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Morrell et al.

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[54] **INTERCONNECTOR LATCH ASSEMBLY FOR PLURAL BANKS OF MULTIPLE PUSHBUTTON SWITCHES**

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[51] **Int. Cl.** **H01h 9/26**

[58] **Field of Search** ..... 200/5 R, 5 B, 5 EB, 50 C, 200/318–328; 74/483 R, 483 PB

[56] **References Cited**

UNITED STATES PATENTS

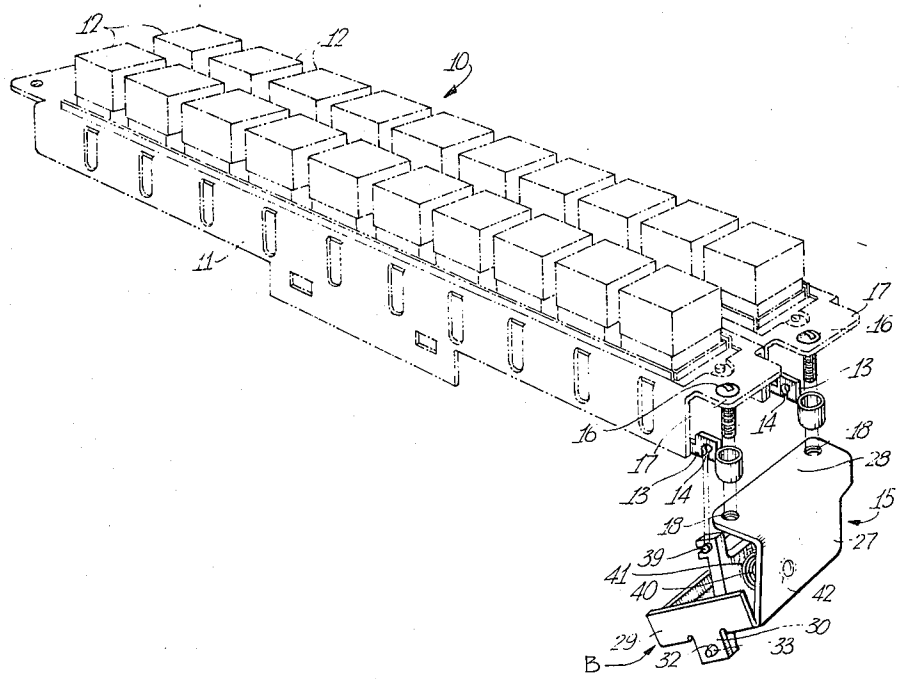
3,166,644	1/1965	Feldmayer	74/483 PB X
3,394,883	7/1968	Reed	74/483 PB X
3,489,867	1/1970	Carlson	200/5 R
3,544,738	12/1970	Gaspar	200/5 R
3,678,288	7/1972	Swanke et al.	200/5 R X
3,778,564	12/1973	Nocella	200/5 E X

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[57] **ABSTRACT**

An interconnector for connecting the latch bars of two or more pushbutton assemblies, particularly as used in telephones. The interconnector is connected to each latch bar and is resiliently urged to a position in which it moves the latch bars to their normal —latching—position. Actuation of any pushbutton, in any row of pushbuttons moves directly its related latch-bar and indirectly via the interconnector all other latch-bars. Thus actuation of any pushbutton will release any other previously actuated and latched pushbutton, irrespective of which row of pushbuttons the previously actuated pushbutton is in. The interconnector comprises an extension on one end of each latch-bar, a rod engaging in a formation in each extension, a member pivotally mounted in a frame and carrying the rod, and a spring acting on the pivotally mounted member.

7 Claims, 4 Drawing Figures



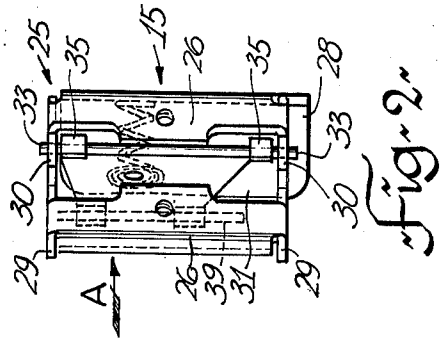


Fig. 2

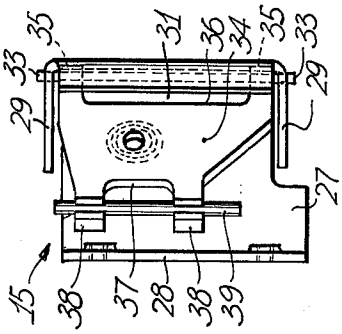


Fig. 3

Fig. 1

Fig. 4

INTERCONNECTOR LATCH ASSEMBLY FOR PLURAL BANKS OF MULTIPLE PUSHBUTTON SWITCHES

This invention relates to a pushbutton switch interconnector, for mechanically interconnecting the latch bars of two or more multiple pushbutton assemblies.

In telephone sets as used in offices, stores and similar places where a number of extensions are interconnected, it is usual to provide a row of pushbuttons which can be selected and actuated individually to connect the related extensions to a particular line. The number of pushbuttons may vary but a common feature is the requirement that actuation of one pushbutton will release any other previously actuated pushbutton so that only one pushbutton can be locked down in an operative position at any one time.

It has been proposed to provide a multiple arrangement of pushbuttons, for example two rows of pushbuttons side-by-side. Each row has its own latching and release mechanism so that only one pushbutton in a row can be in an aperture position. However this means that a pushbutton in each row could be operative and this would connect two lines to the extension telephone.

The present invention provides an interconnector whereby actuation of any one pushbutton in any row will release any other pushbutton in any row so that only one pushbutton is operative at any one time.

Each row of pushbutton switches is provided with an extension to the latch bar and a spring loaded interconnector includes a pivotally mounted bar extending to engage each extension. Actuation of any latch bar, as occurs when a pushbutton is pressed down, pivots the bar which in turn actuates all other latch bars to release any pushbutton already in a depressed position.

The invention will be readily understood by the following description of one embodiment by way of example, in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of a two row pushbutton switch assembly and interconnector, the interconnector shown displaced for clarity;

FIG. 2 is a base plane view of the interconnector in FIG. 1;

FIG. 3 is a side view in the direction of arrow A in FIG. 2;

FIG. 4 is an end view in the direction of arrow B in FIG. 1.

As illustrated in FIG. 1, two rows 10 and 11 of pushbutton switches are located side-by-side. In the example illustrated there are ten pushbuttons 12 in each row. The rows of pushbutton switches are of well-known form and have latch bars which lock or hold down the pushbuttons 12, one at a time. Actuation of a pushbutton slides the latch bar longitudinally in the switch housing and releases any other actuated button. Each latch bar has an extension 13, and each extension has a U-shaped slot 14, the slot having its open end facing downward.

Attached to the forwards ends of the rows of pushbutton switches 10 and 11 is an interconnector 15. The interconnector, in the example illustrated, is attached to the pushbutton assemblies by screws 16 in the end flanges 17 of the pushbutton assemblies which screw into threaded holes 18 in the interconnector 15.

The interconnector 15 is illustrated in more detail in FIGS. 2, 3 and 4. The interconnector 15 comprises a

frame member 25 having a base flange 26, a back flange 27 and top flange 28. The threaded holes 18 for attachment of the interconnector to the pushbutton assemblies are in the top flange 28. The base flange has two side webs 29, and extensions 30 on these side webs extend down below the base flange 26. The base flange 26 has an aperture 31 extending the width of the flange and conveniently the extensions 30 are formed from part of the material removed to form the aperture 31 by being bent down as the side webs 29 are bent up. Formed in each extension 30 is an elongated hole 32, the longitudinal axes of the holes in a plane normal to the plane of the base flange 26. Pivotally supported in the holes 32 is a pivot rod 33.

Mounted on the pivot rod 33 is a connecting member 34. Connecting member 34 is basically a flat piece of material, for example metal, having two extensions 35 one at each end of bottom edge 36. The extensions have holes therethrough for attachment of the connecting member 34 to the pivot rod 33. At the top edge 37 two further extensions 38 carry a second pivot rod 39. The rod 39 extends beyond the extensions 38, the ends of the rod resting in the U-shaped slots 14 of the latch bar extensions 13. As seen in FIG. 3 the connecting member 34 is narrower at the top edge 37 to suit the distance between the latch bar extensions 13.

The connecting member 34 is resiliently urged away from the back flange 27 by a spring 40. A boss 41 is formed on the back surface of the connecting member 34, the boss having a recess into which one end of the spring 40 sits. A protrusion 42 is formed on the inner surface of the back flange 27 over which the other end of the spring 40 fits. The provision of spring 40, spring loading the connecting member 34, permits the removal of the springs normally acting on the latch bars. This reduces the spring loading effective on a pushbutton. Two rows of push-buttons doubles the effective spring load on any individual button arising from latch-bar actuation, and this loading increases further for additional rows of pushbuttons.

In operation, the interconnector 14 attached to the ends of the pushbutton assemblies, actuation of a pushbutton 12 in a first pushbutton row, for example row 10, causes the related latch bar to move longitudinally. Movement of the latch bar — and thus latch bar extension 13 — pivots the connecting member 34 on the pivot rod 33 against the action of the spring 40. The pivoted movement of the connecting member moves the other latch bar of the second pushbutton row 11 longitudinally via the connection formed by rod 38 and groove 14. This longitudinal movement of the latch bar of row 11 releases any button which may have been locked down in an operative position in that row. If no button had been locked down in row 11 but a pushbutton had been locked down in row 10 then this button would have been released in the normal manner by the longitudinal movement of the related latch bar.

Thus a pushbutton depressed in either row will release any other button no matter which row it is in. By suitably extending the rod 39 more than two rows of pushbuttons can be interconnected.

While the interconnector 15 has been described as a metal stamping, it can readily be of molded form. Similarly the connecting member 34 can be metal stamping or of plastic material molded or otherwise formed. Attachment holes 43 can be provided in the base flange

26 for fastening the interconnector to a telephone housing base.

What is claimed is:

1. An interconnector for mechanically interconnecting latch bars of at least two multiple pushbutton switch assemblies, said latch bars adapted to lock down any pushbutton moved to an actuated position and movable from said lock down position to an unlocking position, said interconnector comprising an extension on one end of each latch bar;

a frame member mounted adjacent said ends of said latch bars and including a base flange and two side webs, a web on each end of said base flange;

a connecting member having spaced parallel edges;

means on one of said edges pivotally mounting said connecting member in said side webs;

means on the other of said edges in engagement with said extensions on said latch bars;

and means resiliently engaging said connecting member to urge said latch bars to said lock down position;

the arrangement such that actuation of any pushbutton actuates said connecting member and every latch bar engaging with said connecting member.

2. An interconnector as claimed in claim 1, said frame member including a back flange, said means resiliently engaging said connecting member comprising a compression spring between said back flange and said connecting member.

3. An interconnector as claimed in claim 1, said means in engagement with said extensions comprising a rod mounted on said other edge of said connecting member and extending beyond the ends of said connecting member.

4. An interconnector as claimed in claim 3, each of said extensions on said latch bars including a slot in said extension for engagement with said rod.

5. An interconnector as claimed in claim 1, said means on one of said edges of said connecting member comprising a rod, and further including holes in said end webs for pivotal mounting of said rod therein.

6. An interconnector as claimed in claim 1, said frame member further including a top flange and means connecting said top flange to end flanges on said pushbutton switch assemblies.

7. A mechanically interconnected multiple pushbutton assembly comprising:

at least two rows of pushbuttons, each row including a latch bar, said latch bar adapted to slide longitudinally of said row from a locking position to an unlocking position, said latch bar locking any actuated button in a depressed position when in said locking position;

a frame member mounted on one end of said pushbutton assembly, said frame member including a base flange and two end webs, a web at each end of said base flange;

a connecting member pivotally mounted in said end webs;

an extension on one end of each latch bar adjacent said frame member;

means on said connecting member in engagement with said extensions;

means resiliently engaging with said connecting member to urge said latch bars to said locking position;

the arrangement such that depression of a pushbutton moves the related latch bar and pivots said connecting member, said connecting member moving all other latch bars engaging with said connecting member to release any other depressed pushbutton.

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