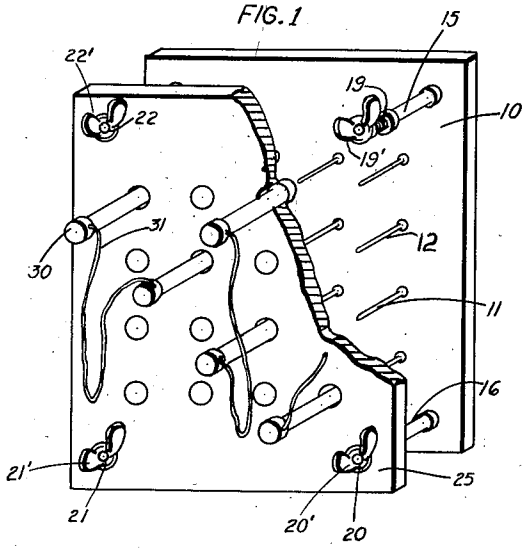
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PLUG AND PLUGBOARD

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FIG. 1



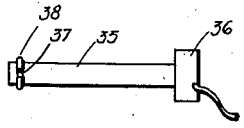


FIG. 2

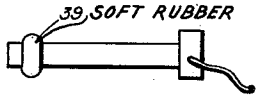


FIG. 3

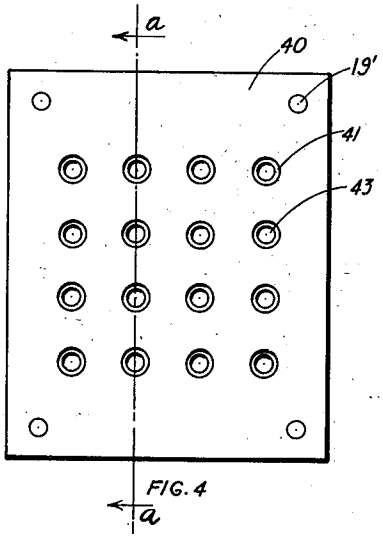


FIG. 4

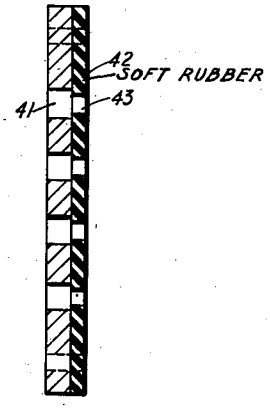


FIG. 4A

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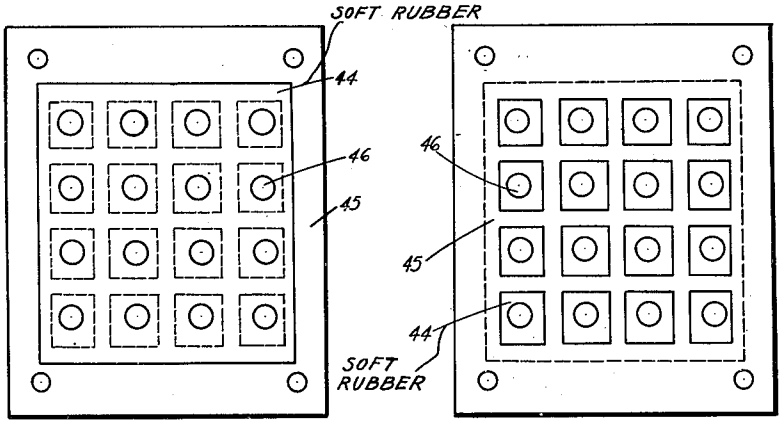


FIG. 5 FIG. 5A

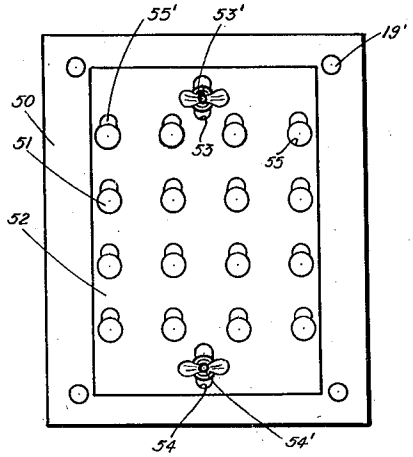


FIG. 6

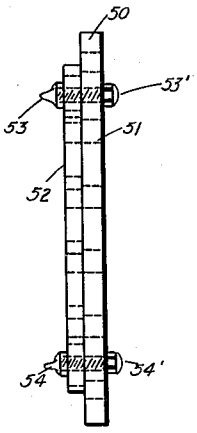


FIG. 6A

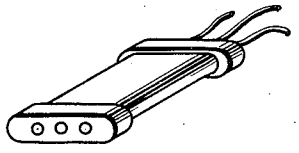


FIG. 7

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PLUG AND PLUGBOARD

Leo Rosen, Arlington, Va.

Application February 12, 1945, Serial No. 577,392

3 Claims. (Cl. 173—228)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the government for governmental purposes, without the payment to me of any royalty thereon.

This invention is in electrical apparatus and particularly is a novel means for establishing and breaking certain types of electrical connections.

In certain electrical fields, as in communications, it is desirable to establish temporarily a large number of circuits and to provide means for interchanging and breaking such circuits quickly. A common means of accomplishing this is through the use of plugs and plugboards. A plugboard normally comprises a number of electrically wired sockets, and circuits are made therethrough with plugged jumper cords. Obviously, the contact members of a board may be plugs instead of sockets, and the jumper cord terminals will then be in the nature of sockets adapted to fit over the plugs.

One object of the invention is to provide a device for use with a plugboard for holding plug members in cooperating relation with the sockets of a plugboard or socket members in proper relation to plugs.

Another object is to provide means for releasably retaining a group of plugs or sockets in predetermined relation with the sockets or plugs of a plugboard.

Another object is to provide a socket- or plug-holding board and a contact member adapted for limited movement therein.

Other objects will be apparent from a reading of the following specifications and claims.

In the drawings:

Figure 1 is a perspective view of the elements of my invention, a portion of the structure being broken away;

Figure 2 is a view of a different form of contact member which may be used;

Figure 3 is a view of a further modified contact member;

Figure 4 is a plan view of a different form of holding board.

Figure 4—*a* is a section through the board of Figure 4 on the line *a*—*a*;

Figure 5 is another form of holding device;

Figure 5—*a* is a plan of the reverse side of the device of Figure 5;

Figure 6 illustrates a further modification of contact member and holder therefor;

Figure 6—*a* shows an edge view of the structure of Figure 6; and

Figure 7 is a view of a multiple contact member adapted for use as a part of the invention.

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Referring to the drawings and particularly to Figures 1, 10 is a plugboard. The board is formed of relatively hard stiff insulating material and has secured therein at regular intervals electrical contacts in the nature of plugs, as 11 and 12. These contacts may be of any desired form and are here shown merely as pins. They extend through boards 10 and are adapted to have wires soldered or otherwise secured thereto on the other side of the board.

At the four corners of plugboard 10 are arranged spacing members, as 15 and 16, bolts 19, 20, 21, and 22 being run through board 10 and each through one of the spacing members.

A holding board, 25, similar in size to the plugboard and adapted to fit over the corner bolts, 19, 20, 21, and 22, and upon the spacers is provided. Holding board 25, also preferably formed of insulating material, has openings therein equal in number and arrangement to the plugs in plugboard 10. These openings, in other words, line up exactly with the plugs of plugboard 10.

Contact members, as 30, used with holding board 25 are of insulating material, cylindrical in form and are provided with collars of such size as to fit snugly in the openings in the board. The result is that while a contact member can be pushed through the board, it will not readily fall out of the same because removal requires accurate alignment with the opening.

Within each member 30 is an electrical contact comprising an expansible metal sleeve adapted to slide over and make a good electrical connection with a plugboard 10, and at one end of each member 30 is a conductor, 31, which may be soldered to said expansible sleeve.

The manner in which members 30 are arranged in board 25 wil depend upon the use to which the device is to be put, but, according to the drawings, they are arranged in connected pairs.

In operation, one or more of the boards, 25, are set up in advance, the contact members, 30, being inserted in the proper openings. The board is then put in place upon the bolts, 19, 20, 21, and 22, and the nuts, 19', 20', 21', and 22', put in place, the result being that the contact members, 30, are held adjacent and aligned with the plugs of plugboard 10. The contact members are then manually engaged with the plugs of plugboard 10. The contact members are normally manually disengaged individually from their cooperating plugs and may be allowed to remain in the holding board 25, spacing members 15, 16, etc., being of such length as to provide clearance between

the contact pins of board 10 and the open ends of contacts 30 when the latter contacts are in their retracted positions.

The socket member of Figure 2 comprises a body portion, 35, with a collar, 36, at one end thereof larger than the opening to be provided in the holding device, not shown. Body member 35, on the other hand, is of such diameter as to slide smoothly through an opening in a holding board such as 25 of Figure 1. At the end of the socket member opposite collar 36 is formed an annular groove, 37, and in this groove is seated a split wire ring, 38, which normally protrudes beyond the periphery of member 35 but which may be compressed somewhat, there being a little clearance provided by the ends of wire ring 38. The device of this figure is used just as the device of Figure 1, the wire ring, of course, being compressed and passed through an opening in board 25 and then expanding to hold the contact member within the holding board. Obviously, a second wire ring can be used with this contact member in place of the collar, 36.

The contact member of Figure 3 is essentially like that of Figure 2, the only difference being that the wire ring, 38 (Figure 2), is replaced by a compressible collar, 39, of soft rubber.

According to Figures 4 and 4—*a*, the holding board may consist of a body member 40, of stiff insulating material with openings 41 therein large enough to permit easy insertion and removal of the collared contact members, 30 (Figure 1). To one face (or both if desired) is attached by cementing or otherwise a rubber sheet, 42. Orifices 43, approximately the size of the shanks of contact members 30, are formed in the sheet, their pattern being such as to align them with openings 41 in body member 40. The contact members are pushed through the holding board, and there retained against accidental displacement by abutment of their collars against rubber sheet 42.

The holding device shown in Figures 5 and 5—*a* is formed of a soft rubber member, 44, supported at its margins and throughout its surface by framework 45. Openings are provided in the framework at the corners of the device for cooperation with bolts, such as 19, 20, 21, and 22 of Figure 1, and other openings 46 are formed at regular intervals through the rubber body member, 44, of the device. These openings are of such size that the collar of a contact member such as is shown in Figure 1 may be readily forced therethrough but cannot be easily displaced therefrom.

In Figures 6 and 6—*a*, the modified holding device comprises a body member, 50, of insulating material, with openings 51 therein large enough to take the collar of the contact member of Figure 1. Secured to one face of member 50 is a second body member, 52, mounted by means of slots 53 and 54, bolts 53′ and 54′, and cooperating wingnuts for limited sliding movement with respect to member 50. Keyhole-shaped openings, as 55, are provided in member 52. In cooperation, member 52 is slid upon member 50 until the circular portions of openings 55 register with openings 51 in member 50, collared contact members 30 are inserted, member 52 then slid upon bolts 53′ and 54′ so that slot-like portions 55′ of openings 55 register with openings 51, and the wingnuts tightened, whereupon the contact members cannot be withdrawn.

The contact member of Figure 7 may be used for special purposes as where electrical connections are always to be made in groups of three. In substance, the contact member is like that of Figure 1. Obviously, with the contact member of this nature, an opening in a holding board (such as 25, Figure 1) will not be circular but instead will be in the nature of a slot with round ends.

The wiring shown in Figure 1 and indicated elsewhere in the drawings connects the several pairs of contact members at their "outer" ends, the ends, in other words, that are normally grasped by an operator in making and breaking circuits through plugboard 10. This is the customary arrangement, but for some purposes it may be desirable to wire the movable members at their inner ends. Under such conditions, it is possible to make and break circuits as before but not to remove the contact members from the holding board while the latter is in place.

The foregoing description is in specific terms and many modifications will suggest themselves. For the true scope of the invention, therefore, reference should be had to the appended claims.

I claim:

1. The combination of a plugboard or the like having an electrical contact thereon, an electrical conductor having a terminal contact member adapted to cooperate with the contact of said plugboard, a holding board adapted to support said terminal contact member and to permit limited movement relative thereto but to cooperate with said terminal contact member to permit removal therefrom only when the parts are in one predetermined positional relation, and means for so supporting said holding board adjacent said plugboard that said limited movement of the terminal contact member will permit contact between the same and said electrical contact.

2. The combination of a plugboard or the like having electrical contacts thereon, electrical conductors including terminal contact members adapted to cooperate with the contacts on said plugboard and comprising a cylindrical shank portion and a collar portion, a holding board having openings therein of a size to permit free movement of the shank portions of said terminal contact members but to engage snugly the collar portions thereof to inhibit removal of said contact members but still to permit removal when the parts are properly juxtaposed, and means for so supporting said holding board adjacent said plugboard that movement of a terminal contact member with respect to said holding device within the limits of its shank portion will permit contact between the same and one of the said electrical contacts.

3. The combination of a board having a plurality of contacts on one side thereof, a holding board mounted in spaced relation to said first-mentioned board and substantially parallel thereto adjacent the contact side thereof, said holding board having openings therein substantially registering with said contacts on said board, and a plurality of second contacts for cooperating with said first-mentioned contacts to complete portions of electric circuits said second contacts each comprising an elongated body member substantially smaller than said openings and a collar at each end thereof but slightly smaller than said openings the elongated body member permitting a second contact to be moved into and out of cooperating relation with the first-mentioned contact while being held by said board, and the collar serving to prevent acci-

dental removal from the board when a second-mentioned contact is in disconnected relation to a first-mentioned contact.

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