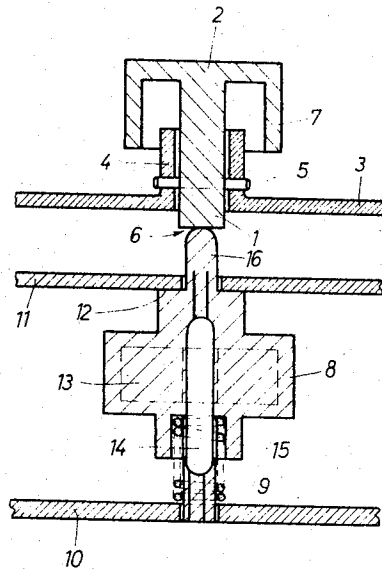


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PUSHBUTTON KEY WITH A DUST PROTECTED PASSAGE  
FOR THE PUSHBUTTON HEAD  
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**PUSHBUTTON KEY WITH A DUST PROTECTED PASSAGE FOR THE PUSHBUTTON HEAD**

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Continuation of application Ser. No. 480,462, Aug. 17, 1965. This application Mar. 14, 1967, Ser. No. 623,141 Claims priority, application Germany, Aug. 20, 1964, St 22,568

3 Claims. (Cl. 200-168)

**ABSTRACT OF THE DISCLOSURE**

A dust-protected pushbutton key is formed by two principal parts or assemblies including a shaft and a pushbutton head. The pushbutton head is shaped to fit through and over a collar to prevent the passage of dust and provide mechanical contact with the shaft. The shaft supports a magnet and relay contacts while it is held against the pushbutton head by a spring. Pressure on the pushbutton head will cause the shaft to move the magnet to magnetically open or close the relay contacts.

This application is a continuation of application Ser. No. 480,462, filed Aug. 17, 1965, now abandoned.

The present invention relates to a pushbutton key capable of being built or inserted into cabinets or plates and which, at its point of insertion, is provided with a dust protection means.

It is well-known that pushbutton keys which are built into a cabinet or a plate, have an air gap around the pushbutton head. This air gap provides clearance for the pushbutton head necessary for actuation, and is necessary for manufacturing and technical reasons. This air gap is a disadvantage insofar that dust can freely pass therethrough and into the inside of the cabinet in which are arranged the contacting elements of the pushbutton key, or other components. In addition thereto, the air gap permits a turning of the pushbutton head which may have a disadvantageous effect upon the actuation of the contacting elements.

The invention offers a solution to the problem of overcoming these disadvantages of the conventional types of embodiments. According to the invention this is accomplished in that both the pushbutton shaft and the pushbutton head consist of one part which is separated from the remaining parts or elements belonging to the pushbutton key, and only acts upon the remaining parts by way of a pressure transfer, and that as a guide for the pushbutton shaft, either the plate or the wall of the cabinet is designed as a pulled up shoulder or as a bushing engaging the pushbutton head from below.

According to one embodiment of the present invention the pushbutton head is designed to have a T-shaped cross-section.

By use of embodiments according to the invention it is possible to achieve various advantages. Thus, for example, by embodying the passage in the inventive way in the wall of the cabinet there are required no further guide members for the shaft of the pushbutton head. This kind of guide extensively prevents the penetration of dust. The pushbutton head is so designed as to have a T-shaped cross-section. Accordingly, the shaft guide and the pushbutton head are arranged on top of each other so that the penetration of dust is prevented on account of this. Both the pushbutton head and the pushbutton shaft form one unit but are separated from the remaining elements, in particular from the contacting members, so that only the pressure movement is transferred.

The invention will now be explained in detail with reference to the copending drawing. In this drawing there is shown an embodiment of a pushbutton key in a sideway representation and in a sectional view.

In the figure of the copending drawing reference numeral 1 indicates the pushbutton shaft forming one unit with the pushbutton head 2. The pushbutton head 2 is shown in a sectional elevation, and may have a round or cornered design. The pushbutton head 2 extends with its shaft 1 through a passage provided in the wall of a cabinet or a plate 3. The passage is provided with a collar or shoulder 4. Along the push button shaft there is provided a through-going oblong hole which serves as mounting for the top part of the pushbutton key including parts 1 and 2. To this end a pin 5 is pushed through a boring provided in the collar (shoulder) 4, for restricting the movement of the pushbutton shaft 1 in the direction of operation and in opposition thereto. The T-shaped cross-section of the pushbutton head 2 effects with its edges 7 that the pushbutton head 2 will extend over the collar or shoulder of the shaft guide 4. At point 6 the shaft 1 engages the actuating pin 16 of a plastic member 8 which, by the action of a compression spring 9 resting against the surface of a plate 10, is pressed against the bottom side of a plate 11, with the surface 12 of part 8 acting as a limit stop. In the part 8 there is arranged an annular magnet 13 or any other body producing a magnetic field, which may be capable of being moved together with the part 8 upon actuation of the pushbutton key, in opposition to the action of spring 9. Into the center opening of the annular magnet 13 there projects according to the exemplary embodiment, a hermetically sealed reed contact 14 in such a way that the armature members movably arranged within the reed contact 14, and quite according to requirements, are either closed in the non-operated pushbutton key position (break contact) or are opened (make contact). If the pushbutton key is actuated in direction towards the spring 9, then the annular magnet 13 is shifted or displaced in the same direction so that e.g. a normally closed contact is opened, and a normally opened contact is closed. The spring 9 finds its counter support in the offset portion 15 of part 8.

Instead of one or more reed contacts 14 it is also possible to have open sets of spring assemblies actuated by the part 8 via not shown cams or actuators.

While the principles of the invention have been described above in connection with specific apparatus and applications, it is to be understood that this description is made only by way of example and not as a limitation on the scope of the invention.

What is claimed is:

1. A pushbutton key for opening and closing reed contacts and incorporating dust protection means comprising first and second parts aligned along a common central axis,
  - said first part including a pushbutton shaft terminating at one end in a pushbutton head and at the other end in a shaft head,
  - said second part including annular magnetic means, aligned about an axis coinciding with said common central axis, for opening and closing electrical contacts,
  - said second part including means for enabling the actuation of electrical contacts through changes in the position of said magnetic means along said central axis responsive to the transfer of pressure through said pushbutton shaft from said pushbutton head,
  - said second part including an actuating pin forming one end of its axis for contacting the shaft head and an offset portion around the other end of the axis for contacting a spring,

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a spring positioned in co-axial relation to said central axis and in contact with the offset portion of said second part,  
 said offset portion supporting said spring under mechanical bias against a base plate,  
 said spring urging said second part along the central axis in the direction of the pushbutton head,  
 a bushing for supporting said pushbutton shaft in a manner to permit the shaft to move freely along the central axis,  
 said bushing serving also as a collar cooperating with said pushbutton head to restrict the flow of dust, a hole through said bushing,  
 an oblong hole through the pushbutton shaft, and a pin through both said holes to retain the pushbutton shaft within the bushing while permitting its motion along said axis,  
 said pin serving as a retainer to prevent removal of said shaft from the bushing.  
 2. A pushbutton key substantially as claimed in claim 1, in which  
 the pushbutton head is formed to have a cross-section like a capital T with long vertical extensions at the ends of its crossed portion to fit over and around said collar and thereby prevent the intrusion of dust.  
 3. A pushbutton key for opening and closing electrical contacts which is free from the infiltration of dust through its point of insertion through and into a supporting body comprising  
 a first portion aligned along a common central axis and a second portion,  
 said first portion including a pushbutton shaft integral at one end with a pushbutton head and terminating at the other end as a shaft head,  
 said push button head being T-shaped with long extensions from the ends of sections perpendicular to

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the shaft to form a cup around the end of the shaft, means including a collar for accepting said pushbutton shaft and permitting extension of the shaft there-through,  
 said second portion of said pushbutton key including an annular permanent magnet having an axis coinciding with said common central axis for providing a magnetic field for opening and closing electrical contacts,  
 said pushbutton shaft head engaging said second portion of said pushbutton key to act upon it by pressure transfer, and to change the position of said permanent magnet to thereby alter the condition of said electrical contacts,  
 said collar extending under the pushbutton head as a bushing and dust protector,  
 a hole through said collar,  
 an oblong hole through the push button shaft, and a pin through both said holes permitting motion of said push button shaft along an axis through the center of the shaft,  
 said pin serving as a retainer to prevent removal of said shaft from the collar.

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