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(54) **Membrane keyboard**

Membrantastatur

Clavier à membrane

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Description

[0001] The present invention concerns a membrane keyboard.

[0002] It is known that standard membrane keyboards are disadvantageous in that they are vulnerable under extreme circumstances, for example in the case of vandalism. The front layer of standard membrane keyboards consists of a layer of polyester or polycarbonate of a few hundred micrometres, which can be easily damaged by scratching it with a knife, by perforating it with sharp objects or by melting it by bringing a lighter or such close by.

[0003] In this way, the underlying electronics can also be damaged or influenced.

[0004] For most industrial environments, a conventional membrane keyboard is more than sufficient. However, in public environments, such as at pay machines, automatons in stations and other public places, it is too vulnerable.

[0005] Conventional membrane keyboards, which are provided with a protection before the front side are known from documents DE-U-9205228 which forms the basis for the preamble of claim 1 and US 4.194.105. In the embodiments described in these documents, the forces exerted onto the push-button are completely transferred to the membrane itself. As a result of this, when exerting heavy forces onto the push-buttons, the membrane and the electrical contacts under the membrane may become damaged.

[0006] EP 0.064.615 discloses a keyboard in which the pushbuttons are provided with elastic means such as springs, resulting in the design of the keyboard which is not comparable with the design of a conventional membrane keyboard.

[0007] The invention aims to offer a membrane keyboard of the conventional type, which is less vulnerable and to a high degree resistant to vandalism, but which still offers the advantages of a conventional membrane keyboard, such as long life, good dust and waterproofness, low cost price, simple construction and possibly, when the keys are being pressed on, producing a click effect.

[0008] To this aim the invention consists of a membrane keyboard which contains at least one key contact which consists of the combination of a membrane pressure contact and a protection provided before the front side of the membrane pressure contact, by means of which the membrane pressure contact can be excited, characterized in that said key contact comprises a push-button which, on the one hand, cooperates with the membrane of the membrane pressure contact such that the displacement of the push-button results in an equal or almost equal displacement at the membrane of the membrane pressure contact and, on the other hand, is provided with an end limitation which prevents the membrane pressure contact, including the basic contact part and the membrane thereof, of being damaged, whereby

a recess is provided under the membrane pressure contact allowing that the basic contact part and the membrane of the membrane pressure contact remain in a floating condition, also when the push-button has reached its end limitation.

[0009] As a result of this end limitation, the membrane, as well as the electrical contacts, are protected from being damaged, even when exerting a large impact onto the push-button, for example by means of a hammer.

[0010] In order to better explain the characteristics of the invention, the following preferred embodiment is described as an example only, without being limitative in any way, with reference to the accompanying drawings, in which:

figure 1 shows the front side of a membrane keyboard according to the invention;

figure 2 shows a section to a larger scale according to line II-II in figure 1;

figure 3 shows a side view of the part which is indicated in figure 2 with arrow F3;

figures 4 and 5 show views according to arrows F4 and F5 in figure 3;

figure 6 shows the backside of the cover plate which is indicated in figure 2 with arrow F6;

figure 7 shows a section according to line VII-VII in figure 6.

[0011] As represented in the figures 1 and 2, the invention concerns a membrane keyboard 1, characterized in that it contains at least one key contact 2 which consists of the combination of a membrane pressure contact 3 and a protection 5 provided before the front side 4 of the membrane pressure contact 3 by means of which the membrane pressure contact 3 can be excited.

The protection 5 is hereby preferably integrated in the membrane keyboard 1. In the example shown, the protection 5 to this end mainly consists of a push button 7 provided in a seat 6.

[0012] In order to prevent that the push button 7 sits loose, the whole is preferably built such that the push button 7 is pressed on in the seat 6 by the membrane 8 of the membrane pressure contact 3, preferably only with a very light force.

[0013] According to the most preferred embodiment, the push button 7 consists of a rigid element, which is preferably also solid.

[0014] The above-mentioned protection 5 is preferably integrated in a cover plate 9 and/or is also formed of this cover plate 9. The above-mentioned seat 6 for the respective push buttons 7 is hereby each time formed of a recess 10 in the back side 11 of the cover plate 9 and a smaller, continuing opening 12 leading to this recess 10, such that the cover plate 9 has shoulders 13, whereas the push button 7 consists at least of a knob-shaped body 14 which fits through the continuing open-

ing 12 of the cover plate 9 and which is provided with shoulders 15 which fit in the above-mentioned recess 10 and which make contact with the shoulders 13 of the cover plate 9. For clarity's sake, the push button 7 and the cover plate 9 are represented separately in the figures 3-5, 6-7 respectively.

[0015] As represented in the figures, both the membrane pressure contact 3 and the protection 5 consist of a structure of layers, so that a simple, cost-saving construction is possible.

[0016] The membrane pressure contact 3 can have different shapes, but preferably, use will be made of a membrane pressure contact 3 which contains a membrane 8, as represented in figure 2, which is provided on a spacer sleeve 16 which is provided with openings 17.

[0017] Preferably, use will be made of membranes 8 which consist of a tapered recess 18 along their edges and a segment of a sphere 19 which is suspended in between, directed with its round side towards the push button 7.

[0018] Further, the protection 5 preferably contains an actuator part 20 which consists of a protrusion which makes contact with the membrane 8 at least when being pushed in and whose perimeter is situated inside the perimeter of the opening 17 concerned in the spacer sleeve 16. Preferably, this is a round protrusion as represented in figure 5.

[0019] The actuator part 20 contains an excavation 22 on the side 21 which is directed towards the membrane 8 of the membrane pressure contact 3 which is situated centrally before the membrane 8, which preferably consists of spherical recess. The bend of the spherical recess is preferably stronger than that of the segment 19, so that a ring-shaped contact is obtained. This excavation 22 aims to provide for the preservation of a good click effect and to make the positioning between the membrane 8 and the push button 7 less critical.

[0020] Further, means can also be provided which prevent the push buttons 7 from turning, which is particularly important when inscriptions are provided on the push buttons 7. In the example represented in the figures, these means consist of the forms of the push button 7 concerned which fit together and the corresponding seat 6, such that turning is made impossible. In particular, the knob-shaped body 14 and the opening 12 are square to this end.

[0021] The part of the protection which can be pushed in, in this case the push button 7, is provided with an end limitation so as to prevent that the membrane 8 and the underlying structures are damaged when a large force is exerted on the push button 7 concerned, for example when it is hit at with a hammer or any other object.

[0022] In the example represented in the figures, this end limitation consists of shoulders, in this case the already mentioned shoulders 15, at the part which can be pushed in, i.e. at the push button 7, which extend further sideways than the edge 23 of the above-mentioned

opening 12.

[0023] The membrane pressure contact 3 usually contains at least two contact parts, namely a basic contact part 24 with contacts 25 on the one hand, and the membrane 8 which is provided with contacts 26 on the other hand.

[0024] According to the invention, the membrane keyboard 1 hereby contains means which make it possible to push both contact parts through, whereby these means consist in that both contact parts, i.e. the basic contact part 24 and the membrane 8, are suspended elastically. Moreover, they are preferably suspended in a floating way as is shown in figure 2.

[0025] To this end, the basic contact part 24 is provided on a thick layer of glue 27 in which is provided a recess 28 at the height of each membrane 8.

[0026] The thick layer of glue 27, as well as the recesses 28 therein are advantageous in that the construction is less critical and in that material compressions in the keyboard can be absorbed.

The height of the actuator part 20 is preferably somewhat greater than the thickness of the spacer sleeve 16. In the embodiment shown, this height must be smaller, however, than the thickness of the spacer sleeve 16, increased with the thickness of the layer of glue 27.

[0027] Finally, we can say that the membrane keyboard 1 according to the invention is preferably composed of, in successive order, a support layer 19, a basic contact part 24 formed of a synthetic layer upon which are provided electric contacts 25, a spacer sleeve 16 formed of a plate with openings 17, a second contact part formed of a synthetic layer which also functions as a membrane 8 and a cover plate 9 with seats 6 in which are held push buttons 7 between this front layer 9 and the membrane 8, whereby the different layers and plates are glued together by means of glue layers 27, 30, 31 and 32 or such.

[0028] Naturally, the invention also concerns a membrane key board 1 which contains several membrane pressure contacts 3, provided with protections 5, which are integrated in one and the same structure of layers, as is the case in the figures.

[0029] The cover plate 9 and/or the push buttons 7 are preferably made of solid material. Aluminium is preferable, but other materials such as for example plastic are not excluded.

[0030] In order to prevent the push button 7 from being blocked, the knob-shaped body 14, in other words the knob shaft, has such a height that, when the push button 7 is entirely pushed in, its top side cannot go lower than the bottom side of the shoulders 13.

[0031] The cover plate can be provided with a collar 33 which partly or entirely surrounds the underlying structure.

[0032] The present invention is by no means limited to the embodiments described as an example and represented in the accompanying drawings; on the contrary, such a membrane keyboard can be made in various

forms and dimensions while still remaining within the scope of the invention, as defined by the claims.

Claims

1. Membrane keyboard, which contains at least one key contact (2) which consists of the combination of a membrane pressure contact (3) and a protection (5) provided before the front side (4) of the membrane pressure contact (3), by means of which the membrane pressure contact (3) can be excited, characterized in that said key contact (2) comprises a push-button (7) which, on the one hand, co-operates with the membrane of the membrane pressure contact (3) such that the displacement of the push-button results in an equal or almost equal displacement at the membrane of the membrane pressure contact and, on the other hand, is provided with an end limitation which prevents the membrane pressure contact (3), including the basic contact part (24) and the membrane (8) thereof, of being damaged, whereby a recess (28) is provided under the membrane pressure contact (3) allowing that the basic contact part (24) and the membrane (8) of the membrane pressure contact (3) remain in a floating condition, also when the push-button (7) has reached its end limitation.
2. Membrane keyboard according to claim 1, characterized in that the above-mentioned protection (5) is integrated in it.
3. Membrane keyboard according to claim 2, characterized in that the protection (5) mainly consists of a push button (7) provided in a seat (6).
4. Membrane keyboard according to claim 3, characterized in that the push button (7) is pushed on in the seat (6) by the membrane (8) of the membrane pressure contact (3).
5. Membrane keyboard according to claim 3 or 4, characterized in that the push button (7) consists of a rigid element.
6. Membrane keyboard according to any of claims 3 to 5, characterized in that the push button (7) consists of a solid element.
7. Membrane keyboard according to any of the preceding claims, characterized in that the protection (5) is integrated in a cover plate (9) and/or is also formed of a cover plate (9).
8. Membrane keyboard according to any of claims 3 to 6 and 7, characterized in that the seat (6) is formed of a recess (10) in the back side (11) of the

cover plate (9) and a smaller, continuing opening (12) opening in this recess (10), such that the cover plate (9) has shoulders (13), whereas the push button (7) consists at least of a knob-shaped body (14) which fits through the continuing opening (12) of the cover plate (9) and which is provided with shoulders (15) which fit in the above-mentioned recess (10) and which can make contact with the shoulders (13) of the cover plate (9), and an actuator part (20) which makes contact with the membrane (8) of the membrane pressure contact (3) when being pushed in and which is smaller than an opening (17) provided in a spacer sleeve (16) under the membrane (8).

9. Membrane keyboard according to any of claims 3, 4, 5, 6 or 8, characterized in that it is provided with means which prevent the push button (7) from turning.
10. Membrane keyboard according to claim 9, characterized in that the above-mentioned means consist of forms of the push button (7) fitting together and of the seat (6), which are selected such that no mutual turning is possible.
11. Membrane keyboard according to any of the preceding claims, characterized in that both the membrane pressure contact (3) and the protection (5) are formed of a structure of layers.
12. Membrane keyboard according to any of the preceding claims, characterized in that the membrane pressure contact (3) contains a membrane (8) which is provided on a spacer sleeve (16), provided with openings (17), and in that the protection (5) contains an actuator part (20) which consists of a protrusion which makes contact with the membrane (8) at least when being pushed in and whose perimeter is situated inside the perimeter of the opening (17) concerned in the spacer sleeve (18).
13. Membrane keyboard according to any of the preceding claims, characterized in that the protection (5) contains an actuator part (20) which has an excavation (22) on the side (21) which is directed towards the membrane (8) of the membrane pressure contact (3) which is situated centrally before the membrane (8).
14. Membrane keyboard according to any of the preceding claims, characterized in that the recess (22) consists of a spherical recess.
15. Membrane keyboard according to any of the preceding claims, characterized in that the membrane pressure contact (3) has a membrane (8) which is provided on a spacer sleeve (16) provided with openings (17) and in that the end limitation consists

of shoulders (15) at the part which can be pushed in which extend further sideways than the edge (23) of the above-mentioned opening (17).

16. Membrane keyboard according to any of the preceding claims, characterized in that the membrane pressure contact (3) contains at least two contact parts and in that the membrane keyboard (1) contains means which make it possible to push both contact parts through. 5
17. Membrane keyboard according to claim 16, characterized in that both contact parts are suspended elastically. 10
18. Membrane keyboard according to claim 17, characterized in that both contact parts are suspended in a floating way. 15
19. Membrane keyboard according to claim 18, characterized in that the basic contact part is provided on a thick layer of glue (27) in which is provided a recess (28) at the height of the key contact (2). 20
20. Membrane keyboard according to claims 12 and 19, characterized in that the height of the actuator part (20) is greater than the thickness of the spacer sleeve (16), but smaller than the thickness of the spacer sleeve (16) increased with the thickness of the layer of glue (27). 25
21. Membrane keyboard according to any of the preceding claims, characterized in that the membrane pressure contact (3) has a membrane (8) which is formed of a recess (18) at the edge and a segment of a sphere (19) in the middle. 30
22. Membrane keyboard according to any of the preceding claims, characterized in that it is composed, in successive order, of a support layer (29), a basic contact part (24) formed of a synthetic layer upon which are provided electric contacts (25), a spacer sleeve (16) formed of a plate with openings (17), a second contact part formed of a synthetic layer which also functions as a membrane (8) and a cover plate (9) with seats (6) in which are held push buttons (7) between this front layer (9) and the membrane (8), whereby the different layers and plates are glued together. 35
23. Membrane keyboard according to any of the preceding claims, characterized in that several membrane pressure contacts (3) are provided with protections (5) which are integrated in one and the same structure of layers. 40

Patentansprüche

1. Membrantastatur, die zumindest einen Tastenkontakt (2) umfaßt, der aus der Kombination eines Membran-Druckkontakts (3) und einem vor der Frontseite (4) des Membran-Druckkontakts (3) angebrachten Schutzelement (5) besteht, mittels dessen der Membran-Druckkontakt (3) ausgelöst werden kann, dadurch gekennzeichnet, daß besagter Tastenkontakt (2) einen Druckknopf (7) umfaßt, der einerseits mit der Membran des Membran-Druckkontakts (3) zusammenwirkt, derart, daß die Bewegung des Druckknopfs in einer gleichen oder nahezu gleichen Bewegung an der Membran des Membran-Druckkontakts resultiert, und andererseits mit einer Endbegrenzung versehen ist, die eine Beschädigung des Membran-Druckkontakts (3), einschließlich des Basis-Kontaktteils (24) und dessen Membran (8), verhindert, wobei eine Aussparung (28) unter dem Membran-Druckkontakt (3) vorgesehen ist, die gestattet, daß das Basis-Kontaktteil (24) und die Membran (8) des Membran-Druckkontakts (3) in einer schwimmenden Position bleiben, auch wenn der Druckknopf (7) seine Endbegrenzung erreicht hat. 10
2. Membrantastatur gemäß Anspruch 1, dadurch gekennzeichnet, daß das oben erwähnte Schutzelement (5) darin integriert ist. 15
3. Membrantastatur gemäß Anspruch 2, dadurch gekennzeichnet, daß das Schutzelement (5) hauptsächlich aus einem in einem Sitz (6) angebrachten Druckknopf (7) besteht. 20
4. Membrantastatur gemäß Anspruch 3, dadurch gekennzeichnet, daß der Druckknopf (7) durch die Membran (8) des Membran-Druckkontakts (3) im Sitz (6) angedrückt wird. 25
5. Membrantastatur gemäß Anspruch 3 oder 4, dadurch gekennzeichnet, daß der Druckknopf (7) aus einem starren Element besteht. 30
6. Membrantastatur gemäß einem der Ansprüche 3 bis 5, dadurch gekennzeichnet, daß der Druckknopf (7) aus einem massiven Element besteht. 35
7. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß das Schutzelement (5) in einer Abdeckplatte (9) integriert ist und/oder auch von einer Abdeckplatte (9) gebildet wird. 40
8. Membrantastatur gemäß einem der Ansprüche 3 bis 6 und 7, dadurch gekennzeichnet, daß der Sitz (6) aus einer Aussparung (10) in der Rückseite (11) der Abdeckplatte (9) und einer kleineren, durchge-

- henden Öffnung (12), die in diese Aussparung (10) mündet, besteht, so daß die Abdeckplatte (9) Schultern (13) aufweist, während der Druckknopf (7) zumindest aus einem knopfförmigen Körper (14) besteht, der durch die durchgehende Öffnung (12) der Abdeckplatte (9) paßt und der mit Schultern (15), die in die oben erwähnte Aussparung (10) passen und die mit den Schultern (13) der Abdeckplatte (9) in Kontakt kommen können, und mit einem Auslöseteil (20) versehen ist, das mit der Membran (8) des Membran-Druckkontakts (3) in Kontakt kommt, wenn es eingedrückt wird, und das kleiner als eine Öffnung (17) ist, die in einem Abstandhalter (16) unter der Membran (8) angebracht ist.
9. Membrantastatur gemäß einem der Ansprüche 3, 4, 5, 6 oder 8, dadurch gekennzeichnet, daß sie mit Mitteln versehen ist, die ein Verdrehen des Druckknopfs (7) verhindern.
10. Membrantastatur gemäß Anspruch 9, dadurch gekennzeichnet, daß die oben erwähnten Mittel aus zusammenpassenden Formen des Druckknopfs (7) und des Sitzes (6) bestehen, die so gewählt sind, daß kein Verdrehen in Bezug zueinander möglich ist.
11. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß sowohl der Membran-Druckkontakt (3) als auch das Schutzelement (5) aus einer Schichtstruktur geformt sind.
12. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Membran-Druckkontakt (3) eine Membran (8) umfaßt, die auf einem mit Öffnungen (17) versehenen Abstandhalter (16) angebracht ist, und daß das Schutzelement (5) ein Auslöseteil (20) umfaßt, das aus einem Vorsprung besteht, das, zumindest wenn es eingedrückt wird, mit der Membran (8) in Kontakt kommt und dessen Umfang innerhalb des Umfangs der betreffenden Öffnung (17) im Abstandhalter (18) gelegen ist.
13. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß das Schutzelement (5) ein Auslöseteil (20) umfaßt, das eine Aushöhlung (22) an der zur Membran (8) des Membran-Druckkontakts (3) gerichteten Seite (21) aufweist, die mittig vor der Membran (8) angeordnet ist.
14. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Aussparung (22) aus einer kugelförmigen Aussparung besteht.
15. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Membran-Druckkontakt (3) eine Membran (8) aufweist, die auf einem mit Öffnungen (17) versehenen Abstandhalter (16) angebracht ist, und daß die Endbegrenzung aus Schultern (15) an dem Teil, das eingedrückt werden kann, besteht, die sich seitlich weiter erstrecken als der Rand (23) der oben erwähnten Öffnung (17).
16. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Membran-Druckkontakt (3) zumindest zwei Kontaktteile umfaßt und daß die Membrantastatur (1) Mittel umfaßt, die es ermöglichen, beide Kontaktteile durchzudrücken.
17. Membrantastatur gemäß Anspruch 16, dadurch gekennzeichnet, daß beide Kontaktteile elastisch aufgehängt sind.
18. Membrantastatur gemäß Anspruch 17, dadurch gekennzeichnet, daß beide Kontaktteile schwimmend aufgehängt sind.
19. Membrantastatur gemäß Anspruch 18, dadurch gekennzeichnet, daß das Basis-Kontaktteil auf einer dicken Klebstoffschicht (27) angebracht ist, worin in Höhe des Tastenkontakts (2) eine Aussparung (28) angebracht ist.
20. Membrantastatur gemäß den Ansprüchen 12 und 19, dadurch gekennzeichnet, daß die Höhe des Auslöseteils (20) größer ist als die Dicke des Abstandhalters (16), jedoch kleiner als die Dicke des Abstandhalters (16) vermehrt um die Dicke der Klebstoffschicht (27).
21. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Membran-Druckkontakt (3) eine Membran (8) aufweist, die aus einer Vertiefung (18) am Rand und einem Segment einer Kugelform (19) in der Mitte geformt ist.
22. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß sie, aufeinanderfolgend, aus einer Trägerschicht (29), einem Basis-Kontaktteil (24), gebildet von einer synthetischen Schicht, worauf elektrische Kontakte (25) angebracht sind, einem Abstandhalter (16), gebildet von einer Platte mit Öffnungen (17), einem zweiten Kontaktteil, gebildet von einer synthetischen Schicht, die auch als eine Membran (8) fungiert, und einer Abdeckplatte (9) mit Sitzen (6), worin Druckknöpfe (7) zwischen dieser Frontschicht (9) und der Membran (8) gehalten werden, zusammengesetzt ist, wobei die verschiedenen Schichten und

Platten zusammengeklebt sind.

23. Membrantastatur gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß mehrere Membran-Druckkontakte (3) mit Schutzelementen (5) versehen sind, die in ein und derselben Schichtstruktur integriert sind.

Revendications

1. Clavier à membrane, qui contient au moins un contact de touche (2) qui est constitué de la combinaison d'un contact de pression à membrane (3) et d'une protection (5) prévue devant le côté avant (4) du contact de pression à membrane (3), au moyen de laquelle le contact de pression à membrane (3) peut être excité, caractérisé en ce que ledit contact de touche (2) comprend un bouton-poussoir (7) qui, d'une part, coopère avec la membrane du contact de pression à membrane (3) de sorte que le déplacement du bouton-poussoir donne un déplacement égal ou pratiquement égal au niveau de la membrane du contact de pression à membrane et qui, d'autre part, est pourvu d'une limite d'extrémité qui empêche que le contact de pression à membrane (3), la partie de contact de base (24) et la membrane (8) de celui-ci comprises, soit endommagé, en sachant qu'un évidement (28) est prévu sous le contact de pression à membrane (3) permettant que la partie de contact de base (24) et la membrane (8) du contact de pression à membrane (3) demeurent dans un état flottant, également lorsque le bouton-poussoir (7) a atteint sa limite d'extrémité.
2. Clavier à membrane suivant la revendication 1, caractérisé en ce que la protection susmentionnée (5) est intégrée dans celui-ci.
3. Clavier à membrane suivant la revendication 2, caractérisé en ce que la protection (5) est principalement constituée d'un bouton-poussoir (7) prévu dans un logement (6).
4. Clavier à membrane suivant la revendication 3, caractérisé en ce que le bouton-poussoir (7) est enfoncé dans le logement (6) par la membrane (8) du contact de pression à membrane (3).
5. Clavier à membrane suivant la revendication 3 ou 4, caractérisé en ce que le bouton-poussoir (7) est constitué d'un élément rigide.
6. Clavier à membrane suivant l'une quelconque des revendications 3 à 5, caractérisé en ce que le bouton-poussoir (7) est constitué d'un élément solide.
7. Clavier à membrane suivant l'une quelconque des

revendications précédentes, caractérisé en ce que la protection (5) est intégrée dans une plaque de couverture (9) et/ou est également formée d'une plaque de couverture (9).

8. Clavier à membrane suivant l'une quelconque des revendications 3 à 6 et 7, caractérisé en ce que le logement (6) est formé d'un évidement (10) dans le côté arrière (11) de la plaque de couverture (9) et d'une ouverture continue plus petite (12) s'ouvrant dans cet évidement (10), de sorte que la plaque de couverture (9) comporte des épaulements (13), tandis que le bouton-poussoir (7) est constitué d'au moins un corps en forme de bouton (14) qui s'adapte dans l'ouverture continue (12) de la plaque de couverture (9) et qui est pourvu d'épaulements (15) qui s'adaptent dans l'évidement susmentionné (10) et qui entrent en contact avec les épaulements (13) de la plaque de couverture (9), et d'une partie d'actionneur (20) qui entre en contact avec la membrane (8) du contact de pression à membrane (3) lorsqu'elle est enfoncée et qui est plus petite qu'une ouverture (17) prévue dans un anneau d'écartement (16) sous la membrane (8).
9. Clavier à membrane suivant l'une quelconque des revendications 3, 4, 5, 6 ou 8, caractérisé en ce qu'il est pourvu de moyens qui empêchent la rotation du bouton-poussoir (7).
10. Clavier à membrane suivant la revendication 9, caractérisé en ce que les moyens susmentionnés sont constitués de formes du bouton-poussoir (7) s'adaptant les unes aux autres et du logement (6), qui sont sélectionnées de sorte qu'une rotation réciproque est impossible.
11. Clavier à membrane suivant l'une quelconque des revendications précédentes, caractérisé en ce que le contact de pression à membrane (3) et la protection (5) sont tous deux formés d'une structure de couches.
12. Clavier à membrane suivant l'une quelconque des revendications précédentes, caractérisé en ce que le contact de pression à membrane (3) contient une membrane (8) qui est prévue sur un anneau d'écartement (16), pourvu d'ouvertures (17), et en ce que la protection (5) contient une partie d'actionneur (20) qui est constituée d'une saillie qui entre en contact avec la membrane (8) au moins lorsqu'elle est enfoncée et dont le périmètre se trouve à l'intérieur du périmètre de l'ouverture (17) concernée dans l'anneau d'écartement (18).
13. Clavier à membrane suivant l'une quelconque des revendications précédentes, caractérisé en ce que la protection (5) contient une partie d'actionneur

(20) qui comporte une excavation (22) sur le côté (21) qui est dirigé vers la membrane (8) du contact de pression à membrane (3) qui se trouve au centre devant la membrane (8).

14. Clavier à membrane suivant l'une quelconque des revendications précédentes, caractérisé en ce que l'évidement (22) est constitué d'un évidement sphérique.

15. Clavier à membrane suivant l'une quelconque des revendications précédentes, caractérisé en ce que le contact de pression à membrane comportant une membrane (8) qui est prévue sur un anneau d'écartement (16) pourvu d'ouvertures (17) et en ce que la limite d'extrémité est constituée d'épaulements (15) au niveau de la partie qui peut être enfoncée qui s'étendent plus loin sur les côtés que le bord (23) de l'ouverture susmentionnée (17).

16. Clavier à membrane suivant l'une quelconque des revendications précédentes, caractérisé en ce que le contact de pression à membrane (3) contient au moins deux parties de contact et en ce que le clavier à membrane (1) contient des moyens qui permettent d'enfoncer les deux parties de contact.

17. Clavier à membrane suivant la revendication 16, caractérisé en ce que les deux parties de contact sont suspendues de manière élastique.

18. Clavier à membrane suivant la revendication 17, caractérisé en ce que les deux parties de contact sont suspendues de manière flottante.

19. Clavier à membrane suivant la revendication 18, caractérisé en ce que la partie de contact de base est prévue sur une épaisse couche de colle (27) dans laquelle est prévu un évidement (28) à la hauteur du contact de touche (2).

20. Clavier à membrane suivant les revendications 12 et 19, caractérisé en ce que la hauteur de la partie d'actionneur (20) est supérieure à l'épaisseur de l'anneau d'écartement (16), mais inférieure à l'épaisseur de l'anneau d'écartement (16) augmentée de l'épaisseur de la couche de colle (27).

21. Clavier à membrane suivant l'une quelconque des revendications précédentes, caractérisé en ce que le contact de pression à membrane (3) comporte une membrane (8) qui est formée d'un évidement (18) au niveau du bord et d'un segment d'une sphère (19) au milieu.

22. Clavier à membrane suivant l'une quelconque des revendications précédentes, caractérisé en ce qu'il est composé, par ordre successif, d'une couche de

support (29), d'une partie de contact de base (24) formée d'une couche synthétique sur laquelle sont prévus des contacts électriques (25), d'un anneau d'écartement (16) formé d'une plaque pourvue d'ouvertures (17), d'une deuxième partie de contact formée d'une couche synthétique qui fonctionne également comme une membrane (8) et d'une plaque de couverture (9) pourvue de logements (6) dans lesquels sont maintenus des boutons-poussoirs (7) entre cette couche avant (9) et la membrane (8), en sachant que les différentes couches et plaques sont collées les unes aux autres.

23. Clavier à membrane suivant l'une quelconque des revendications précédentes, caractérisé en ce que plusieurs contacts de pression à membrane (3) sont pourvus de protections (5) qui sont intégrées dans une seule et même structure de couches.

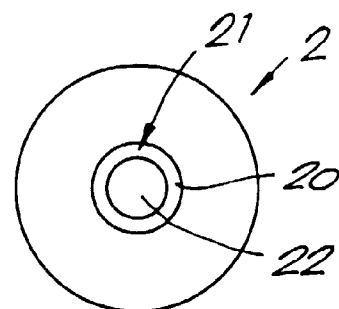
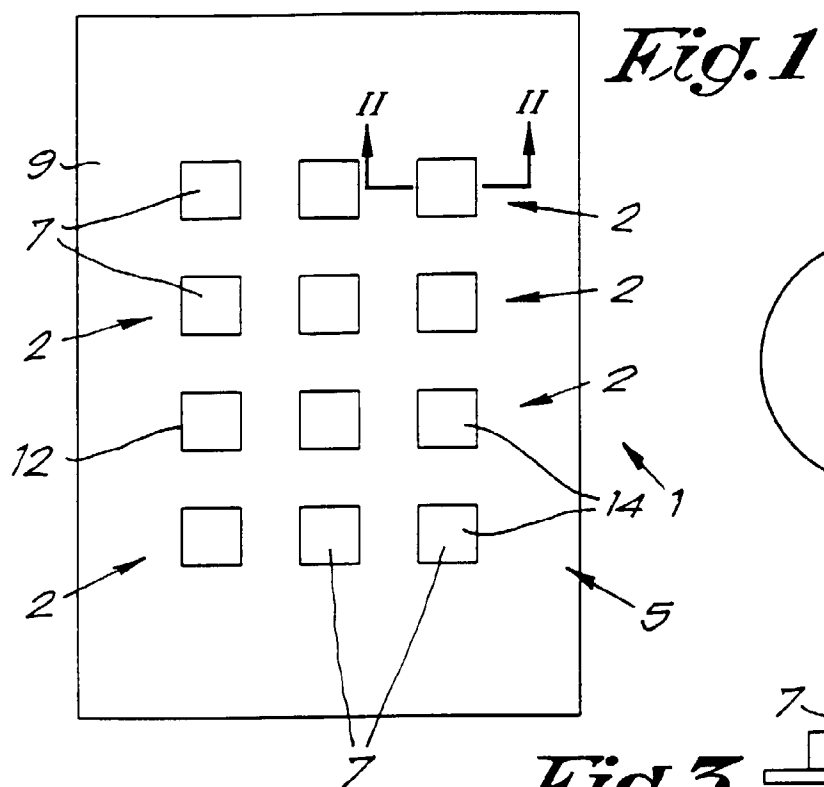


Fig. 3

