

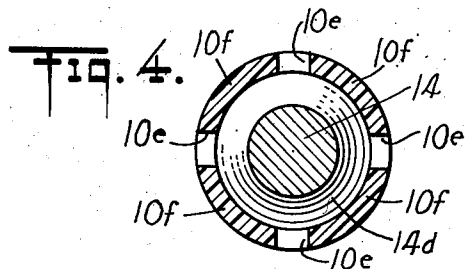
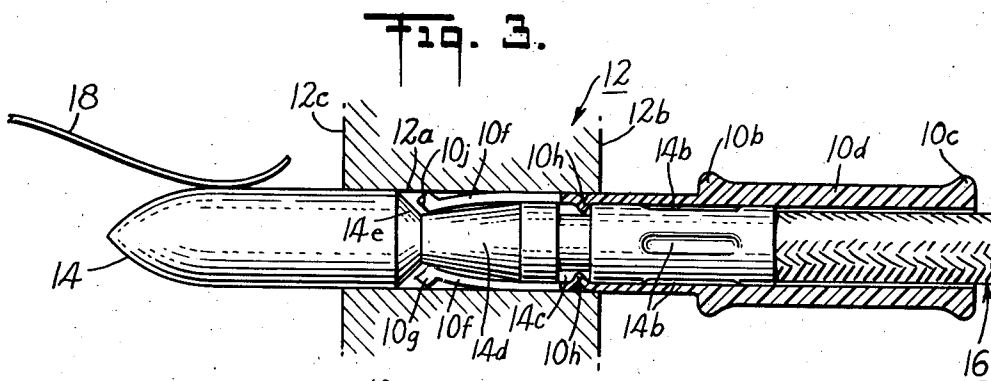
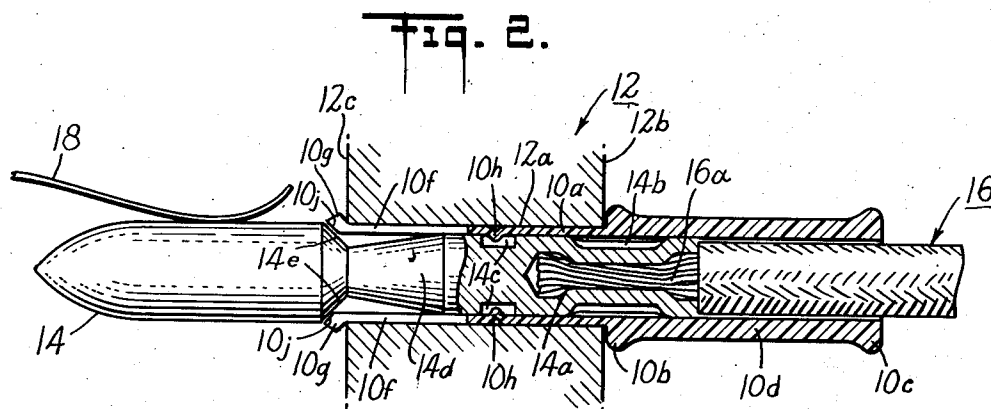
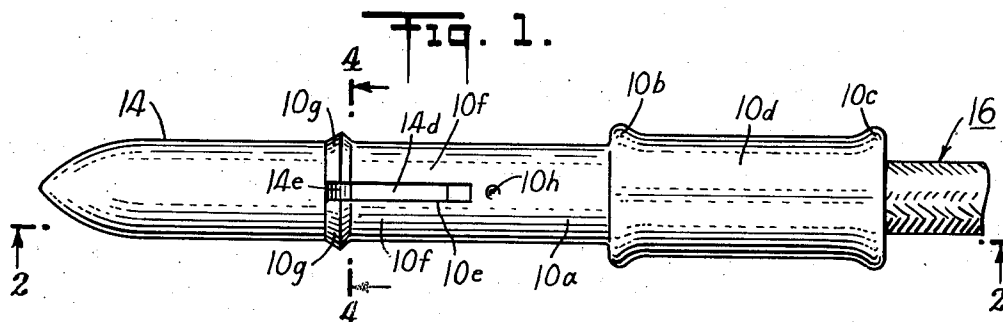
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PLUG CONTACTOR

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2,695,394

PLUG CONTACTOR

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4 Claims. (Cl. 339—217)

This invention relates to plug contactors of the type used, for example, in plugboards for automatic computers, tabulators, accounting machines and the like, for completing selected electrical circuits to control the operation of the machine as desired.

It is among the objects of the present invention to prevent accidental withdrawal of such plug contactors from the plugboard by providing a plug of such construction that it may not be pushed from the plugboard by pressure on the nose of the plug nor pulled from the plugboard by pulling the wire to which the plug is attached, but may be withdrawn from the plugboard only by pulling a predetermined portion of the plug, for example an outer shell or sleeve. Another object is that of providing a plug which makes, between the wire to which it is attached and the plugboard contact, an electrical connection of low resistance which is relatively invulnerable to the adverse effects of corrosive action, etc. A further object is the provision of such a plug which is simple and economical in construction and which may easily be assembled, but which is sufficiently rugged to withstand even careless use, and has a long useful life. Other and further objects of the invention will be in part apparent and in part pointed out hereinafter.

In the drawings:

Figure 1 is a side view of a plug embodying features of the present invention;

Figure 2 is a longitudinal sectional view of the plug of Figure 1, with the plug being shown in fully inserted position in one of the openings of a plugboard;

Figure 3 is a view generally similar to that of Figure 2, but showing the plug in partially withdrawn position with respect to the plugboard;

Figure 4 is a sectional view at slightly enlarged scale, taken generally along the line 4—4 of Figure 1.

As may be seen particularly in Figures 1 and 2, the plug includes an outer sleeve 10, the central portion 10a of which is cylindrical and is adapted to be slidably received in one of the openings 12a in a plugboard 12, as shown in Figure 2. The rear portion of the sleeve 10, which projects from a forwardly directed face 12b of the plugboard to a region of access is provided in the present embodiment with a longitudinally spaced pair of circumferential ridges 10b and 10c, which form between them a finger grip 10d to facilitate grasping of the rear end of the sleeve for inserting the plug into or withdrawing it from the plugboard. The forward ridge 10b additionally serves as a stop to limit the movement of the plug into the plug board.

As shown particularly in Figure 4, the forward portion of the sleeve is provided with a plurality of equally spaced, longitudinally extending slots 10e which divide it into an equal number of forwardly extending fingers 10f (there are 6 slots 10e and 6 fingers 10f in the particular embodiment illustrated). These fingers 10f are resiliently flexible and near their forward ends, integrally formed latch portions 10g project radially outward in position to be engaged behind a rearwardly directed face 12c of the plugboard. The forward and rearward surfaces of the latch portion 10g are bevelled or tapered so that, as the plug is moved for insertion into or withdrawal from the plugboard 12, these inclined faces will engage the front or rear face of the plugboard, as the case may be, and cause the latch portions 10g to be cammed into the opening 12a in the plugboard.

Slidably received within the sleeve 10 and projecting

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from the forward end thereof is a nose member 14 which is composed of a conductive metal such as brass and may suitably be formed on a screw machine, or it could be made hollow and rolled up from flat stock; it is preferably plated, e. g. with nickel, to reduce its susceptibility to oxidation, and other forms of corrosion and insure a connection of low electrical resistance. The nose member 14 is provided at its rearward end with a bore 14a (Figure 2) adapted to receive the bare end 16a of an insulated wire 16. The nose member 14 is secured to the wire 16 by crimping the nose member onto the wire end 16a as indicated at 14b, which results in cold forging the nose member and the stranded wire into a substantially solid mass. This produces a connection which not only has extremely low electrical resistance and is relatively invulnerable to corrosion, but which has sufficient mechanical strength to withstand the tensile stresses to which the nose member 14 and wire 16 will be subjected in normal use. The sleeve 10 extends a substantial distance rearward from the point of connection between the wire 16 and the nose member 14 to support the wire 16 and increases the resistance of the connection to fatigue caused by bending of the wire.

The forward end of the nose member 14 is tapered to facilitate insertion of the plug into the plugboard, and is adapted for electrically conductive engagement with a spring contact 18 in the electrical device with which the plugboard is associated, to form an electrical connection between the wire 16 and contact 18 and complete a selected electrical circuit. The intermediate portion of the nose member 14 is provided with a circumferential recess or groove 14c and the sleeve 10 is provided with one or more dimples or inwardly projecting bosses 10h which are received in the groove 14c. This arrangement permits limited longitudinal movement of the nose member 14 relative to the sleeve 10, while preventing accidental withdrawal of the nose member from the sleeve. To facilitate initial assembly of the plug, the dimples 10h may be formed in the sleeve 10 after the nose member 14 has been inserted into proper longitudinal position in the sleeve.

Since the sleeve 10 is not a part of the electrical circuit, it may be satisfactorily composed of a suitable plastic, such as a nylon of the 10001 series so that this part may be produced quite cheaply by injection molding. The non-conductivity of such plastic sleeves reduces the possibility of short circuits between adjacent plugs in the plugboard.

When the plug is inserted into the plugboard the inclined forward surfaces of the latch portions 10g engage the forwardly directed face 12b of the plugboard and cam the latch members into the opening 12a in the plugboard, against the resistance of the resilient fingers 10f, to permit the plug to be inserted into the plugboard. The portion of the nose member 14 adjacent the fingers 10f of the sleeve is recessed as indicated at 14d (Figure 2) to permit depressing of the fingers to such extent that the latch portions 10g are within the opening 12a in the plugboard.

When the plug reaches its fully inserted position, as illustrated in Figure 2, the latch portions 10g will spring back outwardly and be engaged behind the rearwardly directed face 12c of the plugboard. With the plug in this position, a rearward pull on the sleeve 10 will cause the inclined rearward surfaces of the latch portions 10g to engage the rearwardly directed face 12c of the plugboard and result in camming the latch portions into the opening 12a, as shown in Figure 3, to permit the plug to be withdrawn from the plugboard.

However, when the plug is in the fully inserted position, a rearward movement of the nose member 14 relative to the sleeve, such as is produced by a rearward push on the front end of the nose member or a rearward pull on the wire 16, causes a rearwardly disposed, tapered surface 14e on the nose member to engage the internally bevelled ends 10j of the fingers 10g and cam the fingers outwardly so that the latch portions 10g are locked behind the rear face of the plugboard.

It will therefore be understood that the plug may be inserted into or withdrawn from the plugboard by movement of the sleeve 10, but that the plug may neither be

pushed from the plugboard by rearward pressure on the nose member 14, nor may it be pulled from the plugboard by a pull on the wire 16 to which the plug is attached. It will also be seen that the plug is formed of only two parts which are relatively simple in construction and may easily be assembled. Furthermore, the wire conductor 16 is electrically connected directly to the same integral member 14 which is conductively engaged by contact 18 within the electrical device with which the plugboard is used to provide between the wire 16 and the contact 18 an electrical connection having low ohmic resistance and little vulnerability to corrosion.

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

I claim:

1. A plug contactor comprising an outer sleeve having an intermediate section adapted to be slidably received in an opening in a plugboard, a rear section adapted to project from a forwardly directed face in the plugboard to a region of access, and a forward section having at least one latch portion projecting radially from said sleeve in position to be engaged behind a rearwardly directed face in said plugboard, said sleeve being resiliently flexible to allow said latch portion to be depressed into said opening, and a nose member of electrically conductive material slidably received within said sleeve and projecting from the forward end thereof and adapted to be conductively secured at its rearward end to an electrical conductor, said nose member being recessed relative to the inner surface of said sleeve at a point opposite said latch portion to permit said latch portion to be depressed as aforesaid, and being formed with a surface adapted when said nose member is moved rearwardly relative to said sleeve to engage said sleeve and impede the depression of said latch member.

2. A plug contactor comprising an outer sleeve having an intermediate section adapted to be slidably received in an opening in a plugboard, a rear section adapted to project from a forwardly directed face in the plugboard to a region of access, and a forward section having at least one latch portion projecting radially from said sleeve in position to be engaged behind a rearwardly directed face in said plugboard, said sleeve being resiliently flexible to allow said latch portion to be depressed into said opening, and a nose member of electrically conductive material slidably received within said sleeve and projecting from the forward end thereof and adapted to be conductively secured at its rearward end to an electrical conductor, said nose member being recessed relative to the inner surface of said sleeve at a point opposite said latch portion to permit said latch portion to be depressed as aforesaid, and being formed with a surface adapted when said nose member is moved rearwardly relative to said sleeve to engage said sleeve and impede the depression of said latch member, and said nose member and

said sleeve being provided with interengaging elements limiting the longitudinal movement of said nose member relative to said sleeve.

3. A plug contactor comprising an outer sleeve having an intermediate section adapted to be slidably received in an opening in a plugboard, a rear section adapted to project from a forwardly directed face in the plugboard to a position of access, a forward section slotted longitudinally to form a plurality of fingers having formed at their outer surfaces adjacent their forward ends integral latch portions projecting radially thereof in position to be engaged behind a rearwardly directed face in said plugboard, said fingers being resiliently flexible to permit said latch portions to be depressed into said opening, and a nose member of electrically conductive material slidably received within said sleeve and projecting from the forward end thereof and adapted to be conductively secured at its rearward end to an electrical conductor, said nose member being recessed relative to the inner surface of said sleeve along the forward portions of said fingers to permit said latch portions to be depressed as aforesaid, and the forward ends of said fingers being internally bevelled and the adjacent portion of said nose member being rearwardly tapered whereby rearward movement of said nose member relative to said sleeve will urge said fingers radially outward to lock said plug in said plugboard.

4. A plug contactor comprising an outer sleeve having an intermediate section adapted to be slidably received in an opening in a plugboard, a rear section adapted to project from a forwardly directed face in the plugboard to a position of access, a forward section slotted longitudinally to form a plurality of fingers having formed at their outer surfaces adjacent their forward ends integral latch portions projecting radially thereof in position to be engaged behind a rearwardly directed face in said plugboard, said fingers being resiliently flexible to permit said latch portions to be depressed into said opening, a nose member of electrically conductive material slidably received within said sleeve and projecting from the forward end thereof and with the rear end of said nose member spaced a substantial distance forward of the rear end of said sleeve and being adapted to receive the bare end of an insulated conductor and to be conductively secured thereon, said nose member being recessed relative to the inner surface of said sleeve along the forward portions of said fingers to permit said latch portions to be depressed as aforesaid, and the forward ends of said fingers being internally bevelled and the adjacent portion of said nose member being rearwardly tapered whereby rearward movement of said nose member relative to said sleeve will urge said fingers radially outward to lock said plug in said plugboard, and said nose member being recessed and said sleeve having at least one boss projecting into said recess to limit the longitudinal movement of said nose member relative to said sleeve.

No references cited.