(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 920 039 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.06.1999 Bulletin 1999/22

(51) Int. Cl.[6]: **H01H 13/02**, H01H 13/06

(21) Application number: **98122029.6**

(22) Date of filing: **20.11.1998**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **28.11.1997 IT TO970231 U**

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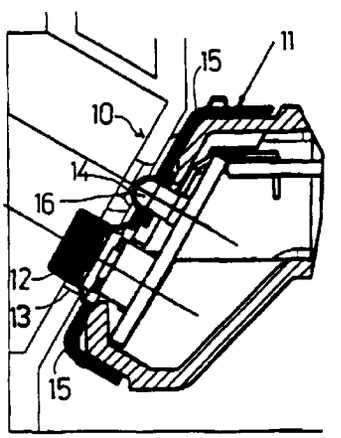
(54) A control push-button board for an automatic machine, in particular for a drink vending machine

(57) A control push-button board for an automatic machine, in particular for a drink vending machine of the type wherein the machine is provided with an outer container (10) wherein a push-button board (11) for controlling the machine is contained. The push-button board comprises:

- a plurality of push-buttons (12) which can be activated from the outside and which are connected to a corresponding plurality of LED diodes (14); and
- a membrane (15) made of an impermeable coating material of the push-button board, said membrane is placed between the push-button board and the container (10).

The membrane (15) is opaque and break free and forms, by the LED's (14), a plurality of dome shaped portions (16) which have a smaller thickness than the thickness of the remaining membrane portion, so as to let the light emitted by the LED's pass through to the outside.

FIG. 2



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Description

[0001] The present invention refers to an impermeable control push-button board for an automatic machine, in particular for a drink vending machine.

[0002] Automatic drink vending machines are currently known and are provided with a push-button board comprising a series of push-buttons for the selection of the available drinks and for the activation of other functions (as for instance "extra-sugar", etc.). Each push-button is connected to at least one LED diode, positioned close to the push-button, said LED diode indicates whether a specific drink or function is currently available.

[0003] An example of a push-button board of the known type for controlling an automatic machine, as previously described, is diagrammatically shown in the vertical section of figure 1. Referring to this figure, a membrane 15 made of an impermeable material is shaped so as to cover the outer side of a push-button board 11 positioned inside an outer container or body of the automatic machine. In particular, the membrane covers the control push-buttons 12 which project from the outer surface of the body 10. The membrane is perforated by the luminous LED's 14 which show through the openings 13 formed in the outer body 10.

[0004] The membrane has the task to avoid the access of water, dust and other polluting agents present in the air of the environment wherein the vending machine is placed, into the inner parts where the push-button electric contacts are positioned. As known, humidity and dust and soil deposits may, in the long run, jeopardise the working capacity of the push-button board. Further, the automatic machines of the above type are usually placed in passageways or in industrial environments where said polluting agents are present in a high quantity.

[0005] The sealing of a membrane of this type is not airtight, since dust and fluids (water, wet air, etc.) can enter into the area of the electric contacts through the holes of the membrane wherefrom the LED diodes project. Said configuration, besides having the problem of not being perfectly airtight, has a disadvantage due to the fact that the LED diodes are exposed externally. In fact, safety regulations require that between the (outer) LED point, which could come directly in contact with the user hand, and the (inner) LED electric current point there has to be a safety distance of at least 8 mm. In soma cases, this condition is met by using longer LED's; in no case, the LED diodes can be lighted from the sides, otherwise they would appear to be on even when they are off, especially if the machine is oriented towards the incoming outside light. By using elongated diodes, this disadvantage is even more frequent.

[0006] A purpose of the present invention is to realise a push-button board provided with a membrane of the improved type which will allow to overcome the disadvantages previously discussed.

[0007] This and other purposes and advantages, which will be better understood hereinafter, are achieved according to the present invention by a control push-button board for an automatic machine, in particular for a drink vending machine of the type wherein the machine is provided with an outer container wherein a push-button board for controlling the machine is contained. The push-button board comprises:

- a plurality of push-buttons which can be activated from the outside and which are connected to a corresponding plurality of LED diodes; and
- a membrane made of an impermeable coating material of the push-button board, said membrane is placed between the push-button board and the container.

[0008] The membrane is opaque and break free and forms, by the LED's, a plurality of dome shaped portions which have a smaller thickness than the thickness of the remaining membrane portion, so as to let pass through to the outside the light emitted by the LED's.

[0009] Now we will describe the structural and functional characteristics of a preferred but non limiting example of the push-button board according to the invention; referring to the attached drawings, in which:

Figure 1 is a partial schematic view in a vertical cross section of a push-button board of a known type for the control of an automatic drink vending machine;
Figure 2 is a partial schematic view in a vertical cross section of a push-button board provided with a protection membrane according to the present invention; and
Figure 3 is a front schematic view according to the arrow III of Figure 2.

[0010] Referring to figure 2, numeral 10 indicates the outer container of an automatic drink vending machine; a push-button board, indicated by numeral 11, for controlling the vending machine is contained inside the container 10.

[0011] The push-button board comprises a plurality of push-buttons 12, which project from the proper openings 13 of the container 10 and which project slightly from the container surface in order to be pushed by the user; the push-buttons 12 are connected, in a known way, to a corresponding plurality of luminous LED diodes, indicated by numeral 14.

[0012] According to the present invention, a membrane 15 made of an impermeable material, break free and opaque to the light, covers completely the portion of the push-button board directed towards the container 10, thus forming a break free sealing barrier which is positioned between the outside and the push-button board to seal in an airtight manner said board against water, wet air and other particles penetration which

might potentially be harmful for the operations of the push-button board.

[0013] The membrane 15 forms, by the LED's 14, a plurality of dome shaped portions 16 which repeat the shape of the LED's; the dome shaped portions 16 have a smaller thickness than the thickness of the remaining membrane portion, so as to let the light emitted by the activated LED's pass through to the outside. The remaining membrane portion, on the other hand, has a bigger thickness, which makes it completely opaque to the light. Thanks to this configuration, the light which passes through the thin domes 16 is uniformly diffused and it is perceived by the observer as a well defined luminous circle which is clearly visible even in the case that the side of the vending machine, wherein the push-button board is positioned, is directed towards the incoming sun or artificial light from the outside. The disadvantage of the traditional vending machines is therefore overcome, as discussed in the preamble of the present description.

[0014] Preferably, the membrane 15 is of a dark or bright colour, which makes the membrane portion, surrounding the dome shaped portions which cover the LED's, completely opaque.

[0015] The most preferred materials, which are used for producing the membrane according to the present invention, are the same as the traditional membrane materials, i.e. natural or synthetic rubber.

[0016] As it can be appreciated, the LED diodes do not remain uncovered and therefore it is not necessary, on the one hand, to make the various parts which form the push-button board with dimensions suitable to satisfy the minimum requirement of 8 mm distance previously mentioned, and, on the other hand, the problem of touching a diode with a hand is avoided.

[0017] It is understood that the invention is not limited to the embodiment shown and described herein, since said embodiment has to be considered as an example of realisation of the push-button board, which can, on the other hand, be changed as far as shape and dimension details are concerned.

[0018] In particular, notwithstanding the fact that the present invention has been described in relation to a drink vending machine, it is clear that the present invention can be applied to different types of automatic machines, thus obtaining the same advantages previously mentioned.

Claims

1. A control push-button board for an automatic machine, in particular for a drink vending machine of the type wherein the machine is provided with an outer container (10) wherein a push-button board (11) for controlling the machine is contained, the push-button board comprises:

   - a plurality of push-buttons (12) which can be activated from the outside and which are connected to a corresponding plurality of LED diodes (14); and
   - a membrane (15) made of an impermeable material used as coating of the push-button board (11), said membrane is placed between the push-button board and the container (10); characterised in that said membrane (15) is opaque and break free and forms, by the LED's (14), a plurality of dome shaped portions (16) which have a smaller thickness than the thickness of the remaining membrane portion, so as to let the light emitted by the LED's (14) pass through to the outside.

2. A push-button board as claimed in claim 1, wherein said membrane (15) has a colour that makes the membrane portion surrounding said dome shaped portions (16) completely opaque.

FIG.1

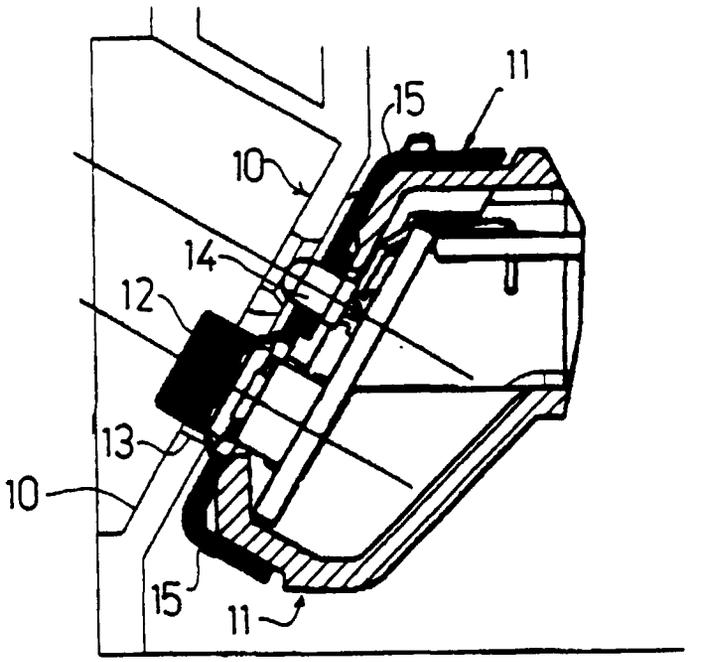
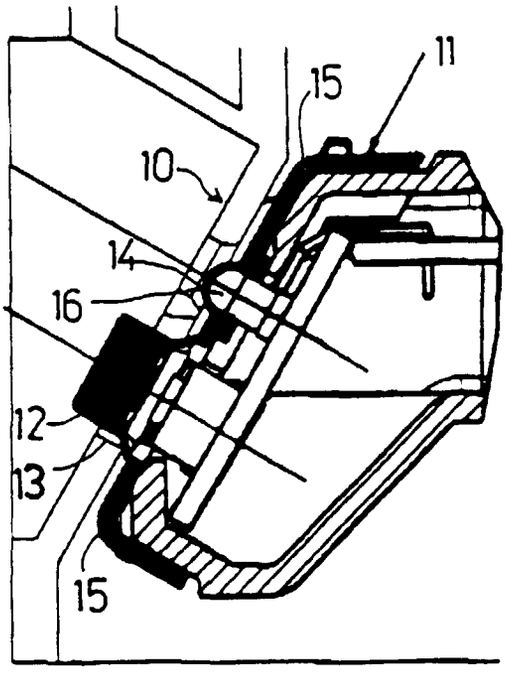


FIG.2



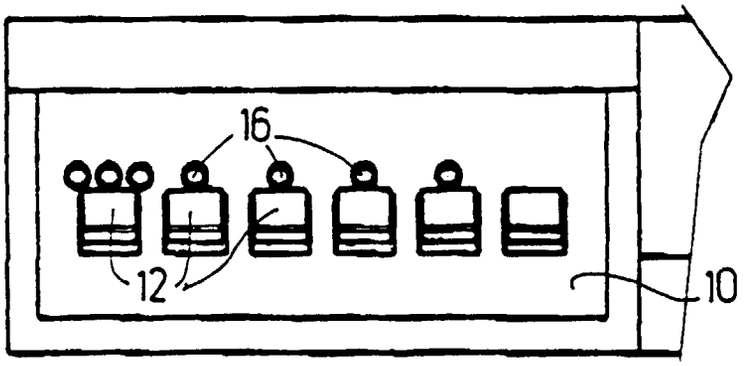


FIG.3