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[73] Assignee **International Standard Electric**
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[54] **PUSHBUTTON ARRAY**
4 Claims, 2 Drawing Figs.

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ABSTRACT: An array of pushbuttons is formed as a one-piece molding with interconnecting flexible strips which allow for individual movement of each pushbutton. This process results in pushbutton switch assemblies which are economical and which may be placed in subscriber telephone sets without danger of misplacement of individual pushbuttons.

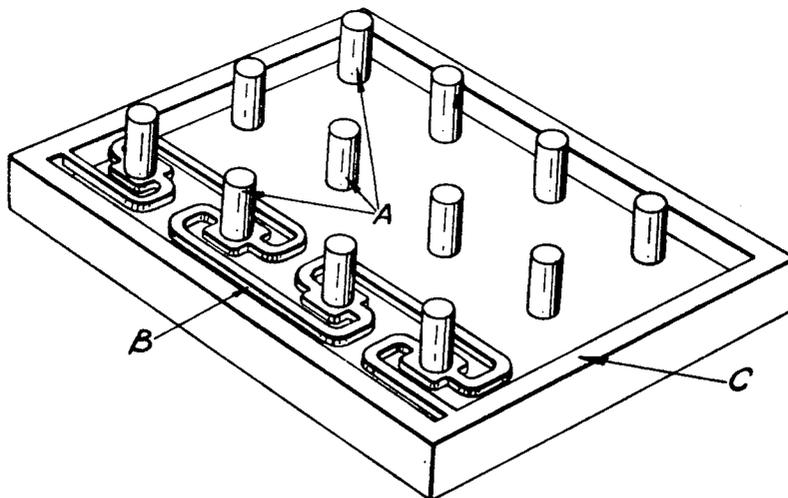


Fig. 1.

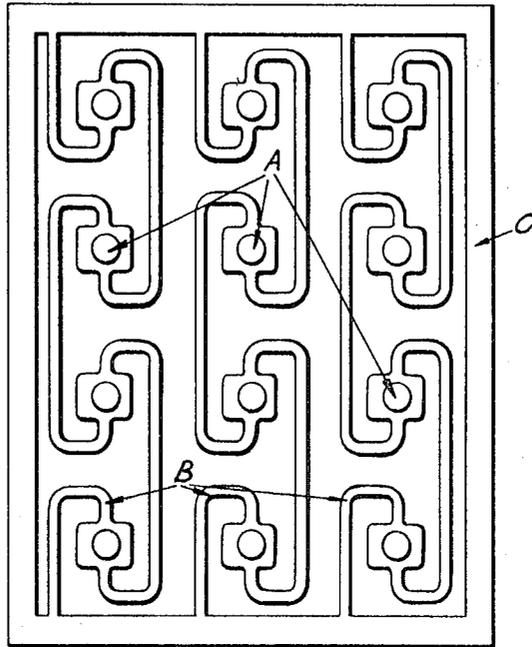
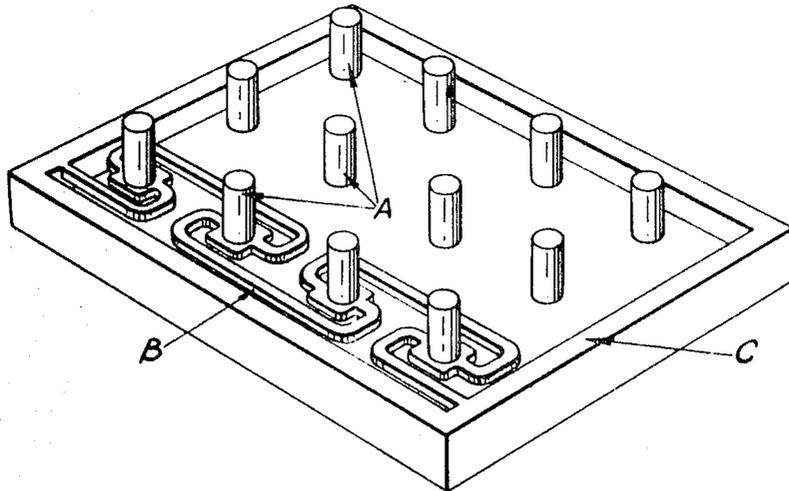


Fig. 2.



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PUSHBUTTON ARRAY

This invention relates to pushbutton-operated devices, and particularly to arrays of pushbuttons and methods of making such arrays.

According to the invention there is provided an array of pushbuttons formed integrally with flexible interconnecting strips and a surrounding frame, the configuration of the interconnecting strips enabling individual operation of each pushbutton.

The invention will now be described with reference to the accompanying drawings, in which:

FIG. 1 shows a plan view of a pushbutton array arranged for the key strip of a telephone set, and

FIG. 2 shows a perspective view of the pushbutton array shown in FIG. 1, with flexible strip connecting only one column of pushbuttons.

Referring now to the drawings the pushbuttons A are arranged in three columns and four rows, and are interconnected by flexible connecting strips B which are formed integrally with a frame C. The strips are designed so as to be flexible in the direction in which the buttons are to be moved and stiff enough to restrict unwanted movement in other directions. The connecting strips are also so arranged that when one button is depressed the effect on adjacent buttons is negligible. Other patterns of connecting strips can be designed to have the same effect.

The array shown can be incorporated in the assembly of a pushbutton-operated device which forms the key strip of a telephone set. In the finally assembled key strip, downward pressure on each button closes one or more contact means (not shown) which will allow the generation of a signalling code. Furthermore by careful design the connecting strips can have sufficient stiffness to return the buttons to the normal position when released, thereby acting as a return spring and so eliminating the need for button return springs in the pushbutton device assembly.

The frame C of the pushbutton array could be extended to form a boxlike structure which would house some or all of the other components of the complete pushbutton device.

The material for the array will be chosen to give the necessary degree of flexibility for the connecting strips with the ability to stand up to continual flexing over a long period of time, also having the necessary finish and durability for the buttons themselves.

The advantage of the form of construction described above is that the pushbutton array can be formed in one operation so that each button is in its correct position and will remain so during any further assembly operations. For most uses, particularly in a telephone set, a series of numbers, letters or other markings are required on the upper face of each button. Starting with individual buttons, the possibilities of assembly error are considerable; buttons can be placed in the wrong position, or two buttons bearing the same character can be in-

cluded; in many designs characters could be assembled with the wrong orientation and in any event special keyways or shapes have to be used to prevent rotation. The above-described array eliminates all these hazards.

The array can probably most advantageously be made by moulding in plastics material. The array can be marked as a whole either by a well-known marking process such as hot stamping; by including the characters in the mould; or by the use of a "two-shot" moulding process in which characters are moulded first and a second injection surrounds them with the final form. In the latter case an additional advantage can be obtained by a choice of moulding materials; the markings and flexible raster (i.e. the strips B and frame C) would utilize a material such as polypropylene chosen for its durability to flexing, whilst the buttons could be made from a harder wear-resisting material.

Another possible method of manufacture would be to cover the tops of the buttons transparent caps, so that markings on the button tops would be protected. The use of such caps would again permit the use of a harder less flexible material for the button tops. It would also permit some interchangeability of markings; for example on a normal telephone set there are recommended international layouts for the 110 digits but the two buttons on either side of '0' digit in the bottom row have a variety of uses and possible markings. It might be expedient on these buttons (or on all buttons) to put the markings on the plastic caps so that a choice of characters can be obtained dependent on the particular use of the buttons.

The buttons could be formed by plastics injection moulding, with the connecting strips between the buttons serving as feeds. This would result in a saving in the cost of moulding compared with using the injection method for moulding individual buttons, where the individual buttons have to be cut off and the remaining flash trimmed.

We claim:

1. A pushbutton arrangement including as components thereof a plurality of arrayed pushbuttons, a plurality of flexible strips each interconnecting certain of said pushbuttons and a surrounding frame, said components integrally formed as a single unit with said strips sufficiently flexible and configured to enable depressive operation of each pushbutton.

2. A pushbutton arrangement as claimed in claim 1, in which the array of said pushbuttons comprises a plurality of columns and rows in which the pushbuttons of a column are interconnected serially by surmounting on a strip and said strip includes a multiple step portion adjacent each pushbutton to limit the effect of operation of one pushbutton on the other pushbutton in that column.

3. An arrangement as claimed in claim 2, in which all said individual strips are similarly configured.

4. An arrangement as claimed in claim 3, wherein said connecting strips are inherently resilient to restore a pushbutton to its normal position on release of depressive operating force thereon.

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