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(58) Field of search
UK CL (Edition J) **H1N**
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(54) **Push-button key switches**

(57) A customized push-button keypad or keymatrix is made up of a plurality of individual single key switches each comprising a profiled silicon-rubber mat (1) and a rigid support plate (2), the latter carrying the fixed contacts, (8) of the key switch and a respective LED (7) for the purpose of backlighting the push-button. The mat (1) closely engages the plate (2) and adjacent similar keypads constituting a key matrix, the keypads being mounted on a common pcb by a respective support member (10). The mat (1) includes a snap fit region (3) for a label and a rectangular, tubular bridging contact (6).

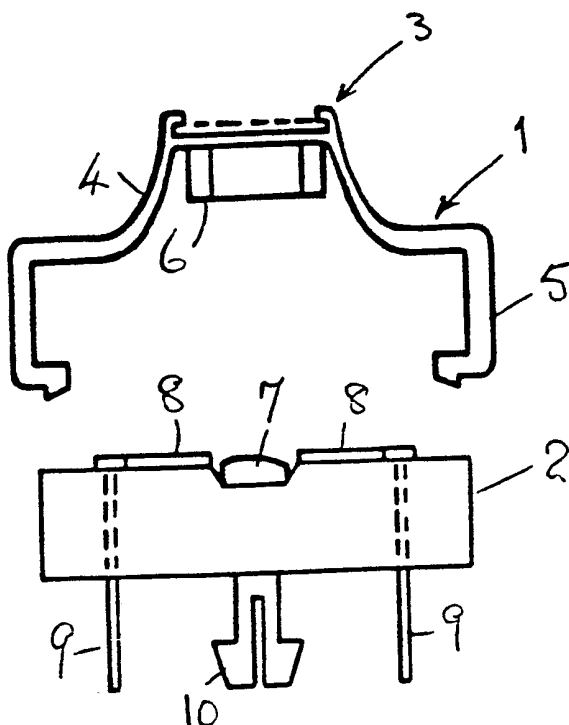
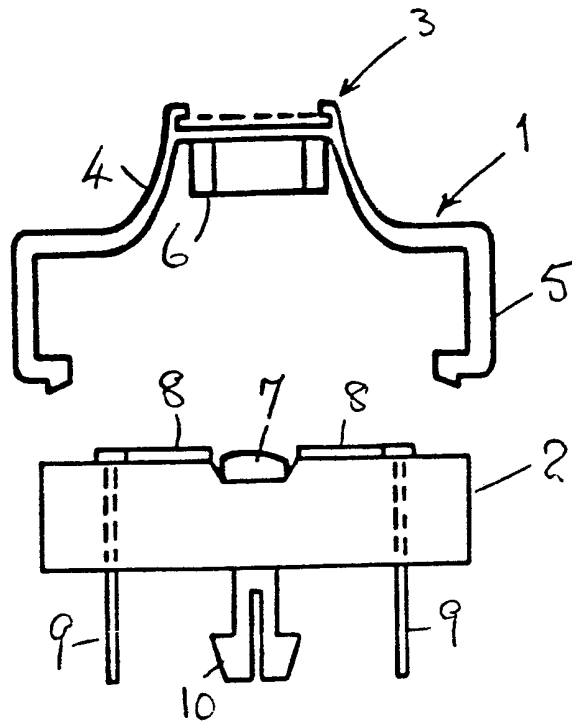
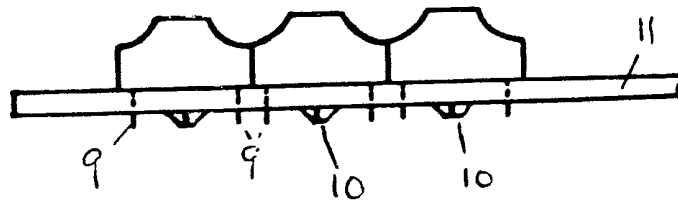


Fig. 1

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Fig. 1Fig. 2

SCS/3343Push-button key switches

The present invention relates to push-button key switches.

According to one aspect of the present invention a push-button key switch comprises a member of resilient electrically insulating material which is profiled to form a single raised push-button key and which is arranged to fit closely around the edge of a substantially rigid support plate, said support plate being provided with conductors forming fixed contacts which are arranged to cooperate with a moving contact secured to the underside of said member of electrically insulating material and means to make external connections to said conductors.

The means to make external connections to said conductors may comprise a plurality of pins extending from the underside of said support plate. A plurality of said push-button key switches may be mounted adjacent one another to form a multi-key pad of a required configuration. Each push-button key switch may incorporate a respective light-emitting diode for the purpose of backlighting the respective push-button key.

According to another aspect of the present invention a push-button key switch matrix comprises a plurality of push-button key switches as defined above and means to support said key switches in close proximity to one another such that the respective members of electrically insulating material of adjacent key switches bear resiliently upon one another and upon said support means.

A push-button key switch will now be described by way of

example with reference to the accompanying drawing, of which:-

Figure 1 shows schematically the component parts of the key switch in cross-section, and

Figure 2 shows schematically in cross-section an assembly or matrix of key switches.

Referring first to Figure 1 the push-button key switch comprises a profiled member 1 of resilient electrically insulating material of, for example, silicone rubber and a substantially rigid support plate 2. The profiled member 1 comprises a raised central region 3 of generally rectangular plan into which a transparent or partly transparent legend slip (not shown) is arranged to snap fit, side walls 4 of thinner cross-section than the surrounding areas, and down-turned edges 5 which are arranged to fit closely over the edges of the support plate 2 in the assembled key switch. A moving contact 6, of the form of a short length of tube of conductive material having a generally rectangular cross-section is secured to the under side of the region 3.

The support member 2, which may be moulded of a plastics material, is generally planar, and has a light-emitting diode 7 provided in a central recess in its upper surface. The upper surface of the member 2 also carries a pattern of conductors 8, for example of a conductive polymer, which forms the fixed contacts of the key switch. A plurality of electrically conducting pins 9 extend from the under surface of the member 2, by means of which external electrical connections may be made to the fixed contacts of the key switch and to the light-emitting diode 7.

An integrally-moulded snap-fastening peg 10 also extends from the underside of the member 2, by means of which the key switch may be secured to a planar support member, such as a printed circuit board 11, as shown in Figure 2. The resilient material of the profiled member 1 of each key switch of the assembly shown in Figure 2 is arranged to be slightly in compression both where it abuts the profiled members 1 of adjacent key switches and where it contacts the printed circuit board 11, so that these abutting parts are sealed to one another. Once the key switches have been snap-fitted to the board 11 by means of their pegs 10 the external connections to the key

switches may be extended by way of soldered connection of the pins 9 to conductors (not shown) on the printed circuit board 11. The single key switches can thus be assembled to produce customised keypad configurations without incurring any extra tooling costs.

CLAIMS

1. A push-button key switch comprising a member of resilient electrically insulating material which is profiled to form a single raised push-button key and which is arranged to fit closely around the edge of a substantially rigid support plate, said support plate being provided with conductors forming fixed contacts which are arranged to cooperate with a moving contact secured to the underside of said member of electrically insulating material and means to make external connections to said conductors.
2. A push-button key switch in accordance with Claim 1 wherein the means to make external connections to said conductors comprises a plurality of pins extending from the underside of said support plate.
3. A push-button key switch in accordance with Claim 1 or Claim 2 wherein a plurality of said push-button key switches are mounted adjacent one another to form a multi-key pad of a required configuration.
4. A push-button key switch in accordance with Claim 1 incorporating a light-emitting diode for the purpose of backlighting the respective push-button key.
5. A push-button key switch matrix comprising a plurality of push-button key switches each in accordance with Claim 1 and means to support said key switches in close proximity to one another such that the respective members of electrically insulating material of adjacent key switches bear resiliently upon one another and upon said support means.
6. A push-button key switch substantially as hereinbefore described with reference to the accompanying drawing.