

Nov. 7, 1939.

J. SINGER

2,179,385

SWITCH

Filed Dec. 8, 1937

2 Sheets-Sheet 1

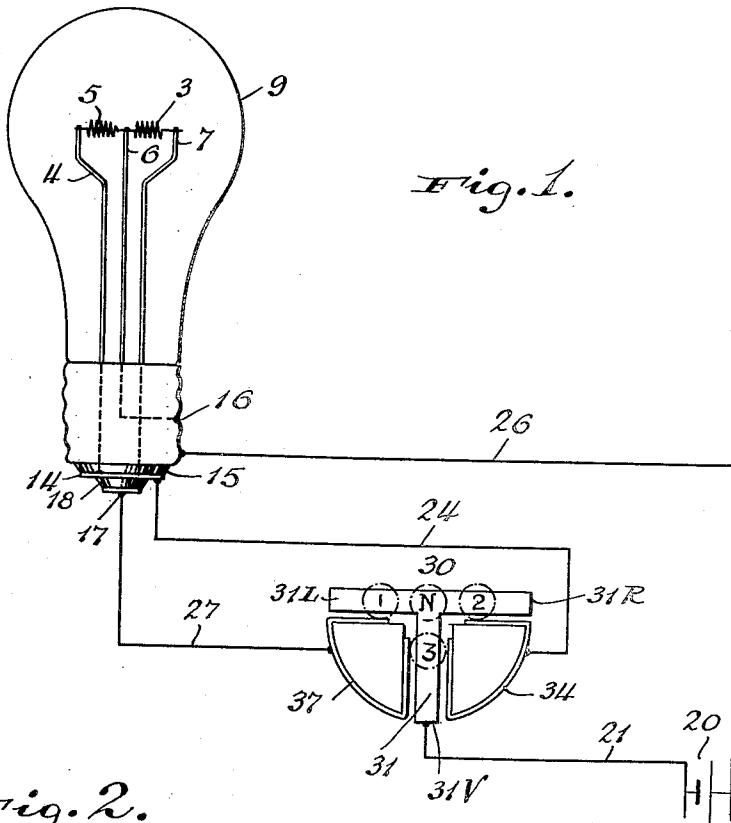


Fig. 1.

Fig. 2.

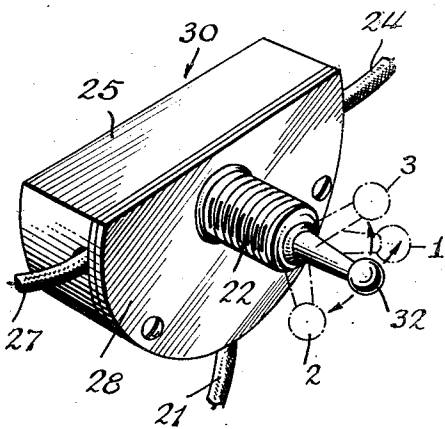
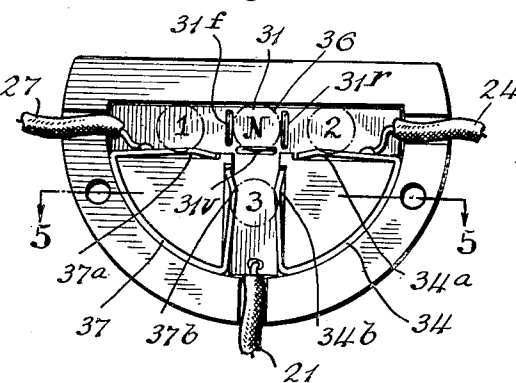


Fig. 3.



INVENTOR
JOSEPH SINGER
BY
J. Bassiches
his ATTORNEY

Nov. 7, 1939.

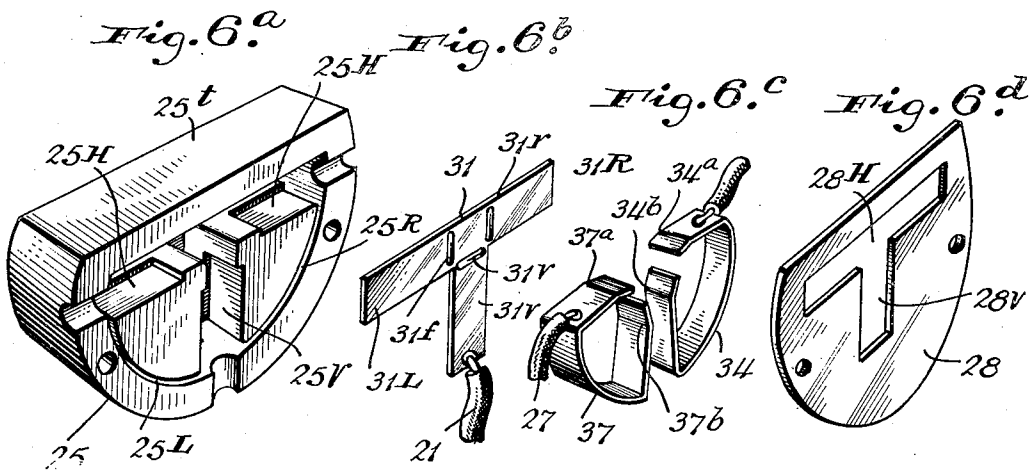
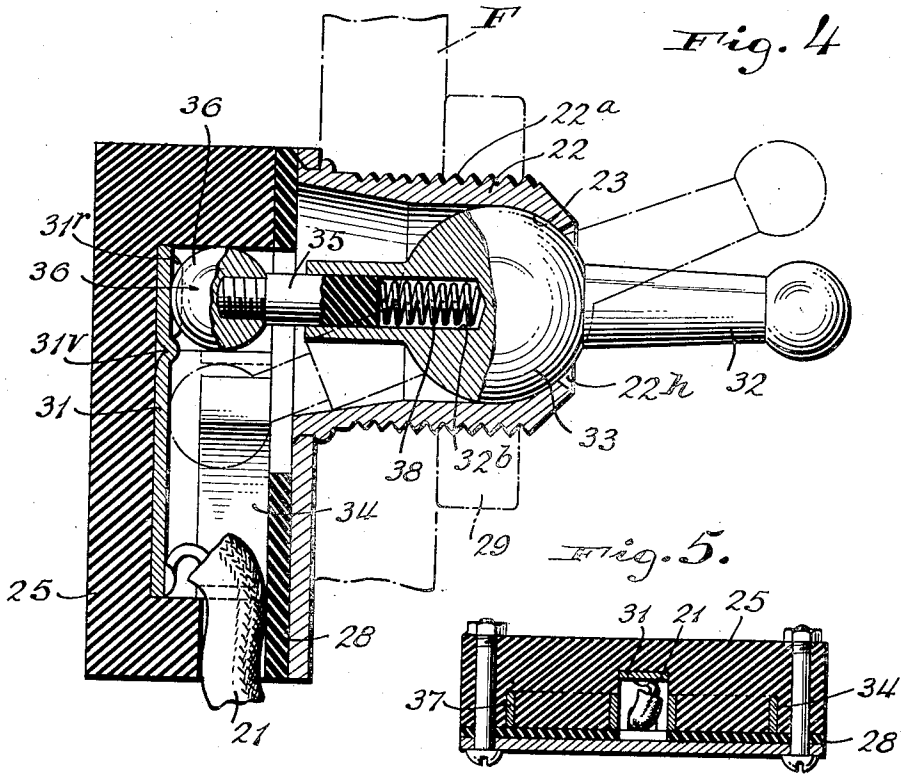
J. SINGER

2,179,385

SWITCH

Filed Dec. 8, 1937

2 Sheets-Sheet 2



INVENTOR
JOSEPH SINGER
BY
J. Bassiches
his ATTORNEY

UNITED STATES PATENT OFFICE

2,179,385

SWITCH

Joseph Singer, New York, N. Y., assignor to Leo
H. Kalow, New York, N. Y.

Application December 8, 1937, Serial No. 178,661

8 Claims. (Cl. 200—6)

This invention relates to electrical switches, more particularly of the type controlling multiple circuits known as "multiple-way" switches, e. g., a "three way" or a "four way" switch; and used for selecting particular ones or combinations of a plurality of circuits.

Multiple-way or selective switches as commonly made today are operated by a rotary manipulative member which is turned from one angular position to the next. An undesirable feature residing in such switches is that, in order to pass from the particular position at which the switch might be set, to another desired position, the manipulative member must be successively turned from the set position to the desired position through all the intervening positions. Not only is this time-consuming and annoying, but it also results in unnecessary wear upon the moving parts of the switch; moreover, it might be undesirable, in some instances, to cause functioning of the circuits or, rather, fixtures controlled by the said intervening positions.

It is the object of my invention to overcome the above enumerated objections by providing a multiple-way switch, in which the desired station or position may be directly selected, without passing through the intervening stations. It is a further object of my invention to provide a directly selective switch which shall be a unitary and compact device of simple construction comprising few and inexpensive parts and which shall readily fit in existing fixtures, being for this purpose of standard dimensions and interchangeable with present equipment.

It is a further object of my invention to provide a switch particularly suitable for installation as a standard fixture switch in which a selected number of circuits may be quickly and conveniently closed from a neutral position or "off position" to any of the desired selected positions independently, and in which a manually operable member for effecting such selected position is indicative either of the particular circuit that is closed or of the "off" or open circuit position of the switch. More particularly, it is contemplated by my invention to provide a switch in which a tiltable, manually operable member may independently and selectively control the circuit desired to be opened or closed and in which the angular position of the manually operable member also indicates the particular circuit which is open or closed, thereby to indicate to the operator what change to make, to go to any other selected position.

For the attainment of the above and such other objects as may hereinafter appear or be pointed out, I have shown one embodiment of my invention in the accompanying drawings, in which:

Figure 1 is a diagrammatic showing of the electrical circuits and connections;

Figure 2 is a perspective view of a selective switch of this invention;

Figure 3 is a front view of the switch casing and parts, with the cover plate and manipulative finger removed;

Figure 4 is a detail of the construction of the manipulative finger;

Figure 5 is a section on the line 5—5 of Figure 3;

Figures 6a to 6d are exploded views of the switch parts; Figure 6a showing the casing; Figure 6b, the battery contact plates; Figure 6c, the lamp contacts; and Figure 6d, the cover plate.

Multiple-way switches are commonly employed to regulate a plurality of circuits so that particular ones or combinations thereof may be selected; the plurality of circuits may supply current to individual electrical fixtures or the plural circuits may be embodied in a single fixture. Merely for purposes of illustration, the latter is shown in Figure 1, wherein the single fixture 9—a lighting lamp bulb—has an incandescent filament 8 between branch leads and supports 7 and 6, and a second filament 5 between the said lead and standard 6 (common lead) and a third lead and standard 4. Filament 8, for example, might consume 100 watts and filament 5 might burn 200 watts. Hence if the circuit including leads 6 and 7 were closed, the lamp will burn with an intensity equivalent to 100 watts; if the circuit including leads 6 and 4 were closed, the wattage would be 200; if both said circuits were closed, the lamp would consume 300 watts. The common lead 6 is connected, as shown, to portion 16 constituting screw base of the lamp; lead 7 is connected to contact plate 17, and lead 4 to contact plate 14, the three portions being insulated from each other by separating insulations 15 and 18.

Lamp 9 is of known construction and is no part of this invention, which may be as readily applied, as already pointed out, to a plurality of independent circuits. There are hence four positions or conditions possible in lamp 9, namely; position (1), 100 watts; position (2) 200 watts; position (3) 300 watts, the combination of (1) and (2); and a fourth position in which the lamp is not lighted at all, or in the neutral posi-

tion. It is clear that the improved switch of my invention may be applied to a lesser or greater number of stations or positions than four, and that lamp 9 with the stated four conditions is merely illustrative. Manifestly, my improved switch may be applied to control lighting circuits (as shown) or to regulate heating or any other kind of circuits and fixtures; hence the filaments 5 and 8 may be resistance elements of some other character.

The common lead 6 of lamp 9 is connected from lamp portion 16 by wire 26 to one side of battery 20. Lead 7 is connected from lamp portion 17 by wire 27 to a contact 37 of the improved switch 30 of my invention. Lead 4 of the lamp is connected from portion 14 by wire 24 to a contact 34 of switch 30.

The other side of current supply 20 is connected by wire 21 to a contact 31 of switch 30. In the neutral position of the manipulative member (presently described) no contact is made between current supply of battery contact 31 and either of the two lamp contacts 37 or 34. Battery contact 31 may be connected to lamp contact 37 to supply current to the 100 watt element or filament 8, i. e. position (1), so designated in Figure 1. Or battery contact 31 may be connected to lamp contact 34 to supply current to the 200 watt element or filament 5, i. e. position (2). Or battery contact 31 may be connected to both 34 and 37 to supply 300 watts to the lamp, i. e. position (3).

The manipulative element of the switch is a manually operable tripping finger piece or trigger 32, shown in perspective in Figure 2, and in detail in Figure 4. Referring to the latter figure, finger 32 has a spherical portion 33 which is journaled in a curved seat 23, provided interiorly of a bushing 22, the latter being provided with an opening 22h where through finger trigger 32 clears. The end of finger or trigger 32 which is inside the bushing 22 is provided with a central bore 32b, within which is slidable a pin 35, made of insulating material, extending from the finger or trigger and terminating in a contact ball or point 36. A spring 38 contained within the central bore 32b constantly urges pin 35 outwardly to maintain ball 36 in contact with the battery contact 31 and the lamp contacts 37 and 34, as will be seen, and to maintain spherical portion 33 of the finger or trigger seated in the curved seat 23 of the bushing. It will be observed from Figure 4 that pin 35 is constructed, in whole or in part, of insulating material so that contact ball 36 is entirely insulated from the manually operable trigger or finger 32 and from any other part of the switch except for whatever contacts the ball 36 may make with 31, 34 and 37, as will be seen as this description proceeds.

The battery or live circuit contact 31 is in the form of a T having a left branch 31L, a right branch 31R and a vertical branch 31V. Lamp contact 37 is in the form of a quarter sector and is positioned between the vertical branch 31V and the left branch 31L of the battery contact; contact 34 is likewise in the form of a quarter sector, but is located between 31V and 31R. All three contacts are contained within a casing 25, best shown in Figure 6a, which is made of suitable insulating material and is substantially in the form of a half-circle, or at least has a flat top surface 25t and rounded bottom surfaces. Parallel and close to top surface 25t, the casing is provided with a recess 25H running horizontally, Figure 6a, and a recess 25V, running vertically

and meeting the horizontal recess at a medial point, thus forming a T-shaped recess within which the T-formed battery contact plate 31 is received. Casing 25 is further provided with a groove 25L on its left (as viewed in Figure 6a) and a similar groove 25R on its right, both being in the form of a quarter circle. The left lamp contact 37 which is formed of a strip, see Figure 6c, is received in left groove 25L with its horizontal portion located in the left part of recess 25H; right contact 34 is received in right groove 25L and the right part of recess 25H. As seen in Figure 3, the vertical portions of both 37 and 34 are located in the vertical recess 25V. Casing 25 is closed by cover 28, Figure 6d, which is slotted 28H and 28V to correspond to recesses 25H and 25V and to the shape of contact plate 31.

The seat 23 of bushing 22 in which the spherical portion 33 of switch finger trigger 32 is journaled, is located at the point of intersection of the recesses 25H and 25V (likewise, at the point of intersection of branches 31L—31R and 31V of contact plate 31). By virtue of spring 38, already described, ball 36 is constantly maintained in contact with battery or live circuit plate 31. In the neutral position of switch finger 31, i. e. with no current supplied to lamp 9, it is in a normal position relative to the casing, more particularly relative to contact plate 31; this is the position shown in solid lines in Figure 2. In the neutral position of finger 32, its ball 36, represented in Figure 3 by dot and dash circles, will be positioned precisely at the intersection of the three branches 31L, 31R and 31V of plate 31; designated "N" in Figure 3. In this position of the finger or trigger ball 36, it is out of contact with either lamp contact 37 (left) or lamp contact 34 (right) and is in contact only with battery plate 31.

Due to the spherical seating of finger or trigger 32, it may be turned or tilted in a horizontal plane to either the left (position (2), Figure 2) or to the right (position (1)) or may be turned or tilted in a vertical plane to position (3). Inasmuch as the fulcrum of the finger 32 is at its midpoint (the lever being of the first class), the position designations of the manipulative end of the finger, in Figure 2, are reversed from the position designations of the contact or ball end, in Figures 3 and 1. In position (1) (left), Figures 3 and 1, ball 36 contacts the lamp contact 37 as well as the battery contact 31; hence the circuit is completed from one side of battery 20, Figure 1, through 31—37, to lamp element 8 and to the other side of battery. In position (2) (right) Figures 3 and 1, ball 36 makes contacts 31—34 to supply current to element or filament 5. In position (3), Figures 3 and 1, the ball is in contact with both left contact 37 and right contact 34 (as well as battery contact 31); hence the circuits to both elements or filaments 8 and 5 are closed.

The battery or live circuit contact plate 31 is provided with three folds or crimps 31r, 31f and 31b, Figures 6b and 3, in its branches 31R, 31L and 31V, respectively, serving as detents for the purpose of retaining the manipulative finger in any one of its four positions. For example, as ball 36 is moved to the left (as viewed in Figure 3) it will snap over crimp or lug 31f, against the urgency of spring 38; the lug 31f hence will offer resistance to the rightway movement of the ball from position (1). Thus the temporary resistance or obstruction provided by the crimping 31f, 75

31r, 31v is conducive to a "snapping" movement, avoiding sparking.

It will also be observed that the quadrant shaped contacts 34 and 37 may be formed to assure good lateral or wiping contact with the ball member 36, as it is passed into the T-shaped recesses. For this purpose the quadrants 34 and 37 are formed with camming ends 34a, 34b and 37a, 37b, which disposes the side wall contacts which the members 34 and 37 provide, in a resilient manner, to give desired wiping contact, as will be readily understood.

Bushing 22 is threaded at 22a, Figures 4 and 2, to receive a cover ring or nut 29, Figure 4, shown in dot and dash lines. Either the cover or the casing itself or both may be provided with indicia (not shown) to indicate the adjusted position of manipulative finger 32.

It will be observed that the threaded portion 22 serves as a means to mount the entire switch assembly wherever it may be found desirable to use the switch by passing the neck 22 through a boring in a fixture part F and then tensioning the nut 29 in position. This serves to make my switch applicable as a well known and standard installation to any lighting fixture.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

1. An electric switch comprising a base of insulating material having a pair of connecting recesses forming a guideway, a main fixed contact in said guideway approximating the shape of the guideway, a pair of fixed contact plates mounted on said base and a manually operable operator provided with a substantially universal pivot and having a contact bridging conducting end portion disposed within said guideway in contact with said main contact in all positions, the said operator being movable in said guideway from a neutral position in which the said end portion is out of contact with the said contact plates to different positions in which the said end portion is in contact with a selected contact plate.

2. An electric switch comprising a base of insulating material having a pair of connecting elongated channel-shaped recesses forming a T-shaped guideway, a T-shaped fixed contact disposed on the bottom of said guideway, a pair of fixed contact plates mounted on said base and a manually operable operator provided with a substantially universal pivot and having a contact bridging conducting end portion disposed within said guideway in contact with said main contact in all positions, the said operator being movable in said guideway from a neutral position in which the said end portion is out of contact with the said contact plates to different positions in which the said end portion is in contact with a selected contact plate.

3. An electric switch comprising a base of insulating material having a pair of connecting elongated channel-shaped recesses forming a T-shaped guideway, a T-shaped fixed contact disposed on the bottom of said guideway, a pair of fixed contact plates mounted on said base and a manually operable operator provided with a substantially universal pivot and having a contact bridging conducting end portion disposed within said guideway in contact with said main contact in all positions, the said operator being movable in said guideway from a neutral position in which the said end portion is out of contact with the said contact plates to different positions in which

the said end portion is in contact with a selected contact plate, each of the branches of said T-shaped contact having a raised portion serving to hold the operator in adjusted position.

4. An electric switch comprising a base of insulating material having a pair of connecting elongated channel-shaped recesses forming a T-shaped guideway a T-shaped fixed contact disposed on the bottom of said guideway, a pair of fixed contact plates mounted on said base, one in each of the sectors formed between the leg and arms of the guideway, and a manually operable operator provided with a substantially universal pivot and having a contact bridging conducting end portion disposed within said guideway in contact with said main contact in all positions, the said operator being movable in said guideway from a neutral position in which the said end portion is out of contact with the said contact plates to different positions in which the said end portion is in contact with a selected contact plate.

5. An electric switch comprising a base of insulating material having a pair of connecting elongated channel-shaped recesses forming a T-shaped guideway a T-shaped fixed contact disposed on the bottom of said guideway, a pair of fixed contact plates mounted on said base, one in each of the sectors formed between the leg and arms of the guideway, and having their end portions disposed in the adjacent arm and leg of the guideway, and a manually operable operator provided with a substantially universal pivot and having a contact bridging conducting end portion disposed within said guideway in contact with said main contact in all positions, the said operator being movable in said guideway from a neutral position in which the said end portion is out of contact with the said contact plates to different positions in which the said end portion is in contact with a selected contact plate.

6. An electric switch comprising a base of insulating material having a pair of elongated channel-shaped connecting recesses forming a T-shaped guideway, said base also having a groove connecting the foot of the guideway with each arm thereof, a main fixed contact in said guideway approximating the shape of the guideway, a pair of fixed contact plates mounted on said base, one in each of the areas between the leg and each arm of the guideway and having their median portions disposed in said grooves and end portions disposed in the leg and adjacent arm of the guideway, and a manually operable operator provided with a substantially universal pivot and having a contact bridging conducting portion disposed within said guideway in contact with said main contact in all positions, the said operator being movable in said guideway from a neutral position in which the said bridging portion is out of contact with the said contact plates to different positions in which the said end portion is in contact with a selected contact plate or with both contact plates.

7. An electric switch comprising a body of insulating material, said body having a T-shaped channel and a groove connecting the foot of the channel with each arm thereof, forming a pair of sector-like portions disposed between the leg and arms of the channel, a T-shaped contact plate lodged on the bottom of said channel, and a pair of conducting elements each substantially encircling said sector-like portions.

8. An electric switch comprising a body of in-

5 insulating material, said body having an open-ended T-shaped channel and a groove connecting the foot of the channel with each arm thereof, forming a pair of sector-like portions disposed between the leg and arms of the channel, a T-shaped contact plate lodged on the bottom of said channel, a pair of conducting elements each sub-

stantially encircling said sector-like portions, said body also having passages for lead in wires at the end of each arm and leg of the guideway, and a closing plate having a T-shaped slot in registry with said guideway.

JOSEPH SINGER.