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LEVER KEY SWITCH WITH MOLDED LEVER KEY

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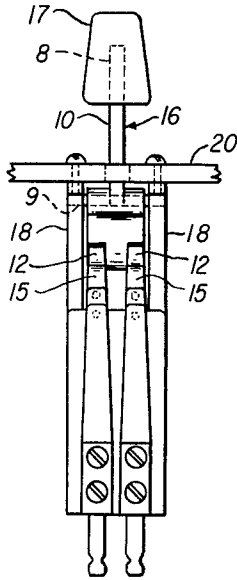


FIG. 1

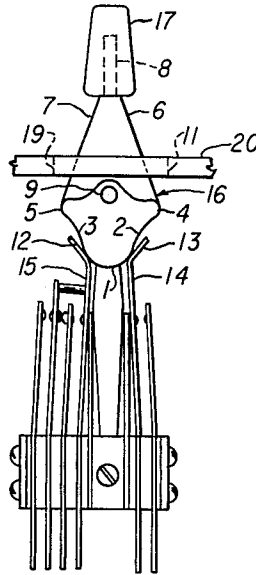


FIG. 2

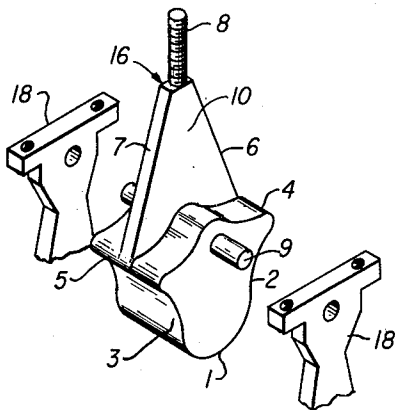


FIG. 4

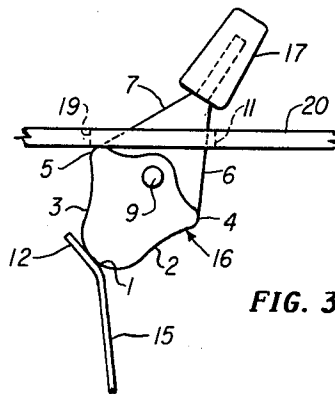


FIG. 3

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LEVER KEY SWITCH WITH MOLDED LEVER KEY
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2 Claims. (Cl. 200-1)

This invention relates to switching mechanisms, and more particularly to lever key switches such as those commonly used, for example, on a telephone operator's switchboard. It is directed particularly to the construction of the lever key itself and the escutcheon plate through which the lever key protrudes.

Heretofore lever keys were assemblies of rather intricate design and consisting of several small parts. For example, the lower end of the lever key had a pair of rollers mounted thereon, and the body of the lever key had two pairs of stop pins staked to it, while the upper shank end was semicircular shaped thus requiring a special bevel edge in the escutcheon plate. This construction, while generally satisfactory in performance, was difficult to manufacture and in addition, contributed significantly to the manufacturing cost of the lever key switch.

Therefore, it is a primary object of this invention to provide a simple and economical lever key for use in a lever key switch.

A feature of this invention is a lever key designed such that it becomes possible to make the lever key in one piece, preferably of molded plastic material. Preferably this lever key is designed so that it may be used in a lever key switch of otherwise conventional construction.

It is a further feature to provide such a lever key with an integral cam shaped lower end for engagement with the armature springs of a spring pileup.

It is a further feature to provide a lever key of the type described and adapted for mounting beneath an escutcheon plate, with a lower end having shoulders integrally formed thereon which serve as stops for the lever key.

It is a further feature to provide a lever key of the type described and adapted for mounting beneath an escutcheon, with a tapered shank which allows use of a vertically edged slot in the escutcheon plate.

Briefly, the embodiment of the invention described herein comprises a one piece lever key of molded plastic material. The lower portion of this lever key has molded thereon a cam face for engaging the armature springs of the spring pileup of the key, and shoulders which abut against the underneath surface of the escutcheon plate through which the lever key extends. These shoulders serve as stops for the lever key in either of its extreme positions. In addition, the shank of the lever key is tapered such that the slot in the escutcheon plate may have vertical end edges.

The invention will be more fully understood from the following detailed description of an embodiment thereof. In the accompanying drawings:

FIG. 1 is a front view of a lever key switch in the normal position, showing the top of the armature springs, the frame structure for the lever key, and the edge of the escutcheon plate.

FIG. 2 is a side view of the switch with the lever key mounting arms of the frame structure removed, showing the lever key in the normal position. The spring pileups, are visible, and the armature springs are seen to have flattened sections at the ends which engage the lower portion of the lever key.

FIG. 3 is a side view of the lever key switch with the mounting arms removed showing the lever key in an ex-

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treame position with one shoulder against the escutcheon plate and the lower portion of the lever key deflecting the armature spring outwardly. In addition, as will be seen in FIG. 3, the corresponding side of the tapered shank in the operated condition shown is nearly perpendicular to the surface of the escutcheon plate. In FIG. 3 it has been assumed, by way of example, that the lever key switch is to be non-locking in its operated position.

FIG. 4 is an exploded perspective view of the lever key and its mounting arms showing the shape and relative size of the shank, shoulders, and cam face.

Referring now to the drawings, in FIGS. 1 and 4 the lever key 16 which is made in one piece of plastic molded material, such as nylon, is shown as having shaft 9 inserted therein so that the lever key may be mounted for rocking movement between arms 18 which form part of the frame structure of the lever key switch. This switch is of generally conventional construction with the exception of the lever key itself. The top of lever key 16, for instance, has a short threaded portion 8 for receiving the handle 17. The threaded portion 8 extends from a shank 10 which has tapered side walls 6 and 7. The lower end of lever key 16 is constructed by integrally forming a boss on each side of the flat center portion. This lower end of lever key 16 has a cam face 1 which is substantially half round and blends into arcuate side walls 2 and 3. Shoulders 4 and 5, also molded integrally with shank 10, are at the upper ends of side walls 2 and 3 and protrude outward and upward slightly.

The cam face 1 of lever key 16 engages the armature springs of the spring pileups as viewed in FIGS. 1, 2, and 3. For example, in FIG. 3 armature spring 15 has a flattened section 12 engaging the cam face 1. Armature spring 15 may thus be deflected and its corresponding spring pileup actuated by cam face 1 if the handle 17 of lever key 16 is pivoted to the right as viewed in FIG. 3. Similarly, armature spring 14 can be deflected and its corresponding spring pileup actuated by pivoting the handle 17 of lever 16 to the left to cause cam surface 1 to engage surface 13 of spring 14 as viewed in FIG. 3.

As handle 17 of lever key 16 is pivoted to the left or to the right, shoulders 4 or 5 respectively comes against the underneath surface of the escutcheon plate 20. For example, in FIG. 3 the handle of lever key 16 is shown in the extreme right position, with shoulder 5 of the lever key serving as a stop against the escutcheon plate. It is noted that shoulder 5 strikes the escutcheon plate on each side of the elongated slot.

In addition, in FIG. 3 the tapered side 6 of shank 10 is shown as being substantially perpendicular to the surface 11 of escutcheon plate 20 when the lever key 16 is pivoted to the extreme right position. Similarly, when lever key 16 is pivoted to the extreme left position, the tapered side 7 is substantially perpendicular to the surface 19 of escutcheon plate 20. This makes possible the use of an escutcheon plate with a slot which has a simple vertical edge so that no special beveling operation is required, as it is in lever key escutcheons of the prior art.

It will be appreciated that a one piece molded plastic lever key of the type disclosed greatly reduces the cost of producing a completed lever key switch. Furthermore, by employing a tapered shank, the slot in the escutcheon plate can be simplified. The formed lower end of the lever key serves the dual purpose of actuating the armature springs and as a stop for the lever in either of its extreme positions.

While I have described the above principles of my invention in connection with a specific embodiment, it is to be clearly understood that this description is made only by way of example and not as a limitation to the scope and spirit of my invention as hereinafter claimed.

What is claimed is:

1. In a lever key switch, an escutcheon plate having a slot therein with vertical ends, a framework secured to and depending from said plate with switching springs secured thereto, a lever key pivotally mounted in said frame with its upper portion extending upward through the slot in said escutcheon plate and having projections on its lower portion for operating the springs when the key is moved about its pivot, said key integrally molded in one piece with one portion comprising a thin flat tapered shank extending upward from its pivot point in the shape of a triangle with a threaded portion extending upward from the upper apex of the triangular shaped portion to which a handle may be attached, the lower portion of the key at the base of the triangular shaped shank formed of greater thickness than said shank portion with a large cam surface on the lower side thereof engaging the springs when the key is operated and with upper cam surfaces, on each side of said shank, formed by said thicker portion and engaging the under side of said plate on either side of said slot to stop the key, and a pivot pin extending through said thickened portion for pivoting the key in the frame, each side of said triangular section lying parallel to the adjacent end of the slot when the key is moved in either direction to operate one of the sets of switch springs.

2. In a lever key switch, an escutcheon plate having a narrow slot therein, a frame structure secured to said plate on either side of said slot and depending therefrom,

switching springs secured to said structure, a lever key pivotally mounted in said frame structure for operating said springs, said key integrally molded with one portion comprising a thin flat shank extending upward from the pivot point through said slot with a threaded portion at its upper end with a handle attached thereto, said key molded with a greater thickness below the lower edge of said shank than the shank portion thereof to form upper and lower cams on either side and below the flat surfaces of said shank, a pivot pin extending from the cam and through openings in said frame structure, the upper cams extending outward on both sides of said shank portion and engaging the under side of said plate on both sides of said slot when the key is moved about its pivot in either direction to thereby limit the movement of the key, and the lower cam engaging and operating certain of said switching springs.

References Cited in the file of this patent

UNITED STATES PATENTS

1,060,576	Andrick et al. -----	May 6, 1913
1,551,722	Wohlers -----	Sept. 1, 1925
1,778,529	Ide -----	Oct. 14, 1930
1,784,898	Gary et al. -----	Dec. 16, 1930
2,290,453	Stehlik -----	July 21, 1942
2,727,103	Barber -----	Dec. 13, 1955
2,763,737	Barber -----	Sept. 18, 1956
2,943,158	Dubeau -----	June 28, 1960