The present invention concerns a confidential touch-effect keyboard and its use.

There are known keyboards having a flat surface and operating either on an electrostatic principle with capacitors, as for example in patent application FR 2499352, corresponding to application GB 2090979, or on an electromechanical principle with contacts, as in patent application FR 2586117, or patent US 4 263 485.

This latter type of keyboard generally consists of a membrane comprising a contact which, when pressed by a finger, comes to touch a fixed surface and establish an electrical connection between two conducting lines supported by a printed circuit. This type of keyboard generally comprises a means producing a touch-effect, that is, a sensation of resistance followed by a sensation of depression as soon as a certain pressure exerted by the finger is exceeded.

In some applications these keyboard, which are cheap to manufacture, may also require measures allowing information entered by pressing the various keys of the keyboard to be kept confidential.

A first aim of the invention is therefore to propose a keyboard making it possible to keep confidential the information which is entered by preventing a third party from observing, while retaining this touch-effect by which the double entry of the same datum can be prevented.

This aim is achieved by the fact that the confidential touch-effect keyboard comprises a set of click-sensitive conducting caps with an omega-shaped section, forming a switch mounted in a printed circuit, a disc of material with a given rigidity, diameter and thickness is placed on each cap and covered with an element of translucent material forming a directional filter with microshutters and supporting the screen printing.

According to another special feature of the invention, the diameter of the disc is comprised between one-third of the diameter of the cap and half the diameter of that cap, the thickness is greater than or equal to half the thickness of the element forming the filter and supporting the screen printing.

According to another special feature, the element is formed of a single sheet comprising the screen printing on the reverse, on the face facing the disc.

According to another characteristic, the element consists of a first sheet of translucent material supporting the screen printing, and a second sheet of translucent material with microshutters.

According to another special feature of the invention, the disc is made of a material, the minimum hardness of which is between 40 and 45 Shore A.

Another aim of the invention is to improve visual perception for the user while maintaining confidentiality. This aim is achieved by the fact that the first sheet comprises a screen-printed pattern consisting of a light background and dark alphanumeric characters.

According to another special feature, the screen-printed pattern comprises a dark circle surrounding a light area in which the alphanumeric characters are inscribed.

A final aim is to propose a use for the keyboard. This aim is achieved by the fact that the keyboard is used in a cash dispenser, the mounting of which comprises a frame with dimensions suited to the dimensions of the printed circuit board, characterised in that the frame comprises a shoulder with a height corresponding to the thickness of the two sheets and a depth greater than the lateral dimensions of the two sheets so as to contrive a free space.

Other advantages of the present invention will become more clearly apparent on reading the following description made with reference to the attached drawings, in which:

- Figure 1 shows a view in section of the device of the invention;
- Figure 2 shows a view from above of the contact cap and the disc;
- Figure 3 shows a side view in section of the cap and the disc;
- Figure 4 shows a view from above of the screen-printing.

The structure of the touch-effect electromechanical-contact keyboard consists of a multi-layer printed circuit (1, 2), a first layer (1) of which comprises on one of its faces the conducting track (12) supplying the current to a contact (13) which is itself connected to the cap (4). This cap (4), the section of which shown in Figure 1 and in Figure 3, has substantially the form of an omega, is made of conducting material and has a shape such that initially it resists depression until a certain force of pressure is reached and, beyond this force of pressure, the rounded portion (40) is depressed so as to touch the fixed contact (10) which is integral with the insulating layer of the printed circuit (1). This sudden depression produces a sensation to the observer's touch which is called a touch-effect. This contact (10) communicates with a second conducting track (11). The tracks (11, 12) of each contact are connected to the terminal of a connector in a known manner. The collar (41) forming the foot of the cap, the section of which has substantially the form of an omega, is wedged between the first layer (1) and the second layer (2) of the printed circuit. On the layer (2) of the printed circuit, in a keyboard with a conventional structure, there rests a flexible layer (3) made of mylar which comprises screen-printing.

In the invention, this mylar sheet (3) is separated from the cap by a disc (6) made of a material, such as for example neoprene, which has a rigidity of at least 40 to 45 Shore A. This disc (6) must have a minimum thickness (e) and a diameter which is related to the diameter (D) of the cap. Above the mylar sheet (3), there is placed a sheet (5) of translucent material (51) comprising, at regular intervals and perpendicular to the surface of the sheet, microshutters (50). This sheet (5) with its microshutters (50) spaced at regular intervals constitutes a directional microshutter filter which allows the eye (8) of an observer located within the angle (B) to observe what there is behind this sheet (5) and in particular to look at the screen-printing on the mylar sheet. On the other hand, an observer (9) who is located outside the angle (B) will not be able to see the screen-printing, and consequently the inscriptions.

To obtain a touch-effect keyboard making it possible to preserve a degree of confidentiality for information entered at the keyboard, it could have been thought sufficient to superimpose the sheet (5) on the conventional structure of the keyboard. On doing this, it was noticed that the keyboard lost its tactile characteristic.

The disc (6), the diameter (d) of which must fulfil the relationship:

$0.3\ D \leq d \leq 0.5\ D$ and the thickness (e) of which must fulfil the relationship $e \geq 0.5\ E$; E being the total thickness of the sheet (5) and the sheet (3).

Surprisingly, by adding this disc (6), the touch-effect reappears, while preserving for the device a degree of confidentiality from observation by a third party. This touch-effect reappears in certain conditions of values for diameter, thickness, nature and hardness of the material of the disc (6) which must be defined as a function of the diameters, depth and depression force of the cap (4), as well as the thickness of the element constituted by the two sheets (5) and (3).

Given that the microshutters are opaque and that the sheet (6) limits the passage of light, in order to improve the visual perception of the screen printing in the case of a non-illuminated keyboard, advantageous use will be made of black figures (31) disposed on a white background. Finally, to facilitate use, and in particular the orientation of the user's fingers on the keyboard, a circle (30) will be defined on the mylar layer (3), surrounding each screen-printed alphanumeric element, with the aim of defining the target at which the finger has to aim. This arrangement is preferable to an arrangement defining a grid on the surface of the keyboard, since with such a grid the confidential nature created by the microshutter sheet would disappear. Indeed, thanks to the presence of the grid on the surface of the keyboard, an observer could memorise the position of the underlying contacts without thereby knowing their alphanumeric meaning.

To allow the normal operation of this confidential touch-effect keyboard, it is necessary to contrive in the frame (7) which surrounds this keyboard a recess (71) which allows the sheets (5) and (3) to be displaced in this recess, so as to absorb variations in dimension of the sheet caused by the depression of the keys. This recess (71) has a height (H) corresponding substantially to that of the sheets (3) and (5) and the disc (6). Thus, the printed circuit is kept pressed in a known manner against the shoulder (70) of the frame, while the sheets (5) and (3) can be displaced and can slide relative to the edges of the surround (7) constituting the opening (71). The frame (7) can form part of the mounting of a cash dispenser.

Other modifications within the scope of the person skilled in the art also form part of the spirit of the invention.

Thus, in a variant, the two sheets (3) and (5) can be replaced by a single translucent element with microshutters, the reverse of which, that is, the face facing the disc (6), is in this case provided with screen-printing.



CLAIMS

1. A confidential touch-effect keyboard comprising a set of click-sensitive conducting caps (4) with an omega-shaped section, forming a switch with the conducting tracks (10, 11, 12) of a printed circuit, characterised in that a disc (6) of material with a given rigidity, diameter and thickness is placed on each cap and covered with an element of translucent material forming, with the aid of microshutters (50), a directional filter and supporting the screen printing.

2. A keyboard according to Claim 1, characterised in that the diameter (d) of the disc (6) is comprised between one-third of the diameter (D) of the cap and half the diameter of that cap, the thickness (e) of the disc is greater than or equal to half the thickness (E) of the element forming the filter and supporting the screen printing.

3. A keyboard according to Claim 1 or 2, characterised in that the element is formed of a sheet comprising the screen printing on the reverse, on the face facing the disc.

4. A keyboard according to Claim 1 or 2, characterised in that the element consists of a first sheet (3) of translucent material supporting the screen printing placed under a second sheet (5) of translucent material with microshutters.

5. A keyboard according to Claim 3 or 4, characterised in that the disc (6) is made of a material, the minimum hardness of which is between 40 and 45 Shore A.

6. A keyboard according to one of Claims 3 to 5, characterised in that the first sheet (3) comprises a screen-printed pattern consisting of a light background (32) and dark alphanumeric characters (31).

7. A keyboard according to Claim 6, characterised in that the screen-printed pattern comprises a black circle (30) surrounding a white area (32) in which the alphanumeric characters (31) are inscribed.

8. Use of the keyboard according to one of the preceding claims in a cash dispenser, the mounting of which comprises a frame with dimensions suited to the dimensions of the printed circuit board, characterised in that the frame comprises a shoulder (71) with a height corresponding to the thickness of the two sheets (3, 5) and a depth greater than the lateral dimensions of the two sheets.