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Schneider

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[45] **Oct. 29, 1974**

[54] **PRESS-BUTTON PANEL ARRANGEMENT FOR PRINTED CIRCUIT CARD**

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[73] Assignee: **La Telephonie Industrielle et Commerciale "Telic"**, Strasbourg-Meinau, France

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** ..... **200/5 A**, 317/112, 200/292

[51] **Int. Cl.** **H01h 3/12**

[58] **Field of Search** ..... 317/101 CC, 112; 200/1 A, 200/1 R, 5 A, 5 D, 159 R, 159 A, 160, 167 A, DIG. 25, 166 PC

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Assistant Examiner—Gerald P. Tolin
Attorney, Agent, or Firm—Craig & Antonelli

[57] **ABSTRACT**

Press-button panel intended to set up a temporary galvanic connection between two terminals existing on a printed circuit card such as is found more particularly in telephone equipment, comprising a battery of press-buttons in a matrix configuration assembled separately and installed in a single part as a superstructure above the card.

7 Claims, 7 Drawing Figures

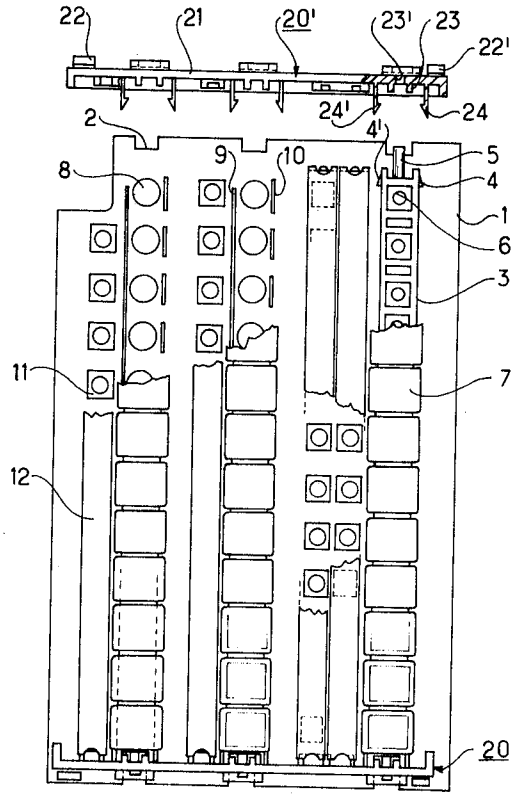


FIG. 1

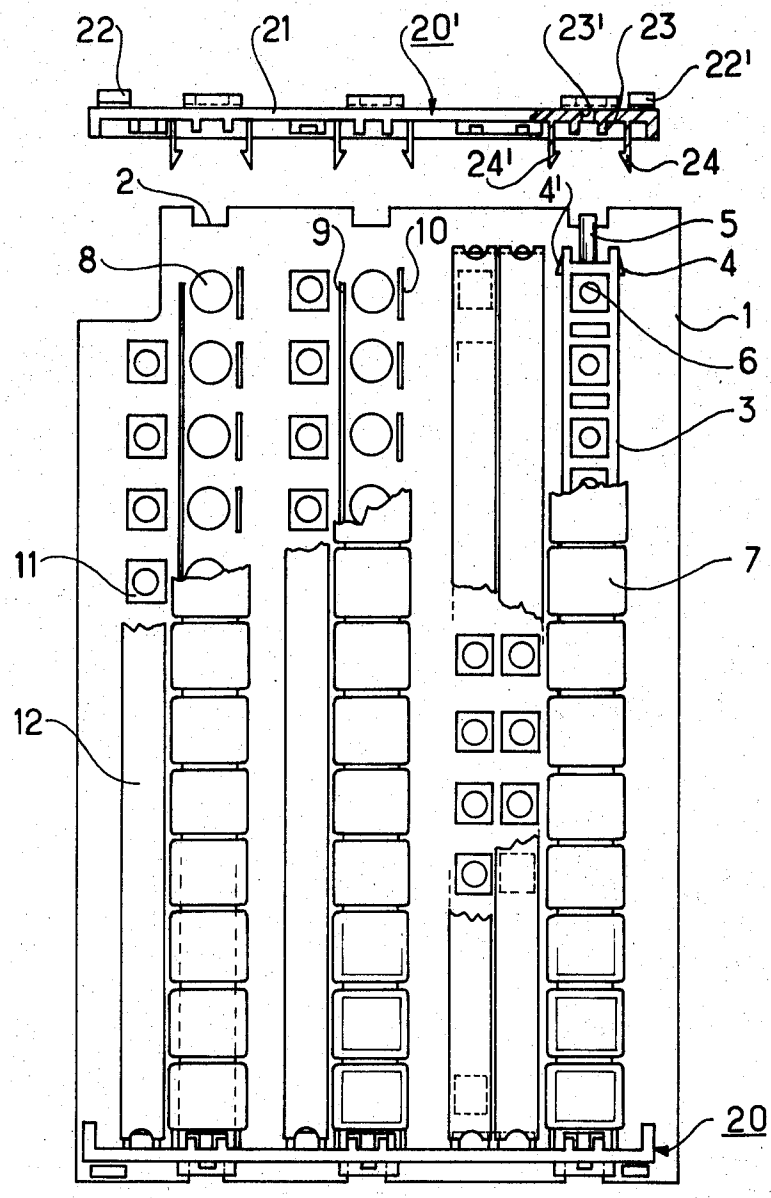


FIG. 2

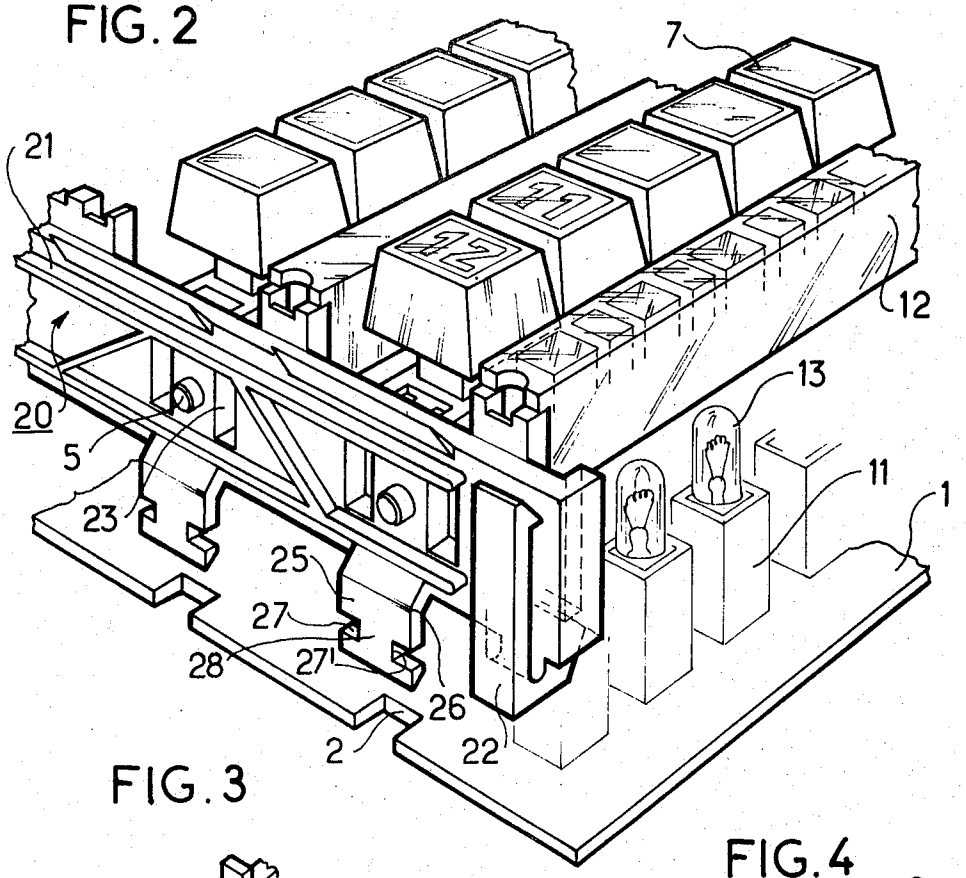


FIG. 3

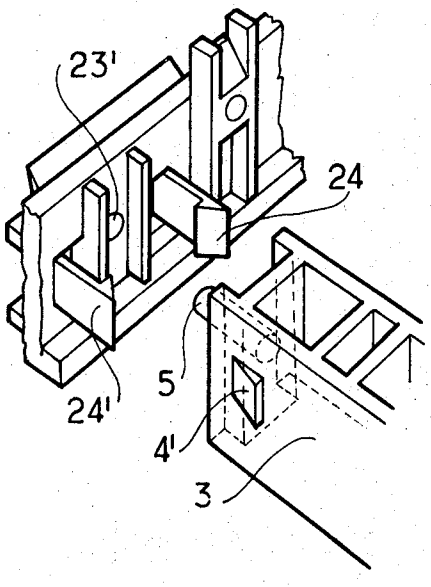


FIG. 4

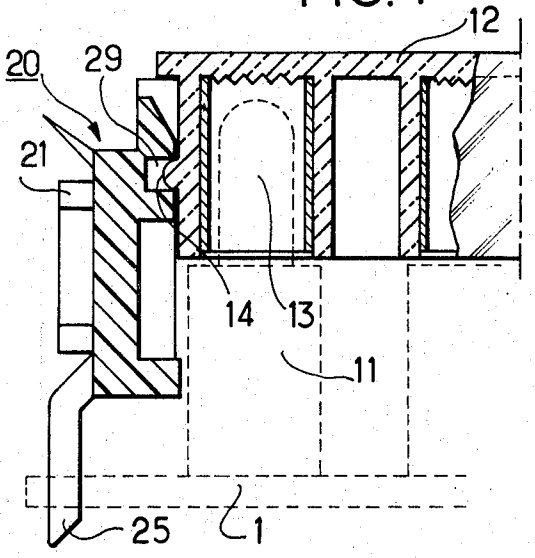


FIG. 5

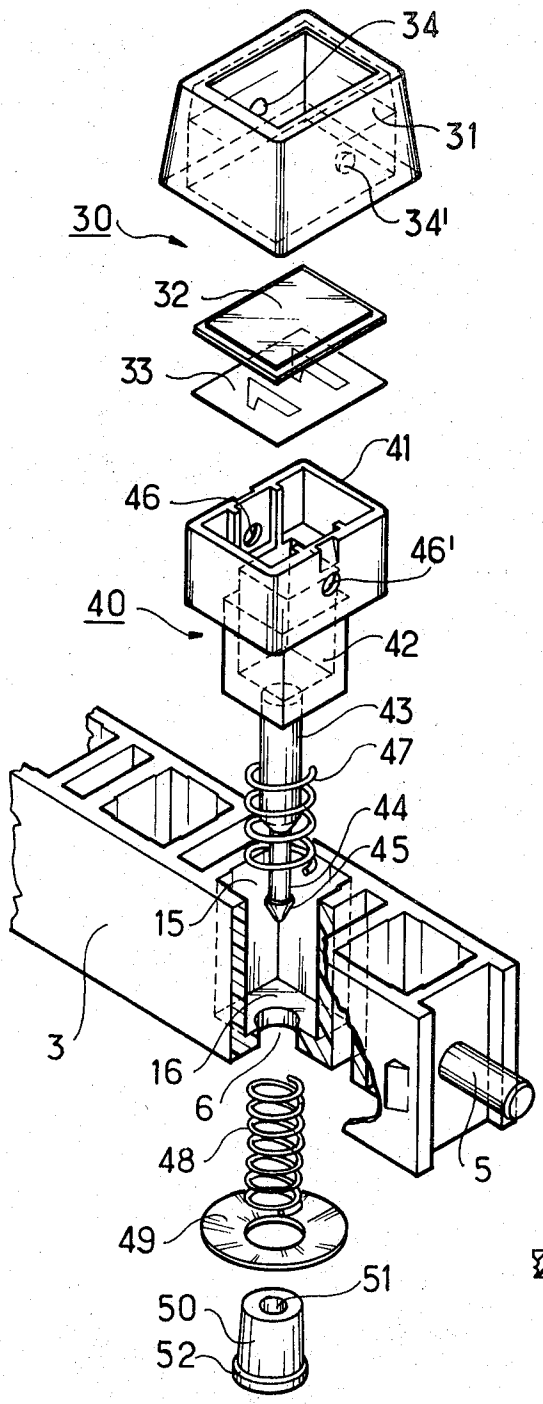


FIG. 6

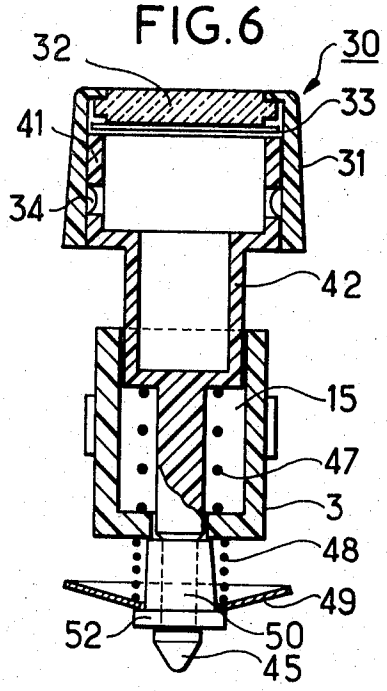
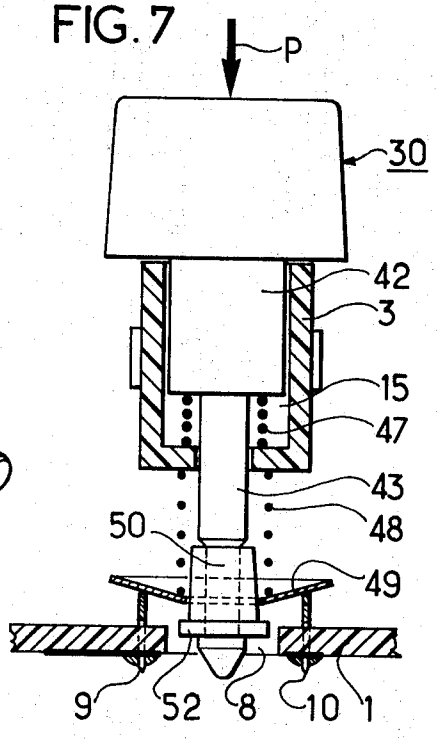


FIG. 7



PRESS-BUTTON PANEL ARRANGEMENT FOR PRINTED CIRCUIT CARD

The invention comes within the branch of connection elements in the form of press-buttons intended for setting up a temporary galvanic connection between two terminals existing on a printed circuit card such as is found more particularly in telephonic equipment sets. It concerns a battery of press-buttons in a matrix configuration assembled separately and installed in a single piece as a superstructure above the card. It is applied to selection equipment, control equipment, etc., in telephone switchboards, in remote control equipment, etc.

A press-button panel formed by combining several rows of press-buttons, each of which comprises at least one part in the form of a beam provided with holes alined for the rods of the press-buttons to pass through them, each equipped beam being installed parallel above a printed circuit card having terminals on which a contact part forming the lower end of each press-button may bear, is known through French Pat. No. 6,942,786 "Press-Button Control Panel" by the applicant.

A press-button panel having a matrix configuration according to the present invention is constituted by the assembling of several parallel beams equipped individually with several press-buttons, this assembling being held by two molded parts recessing the ends of the said beams and having appendixes enabling the fixing of the assembly thus constituted on the printed circuit card by recessing without use of any tool.

The invention will be described with reference to the accompanying drawings, among which:

FIG. 1 is a partly cutaway plan view of a printed circuit card equipped with a press-button panel according to the invention;

FIG. 2 is a perspective view on a larger scale of a part of FIG. 1;

FIG. 3 is a detail of FIG. 2 on a larger scale;

FIG. 4 is a cutaway view of apart of FIG. 2;

FIG. 5 is an exploded view of a press-button;

FIG. 6 is a cutaway view of a press-button installed in the rest position; and

FIG. 7 is a partly cutaway view of a press-button in the work position.

FIG. 1 is a partly cutaway plan view of a printed circuit card 1 having a generally rectangular shape, comprising, on each small side, bevel shoulders which are three in number in the example according to FIG. 1, one of which is referenced 2.

The framework of a beam made of a molded substance which may accommodate press-buttons, ending, at each end in a double clipping device 4, 4' and in a positioning lug 5 may be seen at 3. The rod of a press-button may pass through a through hole in the beam 6. A press-button head, among many others, is shown at 7.

The press-button panel according to FIG. 1 comprises two further beam bearing press-buttons, parallel to the beam 3, but they are not shown in FIG. 1, for they have been cut away in order to show the through holes such as 8 of the press-button rods in the card, as well as a connection common to all the press-buttons of a row such as 9 and individual contacts such as 10.

The press-button panel also comprises, as accessory elements, several rows of indicator lamp holders. One of these is referenced 11. After assembling, the indicator lamps are covered with a translucid cap such as 12.

Reference numeral 20 is a molded end assembling part in the shape of a rib in the assembled position and 20' is a similar part in the turned down position.

The part 20' shown in a partly cutaway view, comprises a reinforcing piece 21, end pieces such as 23 comprising a through hole 23' for a positioning lug such as 5, as well as a double clip 24, 24', cooperating, in the assembled state, with a double clipping device such as 4, 4'. Numerals 22 and 22' are molded hooks for complementary fixing.

FIGS. 2, 3, 4 — the rib 20 comprises end pieces such as 23 for passing a beam positioning lug such as 5. The rib 20 also comprises fixing tabs such as 25 having a connection shoulder 26, two notches 27, 27' and a locking lobe 28.

The lamp holder 11 bears a lamp 13. The cap 12 covering a row of lamps is held in place by a protuberance 14 which is recessed in a hollowed out part 29 of the rib 20.

The resiliency of the molding substance enables beams such as 3 bearing the press-buttons to be recessed in the ribs such as 20 through the clipping devices and clips and then the ribs such as 20 to be recessed in the card 1 through the tabs such as 25 and the bevel shoulders such as 2.

In FIGS. 5, 6, and 7, the references common to the preceding figures have the same signification as in the preceding figures.

FIG. 5 shows a press-button comprising a head 30 and a mechanism 40. The head 30 comprises a cap 31 whose top part is closed by a transparent cap cover 32 which is clamped over a reference plate 33. The cap 31 bears protuberances 34, 34' projecting inwards.

The mechanism 40 comprises on the one hand a molded part comprising a socket 41, a guide part 42, a cylindrical rod 43, a rod end 44 having a diameter smaller than that of the rod 43, an end boss 45. The socket 41 has two holes 46, 46' in which the protuberances 34, 34' of the cap 31 are recessed on installing.

The mechanism 40 comprises, moreover, a first spiral spring 47 placed round the rod 43, a second spiral spring 48 placed round the rod end 44, a metallic cup drilled with a central hole 49, a slightly truncated cone shaped fixing part 50 provided with a hole 51 and having a rim 52. A part of the mechanism 40 is housed in an alveolus 15 formed in the beam 3, open towards the top, having a bottom 16 drilled with a hole 6.

FIG. 6 — In the assembled state, at rest, the spring 47 holds the guide part 42 in place in the top part of the alveolus 15. The metallic cup 49 is held pressed against the rim 52 of the part 50 by the spring 48 compressed between the bottom of the beam 3 and the metallic cup 49 subsequent to the high position of the mechanism.

FIG. 7 — Under the effect of a pressure applied to the head 30 in the direction of an arrow P, the guide part 42 goes down into the alveolus 15, the spring 47 is compressed. The rod 43 and the fixing part 50 are lowered, the spring 48 is unstretched, but only partly and retains a calibrated residual force sufficient for pressing the cup against the projecting contacts 9 and 10. In that position, the cup has left the rim 52.

It will be observed that the press-buttons according to the invention may be installed completely without the use of any tool.

What is claimed is:

1. Press-button panel having a matrix configuration, comprising a printed circuit plate, a plurality of beam-shaped parts mounted in parallel on said printed circuit plate, a plurality of push-button assemblies mounted in each beam-shaped part, first and second resilient means in the form of elongated ribs, securing all of the ends of said beam-shaped parts on one side to one another and securing all the ends of the beam-shaped parts on the opposite side to one another, respectively, said ribs including projection means engaging peripheral notches on the said printed circuit plate securing said ribs to said printed circuit plate and a plurality of clips, said beam-shaped parts being provided with clipping devices engaged by said clips to secure said ribs to said beam-shaped parts.

2. Press-button panel according to claim **1,** characterized in that the said ribs are provided with a plurality of positioning holes, and further including positioning lugs carried by the ends of each beam and engaging in said positioning holes.

3. Press-button panel according to claim **1,** characterized in that the said projection means comprises tabs made of a molded substance having two notches and a locking lobe.

4. Press-button panel according to claim **1,** characterized in that said press-button assemblies comprise a control mechanism formed essentially by a rod extended by a rod end having a diameter less than that of the said rod and ending in an end boss on which is clamped a slightly truncated cone shaped fixing part provided with a rim on which a metallic cup acting as a mobile contact between two fixed contacts may bear.

5. Press-button panel according to claim **1,** further including a plurality of indicators disposed on said printed circuit plate in at least one row adjacent a beam-shaped part, a cover disposed over said row of indicators, and means on said cover effecting engagement of said cover to said elongated ribs.

6. Press-button panel according to claim **5,** characterized in that said press-button assemblies comprise a control mechanism formed essentially by a rod extended by a rod end having a diameter less than that of the said rod and ending in an end boss on which is clamped a slightly truncated cone shaped fixing part provided with a rim on which a metallic cup acting as a mobile contact between two fixed contacts may bear.

7. Press-button panel according to claim **6,** wherein said press-button assemblies further comprise spring means engaging said beam-shaped part for biasing said rod into a neutral position within said beam-shaped part.

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