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L. H. FLORA

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ELECTRICAL SOCKET CONTACT

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Fig. 1.

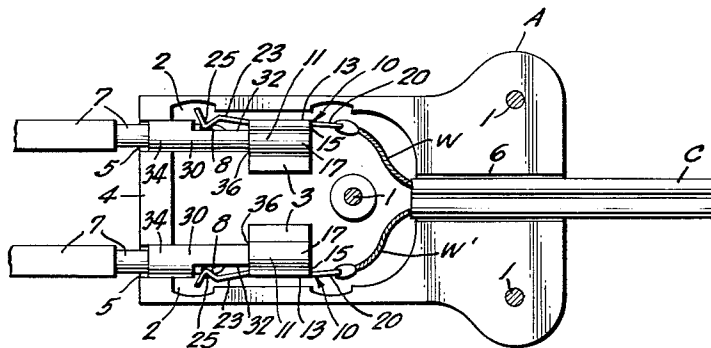


Fig. 2.

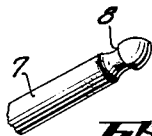
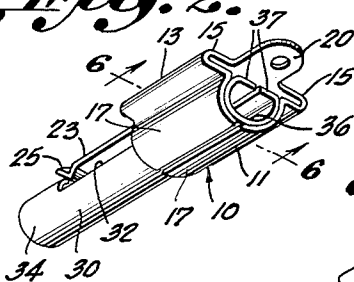


Fig. 3.

Fig. 6.

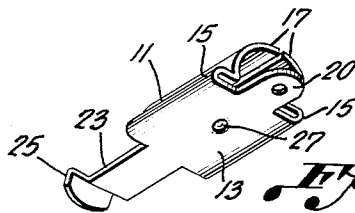
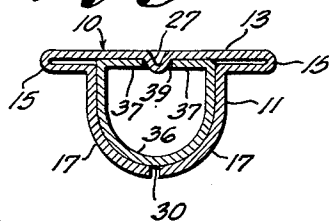


Fig. 5.

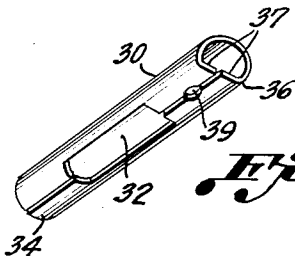


Fig. 4.

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1

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ELECTRICAL SOCKET CONTACT

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2 Claims. (Cl. 339—191)

This invention relates in general to electrical connectors of the kind provided by separable plug and socket members and deals, more particularly, with the socket contacts provided in the socket member of such an electrical connector.

A primary object of the invention is to provide a socket contact for an electrical socket member of this character in a relatively inexpensive construction made up of two simple generally tubular sheet metal parts which telescope together to form a completed socket contact that is strong, durable and reliable and readily produced in relatively small sizes for use in small-sized connectors and in special electrical couplings for multiple circuits which require a considerable number of contacts in a socket member of the smallest possible size.

A further object of the invention is to provide a highly simplified construction for a socket contact, such as described, in which one of the tubular sheet metal parts, aforesaid, serves as a rigid body for the socket and includes an integral resilient spring finger adapted for snap fastening engagement with its cooperating pin contact in a manner which ensures a positive electrical circuit and otherwise provides for ready connection or disconnection of said contacts with ease and facility as often as may be necessary over a long period of service and use.

Another object of the invention is to provide a socket contact of the character described which lends itself to economical quantity production at relatively low cost in that the same is provided as an all sheet metal article of manufacture made up of two simple generally tubular sheet metal parts which readily telescope together in locked relation to each other to form the completed socket contact without need for extraneous fastening means such as rivets, solder, or the like, thereby providing important savings in the cost of such extraneous fastening means and in the cost of the separate assembling operations and other added steps of manufacture required in the use of such extraneous fastening means.

A further object of the invention is to provide an improved construction for a socket contact, as aforesaid, which comprises a pair of generally tubular sheet metal parts or portions which telescope together in predetermined assembled relation in the completed socket contact, and with said generally tubular sheet metal parts locked in such predetermined assembled relation by a locking boss or lug provided on one of said tubular parts and seated in a preformed aperture in the other of said generally tubular sheet metal parts.

Further objects and advantages, and other new and useful features in the construction, arrangement and general combination of elements of the invention will be readily apparent as the following description proceeds with reference to the accompanying drawings, for purposes of illustration but not of limitation, in which like reference characters designate like parts throughout, and in which:

Fig. 1 is a view on a plane through the horizontal cen-

2

ter of an electrical socket member or receptacle having two or more socket contacts, and shows such socket contacts as provided in accordance with the invention and assembled in said socket member, and having their inner ends joined to the wires of an electrical conductor with the other ends of said socket contacts receiving the pin contacts of a cooperating plug member in connected relation;

Fig. 2 is a perspective view of one of the socket contacts in accordance with the invention shown employed in Fig. 1;

Fig. 3 is a perspective view illustrating one of the pin contacts shown employed in Fig. 1;

Fig. 4 is a perspective view of the barrel portion or part of the socket contact shown in Figs. 1 and 2;

Fig. 5 is a perspective view of the body portion or part of the socket contact shown in Figs. 1 and 2; and,

Fig. 6 is an enlarged transverse sectional view through the socket contact illustrated in Fig. 2, along line 6—6, and shows the generally tubular parts or portions of the socket contact as telescoped together in assembled relation and the means for locking said portions in assembled relation.

It will be understood that the invention is directed primarily to a socket contact construction that is particularly suited for production in relatively small sizes as a low-cost article of manufacture, as required for inexpensive line connectors, and the like, and which is especially advantageous in that the socket contact, as provided in any such relatively small construction is strong, durable and reliable.

Referring now, more particularly, to the drawings, there is illustrated in Fig. 1 one form of an electrical socket member A provided with socket contacts 10 in accordance with the invention. The socket member A is illustrative of a socket for a small-size line connector or other electrical coupling for multiple circuits requiring two or more small-size socket contacts as employed for any desired application or use.

In the present example, the socket member A is one of two similar pieces forming the housing for the complete socket member. Such a socket member is provided in any desired design in the form of a shell having holes for screws 1 which secure the two similar mating pieces forming the housing of said socket member. The inner surface of the socket member A is formed in any suitable way with recesses 2 for seating the required number of socket contacts 10 to be housed within said socket member A. These recesses 2 are shown provided together with adjoining spacer blocks 3 bearing against the inner ends of the socket contacts 10 together with an intermediate insulating block 4 abutting the forward ends of said socket contacts 10. The insulating block 4 is formed with entrance openings 5 and the opposite end of the socket member A is provided with a passage 6 for an electrical conductor C composed of two or more wires w and w' , for example, connected to said socket contacts 10. Pin contacts 7, Fig. 3, on a cooperating plug (not shown) are receivable in said entrance openings 5 in position to be advanced into separable snap fastening engagement with said socket contacts 10, as shown in Fig. 1. Such a pin contact 7, Fig. 3, may be of any suitable character and in the present example, is shown provided as a cylindrical stud or prong having a rounded or ball-shaped point and an adjacent annular groove defining a shoulder 8 adapted for snap fastening engagement in connected relation with the socket contact 10, as presently to be described.

Fig. 2 shows a completed socket contact 10, which is provided by a pair of generally tubular portions or parts comprising a body portion 11, Fig. 5, and a barrel or sleeve portion 30, Fig. 4, which is telescoped within said

3

body portion 11. These parts 11 and 30 are constructed of any suitable sheet metal such as beryllium copper, for example, and the same provided as simple sheet metal stampings which are particularly suitable for economical quantity production at relatively low cost.

The body portion or part 11, Fig. 5, is provided as such a stamping from a generally T-shaped blank which presents a flat base 13 having sides which define lateral flanges 15 that are return bent inwardly toward each other. The return bent flanges 15 are further bent in the direction outwardly from the base 13 in the manner of a pair of inwardly curved arms 17 defining a tubular passage therebetween and having a split between the extremities thereof such that said arms 17 are yieldable relatively to each other. As seen in Fig. 6, the tubular passage thus provided is generally D-shaped in cross section with the flat base 13 forming the flat side of such D-shaped tubular passage.

One end of said base 13 is formed with a short extension providing a soldering tab 20 for the electrical wire w or w' to be connected to each completed socket contact 10, as illustrated in Fig. 1. The other end of said base 13 includes a relatively longer extension in the form of a resilient spring finger 23 having a V-shaped bend or other suitable depression adjacent its end defining an inwardly projecting detent 25 adapted to snap into the groove on the cooperating pin contact 7 and engage the shoulder 8 adjacent such groove on said pin contact 7. The base 13 of said body portion 11 otherwise is provided with a dimple in the center thereof forming an inward projection or locking element in the nature of a boss or lug 27, Figs. 5 and 6. This boss or lug 27 projects within the tubular passage in said body portion 11 at a predetermined point to serve also as an indexing element for locating and positioning the associated barrel portion 30, Fig. 4, in predetermined assembled relation with said body portion 11 in providing the completed socket contact 10, Fig. 2, as presently to be described.

The barrel portion or part 30 is also a relatively simple device in the form of a split tubular sleeve or shell, as best seen in Fig. 4. The split area of said barrel 30 is provided with a longitudinal slot 32 intermediate the ends thereof. The longitudinal slot 32 is formed by cutouts on the edges adjacent the split in said barrel 30 and extends between the forward end 34 of said barrel and the rearward end 36 thereof. The forward end 34 of said barrel 30 is formed to define a sleeve corresponding to the cross section of the cooperating pin contact 7, and in the present example, said forward end 34 is provided as a cylindrical sleeve slightly larger than the cylindrical pin contact 7 to be received therein. The rearward end portion 36 of said barrel 30 is provided in a D-shaped cross section conforming to but slightly larger than the D-shaped cross section of the tubular passage defined by the arms 17 and base 13 of the body portion 11. Preferably the D-shaped cross section of said rear end portion 36 of the barrel 30 is provided by flattening the sections 37 adjacent the split in this portion of said barrel 30. This rear end portion 36 of the barrel preferably is of a length approximating the length of the D-shaped passage formed by the arms 17 of the body portion 11, and in the flat side thereof defined by the flat sections 37, a central aperture 39 is provided by cutouts in the adjacent edges of said flat sections 37 midway of the length of said flat sections 37.

With the body portion 11, Fig. 5, and the barrel portion 30, Fig. 4, thus provided, it will be understood that in the assembly of the completed socket contact 10, Fig. 2, the rearward end 36 of the barrel 30 is arranged with its D-shaped cross section aligned with the D-shaped tubular passage defined by the arms 17 of the body portion 11, and with the longitudinal recess 32 in said barrel 30 facing the spring finger 23 on said body portion 11. And accordingly, when said rearward end portion 36 of the barrel 30 is telescoped between said arms

4

17 of the body portion 11 in fully assembled relation, the flat sections 37 of said barrel end 36 and the flat base 13 of the body portion 11 are in face to face abutting relation, as seen in Fig. 6, such that said rear end 36 of the barrel 30 is held against relative turning in such assembled relation with said body portion 11. As the barrel end 36 is thus telescoped in the passage between the arms 17 of body portion 11, the inwardly projecting boss or lug 27 on said body portion seats in the aperture 39 in the barrel end 36 to serve as a stop or indexing means positioning said barrel 30 in predetermined assembled relation with said body portion 11 and otherwise locks said barrel 30 in such assembled relation against lengthwise shifting or displacement in the completed form of the socket contact 10, Fig. 2.

The arrangement otherwise is such that the arms 17 defining the tubular passage in the body portion 11 expand as necessary to receive therebetween the slightly large cross section of the barrel end 36 such that said barrel end 36 is held firmly and rigidly in assembled relation with said body portion 11 in a friction or press fit, and in a locked assembly, Fig. 6, provided by the boss or lug 27 on said body portion 11 received in the aperture 39 in the barrel end 36, as aforesaid.

In this locked assembled relation of the barrel 30 with the body portion 11, the resilient spring finger 23 on said body portion 11 is disposed over the longitudinal slot 32 in said barrel 30 with the inwardly projecting detent 25 on said finger 23 extending radially through said longitudinal slot 32 into the interior of said barrel 30 to a position in which said detent 25 normally lies partially over the passage through the forward end 34 of said barrel 30, substantially as shown in Fig. 2. The detent 25, accordingly, lies in the path of the pin contact 7 which passes through the forward end portion 34 of the barrel 30 and is adapted to snap into the groove on said pin contact 7 in engagement with the adjacent shoulder 8 thereof in completing an electrical connection.

The completed socket contact 10, Fig. 2, is admirably suited for a wide range and variety of applications in various types of electrical sockets. In the form of socket shown in Fig. 1, the required number of socket contacts 10 are connected as terminals to the electrical conductor C by soldering the tab 20 on each socket contact 10 to its respective wire w or w' of said conductor C. The socket contacts 10 may, of course, be connected to the wires w or w' in any other suitable manner, whereupon the socket contacts 10 are seated in the recesses 2 of said socket member A with the conductor C lying in the passage 6 through the rearward end of said socket member A. The housing for the socket is then completed by fitting the socket member A with its mating piece and securing the same by the screws 1.

In the completed socket member thus provided, the socket contacts 10 are firmly seated in the recesses 2 and against the spacer blocks 3 and the intermediate insulating block 4 which retain said socket contacts 10 in operative assembled relation in the socket member in proper position for receiving the cooperating pin contacts 7 applied through the entrance openings 5 in the forward end of the socket member. Each pin contact 7 passes through the forward end 34 of the barrel 30 of its cooperating socket contact 10 until the rounded point of the pin contact 7 cams against the outwardly flared extremity of the V-shaped detent 25. This camming action causes the spring finger 23 to yield as necessary for the point of the pin contact 7 to pass the detent 25 and permit said detent 25 to snap into the groove on the pin contact 7 in engagement with the adjacent shoulder 8 on said pin contact 7, thereby providing a positive electrical connection between said pin contact 7 and said socket contact 10.

A similar action takes place in disconnecting a pin contact 7 from its cooperating socket contact 10 under suitable force pulling the same apart from the connected po-

5

sition shown in Fig. 1. In this relation, the shoulder 8 on the pin contact cams against the engaged inner tapered surface of the V-shaped detent 25 to cause the spring finger 23 to yield as necessary for the detent 25 to disengage from the shoulder 8 on said pin contact 7 and thereby permit said pin contact 7 to be withdrawn and removed from its associated socket contact 10.

While the invention has been described in detail with a specific example, such example is intended as an illustration only inasmuch as the invention fully contemplates various modifications which may be provided without departing from the spirit and scope of the invention.

What is claimed is:

1. A socket contact comprising two parts in assembled relation, one of said parts comprising a piece of sheet metal bent to provide a base and a pair of arms projecting from said base and defining an expansible split tubular body of generally D-shaped cross section, a spring finger projecting from one end of said base, the other of said parts of the socket contact comprising a substantially tubular sheet metal barrel, said barrel having a tubular forward end and a rearward end portion of generally D-shaped cross section telescoped within said tubular body of generally D-shaped cross section such that said parts are retained against rotation relatively to each other in assembled relation, means retaining said parts against axial displacement relatively to each other in such assembled relation comprising a lug on one part positioned in an aperture in the other part, said barrel having an intermediate portion provided with a slot extending along the underside of said projecting spring finger, said spring finger cooperating with said barrel in providing means for engaging a pin contact inserted in said tubular forward end of said barrel.

6

2. A socket contact comprising two parts in assembled relation, one of said parts comprising a piece of sheet metal bent to provide a base and a pair of arms projecting from said base and defining an expansible split tubular body of generally D-shaped cross section, said base having a dimple providing a lug projecting inwardly from said base and a spring finger projecting from one end of said base, the other of said parts of the socket contact comprising a substantially tubular sheet metal barrel, said barrel having a tubular forward end and a rearward end portion of generally D-shaped cross section provided with an aperture and telescoped within said tubular body of generally D-shaped cross section such that said parts are retained against rotation relatively to each other in assembled relation, said lug seating in said aperture to retain said parts against axial displacement relatively to each other in such assembled relation, said barrel having an intermediate portion provided with a slot extending along the underside of said projecting spring finger, said spring finger cooperating with said barrel in providing means for engaging a pin contact inserted in said tubular forward end of said barrel.

References Cited in the file of this patent

UNITED STATES PATENTS

1,978,510	Spence	Oct. 30, 1934
2,188,530	Del Camp	Jan. 30, 1940
2,410,098	Muller	Oct. 29, 1946

FOREIGN PATENTS

571,900	Great Britain	Sept. 13, 1945
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