respective terminals 32 to the case 10. Rivets 24, 26, 28, 30, 36, and 38 may be identical and are preferably formed of metal having low electrical resistivity.

Contact spring 34 has a configuration substantially like that of an inverted W. A pair of spaced leg portions 42 extend from a base or web portion 44 which is held against the floor of the casing 10 by rivet 38. The outer ends of the legs 42 are reversely bent to define spring arms 46 each provided with 2 cup-like contact elements 48 pressed outwardly from one side and normally bearing against the head of the cooperating contact rivets 24 or 26. Contact spring 36 is generally U-shaped and comprises a pair of spaced leg portions 50 extending from the base or web portion 52 which is held against the floor of the casing 10 by rivet 40. Each leg of contact spring 36 has an extension 54 provided with cup-like contact-elements 56 and 58 overlying and normally separated from the heads of their respective cooperating contact rivets 24 and 28 or 26 and 30. It will be noted that contact rivets 24 and 26 each cooperate with both contact springs 34 and 36.

A contact actuator 60 made of insulating material is mounted upon the cross-piece 62 of a T-shaped guide 64 for rectilinear sliding movement lengthwise within the case recess 12. The ends of the cross piece 62 are received in slots 66 of the case 10 while the end of the guide tongue 68 is received in groove 70 of the case. Two ears 71 struck out from the cover 16 and bent at right angles are also received in slots 66 to retain guide 64 in position. The actuator 60 is provided with a longitudinal groove 72 into which groove the cross-piece 62 of guide 64 extends. Projecting from the actuator 60 is an integral stud 74 which passes through a slot 76 in the cover 16. The opposite ends of this slot limit the longitudinal movement of the actuator by acting as stops which the stud 74 strikes. A pair of coil springs 78 are disposed about the cross-piece 62 between the walls of the case recess 12 and the actuator 60 to normally urge the actuator to a central position within the case recess.

Each side of the actuator 60 is longitudinally slotted as at 80 to provide a shoulder 82 having deflecting surfaces 84 and 86 for actuating the contact springs 34 and 36. The shoulders 82 have their corners rounded as at 88 and are disposed so that upon movement of the actuator away from the central position, one of the deflecting surfaces

84 will engage a portion of the sloped face of a spring arm 46 to deflect it away from the floor of the case recess. Similarly, a deflecting surface 86 of one of the shoulders 82 is adapted to engage a portion of the inclined surface of a leg 50 of contact spring 36 for deflecting the end of its respective extension 54 towards the floor of the case recess 12 upon movement of the actuator 60 away from its central position.

The assembly of the switch described is facilitated by the several features of the invention. In assembly, the contact rivets 24, 26, 28, 30 and their respective terminals 32 are first attached to the casing 10. The contact spring 35 and 36 are then inserted in place and together with their terminals 32 are secured to the case 10 by their respective rivets 38 and 40. The guide 64 and the two coil springs 78 are then assembled as a unit after which the ends of the guide 64 are inserted in their respective slots 66 and groove 70, and the actuator 60 is slipped over the guide intermediate the coil springs. After the cover 16 is inserted in place with the arms 18 being guided by recesses 20, the ends of arm 18 are bent over against the case to permanently retain actuator 60 and guide 64 in the switch assembly. It will be understood that the actuator 60 and other appropriate parts are lubricated prior to or during assembly.

The actuator 60 has three operating positions. The first is a central position as illustrated in Figure 3 while a second position is shown in Figure 5. The third position is not shown as such is believed to be apparent from the following description:

In the central position of the actuator, the bent spring arms 46 tightly press the contact elements 48 of contact spring 34 against the contact rivets 24 and 26 to assure good electrical connections. Contact spring 34 thus interconnects rivets 24, 26, and 38 and their respective terminals. Contact elements 56 and 58 of contact spring 36 are separated from their contact rivets such that contact spring 36 interconnects no rivets or terminals.

When the actuator 60 is moved to the position shown in Figure 5 with stud 74 engaging the end of slot 80, the left coil spring 78 is compressed. Deflecting surface 84 of one of the shoulders 82 engages one of the spring arms 46 of contact spring 34 to deflect contact element 48 away from the contact 26. Simultaneously, the deflecting surface 86 of the other shoulder 82 engages leg portion of 50 to cause the extension 54 to swing toward the floor of the case recess 12 until contact elements 56 and 58 engage contact rivet 26 and 30. Thus contact rivet 26 is disconnected from contact spring 34 while contact spring 36 interconnects contact rivets 26, 30, and 40. As soon as the moving force is released from stud 74, the compressed coil spring 78 will immediately return the actuator 60 to its central position. As the actuator returns to its central position, contact springs 34 and 36 are released to return to their normal positions. In a like manner, the actuator may be moved to the right to its other circuit closing position from which it will return on release of the moving force.

Referring to Figure 7, the switch is shown connected in a conventional directional indicating signal circuit. When the actuator is in the central position, contact spring 36 does not complete a circuit between any of the switch contact rivets but contact spring 34 interconnects rivets 24, 26, and 38. If the stop light switch 100 (normally operated by the foot brake) is closed, current will flow from the battery 102 to the rear lamps 104 and 106 to indicate that the brakes are being applied.

When the actuator 60 is shifted to the position shown in Figure 5 to indicate a turn, rivet 26 is disconnected from rivets 24 and 38 which remain connected by contact spring 34, and rivet 26 is connected to rivets 30 and 40 by contact spring 36. In this position, current will flow from the battery 102 through flasher switch 108 to rear lamp 104 and front lamp 110 which are then intermittently energized to indicate the turn. If the stop light

switch 100 is closed, current will also flow from battery 108 to the other rear lamp 106 to indicate that the brakes are being applied.

In a like manner, rear lamp 106 and front lamp 112 will be intermittently energized if the actuator 60 of the switch is shifted to the other turn indicating position. Rear lamp 104 also may be energized by the stop light switch in this position.

There is thus provided, a multiple contact switch for controlling a plurality of direction indicating signal circuits which is extremely simple in construction and readily adapted to be economically assembled from a small number of parts which may be inexpensively manufactured. The above described arrangement employs a minimum number of contact elements of which the fixed contacts are engaged by the moveable contacts without sliding movement therebetween to provide a switch which operates smoothly at all times and which is dependable in operation.

While the invention has been illustrated and described in its preferred embodiment and has included certain details, it should be understood that the invention is not to be limited to the precise details herein illustrated and described since the same may be carried out in other ways, falling within the scope of the invention as claimed.

I claim:

1. An electric switch for a directional indicating signal system comprising four spaced, fixed contacts carried by a switch housing; four yieldable spring arms carried by said housing; a first terminal member electrically connected to the first and second arms of said arms and a second terminal member electrically connected to the third and fourth arms of said arms; each of said first and second arms being provided with a contact element; the contact element of said first arm normally being urged against a first contact of said fixed contacts and the contact element of said second arm normally being urged against a second contact of said fixed contacts; each of said third and fourth arms being provided with two contact elements; the contact elements of said third arm normally overlying and being spaced from said first fixed contact and a third contact of said fixed contacts for engagement therewith upon deflection of said third arm; the contact elements of said fourth arm normally overlying and being spaced from said second fixed contact and the fourth contact of said fixed contacts for engagement therewith upon deflection of said fourth arm; an actuator member movable from a central position to operating positions on either side of the central position and having cam means for selectively deflecting said spring arms; said first and third arms being positioned to be deflected from their normal positions by said cam means upon movement of said actuator member to one of said operating positions; and said second and fourth arms being positioned to be deflected from their normal positions by said cam means upon movement of said actuator member to the other of said operating positions.

2. An electric switch for a directional indicating signal system comprising four spaced fixed contacts carried by a switch housing; first and second flexible contact arms carried by said housing and electrically connected to each other; third and fourth flexible contact arms carried by said housing and electrically connected to each other; said first arm being positioned to normally engage the first of said fixed contacts; said second arm being positioned to normally engage the second of said fixed contacts; said third arm being positioned for deflection into bridging engagement with the first and third of said fixed contacts; said fourth arm being positioned for deflection into bridging engagement with the second and fourth of said fixed contacts; an actuator having cam means for selectively deflecting said spring arms and adapted for movement from a central position to operating positions on either side of the central position; and said actuator being positioned to cause said cam means to deflect said

5

first and third contact arms from their normal positions upon movement of the actuator to one of said operating positions and to deflect said second and fourth contact arms from their normal positions upon movement of the actuator to the other of said operating positions.

3. In an electric switch for a directional indicating signal system, four spaced stationary contacts mounted on an insulating base; a first bridging member having its mid-portion secured to the base intermediate the first and second of the stationary contacts and having yieldable spring arms each formed with a contact element normally urged against a stationary contact to complete a circuit connecting the first and second stationary contacts to the mid-portion of the first bridging member; a second bridging member lying in generally parallel spaced relation to the first bridging member and having a mid-portion secured to the case intermediate the third and fourth contacts; the second bridging member having a pair of flexible spring arms each formed with two contact elements normally overlying and spaced from the stationary contacts; the contact elements of the first spring arm of the second bridging member engaging the first and third stationary contacts upon deflection of the first spring arm of the second bridging member to complete a circuit connecting the first and third contacts to the mid-portion of the second bridging member; the contact elements of the second spring arm of the second bridging member engaging the second and fourth stationary contacts upon deflection of the second spring arm of the second bridging member to complete a circuit connecting the second and fourth contacts to the mid-portion of the second bridging member; an actuator member movable in a line intermediate the two bridging members in either direction from a central position and having two cam projections; one of the cam projections deflecting a spring arm of the first bridging member and the other of the cam projections deflecting a spring arm of the second bridging member upon movement of the actuator member in either direction from a central position.

4. In an electric switch for a direction indicating signal system; four spaced stationary contacts mounted in an insulating case; a first bridging member having a base portion secured to the casing intermediate the first and second of the stationary contacts and having two spaced leg portions extending from the base portion with reversely bent end portions defining yieldable spring arm each provided with a contact element normally urged against a stationary contact to connect the first and second stationary contact to the base portion of the first bridging member; a second bridging member lying in generally parallel spaced relation to the first bridging member and having a base portion secured to the casing intermediate the third and fourth of the stationary contacts; a pair of yieldable spaced leg portions extending from the base portion of the second bridging member, each leg portion having an extension provided with contact elements overlying and normally separated from the stationary contacts; the contact element of one extension engaging the first and third stationary contacts upon deflection of the first leg portion of the second bridging member; the contact elements of the other extension en-

6

gaging the second and fourth stationary contacts upon deflection of the second leg portion of the second bridging member; an actuator member mounted in the case adjacent the first and second bridging members for a reciprocal movement in either direction from the central position and having two cam projections; one of the cam projections deflecting a spring arm of the first bridging member to move the contact element thereof out of engagement with its respective stationary contact upon movement of the actuator in either direction from its central position; the other of the cam projections deflecting a leg portion of the second bridging member to urge the contact elements of the extension thereof into engagement with their respective stationary contacts; movement of the actuator from its central position in one direction opening the circuit between the first bridging member and the first stationary contact and closing a circuit between the second bridging member and the first and third contacts; movement of the actuator from its central position in the other direction opening the circuit between the first bridging member and the second stationary contacts and closing a circuit between the second bridging member and the second and fourth stationary contacts; and return of the actuator to its central position from a displaced position closing the opened circuit between the first bridging member and the first or second stationary contact, and opening the closed circuit between the second bridging member and the first and third or second and fourth stationary contacts.

5. The switch as defined in claim 4 wherein the stationary contacts and the bridging member are secured to the bottom wall of a recess in the case; the actuator member being provided with a longitudinal groove for sliding movement within the recess upon the cross-piece of a T-shaped guide member; the bottom wall of the recess having a groove disposed between the bridging members for receiving the tongue of the guide member and opposed walls of the recess having slots into which the ends of the cross-piece fit to enable the guide member to be dropped into place in the recess; a pair of coil springs disposed about the cross-piece between the opposed walls and the actuator member to normally urge the actuator member to a central position; a cover attached to the case for enclosing the recess and having a pair of struck out ears received in the guide member receiving slots of the opposed walls for retaining the ends of the guide member seated in the slots; the actuator member being retained between the cover and the guide member and having an operating stud projecting through a longitudinal slot in the cover.

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