July 13, 1965 HOP LEE 3,195,100

ELECTRIC PLUG COUPLING

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FIG. 1.

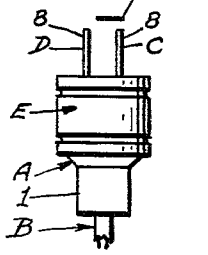



FIG. 2.

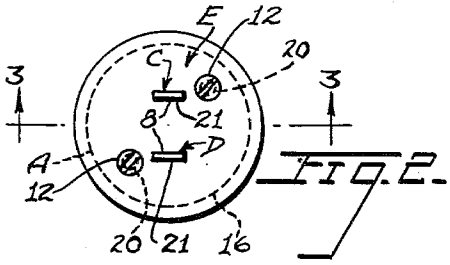



FIG. 3.

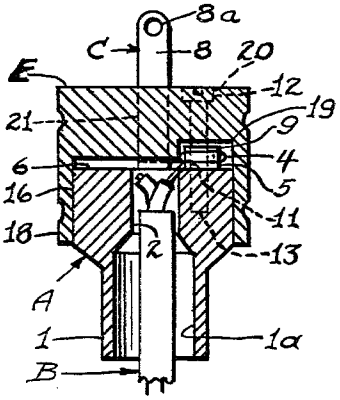



FIG. 5.

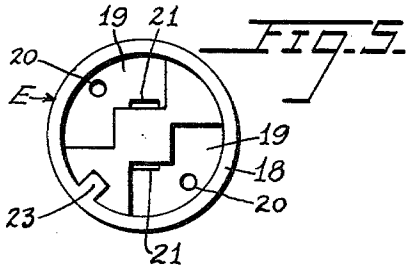



FIG. 4.

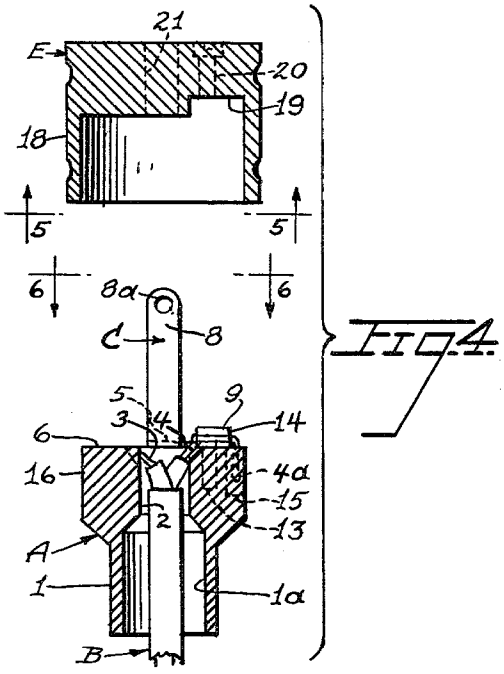
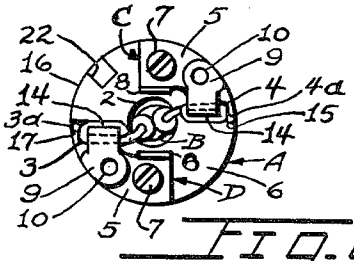



FIG. 6.




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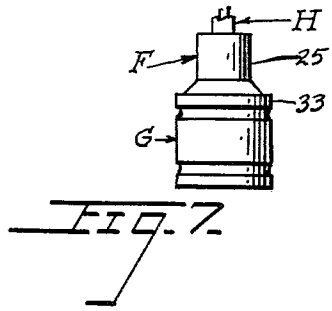



FIG. 7

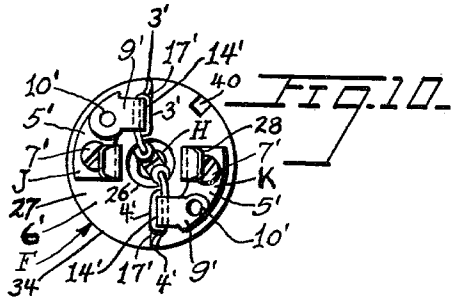



FIG. 10

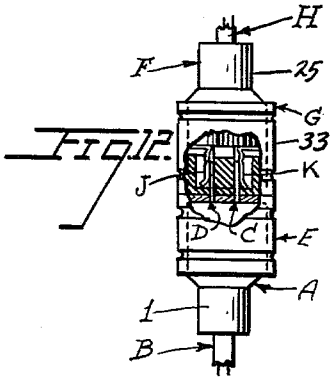



FIG. 12

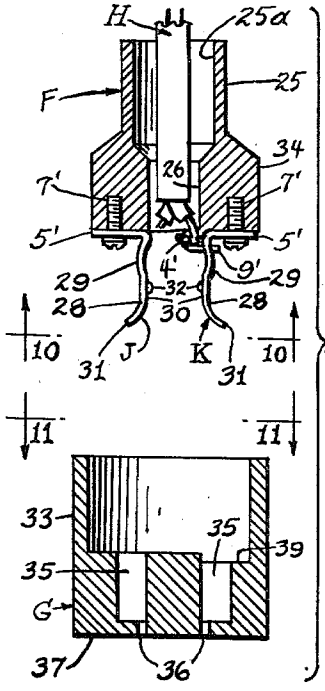



FIG. 9

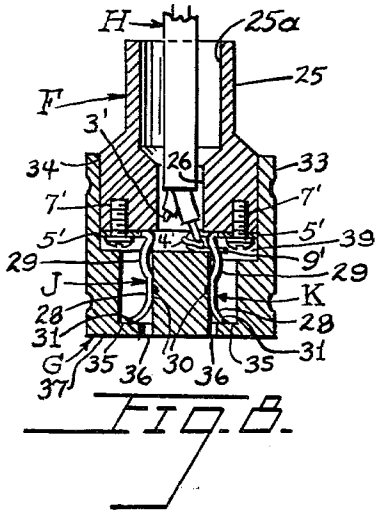



FIG. 8

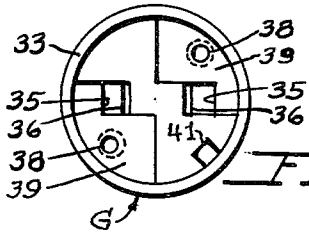



FIG. 11

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United States Patent Office 3,195,100 Patented July 13, 1965



3,195,100

# ELECTRIC PLUG COUPLING

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Filed Nov. 12, 1963, Ser. No. 323,027
6 Claims. (Cl. 339—191)

The present invention relates to improvements in an electric plug coupling, and it consists in the combination, construction and arrangement of parts as hereinafter described and claimed.

An object of my invention is to provide an electric plug coupling in which both the plug and the socket each comprise a body portion that supports the two or more electrodes and a cap that encloses the portions of the electrodes that have the wires connected thereto. The cap that is used with the socket encloses all of the electrodes in the socket and has slots for receiving the terminals of the plug and permitting these terminals to make electrical contact with the electrodes of the plug.

A further object of my invention is to provide an electric plug coupling that has a body with at least two electrodes and these electrodes have base portions with bent back portions around which the wires may be wrapped for forming an electrical connection between the wires and the electrodes. The body has a periphery with grooves therein for receiving the ends of the wires. The body receives a cap that encloses the body periphery and covers the grooves so as to cover the wires and aid in connecting them to the electrodes. The wires can be connected more quickly to my electrodes than is possible where screws are used for connections.

A further object of my invention is to provide an electric plug coupling that has a plug portion and a socket portion. The plug portion has two or more outwardly extending terminals that can be removably received in a like number of slots in the socket. The plug portion could have its terminals electrically connected to a wall electric socket in a building or the like. The device is simple in construction and is durable and efficient for the purpose intended.

Other objects and advantages will appear as the specification continues. The novel features of the invention will be set forth in the appended claims.

*Drawings*

For a better understanding of my invention, reference should be made to the accompanying drawings, forming part of this specification, in which:

FIGURE 1 is a side elevation of the plug portion of the device.

FIGURE 2 is a top plan view of FIGURE 1 and is shown on a larger scale.

FIGURE 3 is a vertical section taken along the line 3—3 of FIGURE 2.

FIGURE 4 is an exploded view of FIGURE 3 and shows the two parts, i.e., the cap and the body of the plug separated from each other.

FIGURE 5 is a bottom view of the cap shown in FIGURE 4 when looking in the direction of the arrows 5—5 of FIGURE 4.

FIGURE 6 is a top plan view of the body of the plug shown in FIGURE 4 when looking in the direction of the arrows 6—6 of this figure.

FIGURE 7 is a side elevation of the socket of the device and is shown on the same scale as FIGURE 1.

FIGURE 8 is a vertical section on an enlarged scale of the socket shown in FIGURE 7. The scale of FIGURE 8 is the same as the scale of FIGURE 3.

FIGURE 9 is an exploded sectional view of FIGURE 8, showing the cap and the body of the socket in spaced apart relation.



FIGURE 10 is a view of the body shown in FIGURE 9 when looking in the direction of the arrows 10—10 of FIGURE 9.

FIGURE 11 is a view of the cap shown in FIGURE 9 when looking in the direction of the arrows 11—11 of FIGURE 9.

FIGURE 12 is a side elevation of the electric plug coupling when both the plug and the socket are interconnected. Portions of the caps for both the plug and socket are shown in section so as to illustrate the electrical connection between the two. The body of the plug and the body of the socket are shown in elevation. The scale of FIGURE 12 is the same as the scale of FIGURE 7.

While I have shown only the preferred form of my invention, it should be understood that various changes, or modifications, may be made within the scope of the annexed claims without departing from the spirit thereof.

*Detailed description*

In carrying out my invention I will first describe the construction of the plug portion of my device and then will describe the socket portion. The plug portion is shown in FIGURES 1 to 6 inclusive while the socket portion is shown in FIGURES 7 to 11 inclusive. The connection of the plug with the socket is shown in FIGURE 12. In FIGURES 3, 4 and 6, I show the body of the plug portion of my device while in FIGURES 2, 4 and 5, I show the cap portion of the plug.

The body portion of the plug comprises a body A that is made of an insulating material and this body has a cylindrical end 1 for receiving an electric cord indicated generally at B. The bore 1*a* in the cylindrical end 1 communicates with a second bore 2 and is axially aligned therewith. The two wires 3 and 4 of the electric cord B are received in the bore 2 and then these wires project through the top of the bore and are connected to electrodes in a manner now to be described. It is possible to have the electric cord B carry three wires, not shown, and in this case, the body A would be provided with three electrodes, not shown, rather than two. Each of the two electrodes C and D is identical to the other and I have illustrated only two in FIGURE 4 although I do not wish to be limited to just these two.

In FIGURES 4 and 6, I show the two electrodes C and D. A description of the electrode C will suffice for both. The electrode C has a base portion 5 and this base portion is supported by the end 6 of the body A, see FIGURE 4. A cap screw 7 is inserted through an opening in the base 5 and is screwed into a threaded bore provided in the body A for securing the base to the body. The base 5 carries an upstanding terminal 8 and this terminal is provided with an opening 8*a* that is disposed near the outer end of the terminal. The purpose of this opening will be described later.

The base 5 also has one end bent back upon itself as shown at 9 in FIGURE 6 and this end is spaced above the base 5 as shown in FIGURE 4. The bent back end 9 has an opening 10 therein for receiving a screw that is used for connecting a cap E that is adapted to partially enclose the body A and cover the base 5 of the electrode in a manner hereinafter described. The opening 10 in the bent back portion 9 of the base 5 is aligned with a second opening 11, see FIGURE 3 and these two openings will receive a screw 12 that is used for removably connecting the cap E to the body A. The body A has a threaded bore 13 that is aligned with the openings 10 and 11 and receives the screw 12 and in this way the cap F is connected to the body A. Two screws 12 are shown in FIGURE 2.

FIGURE 6 shows the wire 4 of the electric cord B with the insulating material of the wire removed so that the

bare wire can be extended through the space between the base 5 and the bent back end 9 and then this wire is bent around the curved portion 14 that interconnects the base 5 with the bent back portion 9. The free end of the bared wire 4 is then again passed between the base 5 and the bent back portion 9 so as to form a complete loop around the curved portion 14. The free end 4*a* of the bared wire 4 is then bent so as to be received in a longitudinally extending recess 15 in the outer circumference 16 of the body A, see FIGURES 4 and 6. This wall of the bore 2 has a groove disposed near the curved portion 14 so that the bare wire 4 is received in this groove as the wire leads to the portion 14 around which it is looped.

The wire 3 is connected to the electrode D in exactly the same manner as that just described for connecting the wire 4 to the electrode C. The free end 3*a* of the wire 3 is received in a second longitudinally extending groove 17 that extends inwardly from the circumference 16 and is disposed diametrically opposite from the longitudinally extending recess 15, see FIGURE 6.

The cap E is provided with a cylindrical or sleeve-like portion 18, see FIGURE 4, and the inner wall of this portion slidably receives the outer peripheral wall 16 of the body A, see FIGURE 3. The cap has recesses 19, see FIGURE 5, that are provided in the inner end of the cylindrical portion 18. These recesses 19 receive the base portions 5 and the bent back portions 9 of the electrodes C and D.

The cap E is also provided with two diametrically opposed openings 20 that receive the screws 12 by means of which the cap is removably secured to the body A. The cap also has spaced apart slots 21 for receiving the two terminals 8 of the electrodes C and D. In order that the cap E be properly positioned on the body A, I provide the body with a key slot 22, see FIGURE 6, and I provide the cap with an inwardly extending key 23, see FIGURE 5. The key 23 of the cap E must be aligned with the slot 22 in the body A.

FIGURE 1 shows the cap E enclosing the body A with the exception of the cylindrical end 1 of the body. The electric cord B enters the cylindrical end 1 and the wires of this cord are connected to the electrodes C and D. The terminals 8 project above the top of the cap E as clearly shown in FIGURE 1 and these portions are adapted to be received in the socket which will now be described. The cap E has two spaced-apart annular grooves in its outer periphery in order to give design appeal to the device. The opening 1*a* can be made smaller in diameter to be just large enough to receive the electric cord B.

In FIGURE 7, I show an outer elevation of the socket for my electric coupling and in FIGURES 8 and 9, I show the two parts of the socket in enlarged section. One part is the body F and the other part is the cap G. The body F has a cylindrical end 25 that is similar to the cylindrical end 1 of the body A of the plug. The bore 25*a* in the cylindrical end 25 receives an electric cord H. The bore 25*a* communicates with a smaller diametrical bore 26 and is aligned therewith. The bore 26 opens out onto the end 27 of the body F, see FIGURE 10.

I provide two electrodes J and K. The bases 5′ of these electrodes are identical to the bases 5 of the electrodes C and D. Therefore similar numbers will be given for similar parts but the numbers for the electrodes J and K will be primed. For example, the bases 5′ of the electrodes J and K are provided with turned back end portions 9′. Screws 7′ secure the bases 5′ to the body F, see FIGURES 9 and 10. The electric cord H has wires 3′ and 4′ that are secured to the electrodes J and K in exactly the same manner as the wires 3 and 4 are secured to the electrodes C and D.

The body F has inwardly extending slots or grooves 17′, see FIGURE 10, and these grooves receive the ends of the wires 3′ and 4′ after the wires have been wrapped around the curved portions 14′ that interconnect the bases 5′ with the turned back portions 9′. In this way the wires



are securely connected to the electrodes J and K without the necessity of wrapping these wires around the threaded shanks of screws which is the present practice in the usual electric plug or socket.

The electrodes J and K differ from the electrodes C and D in that they have terminal members 28 that are a different shape than the terminal members 8 for the electrodes C and D. FIGURE 8 and exploded FIGURE 9 show the body F with the electrodes J and K. The terminal 28 of each electrode has a curved portion 29, a flat portion 30 and an end portion 31 that is curved outwardly. The flat portions 30 of the electrodes J and K have inwardly extending projections 32 and these are adapted to be received in the openings 8*a* of the terminals 8 when the plug shown in FIGURE 1 is electrically connected to the socket shown in FIGURE 7.

The cap G, see FIGURE 9, has a cylindrical or sleeve-like portion 33 for slidably receiving the outer cylindrical periphery of the body F, see FIGURE 8. The cap has recesses 35, see FIGURE 9, that receive the terminals J and K when the cap is slipped over the cylindrical surface 34 of the body F. Slots 36 are also provided in the cap and these slots extend inwardly from the top 37 of the cap and communicate with the recesses 35.

FIGURE 11 illustrates the cap G as having two diametrically opposed openings 38 for receiving screws. These screws are similar to the screws 12 and they are received in the openings 10′ provided in the turned back portions 9′ of the electrodes K and L. The screws have their threaded shanks received in threaded bores in the body F and these bores are aligned with the openings 10′ in the electrodes J and K.

The cap G has recesses 39 of lesser depth than the recesses 35 and the recesses 39 are for the purpose of receiving the base 5′ and turned back portions 9′ of the electrodes J and K, see FIGURES 8 and 11. The body G has a slot 40 in its periphery, see FIGURE 10, and this slot receives a key 41 that extends inwardly from the cylindrical wall 33 of the cap G. The key and slot must be aligned before the cap can be slipped over the body F. In this way the electrodes J and K are properly aligned with the recesses 35 and the base portions of the electrodes are properly aligned with the recesses 39.

The cap G is made of insulating material and so is likewise the body F. When the cap G is mounted on the body F and is secured thereto by the screws then it will entirely enclose the electrodes J and K. Electric contact can be made with these electrodes when the terminals 8 of the electrodes C and D in the plug A are received in the slots 36 in the cap G. The terminals 8 will enter the slots when the plug is electrically connected to the socket and will force the terminals 28 of the socket away from each other. When the plug is connected to the socket the projections 32 on the terminals 28 will be received in the openings 8*a* in the terminals 8. In this way an electrical connection is maintained between the wires in the electric cord B and the wires in the electric cord H.

I claim:

1. In a device of the type described; a plug comprising:
   (a) a body member made of insulating material and having an end and a bore extending longitudinally through said body for receiving electric wires;
   (b) a plurality of electrodes secured to the end of said body;
   (c) each electrode having a base with a bent back portion that is spaced away from and parallels said base; the connecting part between said bent back portion and said base of each electrode being adapted to have one of said wires wrapped therearound for forming an electrical connection therewith;
   (d) said body having an outer periphery with recesses therein that extend from said end, said recesses receiving the ends of the wires that extend beyond the wrapped around portions of the wires;

(e) each electrode having an outwardly-extending terminal, the terminals of said electrodes paralleling each other;

(f) an insulating cap having slots therein for receiving said terminals;

(g) said cap having a sleeve-like portion for slidably receiving the periphery of said body so that said sleeve-like portion will retain the wire ends in said body grooves; and

(h) means for securing said cap to said body.

2. The combination as set forth in claim 1; and in which

(a) the outer periphery of said body is cylindrical;

(b) the sleeve-like portion of said cap being cylindrical, the diameter of the inner surface of said sleeve-like portion being equal to the diameter of the outer periphery of said body;

(c) said body having a key slot extending inwardly from said periphery and terminating at said body end; and

(d) said sleeve-like portion having a key extending inwardly from the inner surface and adapted to be received in the key slot when the cap is mounted on the body.

3. In a device of the type described; a socket comprising:

(a) a body member made of insulating material and having an end and a bore extending longitudinally through said body for receiving electric wires;

(b) a plurality of electrodes secured to the end of said body;

(c) each electrode having a base with a bent back portion that is spaced away from and parallels said base; the connecting part between said bent back portion and said base of each electrode being adapted to have one of said wires wrapped therearound for forming an electrical connection therewith;

(d) said body having an outer periphery with recesses therein that extend from said end, said recesses receiving the ends of the wires that extend beyond the wrapped around portions of the wires;

(e) each electrode having an outwardly-extending terminal, each terminal having an arcuate portion disposed near said base followed by a flat portion and ending in an outwardly curved portion, the flat portion having an inwardly extending projection;

(f) an insulating cap having recesses therein for receiving said terminals, said cap also having slots therein communicating with said recesses;

(g) said cap having a sleeve-like portion for slidably receiving the periphery of said body so that said sleeve-like portion will retain the wire ends in said body grooves; and

(h) means for securing said cap to said body.

4. The combination as set forth in claim 3; and in which

(a) the outer periphery of said body is cylindrical;

(b) the sleeve-like portion of said cap being cylindrical, the diameter of the inner surface of said sleeve-like portion being equal to the diameter of the outer periphery of said body;



(c) said body having a key slot extending inwardly from said periphery and terminating at said body end; and

(d) said sleeve-like portion having a key extending inwardly from the inner surface and adapted to be received in the key slot when the cap is mounted on the body.

5. In a device of the type described; a socket comprising:

(a) a body member made of insulating material and having an end and a bore extending longitudinally through said body for receiving electric wires;

(b) a plurality of electrodes secured to the end of said body;

(c) each electrode having a base with a bent back portion that is spaced away from and parallels said base; the connecting part between said bent back portion and said base of each electrode being adapted to have one of said wires wrapped therearound for forming an electrical connection therewith;

(d) said body having an outer periphery with recesses therein that extend from said end, said recesses receiving the ends of the wires that extend beyond the wrapped around portions of the wires;

(e) each electrode having an outwardly-extending terminal;

(f) an insulating cap having recesses therein for receiving said terminals, said cap also having slots therein communicating with said recesses;

(g) said cap having a sleeve-like portion for slidably receiving the periphery of said body so that said sleeve-like portion will retain the wire ends in said body grooves; and

(h) means for securing said cap to said body.

6. The combination as set forth in claim 5; and in which

(a) the outer periphery of said body is cylindrical;

(b) the sleeve-like portion of said cap being cylindrical, the diameter of the inner surface of said sleeve-like portion being equal to the diameter of the outer periphery of said body;

(c) said body having a key slot extending inwardly from said periphery and terminating at said body end; and

(d) said sleeve-like portion having a key extending inwardly from the inner surface and adapted to be received in the key slot when the cap is mounted on the body.


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