

EUROPEAN PATENT APPLICATION

(21) Application number: 87116320.0

⑤ Int. Cl.4: **H01H 13/70**, **H01H 3/12**

② Date of filing: 05.11.87

③ Priority: 12.11.86 JP 173716/86

④3 Date of publication of application:
18.05.88 Bulletin 88/20

ⓑ Designated Contracting States:
DE FR GB IT

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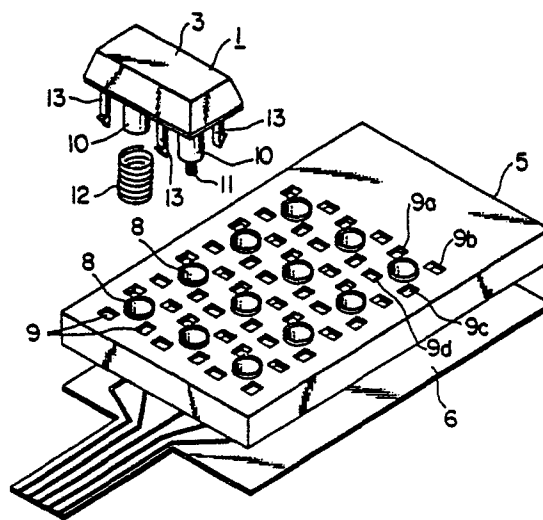
54. A keyboard.

57) The present invention relates to a keyboard designed so that the depression of any key top (3) causes a corresponding switch (2) to be opened or closed through a key stem (10). An upper board (5) of the keyboard is provided with a plural number of key stem guide holes (8) equally distanced in both the directions of X axis and Y axis. In said upper board (5), four slip stopper guide holes (9) are provided symmetrically with respect to each key stem guide hole (8) at a right angle to each other. Furthermore, slip stoppers (13) are provided extending from the bottom of said key top (3), symmetrically with respect to the key stem (10) at 180° to each other. Said key top (3) is available in plural number of sizes, that is, in sizes with the depth of width which is integral-number times the unit size.

The key top (3) of the unit size is provided with one key stem (10), whereas the key top of n-times the unit size is provided with n pieces of key stems (10).

The keys (1) arranged in the manner described above are designed so that their respective directions can be altered by 90°.

FIG. 1



A keyboard

The present invention relates to a keyboard to be used as an input device for the computer and other various electronic equipments.

In a common conventional keyboard, a number of membranes or mechanical switches are installed on its lower board at a specified pitch, whereas plural number of keys are installed on its upper board disposed above the key section so as to be able to move both upward and downward freely. Depressing the key top of any one of said keys causes the corresponding switch to be opened or closed through the key stem as an integral part of the key. The key top of a standard key is a square with the sides of about 18mm, but the key tops of the keys for highly frequent and special uses have rectangular forms or sized to integral-number times the unit size of the standard key. In a conventional keyboard, even the special-form key such as a rectangular key 1 is provided with only a key stem 10 that extends from about the center of its bottom just above a corresponding switch 9 as shown in Fig. 6, a front view of a key, and Fig. 7, a side view of a key. This arrangement prevents each key from being replaced with the keys 1 of different forms and different switches. It is necessary for any special-form key to be depressed evenly irrespective of the point of depression on the key top 3. Thus, in order to meet this requirement, in the case described in Fig. 6, a crank-form interlocking rod 4 is incorporated so that even when the key is depressed at the point on the right-side end of the key top indicated with an arrow, the other end of the key top 3 can be depressed simultaneously by means of the interlocking rod 4, thereby preventing the key from being depressed unevenly as described with the dotted line. The upper board refers to number 5; the lower board to number 6; and the interlocking rod to number 7.

As shown in Fig. 6, in the case of a keyboard wherein the switches 2 are located just under the centers of the corresponding keys 1, the sizes and locations of the individual keys are fixed at the time of the design of the keyboard, and this leads to the lack of flexibility in actual use, which prevents the alterations of the key size and key layout. Thus, in order for the conventional keyboard to be capable of meeting such needs of alterations, a number of and a variety of parts such as the keys, switches, upper board, lower board, interlocking rod and others, which is not only uneconomical but also causes other problems such as the increase in the number of assembly processes.

The first object of the present invention is to provide what is called a general-purpose keyboard capable of flexibly meeting the needs such as the

alterations of the size and layout of the keys so that even the keyboards of different equipments may be used commonly.

The second object of the present invention is to provide the kind of keyboard that permits the alterations of the locations and sizes of keys by simply replacing the keys concerned.

The third object of the present invention is to reduce the number of parts as far as possible by increasing the number of common parts.

The further objects and features of the present invention will be clarified in more details through the following descriptions of the embodiments.

Fig. 1 is an oblique perspective view of disassembled keyboard according to the present invention.

Fig. 2 is a cross-sectional view of the keyboard shown in Fig. 1.

Fig. 3 is an oblique perspective view showing the back of the unit-size key according to the present invention.

Fig. 4 is an oblique perspective view showing the back of a key whose area is 2 times that of the unit size key according to the present invention.

Fig. 5 is an oblique perspective view showing the back of a key whose area is 4 times that of the unit-size key according to the present invention.

Fig. 6 is a partial cut-away front view of a conventional keyboard.

Fig. 7 is a side view of the key shown in Fig. 6.

An embodiment of the present invention will be explained in reference to Fig. 1 or Fig. 5.

The upper board refers to the number 5, and the lower board to the number 6. Said upper board 5 is provided with plural number of key stem guide holes 8 at equal distances in both the directions of X-axis and Y-axis. Four rectangular slip stopper guide holes 9 are provided around each key stem guide hole 8 symmetrically thereto at a right angle to each other. That is, for example, in the case shown in Fig. 1, the 1st hole 9a, the second hole 9b, the 3rd hole 9c and the 4th hole 9d named in clockwise order are of the same size, though the 1st and 3rd holes are disposed as sideways rectangular holes, and the 2nd and 4th holes are vertically rectangular holes. Figs. 3, 4 and 5 show another embodiment concerning the key. For instance, Fig. 3 shows a key whose key top 3 is a square with the sides of a (mm) long. Fig. 4 shows a key whose key top is a rectangle with shorter sides of a (mm) long and longer sides of 2a (mm) long and the area of 2 times that of the square key top. Fig. 5 shows a key whose key top is a with the sides of 2a (mm) long and the area of 4 times that of the unit-size

square key top.

The sizes and forms of the key tops other than that of the unit-size square key top such as the long-form, L-form or U-form key tops according to the present invention feature to be determined as integral times a (mm) depending on the individual purposes. The unit-size key 1 shown in Fig.3 is provided with a key stem 10 extending from the bottom of key top 3. A coil spring 11 for opening or closing the switch 2 on the lower board 6 is forced into the central hole of said key stem 10 as exemplified by the key stem 10 shown on the left in Fig.2, and another coil spring 12 for pushing up the key 1 is provided around the key stem 10 as exemplified by the key stem 10 on the right in Fig.2. Slip stoppers 13 and 13 with projections 14 and 14 are provided under the key top 3, symmetrically with respect to the key stem 10 at 180° to each other. Besides, columnar members 15 and 15 are erected on another set of positions which are also symmetrical with respect to the key stem at 180° to each other, but said members may be omitted. The unit-size key 1 composed in the manner described above is inserted into the key stem guide hole 8 and the slip stopper guide hole 9. The direction of insertion can be changed at the intervals of 90°.

The key 1 shown in Fig.4 has a rectangular key top whose area is 2 times that of the unit-size key as explained previously. Said key is provided with two key stems 10 and 10 at a distance equal to that of the key stem guide holes 8 and 8. Of said two key stems 10 and 10, one which is not required to press the switch 2 has the diameter smaller than that of the other so that said key stems can move up and down smoothly even when there is slight difference between the distance of key stem guide holes 8 and 8 and that of the key stems 10 and 10. The key 1 shown in Fig.4 whose area is 2 times that of the unit-size key has two slip stoppers 13 provided for each of its key stems 10, symmetrically with respect to said key stem at 180° to each other, and the columnar members shown in Fig.3 are not provided. The key 1 shown in Fig.5 has a square key top whose area is 4 times that of the unit-size key top. Said key is provided with four key stems 10, and on slip stopper 13 is provided for each key stem 10. Of said four key stems 10, the two key stems 10 and 10 distanced at 180° to each other provided with the coil springs 11 and 12 respectively.

The keys having rectangular form, L-form, U-form and other forms are also composed in the manner similar to those of the keys described above.

In the keyboard composed in the manner described in the foregoing, the keys 1 of various forms can be inserted into the corresponding key

stem guide hole 8 and slip stopper guide hole 9 so that said keys can be installed through the engagement between the slip stopper 13 and the slip stopper guide hole 9.

As described in the foregoing, in the case of the keyboard according to the present invention, the key stem guide holes on the upper board are pitched at equal distances in both X-axis and Y-axis directions, and both the shorter sides and longer sides of the keys are determined maintaining integral ratios with respect to the unit length so that the layout of the keys can be set freely. Furthermore, the keyboard according to the present invention permits the location of the keys which have once been installed to be altered without disassembling the keyboard by simply replacing the keys from above the keyboard.

Claims

1. A keyboard, wherein the keys (1) are installed on an upper board (5) so that the depression on the key top (3) of any one of the keys (1) can cause the corresponding key (1) on a lower board (6) to be opened or closed through a key stem (10) which is an integral part of the key (1), featuring key stem guide holes (8) provided on said upper board (5) at equal intervals in both X-axis and Y-axis directions, four slip stopper guide holes (9) provided symmetrically with respect to each key stem guide hole (8) at a right angle to each other and slip stoppers (13) provided to extend from the bottom of the key top (3) symmetrically with respect to said key stem (10) at 180° to each other so that said slip stopper (13) can engage with said slip stopper guide holes (9).

2. A keyboard, according to claim 1, wherein a square key top (3) with the sides of unit length is provided with one key stem (10) extending from the center of the bottom of the key top (3) and two slip stoppers (13) are provided around the circumference of the key stem (10).

3. A keyboard, according to claim 1, wherein each key top (3) whose area is n-times the unit area is provided with n pieces of key stems (10), which extend from the bottom of the key top (3) and disposed at equal distances to those of the key stem guide holes (8), and the diameters of these key stem (10) are slightly smaller than that of one key stem.

FIG. 1

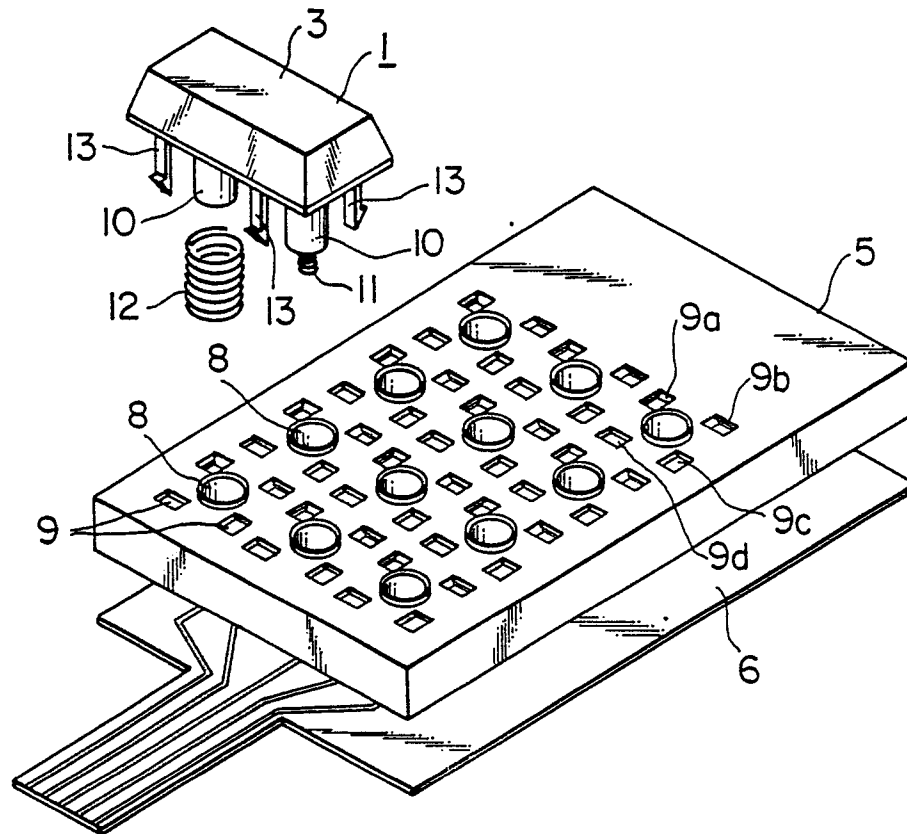


FIG. 2

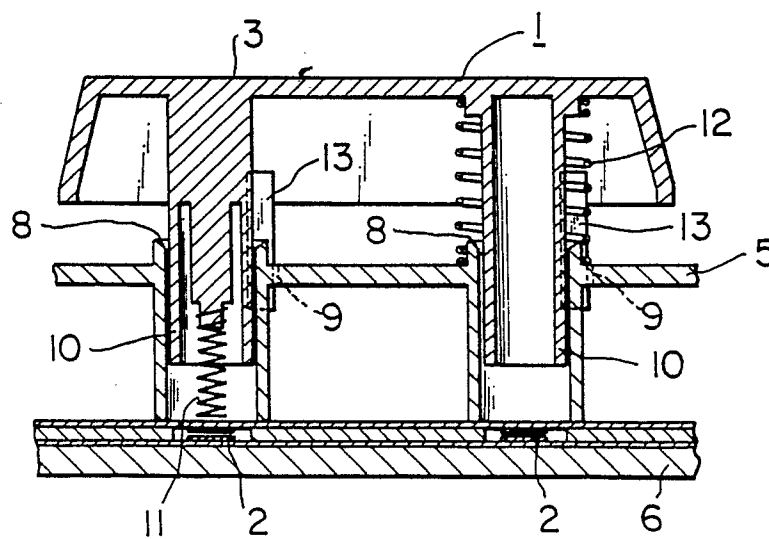


FIG.3

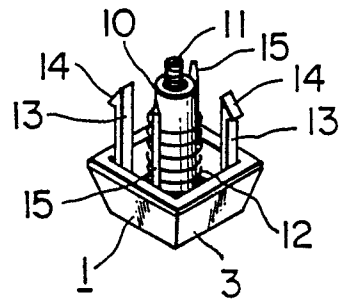


FIG.4

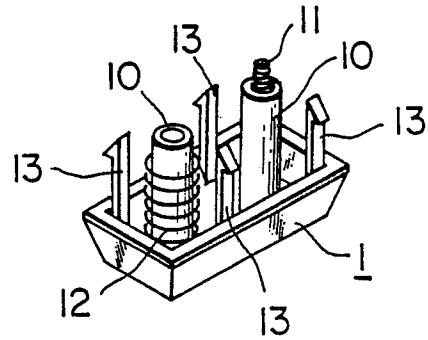


FIG.5

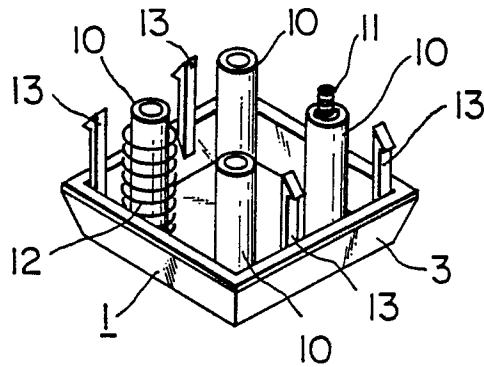


FIG.7

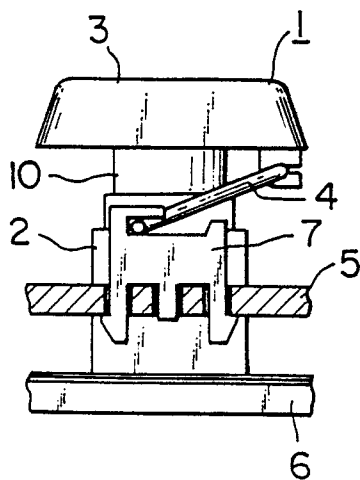


FIG.6

