April 6, 1948. L. L. MALLARD 2,439,176

CONNECTOR

Filed Aug. 24, 1943

Fig. 1.

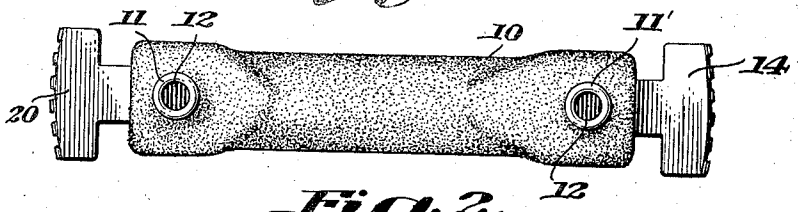


Fig. 2.

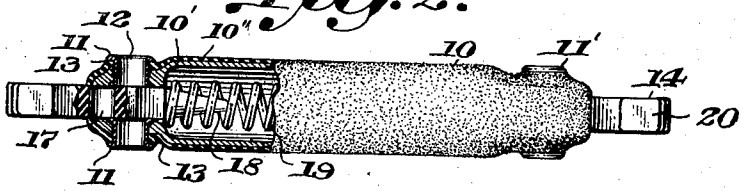


Fig. 3.

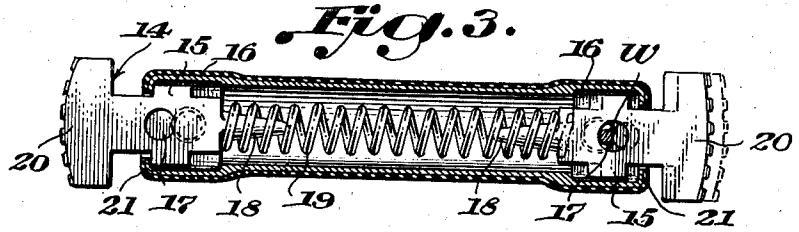


Fig. 4.

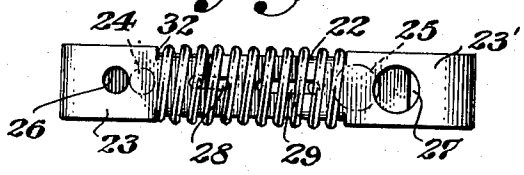
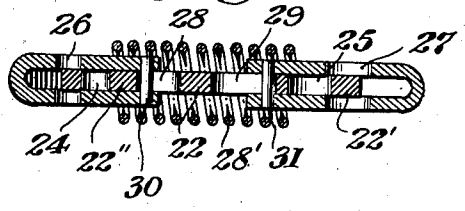


Fig. 5.



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CONNECTOR

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1 Claim. (Cl. 287—75)

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This invention relates to connectors for wire or rod members, and an object of the same is to provide a device of this type which may be easily and quickly applied or installed and is of simple and economical construction.

Another and more specific object is to provide a connector, and particularly an electrical connector, which may be held between the thumb and forefinger, for example, of one hand and the desired connections made simply by pressing on opposite ends of the connector, and inserting the wires with the free hand.

Another object is to provide a connector adapted for emergency repair as well as for easy and quick connections in laboratory work and the like, the device being small and compact so that any desired number may be carried in a tool kit or box ready for use whenever desired.

The foregoing objects and advantages will become apparent in view of the following description taken in conjunction with the drawing wherein:

Fig. 1 is a view in side elevation of a connector in accordance with the invention;

Fig. 2, a view in section and elevation on a side opposite to that of Fig. 1;

Fig. 3, a substantially central longitudinal section of the connector of Figs. 1 and 2;

Fig. 4, a view in side elevation of a modification; and

Fig. 5, substantially central longitudinal sectional view of Fig. 4.

Referring to the drawings in detail, the connector of Figs. 1, 2 and 3 comprises an elongated shell or housing 10 which in the example shown is made up of a metallic conducting liner 10' covered with suitable insulating material 10''. The shell 10, however, may be made of any suitable material, either conducting or non-conducting, it only being necessary that it have sufficient rigidity to avoid bending or collapse when the connector is operated. Suitable materials include sheet metal, cast metal, plastics, dielectrics, hard rubber and the like.

The opposite ends of the shell are similarly constructed, each end being punched for insertion of a pair of eyelets 11, 11' defining a hole or opening 12 for the wire to be connected. The eyelets 11, 11' may be secured in fixed position by crimping the metal of the shell as indicated at 13. The eyelets 11 and 11' are spaced apart or separated at an intermediate point, and an insulated plunger 14 is projected into the open end of the shell between the eyelets, said plunger being formed with lateral projections or shoulders 15 which slide in a guideway 16 made by deforming

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or "pinching" the shell in this region, note Fig. 3. A hole or suitable opening 17 is formed in each plunger 14 and is adapted to register with the openings 12 defined by the eyelets 11 when the plunger is pressed to its inner position. The inner end of the plunger is formed with a tapered or pointed stud 18, and a spring 19 is interposed between the plungers with the opposite ends thereof engaging over said studs. A finger piece 20 is formed on the outer end of each of the plungers 14 and is preferably knurled or roughened to prevent slippage when engaged by the fingers.

Since the assembly at each end of the connector is the same, the foregoing description of one will suffice for both.

In making and assembling the connector, the shell or body 10 may be first slightly flattened at its opposite ends, then punched or perforated for insertion and securement of the eyelets 11, 11', whereupon the spring 19 and plungers 14 may be inserted within the open ends of the housing and the latter crimped or deformed to provide the slideways 16 and also to provide stop shoulders 21 which engage over the lateral projections 15 of the plungers to prevent the latter from moving out of the housing. If desired, one of the plungers may first be assembled in one end of the housing, the spring 19 then inserted, and the other plunger mounted in the opposite end of the housing.

It will be obvious that other methods of manufacture and assembly may be adopted, depending upon the characteristics of the shell 10 and co-acting parts. For example, the shell could be molded and the plungers made in sections to permit their assembly after the molding operation.

The manner in which the improved connector operates will be obvious. A user may grasp one of the connectors between the thumb and forefinger of one hand and press the plungers inwardly to bring the holes 21 in registration with the holes 12, whereupon the wires to be connected may be inserted with the free hand, one of such wires being indicated at W in Fig. 3. When the plungers are released, they are pressed outwardly by the spring 19 and firmly clamp or hold the wires in connected relation.

In the form shown the device serves as an electrical connector, current being conducted from the wire or wires W through the metallic part 10' of the shell 10, but since both the shell and plungers are insulated, there is no danger of shock to the user. However if the connector is to be used as an insulator, or to prevent con-

duction of electricity between the wires to be connected, the shell 10 may be made of insulating material, such as hard rubber Bakelite, and the like.

The plungers 14 will always move inwardly when pressure is applied on opposite ends of the device, and such movement will be substantially uniform since an equalization of pressure takes place, or the pressure is balanced or distributed by the spring 19.

The connector may obviously be made in any desired sizes, that illustrated in the drawings being enlarged to more clearly show the parts thereof.

In Figs. 4 and 5 the same principle of operation is obtained as in Figs. 1, 2 and 3 but with a modified structure. In this instance the connector comprises a body member in the form of a central bar or link 22 having end caps 23 and 23' slidingly mounted on opposite ends thereof, the links preferably being laterally enlarged at opposite ends, or extended laterally to provide shouldered portions 22' and 22''. These enlarged ends are formed with holes or openings 24 and 25, the opening 24 being of smaller diameter than the opening 25 to illustrate how the connectors may be adapted for wires of different diameters. The end caps 23 and 23' are also formed with holes or openings 26 and 27 which are respectively adapted to register with the holes or openings 24 and 25 when the said caps are pressed to their inner positions. A spring 28' is disposed on the link 22 between the shoulders defined by the enlarged ends of the link. To prevent the end caps from moving off the link, the latter is formed with elongated slots 28 and 29, and the said caps are provided with pins 30 and 31 which are fixed therein and pass through said slots. The slots are obviously of such length as to permit the required sliding movemen of the end caps.

The end caps may be formed of a single piece or length of material having the opposite ends reduced to provide stop shoulders 32 and the piece then punched for the holes 26 and 27 and bent upon itself, or bent double so that the openings therein register; and likewise the link 22 may be stamped from a single piece of material in one operation. The end caps may be open or closed at the sides, the cap 23 being shown closed and the cap 23' being shown open, note Fig. 5.

To assemble the device of Figs. 4 and 5, it is only necessary to insert one of the end caps over the adjacent end of the link then apply the cross pin 30 or 31, whereupon the spring 28' may be applied and the opposite cap mounted on the link; and the device is ready for use.

The connector of Figs. 4 and 5 operates in substantially the same manner as the connector of Figs. 1, 2 and 3, pressure on opposite ends of the connector causing the end caps to slide inwardly against the compressive force of spring 28' and bring the openings or holes 24 and 25 in registration with the holes 26 and 27. Wires may then be inserted in these holes, and

when the end caps are released, said wires are automatically clamped or engaged by the said caps and opposite ends of the link.

Both forms of the device are easy to operate and are simple and economical in construction. The fact that pressure may be applied simultaneously on opposite ends of the connector to operate same, permits the use of a spring of considerable strength, since the person operating the connector is less likely to let loose of the device than is the case where the operation is carried on by pressing one end at a time, or in reverse or lateral directions.

This type of connector also has certain advantages over the so-called slip type connector wherein the wires or parts to be connected are inserted by pressure, although the slip type and that illustrated herein have uses peculiar to different types of installations.

It will be understood that limited changes in construction and design may be adopted without departing from the scope of the invention as defined by the appended claim.

What is claimed is:

A connector comprising a one piece generally cylindrical sheet metal stamping forming a housing having flattened end portions, flat apertured plunger members slidably received within said flattened end portions of said housing, shoulders on said plungers, interned flanges on the ends of said housing constructed and arranged to abut said shoulders and prevent removal of said plungers from said housing, finger engaging portions on the outer ends of said plungers, axial projections on the inner ends of said plungers, a compression spring received on said projections and tending to urge said plungers outwardly of said housing against said inturned flanges, apertures in said flattened end portions constructed and arranged to register with the apertures in said plungers upon inward movement thereof whereby wires inserted in said apertures will be clamped therein by the action of said compression spring.

LOGAN L. MALLARD.

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