

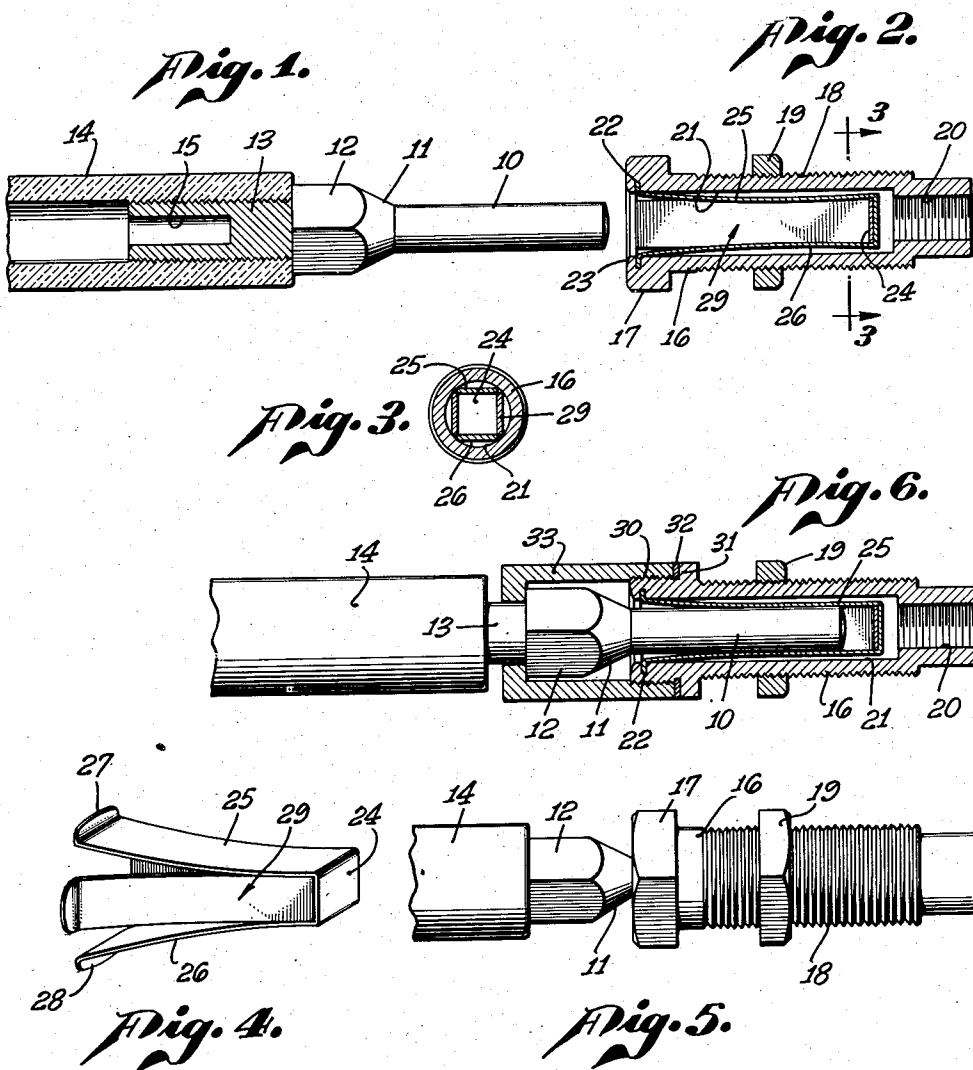
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SELF-WIPING ELECTRIC PLUG CONNECTOR

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SELF-WIPING ELECTRIC PLUG CONNECTOR

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2 Claims. (Cl. 173—363)

This invention relates to a self-wiping electric plug connector.

An object of the invention is to provide an electric connector of the plug and socket type which is so designed that on insertion of the plug into the socket the plug will automatically wipe and clean surfaces of the socket so as to form an excellent electrical connection between the plug and socket.

Another object of the invention is to provide an electric connector of the plug and socket type wherein the plug may have its pin in the form of a solid, smooth cylinder enabling the plug to be very sturdily constructed and to be readily cleaned with the resilient parts of the connector disposed in the socket so as to be effectively protected thereby against damage.

Still a further object of the invention is to provide an electric connector of the plug and socket type having a solid, rigid plug insertable between resilient elements disposed in the socket and which is so designed as to enable the parts to be very easily and inexpensively manufactured and readily assembled together.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawing for an illustrative embodiment of the invention, wherein:

Figure 1 is a view in side elevation, parts being broken away and shown in section illustrating the plug element of the connector embodying the present invention;

Fig. 2 is a longitudinal vertical section through the socket element of the connector embodying the present invention;

Fig. 3 is a transverse section taken substantially upon the line 3—3 upon Fig. 2;

Fig. 4 is a perspective view of the resilient elements in assembled relation which form a part of the socket;

Fig. 5 is a view in side elevation illustrating the plug and socket as having been assembled together; and

Fig. 6 is a view in side elevation, parts being broken away and shown in vertical section illustrating a slightly modified form of connector embodying the present invention.

Referring to the accompanying drawing wherein similar reference characters designate similar parts throughout, the plug element of the connector comprises a solid length of metal providing a solid cylindrical pin 10 of suitable length. At the back of this pin the plug is enlarged as at

11 and preferably flattened as indicated at 12. It is equipped with an externally threaded shank 13 to which may be applied a sleeve 14 formed of plastic, Bakelite, or the like which serves as a handle for the plug.

The shank 13 has a hole 15 therein in which may be leaded the end of a wire conductor, not shown, which extends through the sleeve 14 and which is thus electrically connected to the plug.

The socket illustrated in Fig. 2 is in the form of a hollow cylinder 16 having at its forward end a flattened exterior 17 and which is externally threaded as at 18 for the application of a nut 19. The nut 19 is adapted to be tightened toward the flattened large forward end of the socket in mounting the socket on an instrument panel. The rear end of the socket may be externally reduced and has a threaded aperture 20 therein adapted to receive a screw for the attachment of a binding post to the back of the socket. The interior of the socket has a cylindrical bore 21 formed therein of adequate length to receive the pin 10 of the plug. Adjacent the forward end of this bore there is formed an annular groove 22 and the mouth of the bore is preferably countersunk or rounded as at 23 to facilitate the centering and insertion of the plug into the socket and also to facilitate the insertion of the resilient elements of the socket. The resilient elements of the socket are preferably formed of aluminum phosphorus bronze. These are produced by bending a tape or ribbon of this material into a substantially U-shaped form. Each resilient element thus has a bottom or back 24, forwardly extending arms or sides 25 and 26 which terminate in outwardly extending flanges or lips 27 and 28.

In the construction illustrated there are two of such U-shaped resilient elements, these being exact duplicates of each other except that one element indicated at 29 is slightly shorter than the other, the difference in length being merely equal to the thickness of the metal or ribbon from which the U-shaped elements are formed. As originally or initially constructed these U-shaped elements have their arms or sides 25 and 26 slightly bowed in length as is illustrated in a somewhat exaggerated manner in Figs. 2 and 4. These U-shaped elements are consecutively forced into the bore 21 and as they move into the bore the flanges or lips 27 and 28 engage the countersunk or rounded surface 23 and cause the arms 25 and 26 to be sprung inwardly until the flanges or lips 27 and 28 are opposite the groove 22. The resiliency of the arms then causes these flanges or lips to be sprung or snapped outwardly into the groove

22 and the resilient element is thus retained in the socket. The U-shaped resilient elements are preferably inserted in the socket consecutively in this manner so that their arms occupy positions within the bore 21 as shown in Fig. 3. That is, the widths of the arms are arranged on chords across the interior circumference of the socket. In this manner the bore 21 of the socket is effectively lined with strips, namely the arms 25 and 26, of stiff, but nevertheless resilient material. Inasmuch as the side edges of the arms engage the interior of the socket and the centers of the arms are in spaced relation to the interior of the socket each arm may flex slightly across its width. The rectangle defined by the arms, as shown in Fig. 3, is slightly smaller than the diameter of the pin 10 with the result that on forcing the pin 10 of the plug into the socket it engages the arms on longitudinally extending center lines and flexes the arms outwardly slightly. As the plug is forced into the socket the leading edge of the pin engages the arms and effectively wipes the arms throughout their lengths, pushing any dirt or corrosion that may accumulate on the arms to the back of the socket and thus wiping the arms clean so as to establish a good electrical contact between the arms and the socket. It will, of course, be appreciated that by reason of the fact that the arms are slightly flexed they will maintain a firm frictional engagement with the pin 10 of the plug so as to retain the plug in the socket until it is forcibly withdrawn. When the plug is forcibly withdrawn the resilient elements of course are retained in the socket by the flanges or lips 27 and 28 being disposed in the groove 22.

In the construction illustrated in Fig. 6, the connector is the same as that above described except that the forward end of the socket is externally threaded as at 30 adjacent a shoulder 31 on the flatted exterior of the socket. A gasket 32 may be positioned against this shoulder. A coupling or union 33 may be rotatably mounted on the plug and this is internally threaded for engagement with the threads 30 whereby, upon the insertion of the plug into the socket, the union 33 may be screwed on the socket against the gasket more or less permanently fasten the plug in the socket and provide a waterproof connection.

It will be appreciated from the above-described construction that the connector can have its parts very easily and inexpensively manufactured. The plug and the body of the socket can both be turned out from stock material on automatic screw machines with but very few operations. The U-shaped resilient members can be shaped quite readily from ribbon or tape stock on a high-speed press or stamping machine. The assembly is readily accomplished by merely forcing the U-shaped members into the socket during which

operation they will contract until the lips or flanges 27 and 28 are opposite the groove 22 and at that time these retaining lips or flanges will be sprung into the groove to permanently lock the resilient members in the socket. Inasmuch as the pin of the plug is solid, cylindrical, and smooth, it is quite sturdy. Heretofore connectors of this type have had the plug divided into a plurality of resilient members which have been subject to the objection that they are difficult to clean and that they are easily damaged or sprung out of shape so that they will not properly fit the socket. By having the pin of the plug cylindrical and smooth and also solid, it is very easy to thoroughly clean the plug and danger of the plug becoming sprung or damaged is eliminated. Inasmuch as the resilient members of the connector are housed within the socket they are effectively protected thereby at all times. As each insertion of the plug will wipe the centers of the arms 25 and 26 of the U-shaped resilient members throughout substantially their entire lengths, a clean, bright metal surface is formed on each insertion for establishing an excellent electrical connection between the resilient members of the socket and the plug.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. An electrical connector comprising a plug, a socket adapted to receive the plug having a cylindrical bore therein, there being a groove in the walls of the bore adjacent the mouth of the socket and a pair of U-shaped members disposed in the bore arranged in intersecting planes having laterally bent lips extending into the groove, the arms of the U-shaped members having their widths collectively lining substantially the entire interior of the socket with their edges in contact therewith, whereby upon insertion of the plug the arms will be caused to laterally flex between their side edges to maintain firm engagement with the plug.

2. An electrical connector comprising a plug, a socket adapted to receive the plug having a cylindrical bore therein, there being a groove in the walls of the bore adjacent the mouth of the socket and a pair of U-shaped members disposed in the bore arranged in intersecting planes having laterally bent lips extending in the groove, the bottom of the U-shaped members being contiguously arranged and the arms of the U-shaped members having their widths collectively lining substantially the entire interior of the socket with their side edges in contact therewith, whereby upon insertion of the plug the arms will be caused to laterally flex between the side edges thereof.

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