

May 2, 1950

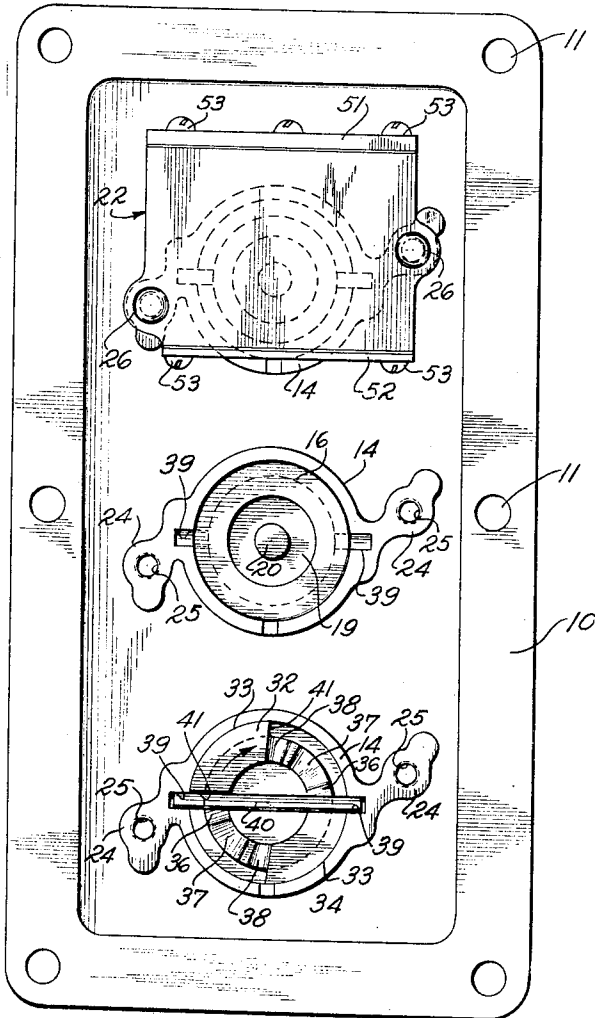
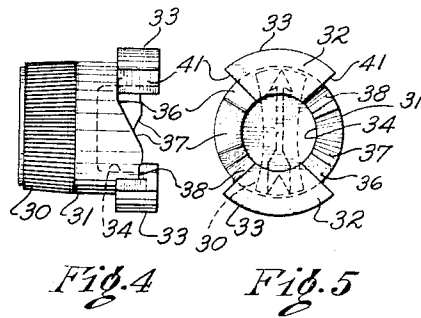
M. L. JEFFREY

2,506,505

SWITCH

Original Filed April 24, 1943

2 Sheets-Sheet 2



Inventor
Max Leroy Jeffery

ॐ

J. H. Douglas
His Attorney

UNITED STATES PATENT OFFICE

2,506,505

SWITCH

Max Leroy Jeffrey, Shaker Heights, Ohio, assignor to The National Acme Company, Cleveland, Ohio, a corporation of Ohio

Original application April 24, 1943, Serial No. 484,376, now Patent No. 2,416,626, dated February 25, 1947. Divided and this application January 27, 1947, Serial No. 724,649

2 Claims. (Cl. 200-168)

1

This invention relates to improvements in control station switches and more particularly to a push button type switch having a snap action mechanism. It is a division of my application, Ser. No. 484,376, filed April 24, 1943, now issued into Patent No. 2,416,626, dated February 25, 1947.

Previous push button control station switches have been expensive to manufacture for several reasons. Among these reasons are the considerable number of parts which were formed specially, and the fact that in many instances it was necessary to design a switch for each installation.

It has been my object to provide a switch of universal application which can be made cheaply and still be simple in design and of rugged construction. In addition, I have provided an assembly which may be operated either by pushing a button or by turning a knob, and these knobs or buttons are completely interchangeable at any of the stations.

Still other objects of the invention and the invention itself will become more apparent from the following description of an embodiment thereof which description is illustrated by the accompanying drawings and forms a part of this specification.

In certain aspects the invention is an improvement of my Patent No. 2,294,559 of September 1, 1942.

In the drawings:

Fig. 1 is a front elevational view of a panel or escutcheon plate in which the switch of my invention is incorporated;

Fig. 2 is a side elevational view of the panel of Fig. 1 with certain parts broken away and shown in sections and showing in side elevation the switches mounted on the back of the panel;

Fig. 3 is a rear view in elevation of the panel of the switch of Fig. 1 with two of the switches removed and showing a rear view of two types of the operating buttons;

Fig. 4 is a side elevational view of one of the turn-type of button used in connection with the switch of my invention;

Fig. 5 is a rear elevational view of the button of Fig. 4.

Throughout the drawings like parts have been designated by like reference characters.

Generally speaking the apparatus adapts itself very efficiently to installations where switches are

2

desired for starting, stopping or jogging a machine. In this case one switch assembly adapts itself for all three of the services mentioned. By substituting different buttons in the switch panel the switch can be made to operate as a push button switch where you push to close the contacts or push to open the contacts, the operation being such that when the finger is removed from the button the switch returns to its former position; or a turn-type button such as shown in the "jog-run" position may be used which enables the switch contacts to remain in an opened or closed position depending on the direction and position to which the button is turned. In any event, the same switch mechanism suffices for all operations.

Although a particular type of supporting panel or escutcheon plate is shown in the drawings, it will be observed that the number of stations is merely a matter of choice and they may be increased or decreased in number to suit the particular conditions where control is desired.

In Fig. 1, by way of illustration, I have shown a panel or escutcheon plate 10 having edge openings 11 which enable the plate to be secured to a suitable support or in a housing.

The panel is provided in its mid portion with three openings 12 therethrough which are vertically aligned. A relatively low annular boss 13 is provided around each of the openings 12 on the front side of the panel. The rear of the panel around each of the openings 12 is provided with an irregularly shaped projection or boss 14, the contour of which is best shown in Fig. 3 and which constitutes a housing for the operating button and a support for the switch assemblies. Each of these projecting housings has an enlarged bore 15 extending towards the opening 12 and terminating in a shoulder 16. The opening or bore 12 receives in sliding engagement the cylindrical end 17 of a push button and the bore 15 likewise receives a flange 18 on the push button. The push button may be moved inwardly from the position shown in Fig. 2, its outward movement being limited by the flange 18 contacting with the shoulder 16. The push button is also provided with an annular groove 19 which surrounds a central pin 20 which extends flush with the inner face of the flange 18 and is adapted to contact the operating pin 21 of the switch mechanism indicated generally at 22.

3

As best shown in Fig. 3, each of the projecting bosses is provided with two laterally extending bosses 24 extending above and below a center line through the main boss and provided with threaded openings 25 for the reception of screws 26 which extend through bosses on the switch assembly housings and hold them in place on the bosses 24. Three such switch assemblies are provided in this specific instance each of which has sets of terminal screws 27 and 28 which extend through the end of the housing into strips which carry fixed contacts on the interior of the housing.

Operation of the switch 22 in the "start" and "stop" positions, as shown in Figs. 1 and 2, is effected by pushing the button 17 inwardly, the pin 20 of the button engaging the operating pin or plunger 21 of the switch which actuates the mechanism, later to be described, inside of the switch housing. It will be noted that these push buttons lie flush with the surface of the panel and the boss 13 and therefore cannot be accidentally operated, since it is necessary to push the button inward depressing it below the front surface of the panel in order to operate the switch mechanism.

The operating lever or button for the "jog-run" position, as previously stated, is a turn type of button, being so designed that it may be turned to hold the contacts in the proper position for the "jog" or "run" position. This is effected by a cam action of the button which either holds the plunger 21 of the switch 22 in or out, the plunger being shown in the out position for "run" and it being contemplated that it will be cammed inward for "jog."

As best shown in Figs. 2, 4 and 5, the "jog" button is provided with a handle or finger grip 30 which is adapted to protrude from the face of the panel 10. The handle is supported by a cylindrical body 31 which is rotatably journaled in the opening 12 in the panel. The body 31 has integral therewith a pair of segments 32 having surfaces 33 which are semi-circular and adapted to ride in the enlarged portion 15 of the bore. A central bore 34 is provided which extends from the rear of the button into the body 31 toward the handle (Figs. 4 and 5).

The wall of the body 31 which defines the bore 34 between the segments 32, is provided with two diametrically opposed cam surfaces each of which comprises a low flat portion 36, an inclined and rising portion 37, and an upper portion 38 which has a seat the purpose of which will hereinafter more clearly appear. As best shown in Fig. 3 the bosses 14 are provided with diametrically opposed notches 39 extending from the rear edge of the boss towards the panel. These notches provide guideways for a pin 40 which extends across the opening and is adapted for engagement with the cam surfaces 36 of the button. It will be seen that when the button is rotated counterclockwise from the positions shown (Figs. 1 to 3) that the cam surfaces 37 engage the pin and force it outward toward the edge of the boss, while rotation of the pin is prevented by the guideways.

In the position as shown in Fig. 2 this pin rests on lower flat surface 36 and when the button is rotated clockwise as viewed in Figs. 3 and 5 the cam surfaces 37 engage the pin and push it outward in the guideways until it comes to rest in the seat 38. The button may be rotated approximately 90 degrees during this operation and the amount of rotation is limited by the

4

faces 41 on the segments 32 which engage with the pin 40.

As can best be seen from Fig. 2, the central portion of the pin also lies against the end of the operating plunger 21 of the switch. Therefore, when the button is moved counterclockwise the pin is moved outwardly in the slots 39 and the central part of the pin bearing against the plunger 21 moves the plunger to the right as shown in Fig. 2. The pin 40 will seat in the depression 38 and hold the plunger 21 in its inwardly pressed position. When it is rotated in the opposite direction the pin is moved out of the notch 38 and the spring pressure from the plunger 21 on the pin 40 is sufficient to cause the camming action of the pin 40 on the cam 37 to rotate the button back to its original position where the pin is seated in the bottom flat portion 36.

It should be noted that each one of the bosses is provided with the notches 39 and therefore the mechanism shown in the lower "jog-run" position may be substituted in any of the other positions when desired or all of the positions may be controlled by the turn-type button or all of them controlled by push type buttons.

It will also be seen that I have provided a push button control that is exceedingly versatile inasmuch as substantially the same mechanism may be used for either a push or a turn-type button switch by merely substituting a cam type button and pin for the simple button.

Having thus described my invention, I am aware that numerous and extensive departures may be made therefrom without departing from the spirit or scope of the invention as claimed herein.

1. An operating mechanism of the turn button type for a switch mechanism including a front panel, a switch housing containing said switch mechanism and an operating member extending from one side, said housing adapted to be secured to said panel with the operating member extending in the direction of the panel, said panel being formed with a rearwardly extending boss, a bore extending through said boss and a counter-bore concentric with said bore at the end of the boss remote from said panel, diametrically opposed slots formed in the walls of said counter-bore extending the full length thereof, a cross pin slidably disposed with its ends in said slots and extending diametrically across the counter bore having its mid portion in engagement with the operating member of said switch mechanism, a turn button having a shank rotatably journaled in said bore and having oppositely disposed segmental flanges in bearing and retaining engagement with the counterbore and being formed with cam faces between said flanges for engagement with said cross pin at regions adjacent to the end portions of said pin.

2. An operating mechanism of the turn button type for a switch mechanism including a front panel, a switch housing, containing said switch mechanism and an operating member extending from one side, said housing adapted to be secured to said panel with the operating member extending in the direction of the panel, said panel being formed with a rearwardly extending boss, a bore extending through said boss and a counter-bore concentric with said bore at the end of the boss remote from said panel, diametrically opposed guide slots formed in the walls of the counterbore extending the full length thereof, a cylindrical cross pin the ends of which are loosely

disposed in said slots, said pin being restrained from longitudinal or sidewise movement by the walls of the slots, the mid portion of said pin being in operative engagement with said operating member, a turn button having a shank rotatably journaled in said bore, and a handle portion extending forwardly of said panel and having oppositely disposed segmental flanges in bearing and retaining engagement with the counterbore and being formed with cam faces between said flanges for tangential engagement with said cross pin at regions adjacent to its end portions.

MAX LEROY JEFFREY.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,889,175	Evans -----	Nov. 29, 1932
1,987,571	Hardage -----	Jan. 8, 1935
2,123,058	Maslin -----	July 5, 1938
2,276,698	Pierce -----	Mar. 17, 1942