United States Patent

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[54] **SELF-SEALING PINBOARD**
1 Claim, 2 Drawing Figs.

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317/112, 339/94, 339/96
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[50] **Field of Search** 339/18, 94,
96, 111

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ABSTRACT: The contacts of a pinboard are sealed against moisture or corrosive atmospheres by a layer of rubber which is punctured when a pin is inserted. The edges of the hole formed in the rubber form a seal around the pin.

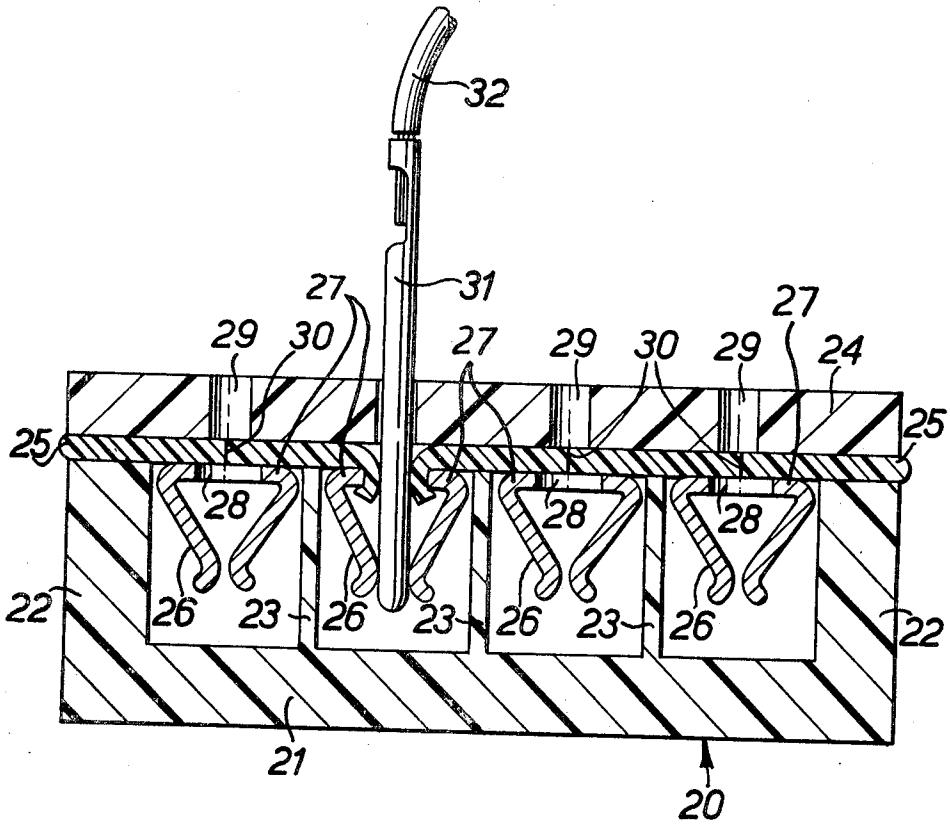


FIG.1.

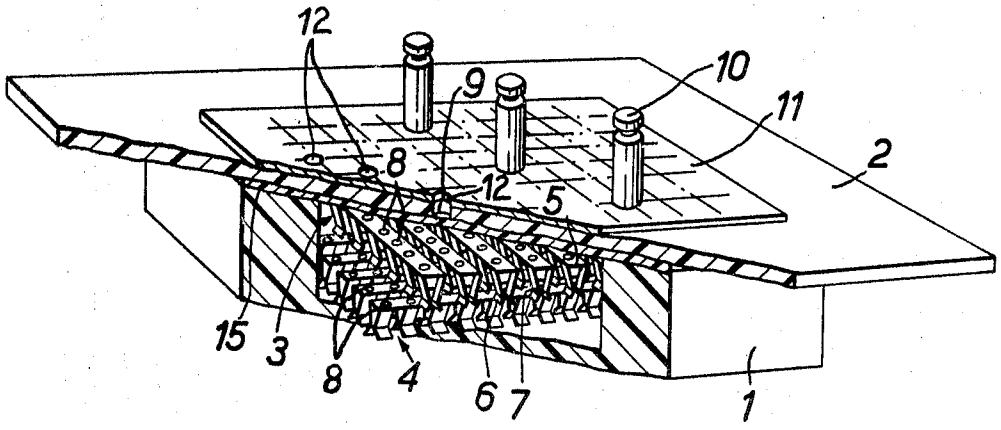
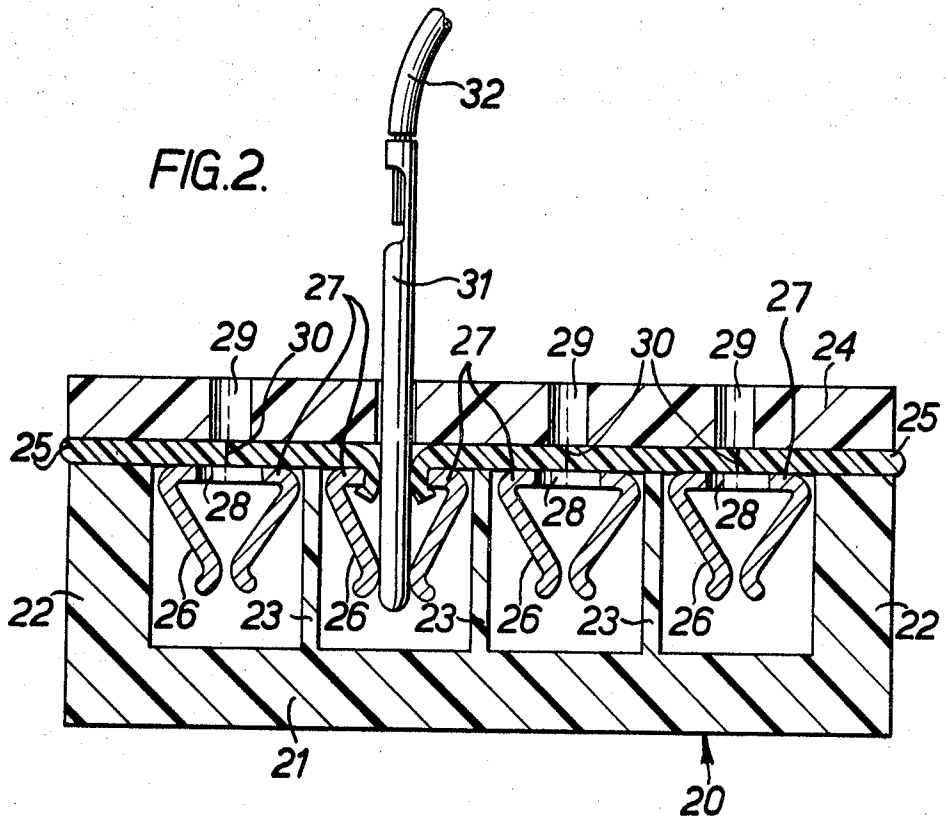


FIG.2.



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SELF-SEALING PINBOARD

This invention relates to a circuit contact arrangement comprising a housing of insulating material containing a plurality of contacts aligned with apertures on one side of the housing through which apertures conductive pins can be inserted to connect with the contacts.

Such circuit contact arrangements have may applications particularly in the fields of selective switching and programming where they can be incorporated as pinboards or plugboards. Often the apparatus of which they form part has to be used in a corrosive or damp atmosphere such as in a chemical processing plant or in a ship which travels through the tropics. In such applications, the quality of the electrical contact between the contact and the pin can quickly deteriorate which may lead to a fault occurring in the apparatus. It is thus necessary to provide for the contact area to be protected from the effects of any corrosive ambient atmosphere.

According to the present invention a circuit contact arrangement comprises a housing of insulating material containing a plurality of contacts aligned with apertures on one side of the housing and resilient sealing means closing the apertures.

An object of the invention is to provide a pinboard having a sealing diaphragm disposed in position thereon to seal the contacts of the pinboard from ambient atmospheric conditions.

Another object is the provision of a pinboard wherein the sealing diaphragm thereon is pierced by pins to reach the contacts therein.

A further object is to provide a pinboard wherein the sealing diaphragm thereon is slit at areas in alignment with holes in the pinboard and contacts so that parts of the diaphragm are trapped between the contact holes and pins thereby effecting a moistureproof seal or retardation of corrosiveness to the contact means.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there are shown and described illustrative embodiments of the invention; it is to be understood, however, that these embodiments are not intended to be exhaustive nor limiting of the invention but are given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In order that the invention may be readily understood two embodiments of a circuit contact arrangement will now be described with reference to the accompanying drawing.

In the drawing:

FIG. **1** is a part sectional perspective view of the first embodiment; and

FIG. **2** is a cross-sectional view of the second embodiment.

Referring first to FIG. **1**, the circuit contact arrangement shown here forms a pinboard in which a variety of different programs can be set up by inserting pins to establish different contact patterns. The pinboard comprises a housing of insulating material made of two parts, a block or base part **1** and a top panel **2**. The base part **1** houses two sets of electrical contacts **3,4** arranged one above the other in rows and columns respectively. Each row or column of contacts is identical and comprises a base strip **5** of conductive material having pairs of contact arms **6** bent up from its edges. The pairs of arms **6** are equally spaced along the length of the strip and are inwardly inclined towards their free ends and formed with a contact area **7**. Holes **8** are made in base strip **5** and aligned with the centers of the pairs of contact arms **6**. The sets of contacts are arranged so that the contacts are equally spaced and so that contacts of each row are aligned with the contacts of the columns and with the holes **8** in alignment. The panel **2** is provided with an array of apertures **9** in line with the holes **8** of the contacts so that a pin **10** can be inserted through a selected aperture **9** to connect a selected row **3** of contacts with a selected column **4** of contacts below it. In order to enable preselected programs to be set up, the panel **2** has a mask **11** placed over it which enables only certain contacts to be made through holes **12**. The other apertures **9** are masked off and no wrong connection can therefore be made by a pin **10**.

The base **1** is a solid molding and has the panel **2** secured to it by screws (not shown). A diaphragm **15** is placed across the top of the base part **1** and rests against the underside of the plate **2**. The diaphragm is made of a resilient rubber sheet or other suitable material and acts as a gasket to prevent moisture reaching the contacts through the joints between base part **1** and panel **2**. Assuming that there are no pins in the panel **2** the diaphragm **15** effectively seals off the apertures **9** and prevents any moisture reaching the contacts through these apertures.

When a program is to be set up, pins **10** are inserted through the appropriate apertures **9** into the body of block **1** to make connections between appropriate sets of contacts **3,4**. To reach the contacts the pin **10** has to pierce the diaphragm **15**. Due to its resilient nature the diaphragm will cling closely around the pin to prevent any moisture from the atmosphere reaching the contacts around the area of the pin where the diaphragm is ruptured. When a pin is withdrawn the resilient nature of the diaphragm enables it to close together so that the hole formed in it does not allow the ingress of moisture from the atmosphere to the contacts.

In the second embodiment in FIG. **2**, to which reference is now made, the contact arrangement is similar to that of FIG. **1** but the sets of contacts are only arranged in rows for bussing purposes and the diaphragm is weakened in the region of the apertures to ease the insertion of a pin. Furthermore to ensure that electrical and atmospheric isolation occurs the rows of contacts are isolated from each other.

The pinboard comprises a base **20** having a bottom plate **21** with sidewalls **22**. The base is divided along its length by intermediate walls **23** having a height equal to that of the sidewalls **22**. The walls **22,23** and the bottom panel **21** are made as an integral molding from a plastic insulating material. A top panel **24** rests on top of the walls **22,23** and is separated from the part **20** by a resilient plastic diaphragm **25** as shown. Sets of contacts **26** similar to the contacts **3,4** of FIG. **1** lie in the channels formed by the walls **23,24** and are secured at their ends by means (not shown) to lie with their base strips **27** along the top of the channels. The base strips **27** are provided with holes **28** aligned with apertures **29** in the top panel **24**. The area of the diaphragm **25** in line with each pair of holes **28** and apertures **29** is slit at **30** to enable a plug or pin member **31** secured to a wire **32** to be inserted easily and with little risk of tearing the diaphragm **25**.

The effect of inserting the pin **31** into the pinboard can be seen well in FIG. **2**. As the pin is inserted through the diaphragm, the slit **30** opens to allow the pin to pass through, and, at the same time, the edges of the diaphragm in the area of the slit are pulled down into the channel to trap the material of the diaphragm between hole **28** and the pin **31**. This gives an effective moistureproof seal. When the pin is withdrawn, the edges of the diaphragm slit drawn into the hole **28** are removed and the slit closes up to seal aperture **29**.

The diaphragm need not be weakened only by producing a slit such as **30** but may be formed with areas of less thickness in the area of the apertures **29**. Although it is useful for the diaphragm to extend right across the base **20** since it also serves as a gasket between the walls **22,23** and the top panel **24**, it is not essential that it follow this form. Separate conventional gaskets could be used so that even if atmosphere leaked into one channel, it would not pass into all the channels and each aperture **29** could be provided with a separate sealing diaphragm.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiments of the invention, which are shown and described herein, are intended as merely illustrative and not as restrictive of the invention.

I claim:

1. An electric contact arrangement comprising a plurality of contacts mounted within a housing of insulating material closed on one side by an insulating side member formed with apertures aligned with respective contacts within the housing for insertion of pins through the apertures, each contact comprising a base strip portion having a pair of contact arms bent up one from each side and convergent towards their free ends, an aperture being formed in the base strip portion for passage of a pin through the contact aperture to engage between the arms, the base strip portion being disposed against a sealing diaphragm of resilient sealing material positioned between the base strip and the one side of the housing, the contact apertures of the plurality of contacts being aligned with respective apertures in the housing one side and the contact arms extending away from the housing one side such that on inserting a pin through an aperture in the one side of the housing to pierce the diaphragm, penetrate the associated contact aperture and engage between the contact arms, resilient sealing material of the diaphragm is trapped between the pin and the surrounding wall of the aperture in the base strip.