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PLUGBOARD CONTACTOR

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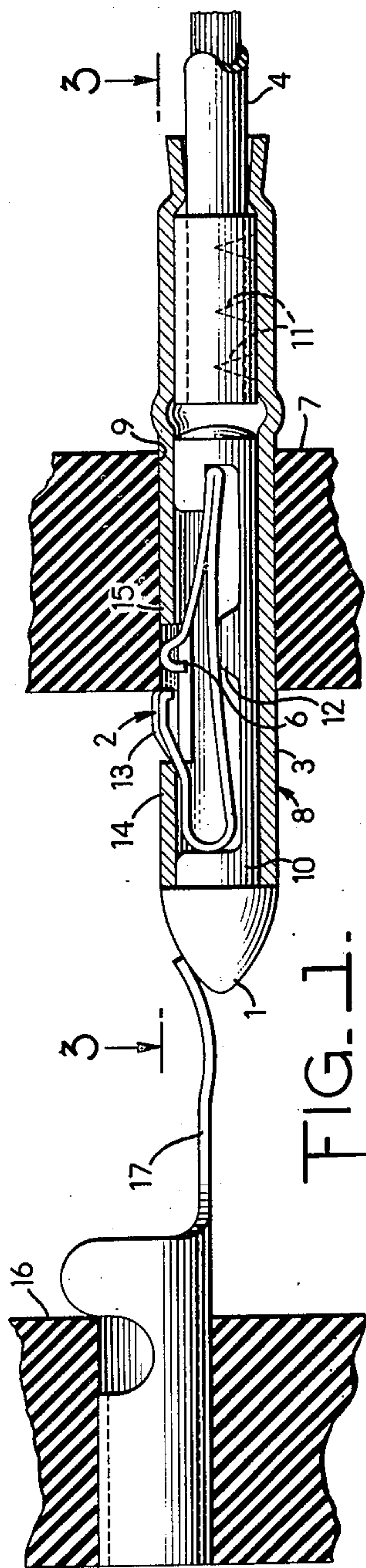


FIG. 1.

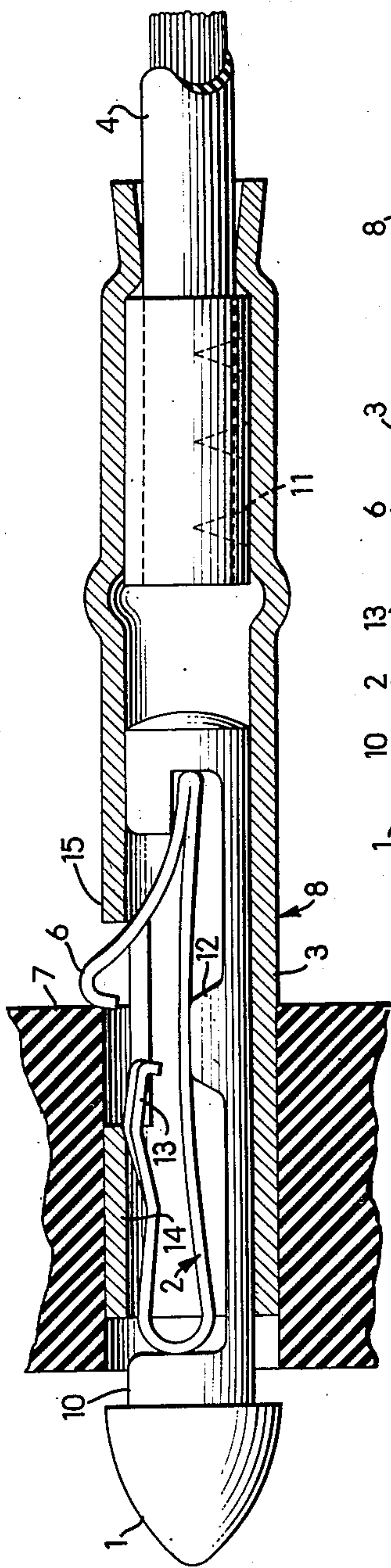


FIG. 2

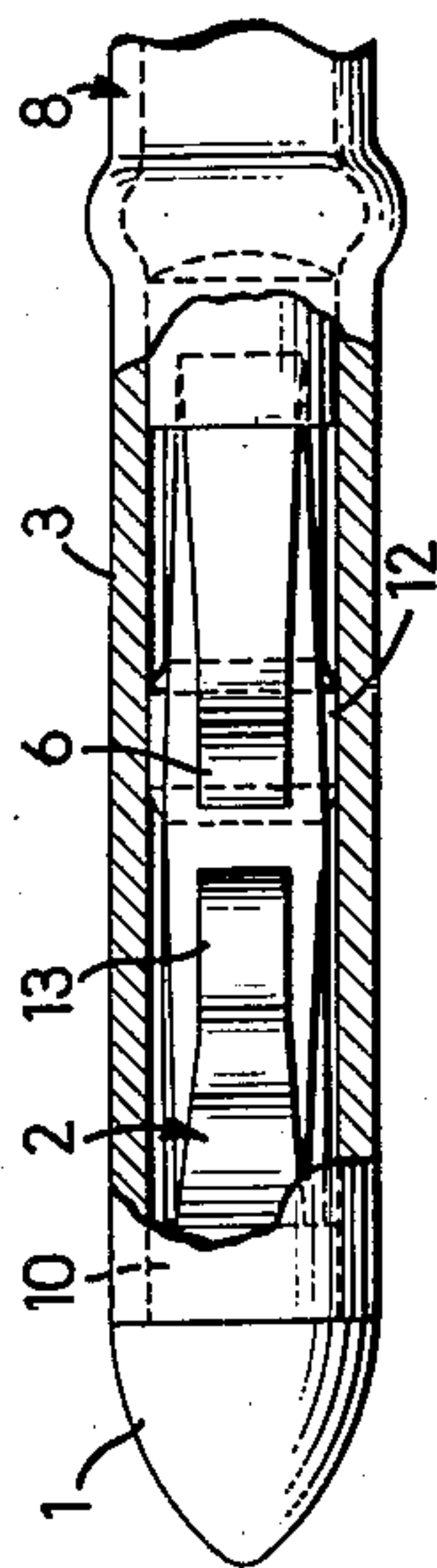


FIG. 3

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PLUGBOARD CONTACTOR

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6 Claims. (Cl. 173-328)

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This invention relates to an improved plug connector which is adapted for use with a control panel which is associated with an electroresponsive device.

An object of this invention is to provide a plug connector that can be readily inserted and withdrawn from the plugboard, but cannot be pushed out by pressure applied to the bullet nose point of the plug.

An object of this invention is to provide an improved plug connector capable of performing a dual function of resisting the tendency to break contact with the corresponding contactor due to the exertion of a force on the contactor side of the panel while readily disengaging from the corresponding contactor when a pulling force is used on the front side of the panel.

A further object is to provide a plug connector which upon being inserted into a plugboard will tend to resist a force applied on one side of the board and will be capable of being withdrawn from the board, due to a force being exerted on the plug from the opposite side of the board.

A further object of this invention is to provide a plug connector which will resist movement from the panel due to a compressive force exerted on the bullet nose end of the plug connector, while readily being detached from the panel board whenever a tensile force is exerted on the opposite end of the plug connector.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawing, which discloses, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawing:

Fig. 1 is a sectional view in elevation of the embodiment of the invention as it is fully inserted within the plugboard.

Fig. 2 is a sectional view in elevation of the embodiment of the invention as it is about to be inserted into the plugboard.

Fig. 3 is a plan view, partly in section, of the invention as taken along lines 3-3 in Fig. 1.

The particular type of plug connector to which this invention applies is adapted for use with an electroresponsive device comprising a fixed plugboard, with permanent connections to an electrical circuit, and a removable plugboard. The fixed plugboard contains rows and columns of electrical contactors with which the corresponding plug connectors of the removable plugboard are brought into contact so as to complete an electrical circuit.

Referring to Fig. 1, the reference numeral 7 represents the removable plugboard containing a plurality of openings within one, such as 9, of which the plug connector 3 is shown inserted. The fixed plugboard 16 also comprises a plurality

of openings within which are inserted a like number of contactors, such as 17. The plug connectors of the removable plugboard upon being brought into contact with the aforementioned contactors completes an electrical circuit.

The plug connector 3 comprises a slidably mounted bullet nose point 1, a relatively movable elongated hollow cylindrical sleeve 3 having a slot therein, within which is disposed a latch spring 2 and supporting means 10 therefor made integrally with the nose 1. Inserted within the right end of the plug is an insulated wire 4 which is electrically connected to the plug through the medium of a plurality of piercing contact points on a sleeve, such as shown at 11.

The latch spring 2, as shown in Fig. 1, is a spring clip element which is folded back upon itself so as to have the two ends 6 and 13 thereof adjacent to each other. Each open end is bent in a generally inverted U-shape configuration with the open side of the U facing the unbroken side of the spring clip and with the adjacent legs of each of the open ends parallel to each other. The latch spring 2 is disposed within a J-type support 10 which contains a projection 12 exerting a force on the unbroken side of the folded spring clip element 2 which in collaboration with the pressure exerted in the opposite direction on the right folded end of the spring 2 tensions the open ends 6 and 13.

The support 10 and the spring clip 2 are enclosed by the sleeve 3 containing a slot through which the ends 6 and 13 of the spring clip project. The outer diameter of the sleeve 3 is equal to the diameter of the base of the nose 1 and contiguous therewith, thus bringing about a smooth line plug.

Operation

The plug 3 is readily inserted into the opening 9 in the front side of the "Bakelite," or other type of insulation, panel so as to make a connection with the corresponding contactor. Now, when pressure is applied to the nose 1, the latch end 13 of the spring 2 is forced squarely against the back side of the panel 7 resulting in a firm resistance of the plug to a pressure which is attempting to force the plug out of contact with the contactor. With the plug in this position in the plugboard, the end 6 of the clip 2 is mainly restrained by the edge 15 of the slot from projecting beyond the outer limits of the sleeve.

When a pulling force is applied to the plug from the front side of the panel, the sleeve 3 will be moved in the direction in which the force is applied so that the sleeve at 14 will come into contact with the end 13 of the spring clip and depress same within the sleeve 3. With the sleeve 3 being moved to the right, the edge 15 of the slot no longer restrains the end 6 of the clip but, while

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the clip is within the opening 9, the end 6 will be restrained from projecting beyond the outer limits of the sleeve by the wall of the opening 9. With end 13 of the spring being forced within the sleeve, the plug may be readily removed from the panel. With the plug removed from the board, the end 6 of the clip is no longer subjected to a restraining force equivalent to that force exerted upon the end 6 when the clip was in its normal position within the plugboard. As a result, the inverted U-shaped end 6 projects beyond the outer surface of the sleeve 3 such as shown in Fig. 2. Thus, the resulting structure has the end 6 of the spring clip extending out beyond the diameter of the sleeve while the end 13 is depressed within the sleeve. Due to the movement of the sleeve, the nose 1 is no longer contiguous with the sleeve.

Upon reinsertion of the plug into the opening 9, the end 6 of the spring clip 2 will come into contact with the front face of the panel. In this position the end 6 will offer enough resistance so that the sleeve 3 will move to the left, thus depressing the end 6 to the original position and restoring the spring 2 and the nose 1 to their original position. Upon being restored to the original position, the latch spring will again be in position to prevent the breaking of contact when pressure is applied to the nose 1, while readily being capable of being withdrawn from the panel due to a pulling force.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. An integral plug connector for insertion in an opening in a plugboard comprising an elongated contactor, a latch carried thereby, and mounted for movement toward or away from the longitudinal axis of the contactor, an actuating element for the latch connected to the contactor and relatively movable with respect thereto in the direction of said axis, said element being telescopically arranged with respect to said contactor, said latch being normally biased away from the axis in a latching position, whereby movement of its actuating element in one direction with respect to the contactor causes the latch to move toward the axis into unlatching position.

2. In combination, a connector having a predetermined cross sectional dimension, a resilient latch carried by said connector and extendable beyond the limits of said dimension whereby upon insertion of the connector into and partially through an opening in a panel of corresponding cross sectional dimension, the latch will extend through one side of the opening and prevent retraction of the connector, a retracting element carried by the connector and slidable thereon in the direction of its longitudinal axis, means for limiting the extent of sliding, said element coacting with the latch, when at one limit of its movement to enable the latch to extend into latching position and when at the opposite limit of its movement engaging the latch to retract it within the limits of said cross sectional dimension, con-

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tinued movement of the element in said last direction carrying the connector and retracted latch.

3. An electrical connector plug comprising a hollow cylindrical sleeve having a longitudinal slotted opening therein, a latch spring folded back upon itself with one of the free ends of said spring projecting through the opening of said sleeve, a support for said spring being arranged so as to tension said spring, a bullet nose contact point with the base thereof contiguous to said sleeve, said nose and said support being an integral unit in slidable contact with said sleeve, whereby upon the application of a pulling force in the direction of a connecting line there is relative motion between said support and nose and said sleeve so as to depress said free end within the sleeve.

4. An electrical plug comprising a contactor, a shank of smaller diameter than the diameter of the base of the contactor extending from said contactor and integral therewith and forming a shoulder at the base of said contactor, a latch spring folded back upon itself and having free ends, said shank forming a support for tensioning the latch spring, a relatively movable sleeve having a slot closed at each end, said sleeve surrounding and in sliding contact with said shank and abutting against the shoulder of said contactor, the latch end of said spring projecting through said slot, whereby said plug may be inserted and withdrawn from a plugboard readily but cannot be pushed out by pressure applied to the contactor.

5. In combination, a folded latch spring clip having adjacent free ends, a support means for said clip, sleeve means having a longitudinal slotted opening surrounding said support, said free ends projecting through said opening, said sleeve means slidably mounted with respect to said support such that the movement of said sleeve causes one of said ends to be depressed thereby.

6. In combination, a plugboard, a hollow plug inserted within said plugboard, means for preventing said plug from being pushed out of said plugboard by pressure applied from the back of said board, said means comprising a latch spring disposed within said hollow plug, said latch spring comprising a metallic element folded back upon itself with the latch end of said spring projecting through an opening in said plug, said latch end abutting against the back face of said plugboard, means for operating upon said latch end for withdrawing the plug from said board by a force exerted from the front of said board, and an electrical feed line connected to said plug.

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