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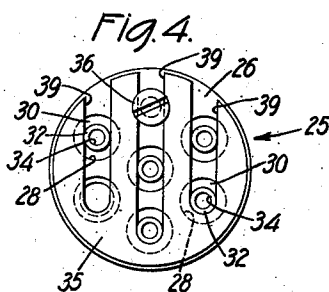
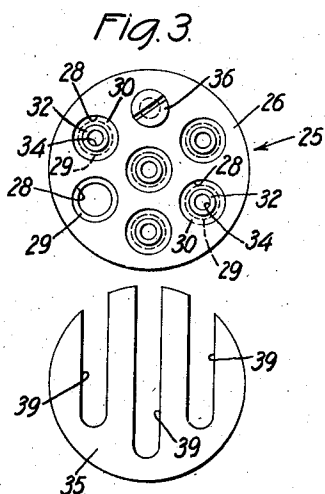
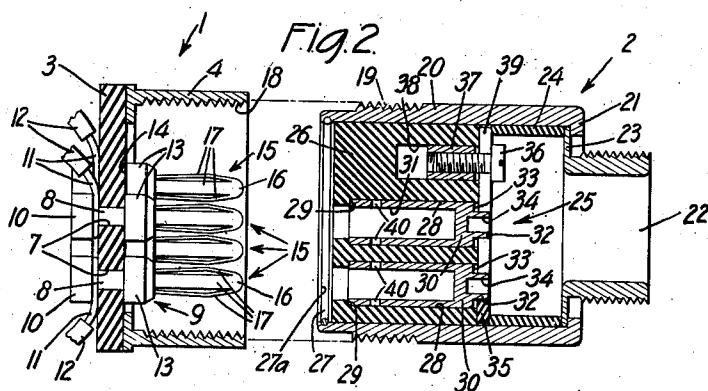
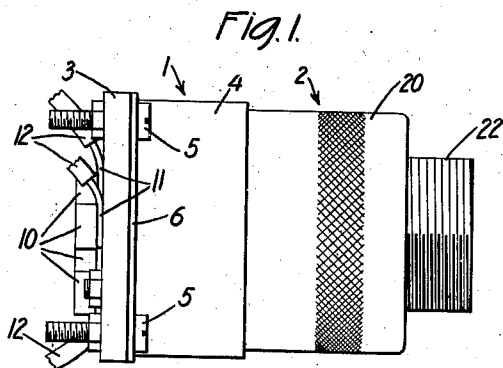
T. B. HOLLIDAY ET AL

2,095,254

SHIELDED CONNECTER

Filed May 8, 1935

2 Sheets-Sheet 1



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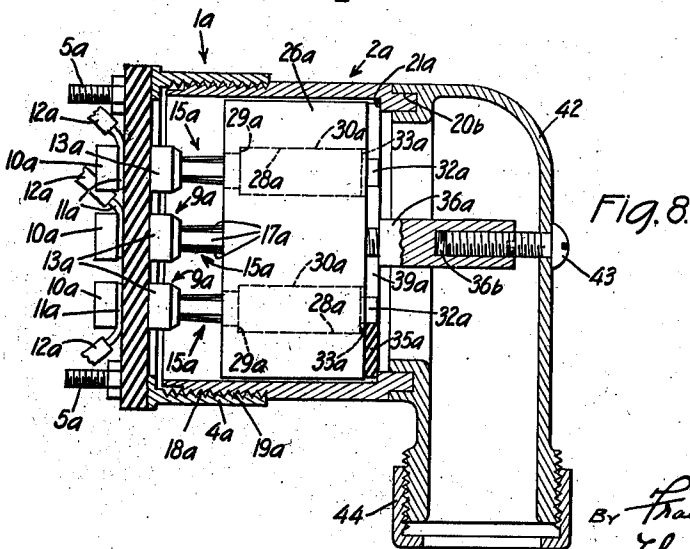
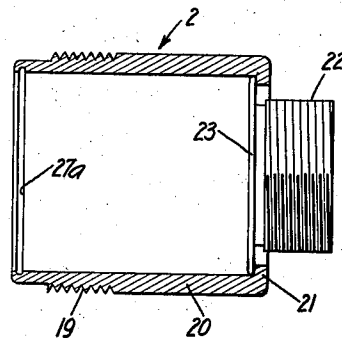
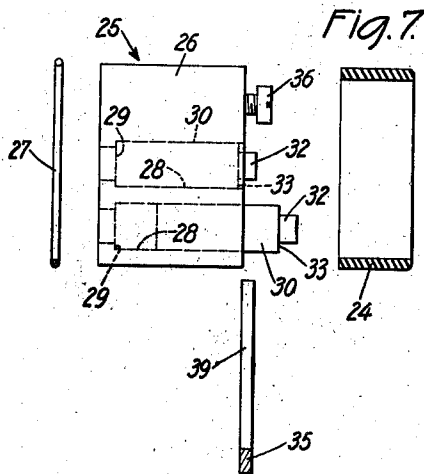
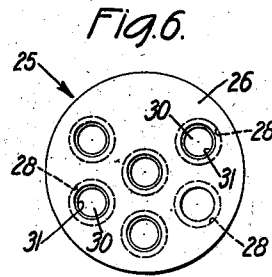
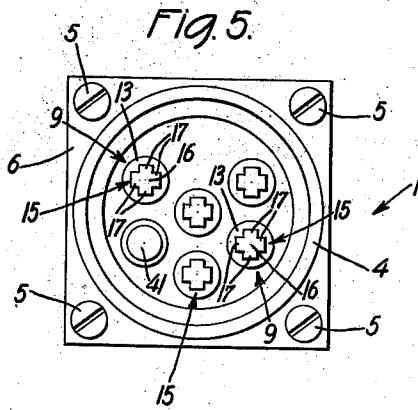
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2,095,254

SHIELDED CONNECTER

Filed May 8, 1935

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,095,254

SHIELDED CONNECTER

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Application May 8, 1935, Serial No. 20,400

3 Claims. (Cl. 173-324)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

5 This invention relates to electrical connectors adapted to be used, for example, in the radio art, and more particularly to a connector in which the mating contact elements are housed and shielded within separate, complementary metallic

10 shell members.
In accordance with one feature of the invention, provision is made of a pair of complementary shell members, one containing a plurality of plugs and the other a plurality of complementary sockets, said shell members being relatively

15 rotatable so that one may be screwed into the other, and one of them being rotatable relative to the circuit making contact members enclosed within it.
20 In accordance with a further feature of the invention the socket member comprises a block having shouldered recesses each for receiving a conductive socket member through the rear end thereof. Each conductive socket is shouldered at

25 the rear end and provision is made of a slotted retaining plate removably mounted on the rear end of the block and adapted to overlie the shouldered ends of all of the conductive sockets to retain them in place.
30 In accordance with a further feature of the invention, each of the conductive socket members is adapted to have a conductive wire soldered to the rear exposed end thereof and is formed to facilitate the securement of a fish wire to the

35 forward end of the socket member, the arrangement being such that a socket member may be soldered to the appropriate wire, then pulled through an electrical conduit, and then assembled with the other socket members in the socket block.
40 In accordance with a further feature of the invention, the block assembly comprises a plurality of terminal posts set in a common insulating base member and each having secured to it a jack or

45 stem formed of a piece of resilient sheet metal, having a central body portion and radial arms the arms being folded to bring their ends together and having their ends received in a recess of the terminal post, so that they form resilient slightly bulging sides for the jack or stem of which they form a part.

50 Other objects and advantages will hereinafter appear.

55 In the drawings forming part of this specification and illustrating certain preferred embodiments of the invention,

Figure 1 is a fragmentary view in a side elevation of a completely assembled plug embodying features of the invention;

Figure 2 is a sectional view of the plug of Figure 1, the two units being shown separated slightly one from the other;

Figure 3 is a view in elevation of the socket block and of the retaining plate, the latter being shown in a position ready to be slipped into place on the socket block;

Figure 4 is a view in rear elevation showing the retaining plate applied to the socket block;

Figure 5 is a view in front elevation of the jack assembly;

Figure 6 is a view in front elevation of the socket block with the socket members shown in place;

Figure 7 is a disassembled view in sectional side elevation showing the parts forming the socket assembly; and

Figure 8 is a view in sectional elevation illustrating a modified embodiment of the invention.

The plug is composed of two principal units, as seen in Figure 2, namely, a jack unit 1 and a socket unit 2.

The jack unit comprises a base block 3 of suitable insulating material such as "Bakelite" and a shell member 4 which may be desirably made of aluminum. The jack unit may be attached to the junction or other box by means of screws 5, which extend through ears 6 formed on the shell base and through holes in the base 3. The base 3 is provided with a number of passages 7 through it for receiving the shanks 8 of terminal posts 9. Nuts 10 are threaded on the outer ends of the terminal posts 9 for clamping conductive terminal members 11 of wires 12 to the respective posts.

Each terminal post includes an enlarged head 13, and each head is provided with an abutment shoulder 14 for engaging the inner face of the base plate 3. Each head 13 has a cylindrical recess formed in the forward face thereof for receiving a jack 15. Each jack is soldered in the recess of one of the base heads 13. Each jack is made of sheet metal, and comprises a tip portion 16 and bulging arms 17. The arms 17, which initially extend radially from the portion 16 are folded down into substantial parallelism and conjointly form the resilient body of the jack. The ends of the arms 17, remote from the head 16 are inserted in the recess of one of the terminal post base heads 13 and soldered in place.

Shell member 4 is provided with an internal

thread 18 for coacting with an external thread 19 formed on a shell member 20, the latter shell member forming the housing member of the socket unit. The shell member 20 is cylindrical in form and is provided at the rear end thereof with an internal annular shoulder 21. A bushing 22 has an external flange 23 thereof disposed within the shell 20 against the shoulder 21, and the body of the bushing projects outward through an opening in the rear end of the shell. A cylindrical spacer sleeve 24 of insulating material is set in the shell against the flange 23 of the bushing 22. A socket assembly 25, which will be described in detail presently, is set in the shell against the spacer sleeve 24, and the elements are retained in place by means of a resilient split retaining ring or wire 27 which is snapped into a groove 27a formed in the shell 20, adjacent the mouth thereof. The described parts may be readily taken out of the shell for inspection, repair or replacement by first removing the retaining ring 27.

The socket assembly 25 comprises a cylindrical socket block 26 which is free to rotate relative to the shell 20. The socket block has a plurality of bores 28 extending through it, each bore being reduced in size at its forward end to provide a rearwardly facing annular shoulder 29. The socket bores correspond in number and position to the jacks or pins of the jack assembly. A metallic socket member 30 may be inserted in each bore 28 through the rear of the socket block 26. Each socket member 30 engages at its forward end against the shoulder 29 of the bore in which it is inserted, and each socket member 30 is provided with a bore 31 in axial alignment with the reduced forward portion of the bore in the block.

Each socket member 30 has a reduced rear end portion 32 and is provided with an abrupt annular shoulder 33 surrounding such reduced portion. The shoulders 33 stand substantially flush with the rear face of the socket block 26, and the reduced portions 32 protrude beyond the rear face of the socket block. Each of the reduced portions 32 has a central, axial recess 34 formed in it, in which an electric wire may be soldered. The sockets 30 are all held in place in the socket block by means of a retaining plate 35 and a retaining screw 36. The retaining screw 36 is threaded into a bushing 37 which is fixed in a recess 38 of the socket block.

The retaining plate 35 is formed of insulating material and is provided with a plurality of parallel slots 39. It will be observed that the ends of the sockets, which protrude beyond the rear face of the socket block, are arranged in parallel rows and that the retaining screw 36 is in line with the central row. Each slot of the retaining plate 35 is, therefore, adapted to receive a plurality of the protruding members 32 and to overlie the shoulders of a plurality of the socket members 30 to retain the socket members in place. The central slot also receives the shank of the screw at the end of the slot remote from the base of the slot, and may be clamped down firmly against the back of the socket block by rotation of the screw. The arrangement makes possible quick and economical assembly and disassembly of the parts.

The fact that the socket members may be readily put in place through the rear of the socket block and then retained by the plate 35 has the further important advantage that the wires do not have to be soldered to the socket members after the socket members have been assembled in the block. Each socket member 30 may be in-

dividually soldered to its wire, then drawn through a conduit which is coupled to the bushing 22, then put in place in the socket block and retained by the plate 35. To facilitate the pulling of a socket member, together with its attached wire, through a conduit by means of a fish wire, each socket member has a pair of diametrically aligned openings 40 formed in the wall thereof near its forward end. The fish wire may be passed through these openings for attaching it temporarily to the socket.

Suitable indicia, not shown, are desirably provided upon the face of the socket block 26 and upon the individual sockets 30 to assure correct assembly. Similar indicia are provided on the outer face of the base plate 3 of the jack unit to facilitate the connection of the wires to the proper terminal posts.

The geometrical arrangement of the jacks 16 and the sockets 30 is such that assembly of the units 1 and 2 can be effected only when the correct mating of jacks and sockets occurs.

The socket block 26 is not compelled to rotate with the shell 20. The thread 19 of the shell 20 is set back behind the forward face of the socket block far enough so that the jacks may start in the bores of the socket block before any relative rotation of the shell members 4 and 20 occurs. Thus the jacks are properly located with reference to their sockets and hold the socket block 26 against rotation as the shell 20 is rotated to screw it into the shell 4. The screwing together of the shell members forces the resilient jacks into the sockets 31 of the socket members 30, and causes good electrical connections to be made.

If desired, a dummy post or guide pin 41 may be provided upon the base 3 for entering one of the bores 28 of the socket block, and this particular bore may be left empty for cooperating with the guide pin. The guide pin 41 is preferably a little longer than the jacks, is large enough in diameter to fill the forward end of the bore 28 with which it cooperates, and is rounded on the end so as to facilitate its entry into the cooperating bore. The guide pin relieves the jacks of the necessity of resisting relative rotation of the jack unit and the socket block.

The manner in which the parts of the socket unit may be quickly and completely disassembled is particularly well illustrated in Fig. 7. In this figure the retaining ring 27 has been removed from the groove 27a. The socket block 26 has been withdrawn from the shell 20. The retaining plate 35 has been withdrawn from the socket block 26. One of the socket members 30 is shown as partially withdrawn from the socket block, and all are free to be withdrawn. The spacer sleeve 24 is shown withdrawn from the shell 20, and the bushing 22, which is the only part remaining in the shell, can be readily withdrawn or merely dropped out of the shell by turning the shell open end downward.

In Fig. 8 a modified form of connector is shown. This connector is generally similar to the connector of Figures 1 to 7 and corresponding reference numerals, with the subscript *a* added, have accordingly been applied to corresponding parts. The parts thus numbered will not be again described. This form differs from the form of Figures 1 to 7, in the fact that an elbow 42 is rotatably mounted upon a reduced end portion 20b of a shell 20a. The socket block 26a is provided with a shouldered retaining post 36a in place of the screw 36 of Figure 2, and this post is situated centrally of the socket block. The

post 36a is, itself, provided with an axial threaded bore 36b, and a screw 43 which passes through a wall of the elbow 42 in alignment with axis of the shell 20a is threaded into the bore 36b and serves both to retain the elbow 42 in association with the shell 20a and to retain the socket block 26a in its proper location in the shell 20a. The spacer sleeve 24 and the retaining ring 27 of Figures 1 to 7 are dispensed with. The retaining plate 35a of Figure 8 is caused to bear against the shoulder 21a of the shell 20a, and hence is pressed around its entire periphery against the rear face of the socket block 26a.

The use of a guide pin as described in connection with Figures 1 to 7 is not a necessary feature, particularly where a large number of jacks is employed, and hence the form of Figure 8 has been illustrated as not including a guide pin.

The elbow 42 is shown as provided with the union coupling 44 on the outer end thereof.

We have described what we believe to be the preferred embodiments of our invention. We do not wish, however, to be confined to the embodiments shown, but what we desire to cover by Letters Patent is set forth in the appended claims.

1. In an electrical connector, a socket unit, comprising a shell member, a socket block therein, a plurality of conductive socket members set in the socket block from the rear and each having a rearwardly facing shoulder and a reduced rear end portion, a retaining plate having parallel slots extending through its periphery, the reduced portions of the sockets being arranged in parallel rows so that the retaining plate can be moved laterally into embracing relation to all of said reduced portions, and means for securing the retaining plate to the back of the socket block.

2. In an electrical connector, a socket unit, comprising a shell member, a socket block therein, a plurality of conductive socket members set in the socket block from the rear and each having a rearwardly facing shoulder and a reduced rear end portion, a retaining plate having parallel slots extending through its periphery, the reduced portions of the sockets being arranged in parallel rows so that the retaining plate can be moved laterally in embracing relation to all of said reduced portions, and a screw threaded in the socket block and having its shank received in one of said slots and its head overlying the retaining plate for holding the retaining plate to the socket block.

3. In an electrical connector, a socket unit, and a jack unit, said units comprising complementary cylindrical shell members adapted to be screwed together, said socket unit comprising a cylindrical socket block fitting in the shell member of the socket unit, a plurality of conductive socket members in said block, a retaining plate overlying the socket members on the rear of the socket block, a headed member extending axially of the socket block and having the head thereof disposed over the retaining plate for holding the latter to the socket block, an elbow mounted on the shell of the socket unit for rotation about the common axis of the shell and the socket block of said unit, and a screw threaded axially into said headed member, for holding the elbow to the shell and the socket block in place.

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