Dec. 26, 1950

C. E. GILBERT
SOCKET RECEPTACLE HAVING BODY
AND CLOSURE MEMBER THEREFOR

2,535,356

Filed Oct. 19, 1948

2 Sheets-Sheet 1

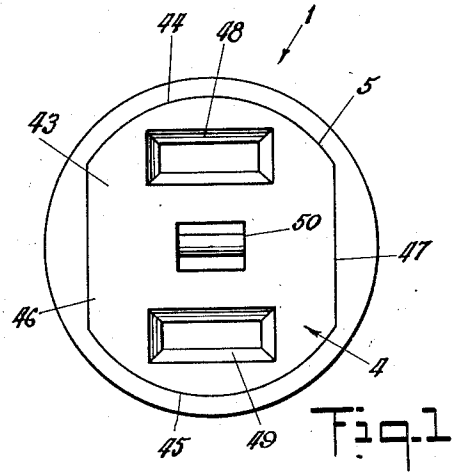


Fig. 1.

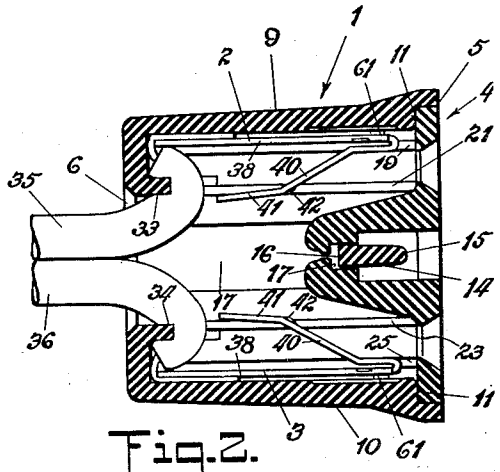


Fig. 2.

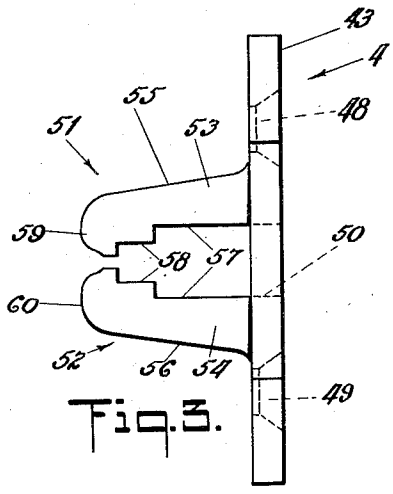


Fig. 3.

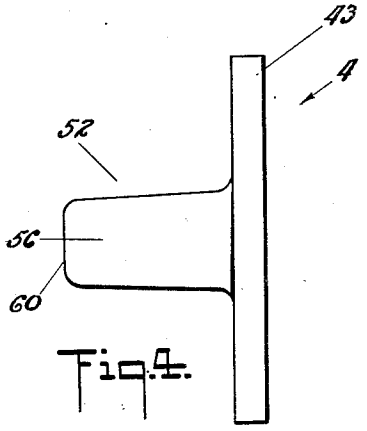


Fig. 4.

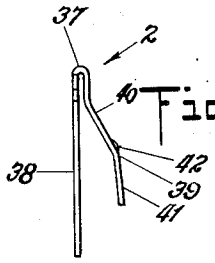


Fig. 5.

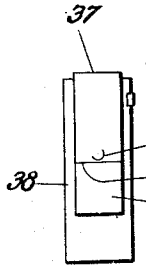


Fig. 6.

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2 Sheets-Sheet 2

Fig. 7.

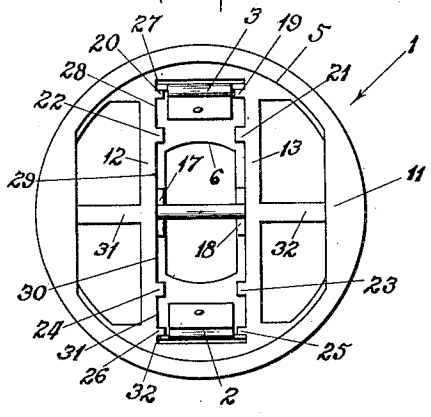
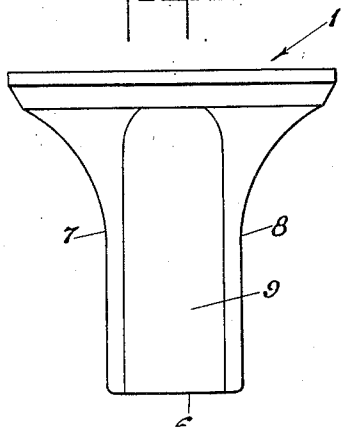


Fig. 8.



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SOCKET RECEPTACLE HAVING BODY AND CLOSURE MEMBER THEREFOR

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Application October 19, 1948, Serial No. 55,257

9 Claims. (Cl. 173—328)

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The invention relates to female electrical connectors and has particular reference to a novel construction of such type of connector and to the assembly of the same.

The main object of the invention is to provide a female type of electrical connector which can be made of a minimum of parts which are easily assembled without the use of tools and when assembled provides a connector which is efficient in use and cheap to manufacture.

A further object of the invention is to provide a female electrical connector construction in which the contact elements thereof may be easily and quickly positioned with respect thereto and held in the connector body and in connection with an electrical conductor, and the connection of the conductor thereto is a step in the assembly of the connector itself.

A further object of the invention is to provide an insulated closure member for the connector body which will permit the standard type of male terminal prongs of another electrical connector to be inserted therethrough and make electrical contact with the contact elements of the female connector, and which closure member is so constructed that, when it is seated with respect to the connector body, it will be held in an unremovable locked position therewith.

Further objects of the invention will be more fully pointed out hereinafter. In the drawing:

Figure 1 is an enlarged top plan view of the assembled female connector construction embodying the features of the invention,

Figure 2 is a sectional side view of the assembled connector,

Figure 3 is an enlarged side view of the closure cap used in the construction,

Figure 4 is an end view of said closure cap,

Figure 5 is an edge elevational view of one of the contact blades used in the construction,

Figure 6 is a front elevation of the contact blade,

Figure 7 is an enlarged top plan view of the connector body with the closure cap removed therefrom, and

Figure 8 is an end elevation view of the connector body.

As clearly indicated in Figure 2 of the drawings, the female electrical connector construction of my invention consists of four parts, namely, the connector body indicated generally by the numeral 1; the contact elements 2 and 3; and the closure member indicated generally by the numeral 4. No other parts, such as screws or rivets for retaining the contact blades within the connector body, for connecting them to a conductor, or for connecting another connector, are required.

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The connector body 1, is made by a molding operation using for this purpose a suitable insulating material which is adapted to form a rigid molded structure. The connector body is molded so that it is formed with the side walls 7 and 8, and the end walls 9 and 10, and with a central passage therethrough terminating in a generally circular shaped top opening 5 and a rectangular shaped bottom opening 6.

The connector body is so molded that there is formed therein a depressed ledge 11, positioned around the generally circular shaped top opening 5 and which ledge provides a seat to receive the cap portion 43 of the closure member 4, as will be more fully apparent later on herein.

The interior of the connector body is molded so that it is formed with two parallel spaced longitudinally extending walls 12 and 13 which extend the entire length of the connector body and merge at their lower ends with the side walls 7 and 8 of said body to form the side walls of the rectangular shaped bottom opening 6. The walls 12 and 13 extend across the connector body between the end walls 9 and 10 thereof as shown in Figure 7, and their top edges are positioned at the same height as the depressed ledge 11.

Extending between the walls 12 and 13, and at a right angle thereto, is a wall member 14 provided with a rounded top edge 15 (see Figure 2) which is positioned slightly below the level of the top edges of the walls 12 and 13. The wall member 14 is of narrow width and has the outer ends of its lower edge 16 merging with and integrally joined to the top of ribs 17 and 18 formed on the outer faces of the walls 12 and 13, and which ribs have their upper edges extending outwardly from either side of said wall 14.

The inner faces of the spaced parallel walls 12 and 13 have formed thereon the ribs 19, 20, 21, 22, 23, 24, 25, and 26, which extend longitudinally of said walls and form therebetween the series of adjacently positioned slots or recesses 27, 28, 29, 30, 31 and 32, the purpose of which will appear later on herein.

The interior of the connector body is also provided with the walls 31 and 32 which extend at right angles between the walls 12 and 13 and the side walls 7 and 8 of the connector body. The walls 31 and 32 serve to strengthen the interior of the connector body and reinforce the walls 12 and 13.

Adjacent to the lower opening 6 of the connector body, the end walls 9 and 10 thereof are

formed with the upwardly inwardly projecting shoulder members 33 and 34 (see Figure 2) which form the end walls of the lower opening and also form closed pockets on the interior of the connector body at the lower end of the slots in which the blades of the contact elements 2 and 3 are inserted. The upper edges of the members 33 and 34 also provide shoulders over which the insulated portions of wires 35 and 36 of a conductor cord are clamped by the contact element blades when said blades are assembled in their respective slots.

The contact elements 2 and 3, more clearly shown in Figures 5 and 6, are made of strips of resilient metallic conducting material bent upon themselves as at 37 into two legs 38 and 39. The leg 38 is made longer and of greater width than the leg 39 and extends in a vertical direction. The leg 39 has a portion 40 thereof bent outwardly from the leg 38 and at an angle thereto and is also bent so as to provide a substantially vertically extending portion 41 at its free end. On the outer face of the angularly bent portion 40 of the leg 39 is formed a raised button like contact projection 42.

The closure member 4, shown more clearly in Figures 3 and 4, is molded of an insulating material and is formed with a cap portion 43 having rounded ends 44 and 45 and straight sides 46 and 47 and so that it is shaped to fit and be seated on the depressed ledge 11 which surrounds the generally circular shaped opening 5 of the connector body. The cap portion 43 has rectangular shaped openings 48 and 49 therethrough which are adapted to receive male contact blades of another electrical connector. The cap portion 43 is also provided with a rectangular shaped central opening 50 therethrough.

Integrally formed with and projecting downwardly from the under side of the cap portion 43 of the closure members are the spaced apart tongue members 51 and 52 which are provided with the flat side faces 53 and 54 and the angularly extending end faces 55 and 56. The tongue members are also formed with rectangular shaped cut out portions 57 and 58 on their adjacent faces and with the rounded free ends 59 and 60.

In assembling the parts of the connector and connecting the contact elements to a conductor cord, the ends of the two insulated wires 35 and 36 of a conductor cord are separated from each other and the insulation removed therefrom. The bared ends of said wires are then inserted through the bottom opening 6 of the connector body and up through said body, and until they project a short distance above the upper open end of the body. The lower ends of the legs 38 of the contact elements 2 and 3 are then caused to become engaged with the bared ends of said wires and said legs with the other angularly projecting legs 39 of the contact elements facing inwardly of the connector body are manually inserted in the slots 27 and 32 formed by the ribs 19 and 20 and ribs 25 and 26, and the end walls of the connector body, with the result that the bared ends of said wires become folded around the lower ends of legs 38 of the contact elements and are forced down into said slots 27 and 32 and are gripped by the ends of said blades in the pockets formed at the bottom of the connector body by the outer end walls 9 and 10 and the upwardly projecting shoulder members 33 and 34. When the bared ends of said wires are thus gripped by said legs 38, the insulated portions of the wires adjacent said bared ends will be bent over the top edges of the shoulder members 33 and 34 and gripped over the same so that the conductor cord will be held firmly in place with respect to the connector body.

When the contact blades are fully seated in their respective slots 27 and 32, they are held firmly in place therein and against accidental displacement by a raised projection 61 formed on the inner faces of the end walls 9 and 10 of the connector body and with the bent legs 39 thereof projecting inwardly and across the slots 28 and 31 between the walls 12 and 13 formed by the ribs 19, 20, 21 and 22, and the ribs 23, 24, 25 and 26.

After the contact blades have been mounted in the connector body with the ends of the conductor wires clamped thereby in the slots 27 and 32, the closure member 4 is then applied to the connector body. In applying said closure member, it is positioned with respect to the top opening 5 of the body with the spaced tongues 51 and 52 thereof engaging therebetween the top edge 15 of the wall 14 and with the cap portion 43 aligned with said top opening and so that it will seat on the depressed ledge 11 surrounding said opening. The closure member is then forced downwardly so that the inner spaced faces of the tongues 51 and 52 thereof will slide downwardly over the sides of said wall 14 and until the top cap portion is fully seated on ledge 11 and the free ends of said tongues are engaged under the lower edge 16 of said wall and with the lower portion of said wall positioned between the cut out portions 58 and the upper portion thereof positioned between the cut out portions 57 of said tongues as clearly shown in Figure 2. When the closure member is thus seated it is held in an unremovable locked position with respect to the wall 14 of the connector body and with the openings 48 and 49 thereof positioned in alignment with the slots 28 and 31 on the interior of the connector and so that male contact blades or prongs of another electrical connector may be inserted therethrough and make electrical contact with the legs 39 of the contact elements 2 and 3 of the female electrical connector construction and which legs are projecting across said slots 28 and 31.

It will be seen from the above description that the contact blade elements of the female electrical conductor of my invention may be quickly, easily and securely positioned within the connector body without the use of rivets or other securing means and in such manner that they will securely hold in electrical contact therewith, the bared ends of the wires of a conductor cord. Also, the insulated closure member can be positioned in an unremovable locked position with respect to the connector body by merely sliding the tongues thereof over the wall 14 and so that the free ends of said tongues become locked under the lower edge of said wall. The construction also is comprised of a minimum of parts all of which are cheap to manufacture and easily assembled by anyone without the use of tools or without any mechanical or electrical knowledge, and the construction provides an efficient electrical female connector to which the male contact prongs of another electrical connector may be easily and readily connected.

What is claimed is:

1. A female electrical connector adapted to be connected to a two-wire line and comprised of a hollow rigid body of insulating material having a top and bottom opening therein, and hav-

ing two walls extending across and the length of the interior of said body in spaced parallel relation to each other and having longitudinally extending adjacently positioned slots formed between the adjacent faces thereof, a third wall positioned between and extending at right angles to said spaced walls, a pair of two legged electrical contact members, each having one leg thereof seated in a slot formed adjacent the walls of said body and when so seated adapted to contact and clamp in said slot the bare ends of the wires of a two-wire line, and having the other leg thereof projecting across the next adjacent slot formed between said spaced walls, and a closure member made of insulating material seated in the top opening of said body and having contact prong receiving openings therethrough which are aligned with the slots across which the projecting legs of said contact members extend, said closure member being provided with means which are engaged with said third wall in said body and which hold said closure member in locked position with respect to said body.

2. A female electrical connector adapted to be connected to a two-wire line and comprised of a hollow rigid body of insulating material having a top and bottom opening therein, and having two walls extending across the interior of said body and longitudinally thereof, and in spaced parallel relation to each other and having longitudinally coinciding ribs on the adjacent faces thereof forming a series of adjacently positioned slots between said walls, a third wall positioned between and extending at right angles to said spaced walls, a pair of two legged resilient electrical contact members, each having one leg thereof seated in a slot closed at its lower end and formed by a pair of said ribs and the walls of said body, and when so seated being adapted to contact with and clamp in said slot the wires of a two-wire line extending through the bottom opening of said body, and having its other leg projecting across the next adjacent slot formed between said spaced walls, and a closure member made of insulating material seated in the top opening of said body and having contact prong receiving openings therethrough positioned in alignment with the slots across which the projecting legs of said contact members extend, said closure being provided with means which engage over said third wall in said body and which are held in locked engagement with the lower edge of said wall.

3. A female electrical connector adapted to be connected to a two-wire line and comprised of a hollow rigid body of insulating material having a top opening with a depressed ledge surrounding the same, and a rectangular shaped bottom opening adapted to receive an electrical conductor cord therethrough, a pair of spaced walls extending across said body and longitudinally thereof and having longitudinal adjacently positioned slots formed between their adjacent faces, a third wall of narrow width and length extending centrally between and at a right angle to said spaced walls and with its upper edge positioned below the upper edges of said spaced walls, a pair of two legged resilient electrical contact members, each consisting of a strip of conducting material bent upon itself to form a two legged blade, one leg of which is seated in a slot formed between said spaced walls and positioned adjacent the walls of said body and which is closed at one end, and when so seated is adapted to

make contact with the wires of an electrical two-wire line inserted through said bottom opening in said body and to force said wires against the bottom of said slot, and the other leg of said contact member extending across the next adjacent slot formed between said spaced walls, and a closure member made of insulating material having a cap portion seated in said depressed ledge around the top of said body and provided with contact prong openings therethrough which are aligned with said slots across which the second mentioned legs of said contact members extend, said cap portion also being provided with means extending from the lower face thereof adapted to be engaged in locked connection with the lower edge of said third wall.

4. A female electrical connector adapted to be connected to a two-wire line and comprised of a hollow rigid body made of insulating material having a top and bottom opening therein and having a pair of walls extending longitudinally and in parallel spaced relation to each other in the interior of said body with their lower ends forming two of the sides of the bottom opening of said body, said walls having coinciding spaced ribs in the adjacent faces thereof forming a plurality of longitudinally extending adjacently positioned slots between said walls, a third wall of narrow width positioned centrally between said spaced walls and extending at a right angle thereto, a pair of two legged resilient electrical contact elements, each having one leg thereof seated in a slot formed between said spaced walls and which is positioned adjacent to the walls of said body and provided with a closed lower end, and when so seated adapted, to make contact with and to clamp in the bottom of said slot the wires of a two-wire line inserted through the bottom opening of said body, and having its other leg projecting inwardly of said body and across the next adjacent slot formed between said walls, and a closure member made of insulating material seated in the top opening of said body having contact prong receiving openings therethrough registering with the slots across which the legs of said contact elements project, and also having downwardly projecting spaced tongues which engage therebetween the said third wall positioned in said body and with their free ends in locked engagement with the lower edge of said wall.

5. A female electrical connector and line combination comprised of a hollow rigid body made of insulating material and having openings through the upper and lower ends thereof, two longitudinally extending spaced walls formed on the interior of said body and in parallel relation to each other, a wall of narrow width positioned at right angles to and extending between said spaced walls and having a rounded top edge, and reinforcing walls extending between the outer faces of said spaced walls and the walls of said body, said spaced walls having coinciding longitudinally extending ribs on the adjacent faces thereof forming a plurality of slots between said walls, a pair of two legged resilient contact elements, each having one leg thereof seated in a slot formed between said spaced walls and positioned adjacent to the walls of said body and which is closed at its lower end, and having the other leg thereof projecting across the next adjacent slot formed between said spaced walls, a two-wire line having a pair of wires extending through the lower opening of said connector body, each with a bared end within a respective one

of said contact-element-receiving slots and contacting and clamped by a respective contact element in its slot and a closure member made of insulating material having a cap portion seated in the upper open end of said connector body and having contact prong receiving openings therethrough registering with the slots across which the inwardly projecting resilient legs of said contact elements extend, said cap portion also having downwardly extending spaced apart tongues engaging therebetween the sides of said narrow width wall and with their free ends engaged under the lower edge of said wall.

6. A female electrical connector and line combination comprising a hollow body of insulating material, two spaced walls formed in the interior of said body and extending across the same, and a third wall of narrow width positioned at a right angle to and extending between said spaced walls, said spaced walls having a plurality of coinciding ribs formed on their adjacent faces providing a plurality of channels between said faces bounded by said ribs, a pair of two legged contact elements formed of conducting material each having one leg thereof seated in a channel which is formed adjacent to the walls of said body, and having the other leg extending inwardly of said body and across the next adjacent channel formed between said walls, a two-wire line having a pair of wires, each with a bared end extending within a respective one of said contact-element-receiving channels and contacting and clamped by a respective contact element in its channel and a closure member having a cap portion provided with contact blade receiving openings therethrough and spaced apart downwardly projecting tongue members having cut away portions in their adjacent faces adjacent their ends, said closure member having its cap portion seated in the top of said hollow body and with the inner faces of its tongue members engaging the sides of said third wall and the cut away portions thereof engaged in locked position under the lower edge of said wall.

7. A female electrical connector comprising a unitary hollow body of insulating material having side and end walls and openings extending through the top and bottom thereof and a depressed flat ledge surrounding said top opening, a pair of spaced walls formed in the interior of said body and extending between the end walls of said body and a wall of narrow width extending between the same and at a right angle thereto, a plurality of longitudinally extending coinciding ribs formed on the adjacent faces of said spaced walls forming a series of adjacently positioned longitudinally extending channels between said walls, a pair of two legged electrical contact members each having one leg thereof seated in a channel formed adjacent to the end walls of said body and having the other leg bent so that it extends across the next adjacent channel formed between said spaced walls, and a closure member made of insulating material and having a cap portion provided with spaced apart contact receiving openings therethrough and with a pair of downwardly projecting tongues extending from the lower face thereof and having spaced apart inner faces formed with coinciding cut away portions therein, said closure member having its cap portion seated in the depressed flat ledge surrounding said top opening of said body and with the openings therethrough aligned with the channels across which the bent legs of said contact members extend and with the inner faces of said tongues engaging therebetween the sides of said narrow width wall and with the free ends thereof engaged under the lower edge of said wall.

8. A female electrical connector comprising a unitary hollow body of insulating material having a circular shaped top opening formed with a depressed ledge therearound and a rectangular shaped bottom opening, a pair of spaced walls in the interior of said body and forming sides of a central passage through said body and two sides of said rectangular shaped bottom opening, said walls having a plurality of coinciding spaced ribs provided on the adjacent faces thereof forming recesses extending lengthwise between said walls, the other recesses between said walls terminating at their lower ends in closed pockets, a wall extending at right angles to said spaced walls with the ends of the lower edge thereof joined to ribs formed on the outer faces of said spaced walls, a pair of contact elements each made of strips of conducting material bent upon itself to form a two legged blade, one leg of which is seated in the outer recesses formed by said ribs and makes contact with the wires of an electrical conductor and forces the same against the bottom pockets of said recesses and so that said conductor wires are sharply bent around and held by the ends of said leg, and the other leg extending at an angle to said first mentioned leg and projecting inwardly across the recess positioned adjacent to that in which the first leg is seated, and a closure member made of insulating material and having a cap portion seated in the depressed ledge of the circular shaped top opening of the body and a pair of spaced tongues projecting from the under side of said cap portion and positioned in the recesses formed between said spaced walls on either side of said wall which extends between said spaced walls and which tongues engage therebetween the sides of said wall and with their free ends engaged under the lower edge of said wall to hold said closure member in locked position with respect to said connector body, said cap portion being provided with openings therethrough in alignment with the recesses across which the bent legs of said contact elements extend and which openings are adapted to receive the contact blades of a male electrical connector.

9. A female electrical connector comprising a hollow rigid body of insulating material formed with side walls and end walls and with a circular shaped top opening and a rectangular shaped bottom opening therein, two parallel spaced apart longitudinally extending walls formed on the inside of said body and which have their lower ends merging with the side walls of said body and forming the side walls of the rectangular shaped bottom opening, the said end walls of said body having their lower ends formed with inwardly and upwardly projecting shoulders which form the end walls of said lower opening, said spaced interior walls of said body having coinciding longitudinally extending ribs formed on their adjacent faces which in turn form a plurality of adjacently positioned slots between said walls, the outer ones of which terminate in closed pockets formed by said upwardly projecting shoulders of said end walls of said body, a third wall positioned between and extending at a right angle to said spaced walls, two legged electrical contact elements each having one leg thereof seated in said outer positioned slots and having its free end contacting with the wires of an electrical conductor and clamping the same in said closed pocket of said slot and having the free end of the other leg extending angularly across a slot positioned ad-

jacent to that in which the first mentioned leg is seated, and a closure member made of insulating material seated in the top opening of said body and having contact prong receiving openings therethrough which are aligned with the slots across which the angularly extending legs of said contact elements project, said closure member being provided with means which engage with said third wall in said body and hold said closure member in locked position with respect to said body.

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