

Dec. 30, 1952

J. M. LOGE

2,623,958

TOGGLE SWITCH

Filed June 27, 1947

Fig. 1

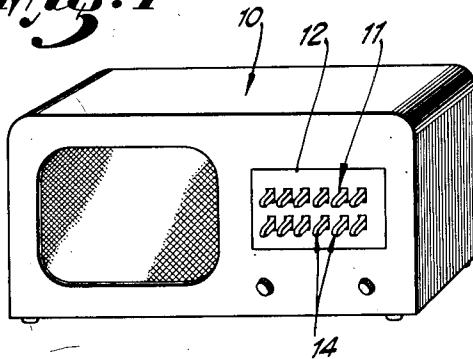


Fig. 3

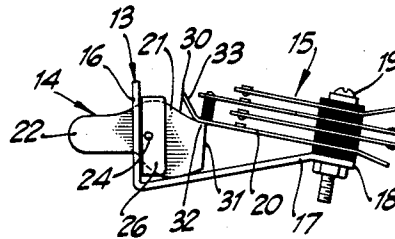


Fig. 2

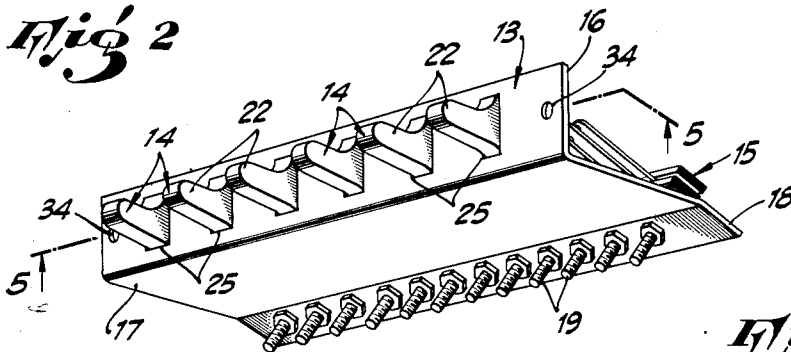


Fig. 4

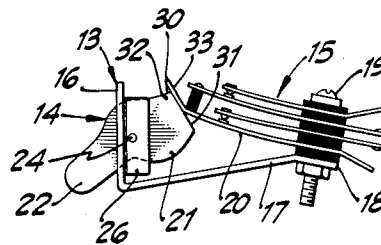
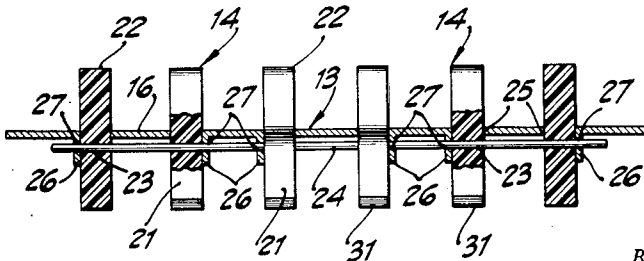


Fig. 5



INVENTOR.

Joseph M. Loge,

BY

Attorney.

UNITED STATES PATENT OFFICE

2,623,958

TOGGLE SWITCH

Joseph M. Loge, Los Angeles, Calif.

Application June 27, 1947, Serial No. 757,572

2 Claims. (Cl. 200—1)

1

My invention relates generally to toggle switches and more particularly to switches of this type that are adapted to be grouped together so that a large number of switches may be placed in a relatively small space.

In many applications, particularly those where a large number of circuits are to be independently controlled, it is desirable to be able to mount a number of switches together in a small space, while still being able to control an appreciable current directly without the use of relays. Certain types of push button switches permit this to be done, but any simple push button switch is of momentary contact type, and generally is capable of controlling only a single pair of contacts.

Where a two-position switch is necessary, or where more than a single pair of contacts must be operated, the push button type of switch is not satisfactory. An example of an application requiring a large number of switches to be grouped together is found in the intercommunicating systems used in many offices. In such equipment, any one of a considerable number of other stations must be instantly selectable at each of the stations, and it is undesirable that the selecting switch be manually held in its operating position during the entire period of operation. Under such conditions, push button switches are not desirable.

It is therefore a major object of my invention to provide a switch that requires a very small amount of space and therefore is suitable for group mounting.

Another object of my invention is to provide a switch of this general type adapted to control a plurality of circuits and likewise adapted to remain in either of two predetermined positions.

It is a further object of my invention to provide a switch of this type which is characterized as a quick-make, quick-break type of switch.

Still another object of my invention is to provide a switch of this type making use of standard and readily available elements whose operating dependability has been proven over a number of years.

It is a still further object of my invention to provide a switch of this type that is simply and easily constructed and may be produced at a small cost.

These and other objects and advantages of my invention will become apparent from the following description of a preferred form thereof, and from the drawings illustrating that form in which:

2

Fig. 1 is a perspective view of a device, herein shown as an intercommunicating station, making use of my improved switch;

Fig. 2 is a perspective view taken from below, showing the method of grouping and mounting my improved switches;

Fig. 3 is an end elevational view of the switch and mounting shown in Fig. 2, with the switch in a first or open position;

Fig. 4 is a view similar to Fig. 3 but with the switch in a second or closed position; and

Fig. 5 is a cross-sectional view taken at 5—5 in Fig. 2 to show the method of mounting the toggle handles or switch operators.

Referring now to the drawings and particularly to Figs. 1 and 2 thereof, the numeral 10 indicates generally a station of an intercommunicating system having a series of individual switches 11 operable to connect the particular station shown to any one of a plurality of other stations (not shown). An escutcheon plate 12 surrounds the projecting handles of the individual switches 11, and the plate is preferably provided with various indicia (not shown) indicating the station controlled by each switch. In addition to providing a more finished appearance of the station 10, the escutcheon plate 12 also serves to cover the attaching screws which hold the switches 11 to the front panel of the station.

One of the particular features of my invention is the fact that the particular construction of my switch renders it very suitable for grouping so that a plurality of switches may be mounted in a single frame and thereafter treated as a unit. While it will be obvious that any desired number of switches may be combined in a single unit, I have found that six is a very convenient number, and consequently I have chosen a group of six switches to illustrate the preferred embodiment of my invention.

As indicated in Figs. 2 to 5, my improved switch includes a generally L-shaped frame 13, a plurality of toggle members 14 carried by the frame, and a series of jack-type switch mechanisms 15, each switch mechanism being associated with a corresponding toggle member. The jack-type switch mechanism 15 has long been known and used in the electrical and allied arts, and I do not claim this switch element in and of itself as my invention except as it may cooperate and be combined with other elements about to be described. Obviously, the particular type of switches which will be selected for any given application will be chosen for their suitability to that particular use, and in the form shown, I have

illustrated a switch mechanism 15 having a pair of single pole, single throw switches which cooperate to act as a double pole single throw switch. It will be obvious, however, that any other desired combination of switch contacts may be chosen, this selection being apparent to one skilled in the art, having regard for the particular application of the switch.

The frame 13 preferably consists of a piece of metal of relatively heavy gage, having a vertically extending front section 16 adapted to bear against the panel of the station 10, with a substantially horizontal section 17 extending rearwardly from the lower edge thereof. At the rear edge of the substantially horizontal section 17, I provide a lip 18, formed as a continuation of the section 17, to which the switches 15 are attached as by screws 19. As indicated, the angle formed by the vertical section 16 and the rearwardly extending section 17 is somewhat less than 90 degrees so that the section 17 extends slightly upwardly from the lower edge of the front portion 16. Likewise, the lip 18 is formed at an angle to the section 17 so that the lip extends slightly downwardly, thereby causing the individual switches 15 to be tilted so that their forward ends extend upwardly. As will hereinafter become apparent, the individual angles are not critical so long as the various elements cooperate in the proper manner, but I have found that if the generally horizontal section 17 makes an angle of approximately 80 degrees with the vertical section 16, and if the lip 18 makes an angle of approximately 155 degrees with the section 17, very satisfactory results are obtained. It will be appreciated, of course, that the terms "vertical" and "horizontal" as used herein are for clarity only, and the switch is not limited to the particular position shown. As indicated in Figs. 3 and 4, certain of the blades of the switches 15 are extended forwardly of their attached contacts, these extending blades being, in effect, operating blades. The lowermost of these operating blades, designated by the numeral 20, is aligned with its corresponding toggle member or switch operator 14 so that movement of the latter controls the operation of the blade 20.

The switch operators or toggle members 14 are generally formed of an insulating material such as a molded plastic, and have a forwardly projecting handle 22, and a cam-shaped rear surface 21 adapted to bear against and move the operating blade 20. Near the junction of the handle 22 with the cam-like body of the device, a hole 23 is formed in the switch operator 14 to receive a horizontal shaft 24 supporting the switch operators for rotation about a horizontal axis. Openings 25 are formed in the vertical section 16 of the frame 13 to receive the handles or levers 22, and the horizontal shaft 24 is supported by the vertical section 16 so that the operating levers are properly aligned therewith. While various methods of mounting the shaft 24 may be employed, I have found one of the most satisfactory methods is to provide ears 26 which project rearwardly from the vertical section 16 adjacent the openings 25 and formed of the material removed thereby, the ears being provided with holes 27 therein to receive the shaft. This construction is clearly shown in Figs. 3 and 5, and it will be appreciated that additional ears 26 may be provided, though normally this is neither necessary nor desirable.

To provide the desired quick-make, quick-break operation of the switch 15, the cam surface 21

is designed so that it has a low dwell 30 and a high dwell 31, separated by a lobe 32. Preferably, the forward end of the lowermost operating blade 20 is bent upwardly as at 33 so that this portion is parallel to and bears against a considerable length of the high dwell 31 when the switch contacts are in closed position. This is indicated in Fig. 4, where the lever or handle 22 is shown in its lowermost position. When the handle 22 is raised to its alternate position, the upwardly formed projection 33 of the operating blade 20 rests against the low dwell 30 of the switch operator 14, as indicated in Fig. 3. To change from one position to the other, it is necessary that the lobe 32, swinging about the shaft 24 as a center, move the operating blade 20 above the position shown in Fig. 4, thereby providing, in effect, an over-center operation which produces the desired quick-make, quick-break action. It will be realized, of course, that the blades of the switch 15 are of a resilient construction, as is customary, and their normal position is substantially that shown in Fig. 3. When the lever 22 is moved downwardly to the position shown in Fig. 4, the blades are deformed slightly and moved upwardly as shown, exerting a resilient pressure against the high dwell 31 of the switch operator 14. The upward movement of the lever 22 is limited by contact of the lower surface of the switch operator 14 with the horizontal section 17 of the frame while the downward movement may be limited by the contact of the upper surface of the switch operator with the vertical section 16.

To mount the individual groups of switches, I provide holes 34 in the vertically extending portion 16 of the frame 13 through which mounting screws (not shown) may be passed. The holes 34, of course, are located so that they are not covered by the shaft 24, and as previously mentioned, the heads of the mounting screws (not shown) are preferably covered by the escutcheon plate 12.

It will thus be seen that I have provided an improved toggle switch for use where a large number of moderate capacity switches must be installed in limited space. The switches are very suitable for group mounting, and any desired number of groups may be mounted, each group consisting of any desired number of switches. While I have shown and described a preferred form of my invention, it will be apparent that modifications may be made therein without departing from the essential features of my invention, and I do not wish to be restricted to the particular form or arrangement of parts herein described and shown except as limited by my claims.

I claim:

1. A switch of the class described, which includes: a generally L-shaped frame having a mounting arm and a supporting arm extending from one edge of said mounting arm to form an acute angle therebetween, the projection of said supporting arm on said mounting arm extending only part way along the length thereof; a lip formed on the edge of said supporting arm remote from said mounting arm, said lip forming an obtuse angle with said supporting arm, and forming, with respect to said first-mentioned angle, a reverse bend whereby said lip, said supporting arm, and said mounting arm cooperate to form a generally Z-shaped member; a plurality of spaced ears stamped from said mounting arm and projecting generally perpendicularly there-

5

from toward said lip, the plane of said ears being substantially perpendicular to the plane of said supporting arm, the forming of said ears leaving apertures in said mounting arm, said apertures and said ears being aligned in a direction generally parallel to the plane of said supporting arm; a jack-type switch member mounted on said lip and having switch blades extending generally parallel to said lip, and at an angle to said supporting arm, toward said mounting arm, whereby the switch blade nearest said lip has its free end substantially aligned with a corresponding one of said apertures in said mounting arm; a unitary switch operator having a lever portion extending through one of said apertures, and having an enlarged portion located on the side of said mounting arm adjacent said supporting arm, said operator having an aperture passing therethrough in a direction generally parallel to both the plane of said mounting arm and the plane of said supporting arm, said enlarged portion of said operator being shaped to limit the rotation of said lever in said aperture, and also being shaped to provide a cam surface bearing against the free end of said blade of said switch aligned with said corresponding aperture, said cam surface having a low dwell, a high dwell, and a lobe therebetween; and a removable shaft extending generally parallel to both the plane of said mounting arm and the plane of said supporting arm, passing through aligned apertures in said ears and said apertures in said operator to support said operator for rotation about said shaft, the shape and size of said operator being such that only removal of said shaft is necessary to effect the removal of said operator and provide complete access to said switch member.

2. A switch of the class described, which includes: a generally L-shaped frame having a mounting arm and a supporting arm extending from one edge of said mounting arm to form an acute angle therebetween, the projection of said supporting arm on said mounting arm extending only part way along the length thereof; a lip formed on the edge of said supporting arm remote from said mounting arm, said lip forming an obtuse angle with said supporting arm, and forming, with respect to said first-mentioned angle, a reverse bend whereby said lip, said supporting arm, and said mounting arm cooperate to form a generally Z-shaped member; a plurality of spaced ears stamped from said mounting arm and projecting generally perpendicularly therefrom toward said lip, the plane of said ears being substantially perpendicular to the plane

6

of said supporting arm, the forming of said ears leaving apertures in said mounting arm, said apertures and said ears being aligned in a direction generally parallel to the plane of said supporting arm; a plurality of jack-type switch members mounted side-by-side on said lip each having switch blades extending generally parallel to said lip and at an angle to said supporting arm, toward said mounting arm, whereby the switch blades nearest said lip have their free ends substantially aligned with corresponding apertures in said mounting arm; a plurality of switch operators each associated and aligned with a corresponding one of said switch members, each having a lever portion extending through said aperture associated with and corresponding to said associated switch member, and having an enlarged portion located on the side of said mounting arm adjacent said supporting arm, each said operator having an aperture passing therethrough in a direction generally parallel to both the plane of said mounting arm and the plane of said supporting arm, said enlarged portions of each of said operators being shaped to limit the rotation of its lever in said associated aperture, and also being shaped to provide a cam surface bearing against said free end of said associated switch blade, said cam surface having a low dwell, a high dwell, and a lobe therebetween; and a removable shaft extending generally parallel to both the plane of said mounting arm and the plane of said supporting arm, passing through aligned apertures in said ears and said apertures in said operators to support said operators for rotation about said shaft, the shape and size of said operators being such that only removal of said shaft is necessary to effect the removal of any or all of said operators and provide complete access to said switch members.

JOSEPH M. LOGE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,008,392	Tiffany	Nov. 14, 1911
1,060,576	Andrick et al.	May 6, 1915
1,246,210	Woodward	Nov. 13, 1917

FOREIGN PATENTS

Number	Country	Date
658,035	France	July 24, 1928