

May 2, 1967

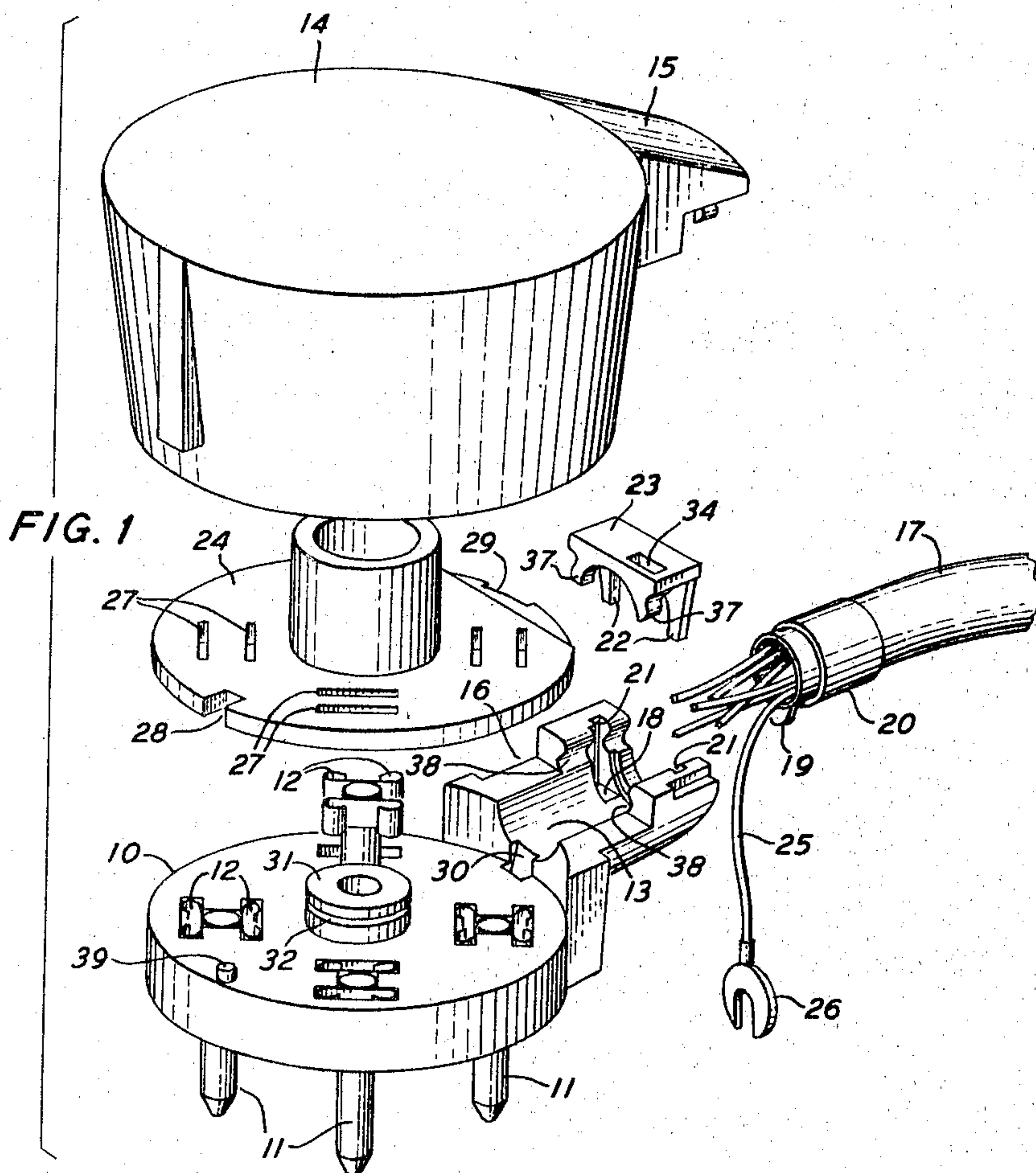
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3,317,884

ELECTRICAL PLUG WITH CORD ANCHOR

Filed Sept. 9, 1964

3 Sheets-Sheet 1



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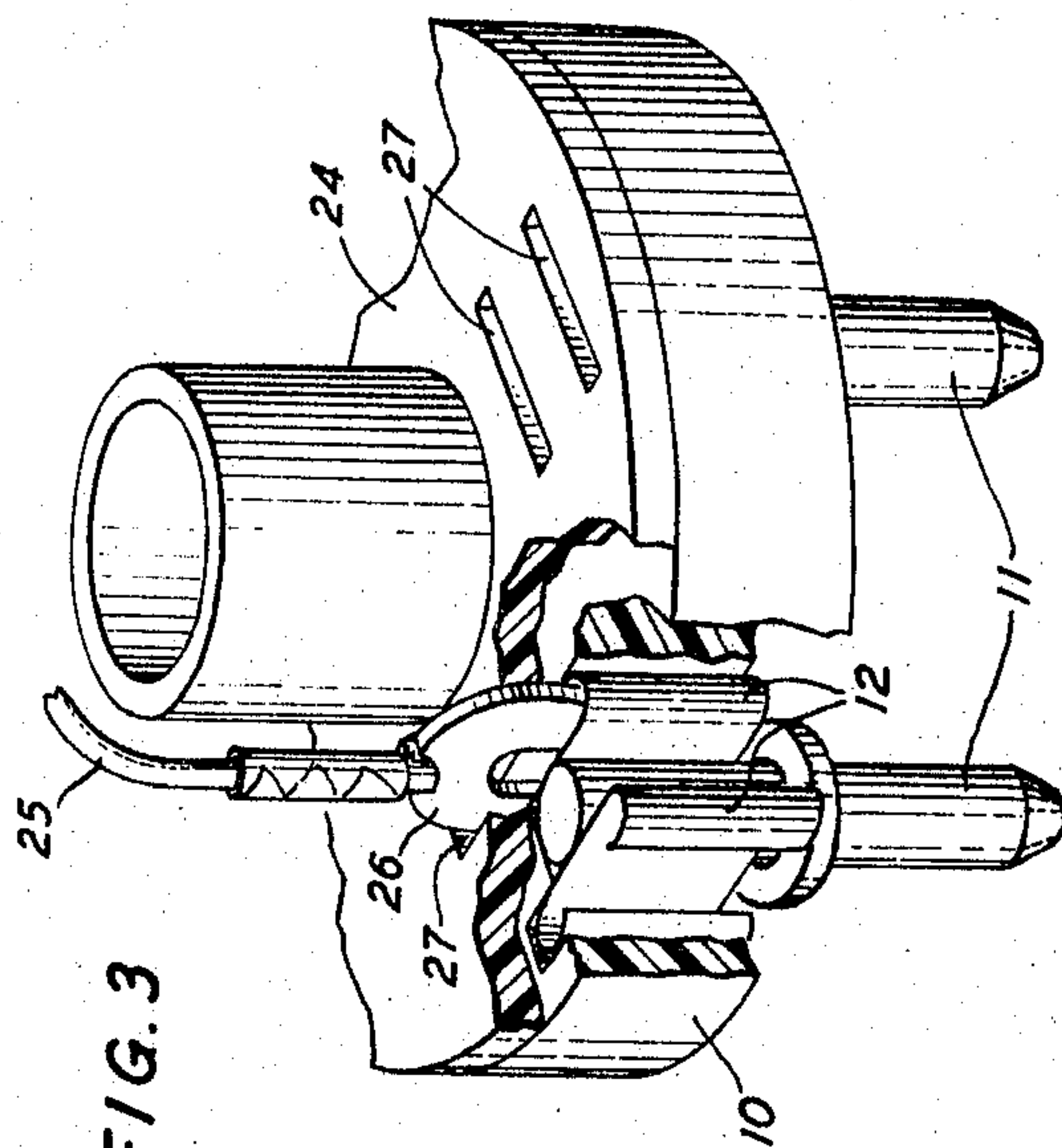


FIG. 3

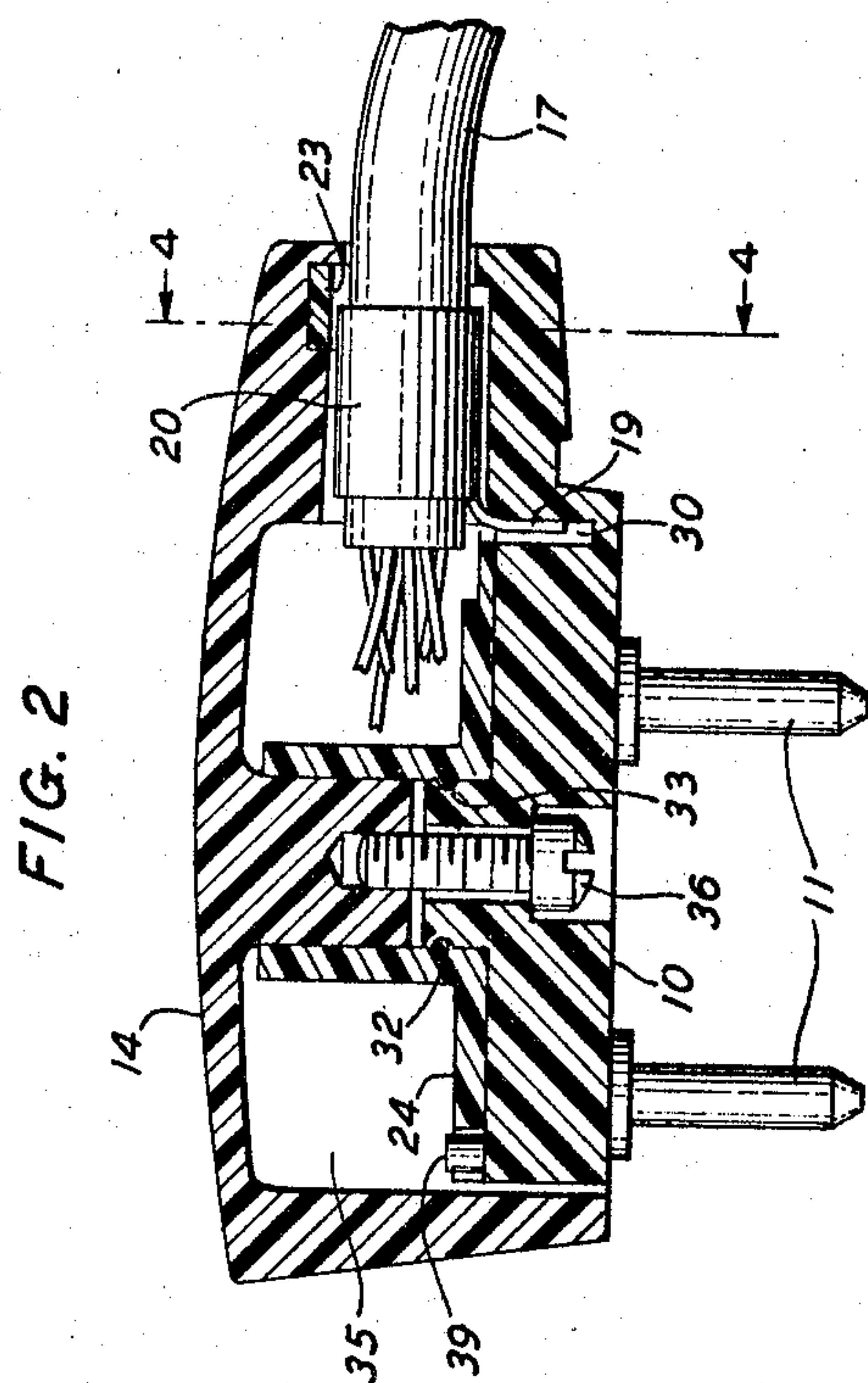


FIG. 2

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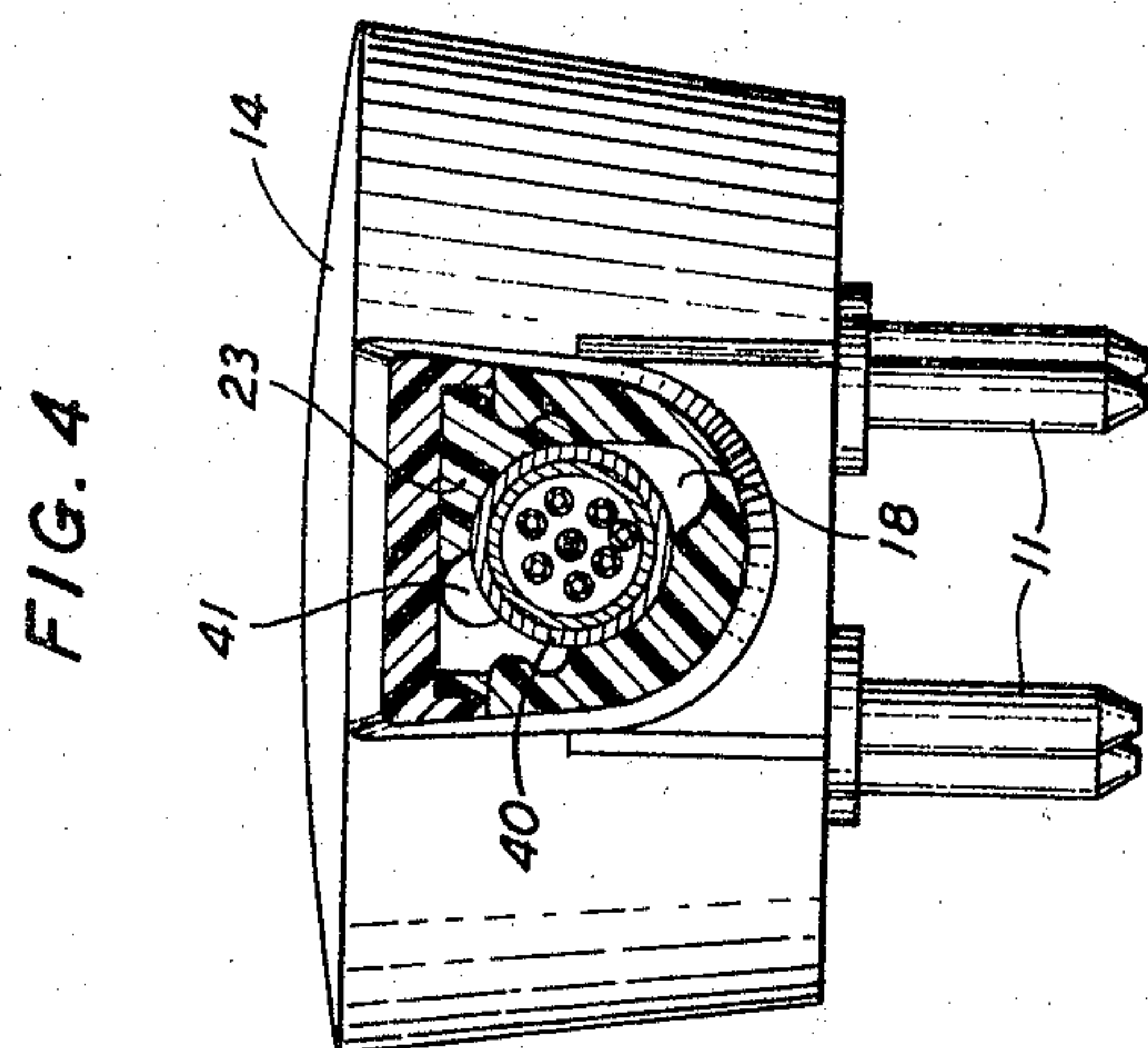
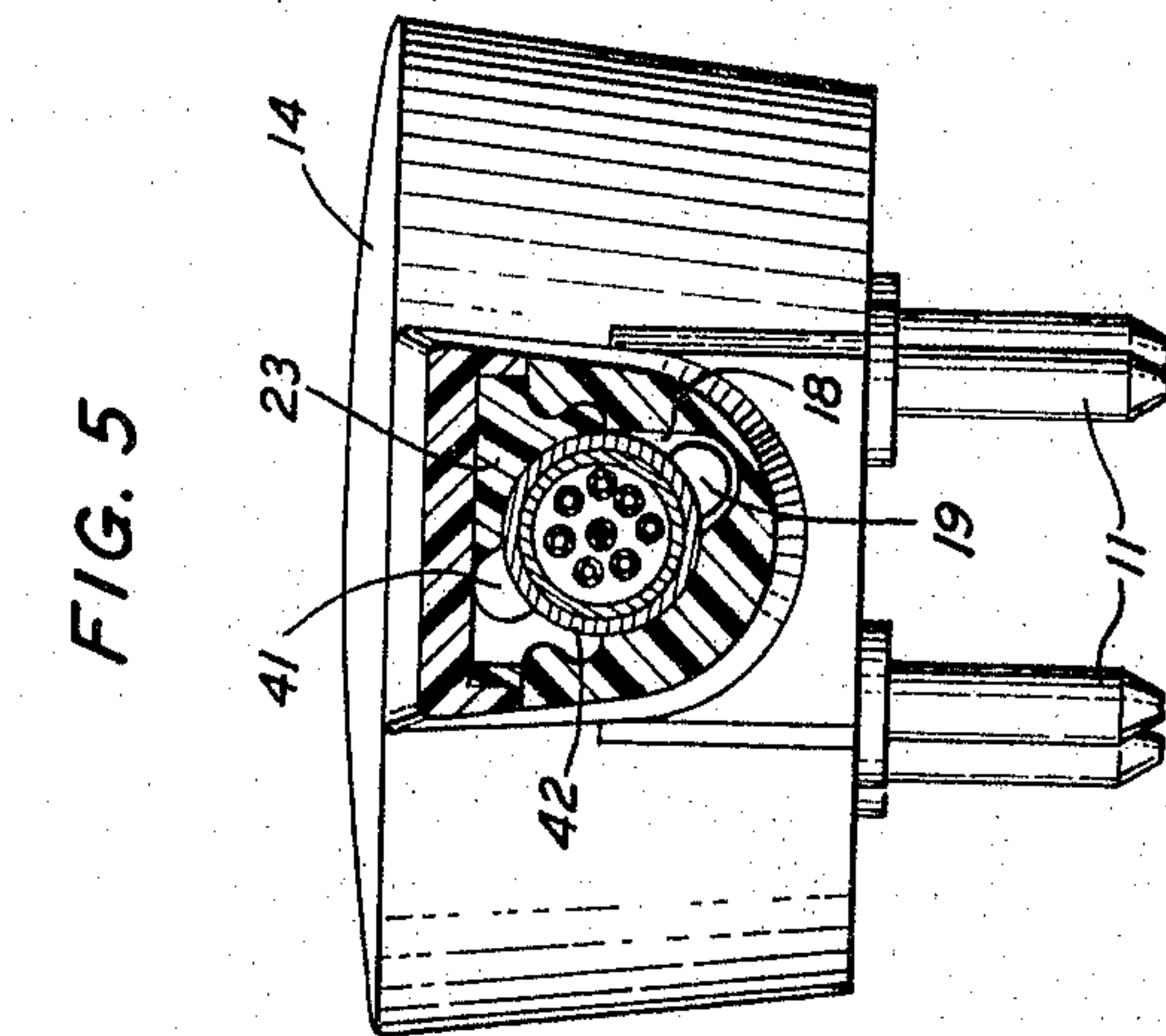
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ELECTRICAL PLUG WITH CORD ANCHOR

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4 Claims. (Cl. 339-106)

This invention relates to electrical plugs or sockets, and more particularly, to plugs or sockets that include cord-anchoring means.

The invention is embodied within the combination of an electrical plug and an electrical cable. The latter includes a plurality of insulated electrical conductors and a shaped rigid anchor attached to the cable near one of its ends. The plug comprises a body member that includes a cord guide chamber and a plurality of electrical prongs that are removably mounted in the body in a predetermined geometric pattern. The prongs extend from the body and are adapted to interfit with an appropriately shaped socket. Each prong includes a connector on one end that is adapted to receive an electrical conductor from the cable.

The plug further includes a cap that is appropriately shaped to fit over the body, thus forming an enclosure or cavity. The chamber opens into the cavity and provides an access to the cavity from the outside.

Interposed between the cap and the body in the cavity is a conductor tip guide that guides the ends of each electrical conductor of the cable into electrical and physical contact with the prongs. The cord guide chamber includes a bridge member that cooperates with the cable anchor to securely fasten the cable to the plug body in the chamber.

The illustrative plug has been designed to overcome the problem caused when axial forces are exerted upon the cable. In order to insure good electrical and physical connections between the individual conductors of the cable and the electrical prongs, it is necessary that any forces transmitted to the cable be isolated from the connections between the conductors and the electrical prongs. Forces exerted upon the cable may tend to break these connections thus resulting in open circuits or interrupted electrical continuity.

It is known within the prior art to solve this problem by using a guide chamber in which the incoming cable is knotted or tied around a rigid member of the plug body. The tying of such a knot requires considerable and expensive installer time and results in a bulky, inefficient package. It is also known to make the electrical connections between the conductor ends and the prongs of sufficient mechanical strength to withstand any forces exerted on the cable member. This results in an enlarged structure that may be sound from a mechanical standpoint but is inefficient, expensive, and impractical from an electrical design standpoint.

The illustrative embodiment of the invention securely anchors the cable to the body member and thus any forces exerted upon the cable are applied to the plug body. Thus, the connections between the individual conductors of the cable and the electrical prongs are insulated from any forces exerted on the cable and are therefore not interrupted or broken by the forces. The connections, as a result, may be designed purely from an electrical standpoint using known quick-connect, efficient electrical methods.

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The invention will be better understood and its advantages and features will be more readily apparent upon the study of the following detailed description of the illustrative embodiment when it is read in conjunction with the drawing, in which:

FIG. 1 is an exploded perspective view of an illustrative embodiment of the invention showing the various components in their relationship to each other;

FIG. 2 is a section view of the embodiment shown in FIG. 1 in which the plug is shown in an assembled condition;

FIG. 3 is a section view showing the interconnection between one conductor of the cable and an electrical prong;

FIG. 4 is a section view taken generally along the line 4-4 of FIG. 2 showing a different anchoring device from that shown in FIG. 2; and

FIG. 5 is a section view taken generally along the line 4-4 of FIG. 2 in which a different anchoring device from that shown in FIGS. 2 and 4 is shown.

As shown in FIG. 1, the illustrative embodiment of the invention comprises a plug body member 10 in which a plurality of electrical prongs 11 are removably mounted in any desired geometric pattern. The prongs 11 are adapted to interfit with a socket member that is not shown. One end of each prong 11 includes at least one spring connector 12 and, as shown in FIG. 1, may include two spring connectors 12. The connectors 12 are formed from a strip of electrically conducting material that is rigidly fastened to the prong 11 by means of brazing, soldering, or other well known fastening means. The ends of the connectors 12 are reversely bent back toward themselves to define a receiving passage whose function will subsequently be described.

The plug further includes a cap 14 that is shaped to fit over the body member 10 and to be secured thereto by means of a threaded fastener 36 as illustrated in FIG. 2. The cap 14 forms an enclosure or cavity 35 with the body member 10 and further includes a projection 15 that is adapted to mate with a projection 16 on the member 10. The projections 15 and 16 of the cap 14 and the body member 10, respectively, are hollowed out to form a cord guide chamber 13. An electrical cable 17 communicates with the inside of the plug through the chamber 13.

The chamber 13 includes an indentation 18 that is adapted to receive a tab 19 on the cable anchor 20, and two mounting slots 21 that are shaped to receive two arms 22 of a cable anchor fastener 23. The fastener 23 may include two locking arms 37 that are adapted to snap into two grooves 38 located in the chamber portion of the projections 16. Thus, when the arms 22 of the fastener 23 are inserted in the slots 21 of the projection 16, the fastener 23 will be locked to the body member 10 and will require a considerable force to pull the locking arms 37 out of the grooves 38 in order to remove the fastener 23 from the member 10. The projection 15 of the cap 14 interfits with the projection 16 of the body member 10 to further insure and hold the fastener 23 over the anchor 20 and in contact with the projection 16 of the body 10.

Interposed between the cap 14 and the body member 10 is a conductor tip guide 24. As shown in FIG. 1 the illustrative embodiment contemplates that each electrical conductor 25 of the cable 17 will terminate in a spade

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tip 26 or other similar structure. The guide 24 includes a number of slots 27 that are adapted to line up with the connectors 12 when the plug is assembled. The tips 26 are thrust through the slots 27 and into the receiving passages of the connectors 12 of the prongs 11. (See FIG. 3.) Alignment of the guide 24 with respect to the body 10 is insured by an aligning pin 39 on the body and an aligning slot 28 on the guide 24. The guide 24 further includes a cut-away portion 29 that is located adjacent a second indentation 30 in the body 10 when the guide 24 is mounted upon the body 10.

The device is assembled as follows. An anchor 20 is securely fastened adjacent one end of the cable 17. The anchor includes at least one tab 19 as shown in FIGS. 1 and 2, one tab 41 as shown in FIG. 4 or may include two tabs 19 and 41 as shown in FIG. 5.

The guide 24 is assembled on the body 10 by fitting the guide 24 over the mounting post 31 of the member 10 and aligning the pin 39 with the slot 28. If it is desired to firmly attach the guide 24 to the body 10, the post 31 may be shaped to include a snap groove 32. The inside of the guide 24 that is adapted to fit over the post 31 may be shaped to include a snap ridge 33 that will interfit with the groove 32 when the guide 24 is mounted upon the body 10. Such a construction is shown in the section view of FIG. 2.

The cable is then laid in the chamber 13 such that the anchor lies in between the second indentation 30 and the indentation 18. If the anchor 20 includes a tab 19 similar to the one shown in FIG. 2, the tab 19 is inserted in the second indentation 30. The fastener 23 is then placed over the anchor 20 and mated with the body 10 by inserting the arms 22 of the fastener 23 into the slots 21 and locking the arms 37 of the fastener 23 in the grooves 38 of the projection 16. The fastener 23 thus bridges the rigid anchor 20 and securely holds it in contact with the chamber 13. The anchor tab 19 is also held firmly in the second indentation 30.

The individual spade tips 26 of the conductors 25 are then fed through the slots 27 into physical and electrical contact with the connectors 12 of the prongs 11. The cap 14 is placed over the partially assembled structure and securely fastened to the body by means of the threaded fastener 36.

From a study of the plug in its assembled form as shown in FIG. 2, it is obvious that electrical continuity exists between the individual conductors 25 of the cable 17 and the prongs 11. It is also obvious that any physical forces exerted upon the cable 17 are applied through the anchor 20 and its tab 19 to the body 10. Thus, the connection between the spade tips 26 of the conductors 25 and the connectors 12 of the prongs 11 are insulated from any forces exerted upon the cable 17.

In accordance with the invention various anchor and tab combinations may be employed. For example, anchor 20 includes a single tab 19, as shown in FIGS. 1 and 2, that is accommodated by the indentation 30 formed between the body 10 and the projection 16. Alternatively, a second tab 19 (or a different single tab), axially displaced from the indentation 30, may be employed for mating with indentation 18 of the projection 16. As shown in FIG. 4, anchor 40 includes a tab 41 that mates with an opening 34 in fastener 23 (FIG. 1). Still another arrangement is illustrated by FIG. 5 wherein anchor 42 includes a first tab 41 that mates with the opening 34 in fastener 23 (FIG. 1) and a second tab 19 that mates with indentation 18 of the projection 16. In each instance the tabs are of substantially the same configuration, modified as required to provide a suitable interfit with the respective accommodating openings 18, 30 and 34. Each of the tabs 19 and 41 is suitably affixed to or preferably integral with its respective anchor. No matter which anchor combination is used, however, the fastener 23 holds the anchor and its associated tabs in contact with the body member 10 and in particular with the chamber

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13, and thus provides a good mechanical fastening of the cable 17 to the plug body 10.

It is obvious to those skilled in the art that this invention may be practiced with any structure in which it is desired to interconnect the individual conductors 25 of a cable 17 to a rigid block without imposing any physical forces or stresses upon the connections of the conductors 25 to the block. It is also obvious to those skilled in the art that numerous changes and modifications may be made to the embodiment as it has been disclosed above without departing from the spirit and scope of the invention.

What is claimed is:

1. A plug, in combination with an electrical multiconductor cord, said plug comprising a mating cap portion and a body member, the latter including a plurality of electrical terminals, said portion and said member each having a trough section, said sections when said portion and said member are mated forming a cord access passage, the ends of the individual conductors of said cord each having an electrical cord terminal tip, said cord including anchoring means including at least one projecting member axially spaced from the terminal tip ends of said cord, a trough section of said member including a slot and attaching means, said slot being adapted to receive said projecting member of said anchoring means, cord restricting means attached to said member by said attaching means and holding said projection in said slot, and, guide means interposed between said portion and said member, said last-mentioned means guiding said terminal tips into physical and electrical contact with said terminals.

2. An electrical element, in combination with an electrical multiconductor cord, said element including a plurality of electrical terminals and a cord access passage, said passage communicating from the outside of said element to a point adjacent said terminals, each of the ends of the individual conductors of said cord having an electrical terminal tip, said cord including anchoring means axially spaced from the terminal tip end of said cord, cord restricting means shaped and adapted to cooperate with said anchoring means to prevent relative motion of said anchoring means with respect to said element, said passage including holding means, said last mentioned means located adjacent said cord restricting means and adapted to hold said anchoring means in cooperative relationship with said cord restricting means, and, said element further including guide means, said guide means guiding said terminal tips into physical and electrical contact with said terminals.

3. An electrical element adapted for use with an electrical multiconductor cord that includes a terminal tip on the end of each conductor, anchoring means axially displaced from the terminal tip end of said cord and at least one projection on said means; said element comprising a mating cap portion and a body member, the latter having affixed thereto a plurality of electrical terminals, said portion and said member each having a trough section, said sections when said portion and said member are mated forming a cord access passage, said trough section of said member including a slot and attaching means, said slot being adapted to receive the projection of said anchoring means, cord restricting means attached to said member by said attaching means and adapted to hold said projection in said slot, and guide means interposed between said portion and said member, said last mentioned means adapted to guide said terminal tips into physical and electrical contact with said terminals.

4. An electrical element adapted for use with an electrical multiconductor cord that includes a terminal tip on the end of each conductor and anchoring means axially displaced from the tip end of said cord; said element including a plurality of electrical terminals and a cord access passage communicating from the outside of said element to a point adjacent said terminals, said passage adapted to receive said cord and said anchoring means,

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said passage having cord restricting means shaped and adapted to cooperate with said anchoring means to prevent relative motion of said anchoring means with respect to said element, said passage further including holding means, said last mentioned means located adjacent said restricting means and adapted to hold said anchoring means in cooperative relationship with said restricting means, and said element further including guide means, said guide means adapted to guide said tips into physical and electrical contact with said terminals.

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