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3,311,210

SLOPING PANEL KEYBOARD MOUNT

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2 Sheets-Sheet 1

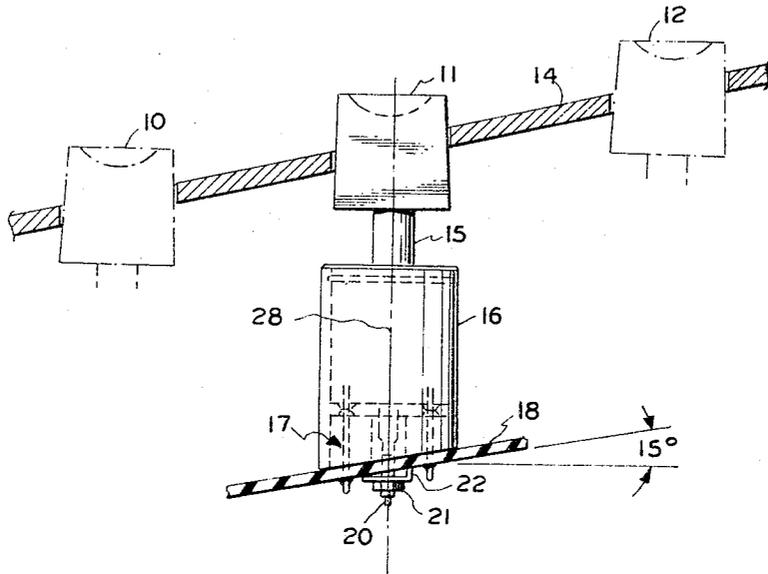


FIG. 1

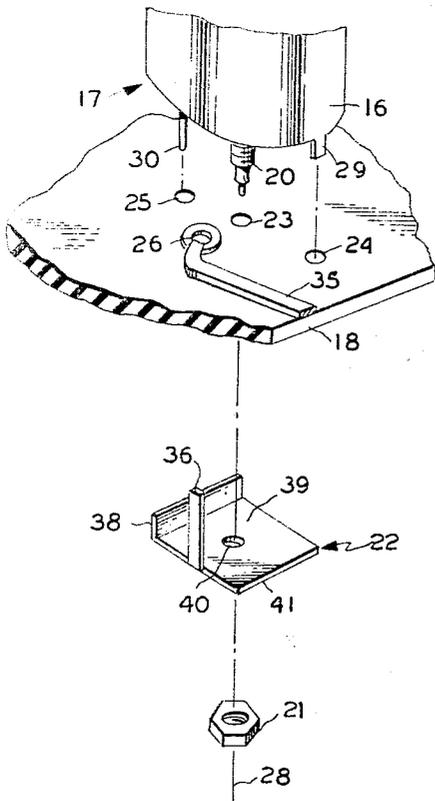


FIG. 2

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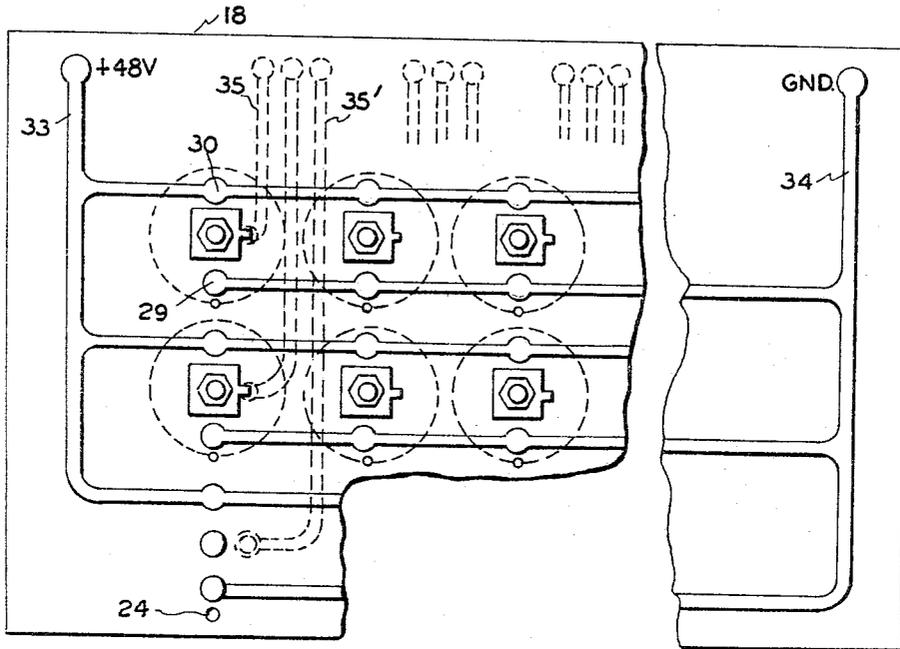


FIG. 3

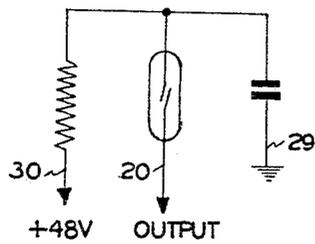


FIG. 4

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SLOPING PANEL KEYBOARD MOUNT

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This invention relates to electronic keyboards, and more particularly, it relates to electronic keyswitches and means for mounting them upon a sloping keyboard panel.

In electronic keyboards such as used with electric typewriters or electronic computers, it is customary to provide a panel sloping in the order of 15° from horizontal while retaining the operational axes of the keyswitches vertical.

Accordingly, it is an object of the present invention to provide improved electrical keyboard assemblies with sloping panels.

In accordance with this invention therefore a plurality of keyswitch assemblies are mounted upon a sloping panel with a connecting stud extending through the panel from each switch to serve as an electrical connection as well as a mechanical mounting post receiving a fastener to hold the switch upon the panel. The panel may be a printed circuit card with separate electrical circuit conductors contacting the studs for connection with each of the switches. Each keyswitch has a sliding member manually operated with a vertical operating axis parallel with the stud and at a slant of about 75° with the panel. Thus, each switch housing comprises a bottom slanted at about 15° to rest on the panel with the stud extending therethrough for receiving a fastener such as a nut to hold the keyswitch in place. The keyswitch is registered in position by means of lugs on the keyswitch extending into registration apertures in the panel. Each stud registers on the opposite side of the panel from the keyswitch assembly with a special mounting washer lug which is wedge-like in construction to present a planar metal member normal to the axis of the switch for receiving the fastener in frictional locking engagement without strain upon the keyswitch housing or switch assembly.

Further features, objects, and constructional details of the invention are found throughout the following specification which refers to a typical embodiment illustrated in the accompanying drawing, wherein:

FIGURE 1 is a side view partly in section of a sloping panel keyboard assembly afforded by the invention;

FIGURE 2 is an exploded view, in perspective, of the various elements registered with the keyboard panel;

FIGURE 3 is a plan view of portions of a printed circuit panel board, showing accompanying keyswitches mounted in accordance with the teachings of this invention; and

FIGURE 4 is a keyswitch circuit diagram conforming to the circuit panel configuration of FIGURE 3.

As may be seen in FIGURE 1, a plurality of keys 10, 11, 12, etc., are conventionally mounted in a matrix layout to extend through apertures in a sloping cover panel 14. Each key is manually operable by sliding a member 15 vertically against a spring bias into housing 16 to operate electrical switch contacts mounted therein. The switch housing 16 has a sloping bottom section 17 conforming to the slope of mounting panel 18, which is typically about 15° from horizontal. The panel 18 is preferably an insulated printed circuit panel such as shown in FIGURE 3, which has thereon a plurality of conductors to which the electrical terminals of the individual keyswitches are connected by soldering.

Because of the slope of the panel 18 with respect to the vertical axis of the switch housing 16, a special mounting array is afforded by this invention. Thus, a mounting stud 20 projects with an axis parallel to that of the elongated

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keyswitch housing 16 from the bottom 17 of the housing to extend through panel 18 for receiving fastener nut 21 and intervening wedge-like washer 22, as may be better seen in FIGURE 2. Apertures 23-26 are placed in each switch position in panel 18 to register keyswitch housing 16 in place with its slanted bottom 17 resting against the panel 18 and having a vertical operational axis 28.

Thus, stud 20, which extends through aperture 23 with the further registration lug 29 on housing 16 extending through aperture 24 serves to hold the slanted bottom 17 of keyswitch housing 16 in place resting against the slope of the panel 18. The further aperture 25 permits one keyswitch electrical contact connection to extend through the panel 18 by way of wire 30, while two further electrical connections of a switching circuit such as shown in FIGURE 4 are made to the stud 20 and housing 16 respectively with registration lug 29 on housing 16 serving as an outlet connector terminal.

As seen in FIGURE 3, the panel 18 may have conductors on both sides with solder points to the wire 30 and lug 29 on the lower side of the board connecting circuits 33 and 34 commonly to a plurality of keyswitches, whereas each key is individually connected to a conductor 35 on the upper side of the board by way of stud 20, washer 22, and alignment finger 36, which extends through aperture 26.

Washer 22 serves the further function of a special mounting washer for affixing the keyswitch assembly onto the sloping panel, which is registered by means of the wedge-like member 38 bent up from the rectangular planar member 39 a distance corresponding with the slope of the housing. Thus, the aperture 40 encompasses stud member 20 while holding the planar section 39 normal to the axis of the stud 20. Thus, the washer 22 contacts panel 18 along the line of the wedge-like projection 38 and the line along the opposite edge 41 of the planar member 39 to hold the planar section 39 immovably in place normal to the axis 28 so that nut 21 may be screwed upon stud 20 to frictionally hold the assembly in position. The alignment finger 36, thus, extends beyond the wedge-like projection 38 to pass through panel 18 and serves as a conductor for soldering to conductor 35. Further, the function of finger 36 to register through aperture 26 as the aperture 40 encompasses stud 20 assures mounting of planar member 39 normal to the switch axis 28.

Thus, the present configuration affords an improved keyswitch mounting and wiring assembly particularly adapted for use in a sloping panel keyboard assembly, and those novel features believed descriptive of the scope and nature of this invention are defined with particularity in the appended claims.

What is claimed is:

1. An assembly comprising in combination, an elongated housing encompassing a switch manually operable by a member moving axially within the housing, a bottom portion on the housing slanted at an angle in the order of 15° from the axis of the housing, a stud extending axially beyond the bottom portion of the housing, a further alignment lug extending from the bottom portion of the housing, a panel with apertures therein registering with the stud and alignment lug of each of a plurality of said housings permitting the stud to extend therethrough and having further alignment apertures for each housing assembly, a mounting washer with a rectangular planar metal member having a wedge-like member bent therefrom substantially normally at a distance corresponding with the slope of said housings to engage said panel and hold the planar member normal to the axis of said housing, said washer having an aperture in registration about said stud, and a further alignment finger extending

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from said planar member into registration with one of said further apertures in said panel to hold the washer conjointly with said stud and said wedge member in an immovable position, and a fastener about said stud holding said lug in place on the opposite side of said panel from said housing wherein the panel is a printed circuit board including a conductor positioned for receiving said washer alignment finger in conductive engagement, and a conductive connector in said keyswitch is connected to said stud, to thereby provide one conductive connection between said switch and the conductor on said panel.

2. An electronic keyswitch assembly comprising in combination, an elongated housing encompassing a switch manually operable by a sliding member moving axially within the housing, a stud extending axially from the bottom of the housing, a bottom portion on said housing slanted from the housing axis at an angle of the order of 75°, an apertured panel for receiving the bottoms of a plurality of said housings side by side in a matrix array with axes parallel and said studs extending therethrough, and a wedge-shaped apertured member about said stud engaging the opposite side of the panel in at least two lines of contact to present a plane normal to the stud wherein the panel is a printed circuit board having a further alignment aperture and a conductor thereon, and the wedge-shaped member has a rectangular planar metal member with a wedge member bent substantially normal

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therefrom a distance registering with said slanted housing having an alignment lug bent substantially normal and extending beyond said wedge member to register with the alignment aperture and contacting the conductor in said panel and to hold the wedge shaped member immovably on said stud with its planar member normal to said stud, and an electrical connection between said switch and said stud.

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