April 18, 1961 W. R. SCHELLER 2,980,883

PLUG CONTACTOR

Filed Feb. 17, 1959

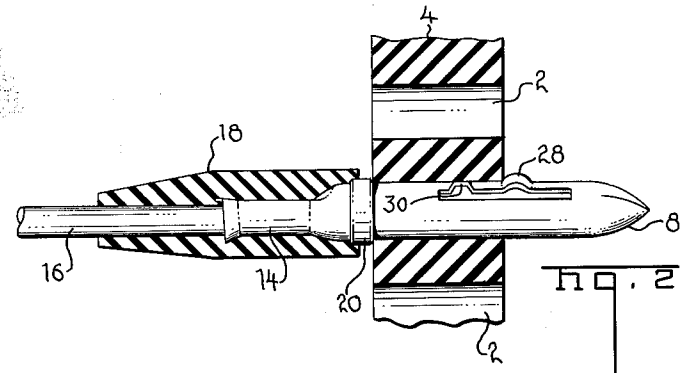


Fig. 2

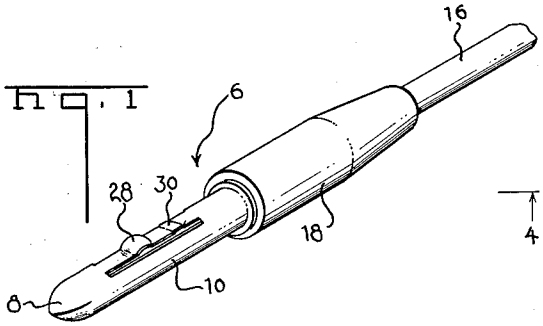


Fig. 1

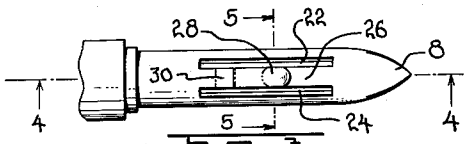


Fig. 3

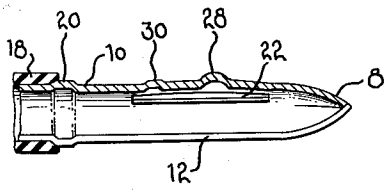


Fig. 4

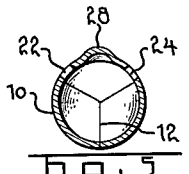


Fig. 5

INVENTOR.
WILFRED R. SCHELLER
BY

Curtis, Morris & Safford

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PLUG CONTACTOR

Wilfred R. Scheller, New Cumberland, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

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2 Claims. (Cl. 339—252)

This invention relates to plug contactors for use with the plugboard or circuit connecting panel of an electrical calculating or accounting machine or the like, and more particularly to an improvement in the construction of the spring detent system of the plug contactor.

A variety of forms of spring systems for plug contactors have heretofore been proposed, some involving separate spring elements assembled in a plug shell and others including spring elements of a form difficult to manufacture and maintain to the uniform shape and close tolerances desired for uniform detention characteristics.

Among the objects of the present invention is the provision of a plug contactor which is simpler and more economical in construction than previous plugs of this type, avoiding the use of added spring parts which are relatively costly in assembly and material. It is also an object to provide such a plug with a spring system which is rugged and will retain substantially its original characteristics over a long life. A further object is the provision of a spring system for such a plug which is integral with the plug shell and of a character easily susceptible to precise control of shape.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration in the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

Figure 1 is a perspective view of an embodiment of a plug contactor incorporating features of the present invention;

Figure 2 is a sectional view in elevation of the plug contactor of Figure 1 in fully inserted position in a plugboard;

Figure 3 is a fragmentary plan view of the plug contactor of Figure 1;

Figure 4 is a sectional view taken at lines 4—4 of Figure 3; and

Figure 5 is a sectional view taken at lines 5—5 of Figure 3.

The particular type of plug contactor to which this invention relates is especially adapted for use in the plugboard wiring system of an electrical accounting or calculating machine, or the like, which system typically includes a fixed plugboard carrying a set of permanent contacts arranged in rows and columns. A movable plugboard removably carrying a corresponding set of plug contactors is arranged to bring the sets of contact elements into engagement so as to complete the electrical circuits desired.

Referring now to Figures 1 to 5, a plurality of apertures 2 of plugboard 4 receives a plurality of plug contactors, such as the plug generally designated at 6, in an array for interengaging at their projecting nose 8 the set of contacts on a fixed plugboard, not shown.

Plug 6 comprises a hollow cylindrical sleeve or shell 10 of a resilient conductive metal, such as nickel-plated full hard brass, preferably rolled up from flat sheet stock into tubular form with a butt seam 12 extending longitudinally of the sleeve along its bottom center line, Figures 4 and 5. At its rearward end, the left-hand end as viewed in Figure 2, shell 10 is provided with integral means 14 by which conductor 16 is mechanically and electrically attached to the plug. Preferably attaching means 14 is formed into a ferrule from an initially U-shaped cross-sectional configuration, the ferrule being tightly crimped around the wire core of conductor 16 by cold forging techniques conventional in the art as illustrated, for example, in Patent No. 2,600,012, issued June 10, 1952, to James C. Macy.

An insulating sheath 18 of a suitable resin such as polyvinyl chloride preferably is molded around the rear end of the plug and adjacent portions of the insulation of conductor 16. Sheath 18 insulates the ferrule or attaching means 14 and supports the adjacent portion of conductor 16 to increase its resistance to bending fatigue while conveniently serving as a handle for manipulating the plug.

At the rearward end of the cylindrical body of shell 10 adjacent the forward end of sheath 18 an integral circumferential bead 20 is provided, which bead is arranged to engage the face of plugboard 4 adjacent edge portions of an aperture 2 to act as a stop for limiting movement of the plug into the plugboard.

To form the spring detent system for the plug a pair of parallel, closed and longitudinally extending slots 22 and 24 define and release therebetween a spring beam 26 anchored at both ends to the body of shell 10, preferably at points in diametric opposition to seam 12. A dome-shaped boss 28 positioned intermediate the length of spring beam 26 serves as a detent which will be depressed with beam 26 as sleeve 10 is pushed into aperture 2, ultimately to snap resiliently behind one edge of the aperture as bead 20 engages the plugboard face at the other end of the aperture. The degree of slope of the sides of boss 28 in part controls the force required to insert and withdraw the plug. The retentive force of the detent may further be varied according to the conditions of a particular use through alteration of the spring characteristics of beam 26, for example, by variation in the length and distance apart of slots 22 and 24, or the cross-sectional configuration of beam 26 as desired. Typically, the slots may be spaced approximately 90° relative to the shell circumference and widened to the degree necessary to yield a spring beam of the desired rigidity. In cross-section beam 26 preferably follows the curvature of shell 10, boss 28 being disposed in the forward half of beam 26 advantageously locating at least half the length of the slots within the plugboard thickness on insertion of the plug.

Forwardly of the spring detent, the nose 8 of the plug converges to present a rounded tip formed from three triangular sections, best shown in Figure 5, in a manner conventional in the art.

For tolerance reasons the circumference of shell 10 may not always be sufficiently closely matched to the diameter of aperture 2, nor the distance between bead 20 and boss 28 to the plugboard thickness, to avoid an undesired loose fit of the plug on insertion. To assure a snug fit a short section 30 of the rear portion of beam 26 is flattened to define a plane approximately tangent to shell 10 thereby increasing its effective circumference

to at least the largest aperture diameter contemplated in use. That is, the edges of flat section **30** will extend beyond the circumference of the shell. For smaller diameter apertures flat section **30** will result in beam **26** being slightly depressed to provide a resilient takeup means for the diameter differential between the plug and aperture. Alternatively, or in addition, a slight convexity may be imparted to beam **26** over its length, as best shown in Figure 4, in assurance of a resilient lateral bias of the plug against the aperture sidewalls.

It will be apparent to those skilled in the art that plug **6**, apart from any insulation sheath **18**, may be wholly and simply formed from a single sheet metal blank by conventional die stamping and forming techniques, yet achieving a rugged and economical construction which is reliable and foolproof in use.

I claim:

1. In a plug contactor for insertion in an aperture in a plugboard, a hollow cylindrical sheet metal sleeve, a pair of longitudinally extending slots circumferentially

spaced approximately 90° in said sleeve, said slots releasing therebetween a spring beam integrally anchored at each end to said sleeve, a detent boss intermediate the length of said beam and projecting outwardly from the sleeve surface, a section of said beam being flattened to define a plane approximately tangential to the sleeve circumference for providing a take-up means resiliently biasing the plug contactor laterally against the aperture sidewalls on insertion.

2. A plug contactor according to claim 1 wherein said beam is convex substantially over its full length along the sleeve.

References Cited in the file of this patent

UNITED STATES PATENTS

2,691,145	Watts	Oct. 5, 1954

FOREIGN PATENTS

403,864	Great Britain	Jan. 4, 1934
567,798	Great Britain	Mar. 5, 1945