Jan. 17, 1956 L. L. HAZEN 2,731,615

ELECTRIC SOCKET AND PLUG CONSTRUCTION

Filed May 3, 1954 2 Sheets-Sheet 1

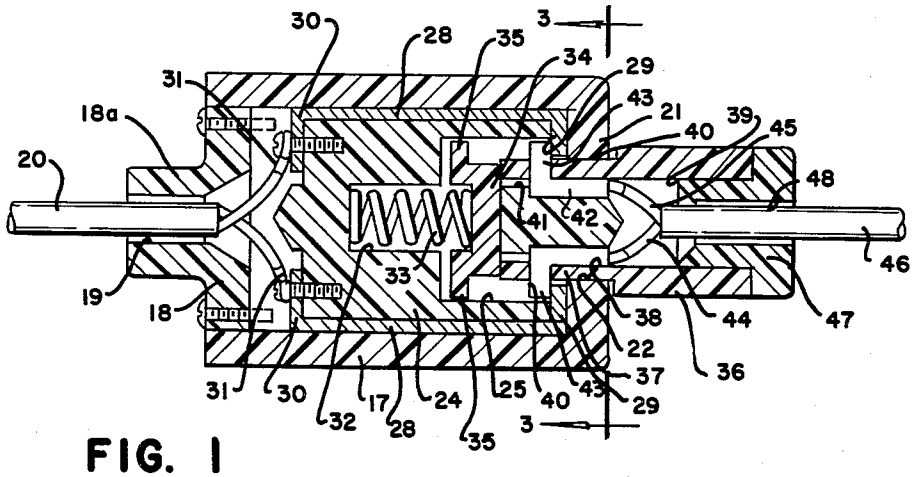


FIG. 1

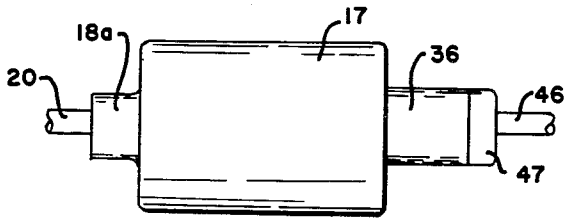
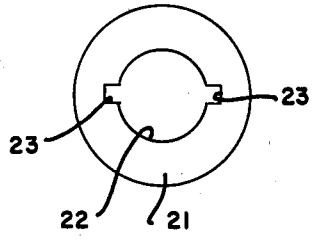


FIG. 2

FIG. 3



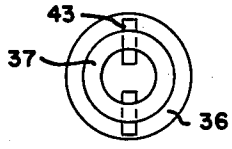


FIG. 4

FIG. 5

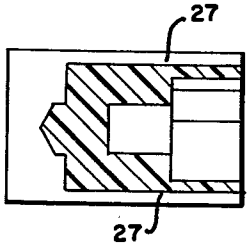
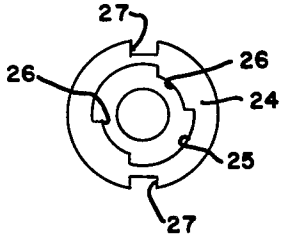


FIG. 6



INVENTOR.
LYSLE L. HAZEN
BY
ATTORNEY

Jan. 17, 1956 L. L. HAZEN 2,731,615

ELECTRIC SOCKET AND PLUG CONSTRUCTION

Filed May 3, 1954 2 Sheets-Sheet 2

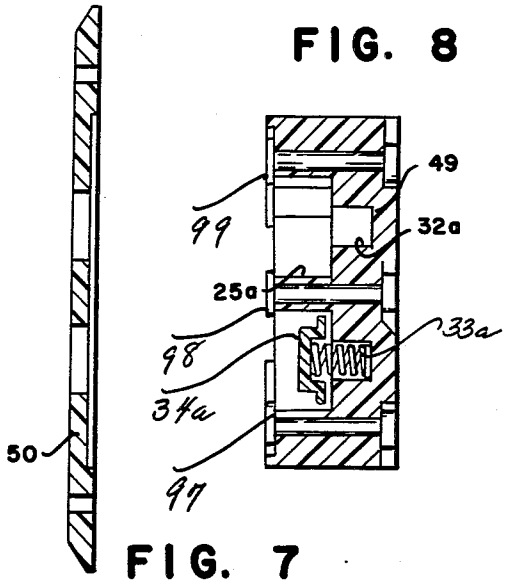


FIG. 8

FIG. 7

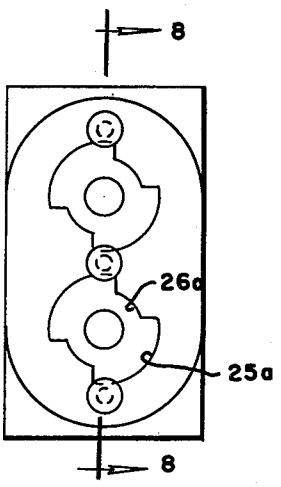


FIG. 9

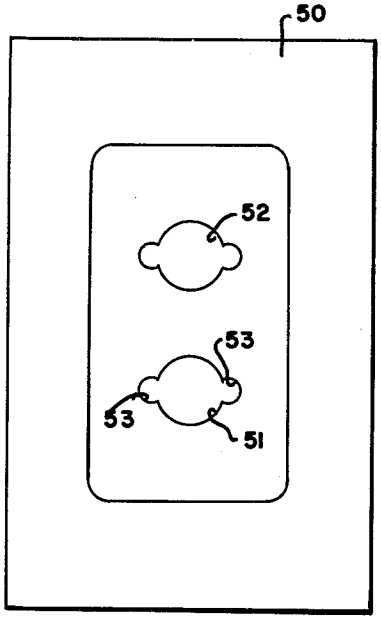


FIG. 10

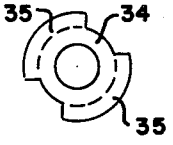


FIG. 11

INVENTOR.

LYSLE L. HAZEN

BY

ATTORNEY

United States Patent Office 2,731,615 Patented Jan. 17, 1956

2,731,615

ELECTRIC SOCKET AND PLUG CONSTRUCTION

Lysle L. Hazen, Detroit, Mich.

Application May 3, 1954, Serial No. 427,056

6 Claims. (Cl. 339—189)

My invention relates to a new and useful improvement in electric plugs and sockets for use on extension cord connections such as used for household appliances, connections to electric motors, and so forth. The construction is of the "keyhole" type in which the socket has a keyhole opening through which may be extended a crosshead contact member carried by the plug.

It is an object of the present invention to provide in such a structure terminal connections in which the terminals are rigid as distinguished from those of the spring type so that the looseness of socket and plug connections which develops where spring terminals are used due to the loss of resiliency or spring pressure in the terminal connections, is avoided.

Another object of the invention is the provision of a socket and plug construction wherein a positive, rigid connection is present at all times, thus avoiding the disadvantages and dangers arising from a loose connection which frequently develops in a plug and socket construction of the spring type.

Another object of the invention is the provision of a socket and plug construction so arranged that the parts, when in operative relationship, are locked together, thus providing a safety feature and preventing undue disconnection resulting from a tug on the cord or resulting from vibration.

Another object of the invention is the provision of a socket and plug construction which will be easily and quickly assembled, economically manufactured, and highly efficient in use.

Other objects will appear hereinafter.

It is recognized that various modifications and changes may be made in the detail of structure illustrated and it is intended that the present disclosure shall be considered to be but the preferred embodiment.

Forming a part of this application are drawings in which:

Fig. 1 is a longitudinal central sectional view of the invention illustrating its use as a cord socket and plug;

Fig. 2 is a side elevational view of the structure shown in Fig. 1, slightly reduced in size;

Fig. 3 is an elevational view of the outer housing taken on line 3—3 of Fig. 1;

Fig. 4 is an end elevational view of the plug used in the invention;

Fig. 5 is a longitudinal sectional view of the terminal retainer body reduced in size from that shown in Fig. 1;

Fig. 6 is an end elevational view of the structure shown in Fig. 5;

Fig. 7 is a sectional view through a cover plate used in the invention;

Fig. 8 is a cross sectional view of a housing adapted for mounting in a rigid support such as a wall;

Fig. 9 is a front elevational view of the housing shown in Fig. 8;

Fig. 10 is a front elevational view of the cover plate shown in Fig. 7;

Fig. 11 is an end elevational view of a cap used in the invention.

In Fig. 1, I have illustrated the invention as a cord socket and plug used for connecting together two electric cords. The invention comprises a housing or outer shell 17 which may be made from plastic, rubber, or any other suitable material. Mounted on this housing 17 is an end wall 18 having a passage 19 formed therethrough, through which is projected one end of the cord 20. This housing 17 is formed substantially cup-shaped and in the bottom 21 thereof is formed a circular opening 22. Diametrically oppositely positioned radially directed slots 23 are formed in the bottom 21 opening into the opening 22.

Positioned in the housing 17 is a contact retainer 24 formed from suitable insulating material, having a socket 25 formed in one end and having at said end diametrically opposite longitudinal lips 26 extended into the socket.

Formed in the periphery of this retainer 24 at opposite sides thereof are longitudinally extended grooves 27 which are diametrically opposite each other. Positioned in each of these grooves 27 is a conducting bar 28 having angularly turned ends 29 and 30 so that the bar is thus formed U-shape. The legs 30 serve as terminals to which the conducting wires 31 are attached. The legs or ends 29 serve as terminals for engaging the terminals of the plug.

Communicating with the socket 25 centrally thereof and extending into the retainer 24 is a socket 32 in which is positioned a spring 33 which bears at one end against the bottom of the socket 32 and at the other end against the inner face of a cap or presser member 34, having at one end the diametrically opposite flanges 35. In inserting the cap into the socket 25, the flanges 35 of the cap 34 would be positioned so that these flanges would project at right angles to the lips 26 for insertion into the socket 25, as shown in Fig. 6. The lips 26 serve as guides for the presser member 34, and they also hold it against turning movement in the bore 25.

The plug comprises a body 36 of insulating material having a reduced end portion 37 fitting in to the opening 22. In this reduced end portion are formed passages 38 communicating at one end with the bore 39 and at the opposite end with the lateral opening 40 and the reduced passage 41. Positioned in each of these passages 38 is one leg 42 of an L-shaped electrical conductor, the other leg 43 of which projects through the lateral opening 40 and functions as a contact member for engaging one of the terminals 29, as explained more fully hereinafter. It will be noted that these legs 43 project outwardly beyond the periphery of the reduced portion 37. Connected to the legs 38 are the electric wires 44 and 45 which lead from the cable 46. Pressed into the end of the bore 39 is the plug 47 having a passage 48 therethrough for accommodating the cord 46.

When it is desired to insert the plug into the operative position shown in Fig. 1, the legs 43 would be rotated to register with the slots 23, whereupon the parts may be moved inwardly, the end of the plug 36 engaging the cap 34 and effecting the compressing of the spring. The plug may then be rotated so as to bring the leg 43 out of registration with the slots 23, whereupon inward pressure would be released. Upon release of this inward pressure, the spring would force the parts into the position shown in Fig. 1 so that the metallic legs 43 would contact the legs 29 and thus the electric wires of the cord 20 would be electrically connected to the cord 46.

It is to be noted that the terminals are rigid and that there is no resiliency in the terminals so that there is no spring operation which would permit the wearing of the contacts to effect a loose connection.

Extending outwardly of the outer face of the member 18 is a hub 18a through which the passage 19 is formed

so that the cord 20 and the cord 46 are in substantial lineal alignment.

In Fig. 8 I have shown a housing 49 and a socket 25*a* communicating with the socket 32*a* corresponding to the sockets 25 and 32 shown in Fig. 1. The spring 33*a* and the cup 34*a* are used in this form for pressing the contacts on the plug into engagement with the contacts 97, 98 and 99 to which the wires are connected.

The plug would be constructed similar to that shown in Fig. 1 and as shown in Fig. 10 the lips 26*a* would function as do the lips 26 shown in Fig. 6.

A cover plate 50 is secured over the housing 49, the housing 49 being adapted for mounting in an outlet box of the wall of a building, or the like. This cover plate has the openings 51 and 52 in alignment with the sockets 25*a* and having the diametrically opposite notches 53 to correspond to the slots 23 shown in Fig. 3.

It is believed obvious that any number of connections may be made in a single unit. In Fig. 8, I have illustrated a pair of units, while in Fig. 1, I have shown a single unit.

Experience has shown that the socket and plug connection of this class is highly efficient in use and results in economy of electric consumption, while at the same time the safety feature and the other advatnages referred to are present.

What I claim is:

1. An electric socket and plug construction of the class described comprising: a socket housing; a terminal retainer mounted in said housing and spaced from the ends threof, said retainer having a socket formed in one end; a pair of conducting bars mounted on said retainer and having the opposite ends thereof angularly turned to provide terminals, one of said ends overlying the socket in said retainer; a presser member loosely mounted in the socket in said retainer; a spring engaging said presser member and normally urging the same outwardly of said socket; a socket plug comprising a body; a pair of contact members mounted on said body and projecting outwardly beyond the periphery of said body and engageable behind and in contact with the ends of said conductor overlying the socket in said retainer, the end of said body engaging said presser member and said presser member normally retaining said contact members on said body in contact with said overlying ends.

2. An electric socket and plug construction, comprising: a socket housing; a terminal retainer mounted in said housing; a pair of conducting bars mounted on said retainer, and having the ends thereof angularly turned and extended inwardly of said retainer at opposite ends thereof, said retainer having a socket formed in one of its ends and one of the ends of said conducting bars overlying said socket; a socket plug comprising a body and insertable at one end into the socket in said retainer; a pair of contact members carried by said body and engageable with the inner faces of the ends of said conducting bar which overlies the socket in said retainer; and means in the socket in said retainer for pressing against said body and retaining its contacts in engagement with the angularly turned ends of said bars which overlie the socket in said retainer.

3. An electric socket and plug construction, comprising: a socket housing; a terminal retainer mounted in said housing; a pair of conducting bars mounted on said retainer and having the ends thereof angularly turned and extended inwardly of said retainer at opposite ends thereof, said retainer having a socket formed in one of its ends and one of the ends of said conducting bars overlying said socket; a socket plug comprising a body and insertable at one end into the socket in said retainer; a pair of contact members carried by said body and engageable with the inner faces of the ends of said conducting bar which overlies the socket in said retainer; and means in the socket in said retainer for pressing against said body and retaining its contacts in engagement with the angularly turned ends of said bars which overlie the socket in said retainer, said conducting bars and said contacts being rigid and non-resilient.

4. An electric socket and plug construction, comprising: a socket housing having an end wall provided with a central opening formed therethrough; a terminal retainer mounted in said housing and spaced at its opposite ends from the ends of said housing; a pair of rigid conducting bars mounted on said retainer, the ends of said bars being angularly turned and extended inwardly of said retainer at the opposite end faces, said retainer having a socket formed in one end in registration with the opening in said wall, and the ends of said bars at the socket bearing end of said retainer extending inwardly and overlying the socket formed in said retainer; a plug comprising a body insertable at one end through the opening in said wall into said socket in said retainer; a pair of rigid contacts on said body projecting beyond the periphery thereof and projectable into the socket in said retainer, said wall at said opening having outwardly extended slots for accommodating said contacts upon insertion of said body through the opening in said wall, said contacts being located on said body at a position for engaging behind and at the inner faces of said overlying ends; and spring means in said socket in said retainer engaging said body and normally mounting said contacts in engagement with said overlying ends.

5. An electric socket and plug construction comprising: a socket housing having an end wall provided with a central opening formed therethrough; a terminal retainer mounted in said housing and spaced at its opposite ends from the ends of said housing; a pair of rigid conducting bars mounted on said retainer, the ends of said bars being angularly turned and extended inwardly of said retainer at the opposite end faces, said retainer having a socket formed in one end in registration with the opening in said wall and the ends of said bars at the socket bearing end of said retainer extending inwardly and overlying the socket formed in said retainer; a plug comprising a body insertable at one end through the opening in said wall into said socket in said retainer; a pair of rigid contacts on said body projecting beyond the periphery thereof and projectable into the socket in said retainer, said wall at said opening having outwardly extended slots for accommodating said contacts upon insertion of said body through the opening in said wall, said contacts being located on said body at a position for engaging behind and at the inner faces of said overlying ends; a spring positioned in the socket in said retainer engaging at one end the base of said socket; a presser member in the socket in said retainer engaging the opposite end of said spring and engaging the inner end of said plug for normally retaining the contacts on said plug in engagement with said overlying ends.

6. An electric socket and plug construction comprising: a socket housing having an end wall provided with a central opening formed therethrough; a terminal retainer mounted in said housing and spaced at its opposite ends from the ends of said housing; said retainer being provided with a pair of longitudinally extending grooves which are disposed diametrically opposite to each other; a pair of rigid conducting bars mounted in said grooves, the ends of said bars being angularly turned and extended inwardly of said retainer at the opposite end faces thereof; said retainer having a socket formed in one end in registration with the opening in said wall and the ends of said bars at the socket bearing end of said retainer extending inwardly and overlying the periphery of the socket formed in said retainer; a plug comprising a body insertable at one end through the opening in said wall into said socket in said retainer; a pair of rigid contacts on said body projecting beyond the periphery thereof and projectable into the socket in said retainer, said wall at said opening having outwardly extended slots for accommodating said contacts upon insertion of said body through the opening in said wall, said contacts being located on said body at a posi-

tion for engaging behind and at the inner faces of said overlying ends; a spring positioned in the socket in said retainer engaging at one end of the base of said socket; said socket being provided with a pair of longitudinally extending inwardly directed lips; a presser member slidably mounted in the socket in said retainer and being provided with a pair of flanges complementary to said lips; said presser member in said socket engaging the opposite end of said spring and engaging the inner end of said plug for normally retaining the contacts on said plug in engagement with said overlying ends.

References Cited in the file of this patent

UNITED STATES PATENTS

1,593,985	Nielsen	July 27, 1926
2,102,625	Hubbell	Dec. 31, 1937
2,123,422	Kautz	July 12, 1938
2,245,294	Pelissier	June 10, 1941

FOREIGN PATENTS

29,205	Australia	Mar. 20, 1931