

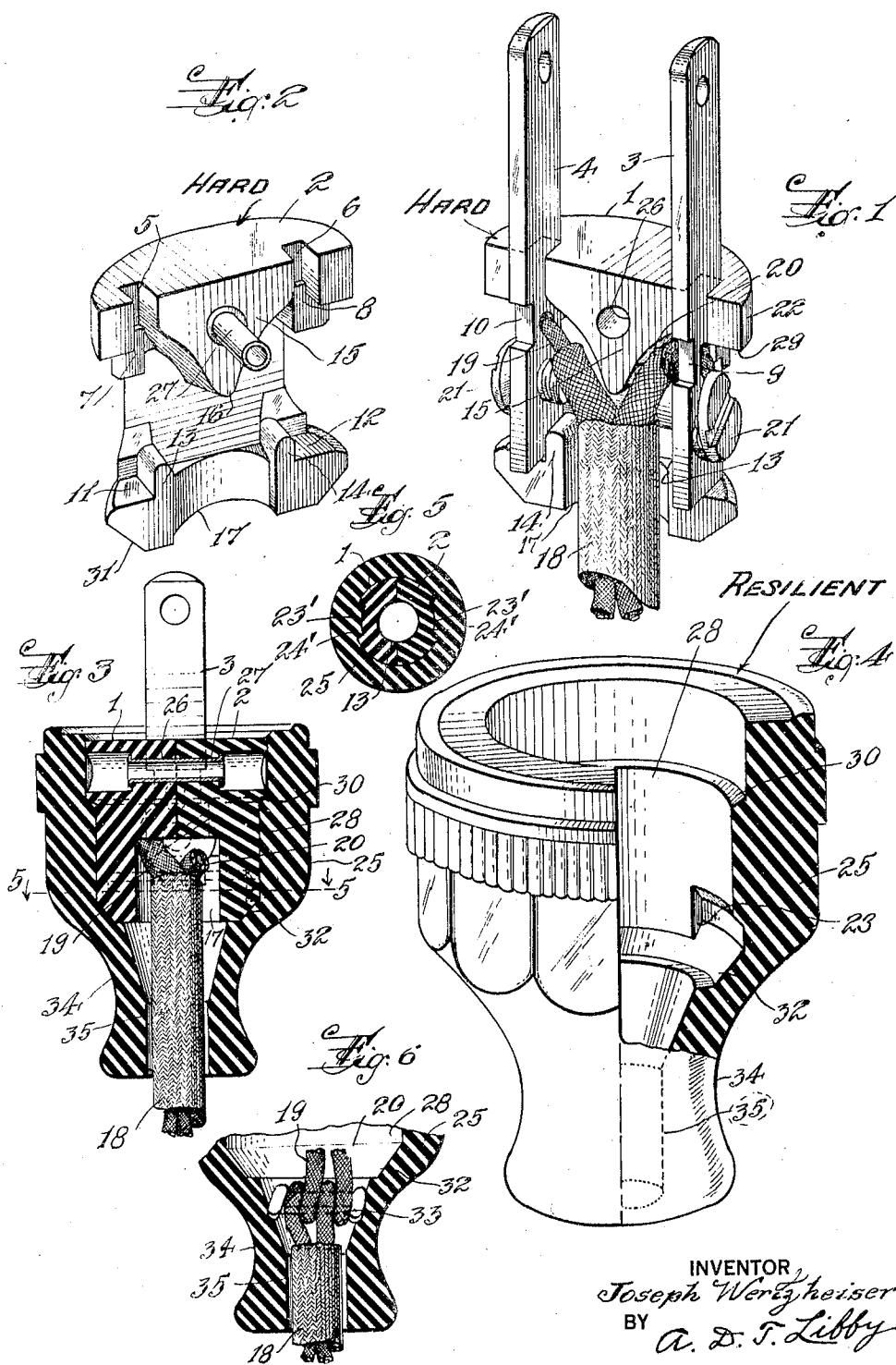
Nov. 10, 1936.

J. WERTZHEISER

2,060,709

ELECTRICAL CONNECTION PLUG

Filed Dec. 22, 1934



INVENTOR
Joseph Wertzheiser
BY A. D. F. Libby
ATTORNEY

UNITED STATES PATENT OFFICE

2,060,709

ELECTRICAL CONNECTION PLUG

Joseph Wertzheiser, Newark, N. J., assignor to
Hatfield Wire & Cable Co., Hillside, N. J.

Application December 22, 1934, Serial No. 758,791

5 Claims. (Cl. 173—361)

This invention relates to the design of an electrical connection plug such as usually used for connecting a piece of electrical apparatus to a source of current supply, such as an outlet plug or socket.

One of the objects of the invention is to provide a connection plug which is substantially non-breakable, but one in which the parts may be easily and quickly assembled with the simplest kind of tools.

Another object of my invention is to provide a plug in which the contact terminals or prongs are more definitely and permanently fixed in position than in present-day plugs made entirely of soft rubber, either in a complete body unit or otherwise, and wherein the body of rubber must be stretched by special tool equipment in order to force the contact prongs into operative position into the plug body.

In plugs having a complete body of soft rubber, when the terminals with stranded wires attached are pulled or forced into the plug, a strand of the cable is apt to be broken away and turned back and thereby cause a short circuit with the other conductor, or a broken strand therefrom. It is therefore another object of my invention to provide a construction in which short circuits cannot possibly occur, as will be clear from the construction to be shown and described.

Other and further objects will be apparent from a study of the following specification, taken in connection with the annexed drawing, wherein:

Figure 1 is a perspective sectional view, on an enlarged scale, through the central core portion of the plug.

Figure 2 is a perspective view, on an enlarged scale, of the other half or portion of the core cooperating with the core portion shown in Figure 1 to make a complete core assembly.

Figure 3 is a part-sectional and part-elevation view through the complete, assembled plug.

Figure 4 is an enlarged view of the cover portion of the plug; that is, the part which acts as a housing for the core shown in Figures 1 and 2.

Figure 5 is a section on a somewhat reduced scale on the line 5—5 of Figure 3, without the conductor cable.

Figure 6 is a part-sectional and part-elevation view on an enlarged scale showing a special form of conductor strain-relief means.

In the various views, the core of the plug is composed of a plurality of pieces 1 and 2 which

preferably are made substantially alike. Both the parts 1 and 2 have cooperative formations for holding a pair of contact members or prongs 3 and 4 in operative position. These formations comprise channels 5 and 6 in each of the parts 1 and 2, and further positioning means 7 and 8 adapted to fit into the notches 9 and 10 respectively of the contact prongs 3 and 4. The said positioning means further includes seats 11 and 12 on which the inner ends of the prongs 4 and 3 rest, the guide and support portions 13 and 14 being provided to guide and support the inner ends of the contact prongs.

Each of the core pieces 1 and 2 is provided with a formation 15 which preferably is generally V-shaped, with the point 16 extending downwardly toward a cut-away portion 17 which forms an orifice for a conductor cable 18 carrying a pair of conductors 19 and 20 which are divided or separated by the separator 15 as particularly shown in Figure 1, so that the conductors 19 and 20, which are fastened to the terminals 4 and 3 respectively, cannot possibly become short-circuited within the central core portion of the plug, as there is no strain put on them in the assembly operation and no chance for loose ends to get together, and the parts are in full view before the piece 2 is put in place.

The conductors 19 and 20 may be fastened to their respective terminals or contact prongs 4 and 3 in any satisfactory manner as by means of the screws 21 which may clamp the bared end of the conductor between the head of the screw and its terminal; or the terminals 3 and 4 may be provided with integral lugs to which the ends of the conductors may be soldered, the conductor preferably first passing through a hole in the terminal as indicated in Figure 1, before it is soldered to the lug, thereby providing a strain-relief from the soldered connection. This also applies to the screw connection shown, or any other type of connection. As a further alternative method of connecting the conductors to the terminal prongs, the conductors may be electrically welded to said prongs.

The central portion of the core pieces 1 and 2, which are moulded accurately to size, is of a reduced diameter from the annular portion 22 through which the prongs 3 and 4 extend or project, in order to provide space for the means used in connecting the conductors 19 and 20 to their respective contact prongs.

The cable conductor ends of the core pieces are provided with notches 23' which are adapted to receive keys 24' on the outer covering 25 as

shown in Figure 5, so as to prevent any rotary movement between the outer covering 25 and the central core portion bearing the terminals and conductors.

- 5 The core pieces 1 and 2 are preferably made of some good hard insulating material and are provided with a hole 26 to receive a fastening means which may be a rivet or eyelet 27, which is shown in position in Figure 2.
- 10 After the conductors have been fastened to their respective terminals 3 and 4, these terminals are merely placed in position in one of the core pieces; for example one as shown in Figure 1 and then the other core piece 2 placed over the
- 15 core piece 1 in operative position and the fastening device inserted through the hole 26 and locked in position. Then the core with cable attached is passed through the central opening 28 in the outer covering 25 until the bottom 29 of the collar 22 engages the shoulder 30 of the outer covering 25, which is preferably of soft flexible rubber-like material such as soft rubber. When the assembled core is thus forced into the cover
- 20 25, the bottom portion 31 of the core engages with the seat 32 on the cover 25, (see Figs. 2, 3, and 4) and as has been explained, a keyway 23 in the cover 25 passes into locking engagement with a key 24 on the core member. The location of the keyway 23 and key 24 of course may be reversed on the respective parts of the plug as indicated in Figure 5 where the key 24' is shown in the cover
- 30 25 and the keyway 23' in the core member.

By making the wall of the cover 25 sufficiently thick and/or flexible, the central core portion

35 will not be broken or injured by ordinary abuse; in fact, the plug will stand a tremendous amount of abuse without injury, and since the members 3 and 4 are rigidly carried by the core member, which is entirely separate from the flexible outer

40 covering, a much better connection plug is obtained than in a plug where the terminal prongs 3 and 4 can be displaced, as in many of the soft rubber plugs now on the market.

In addition, it may be said that I may in certain cases omit the fastening means 26 and 27 entirely and rely wholly on the elasticity of the covering 25 to hold the core firmly in position.

To further remove the strains from the conductors 19 and 20, I may use a suitable insulating pin 33 and wind the insulated conductors 19 and 20 around the pin as shown in Figure 6, the pin being positioned immediately adjacent the inner end of the central core.

It is to be noted that with the cable conductors

55 connected as shown in Figure 1, or with the extra strain-relief as shown in Figure 6, the conductor end 34 of the plug need not grip the cable 18. As a matter of fact, I prefer that a small space 35 be left between the conductor 18

60 and the end 34 of the outer flexible cover.

While I have shown a preferred form of the outer covering 25, the outside contour or design may be varied to suit the taste of the manufacturer. Likewise, certain of the mechanical details

65 may be varied without departing from the spirit of my invention or the scope of the appended claims; for example, the housing 25 or outer cover may be made of a different shape from that shown in Figure 4; that is, it may have the inlet

70 for the cable at an angle to the portion which fits over the core, such a construction being advantageous for certain classes of work.

What I claim is:

1. An electrical connection plug including, a
- 75 two-part central core of insulating material hav-

ing cooperative channels at one end, positioning means including seat and guide portions at the other end of the core in cooperative alignment with said channels, further positioning means located adjacent the inner end of said channels,

5 a pair of contact prongs formed to fit into said channels and engaging said seats as well as having means cooperating with said further positioning means, said prongs extending beyond the channel end of the core parts, means for

10 fastening the core parts together, a covering of flexible rubber-like insulating material enclosing said core except at the prong extension end, said outer covering having an opening at the end opposite to the prong extension end for conductors

15 extending into said core for connection to said prongs.

2. An electrical connection plug including, a central core of two substantially symmetrical parts of relatively hard insulating material, said

20 parts having spaced channel portions opening from one end, prong-positioning means comprising lugs adjacent the inner end of said channels and in alignment therewith, and seats having guide portions located at the opposite end of the

25 core from said channels and in alignment therewith, terminal prongs located in said channels and by said positioning means, said core part having recessed portions to form an orifice for

30 conductors leading to said prongs, said core parts also having a V-type conductor separator extending a substantial distance toward said orifice, means for securely fastening said core parts together, and a covering of relatively soft insulating material enclosing said core parts except

35 at the prong ends, and having openings at the other end for said conductors going into the core.

3. An electrical connection plug having parts constructed for quick assembly comprising a two-

40 piece inner core of insulating material having longitudinally spaced complementary formations to receive, by suitable placement therein, terminal prongs with conductors attached, the material of said core piece being removed between said formations leaving a substantial space therebetween, said prongs spanning said space between

45 the formations and extending through and beyond one end of the core, the conductor attachment points being located in said space, a centrally located conductor separator at least partially dividing said space, means for anchoring said core pieces together after placement therein of said prongs and conductors, and a covering of flexible rubber-like insulating material adapted

50 to be applied to said core, the cover having an opening at one end to receive the conductors and a larger opening at the other end through which the core may be passed.

4. An electrical connection plug having parts constructed for easy assembly comprising a two-

55 piece inner core of insulating material having complementary slots forming channels when the core pieces are together, conductor contact prongs lying in said channels, said core pieces

65 having portions cut away at one end to form an orifice for conductors, positioning means for said prongs comprising seats for the ends of the prongs, guides for said seats and complementary interlocking parts on said core pieces and the

70 prongs adjacent the inner ends of said channels, and a flexible rubber-like insulating material enclosing said core except at the prong end, the cover having an opening for said conductors extending to the prongs.

5. An electrical connection plug including a central core composed of two similar parts of insulating material having complementary formations therein providing channels and positioning means for contact prongs, said core parts also having complementary cut-away portions forming a conductor orifice at one end of the core, and a conductor separator at the opposite end of the core having a reduced portion extending toward said orifice, seats and guide portions adjacent said orifice comprising parts of said formations to locate the extremities of contact prongs, contact prongs located in said channels and extending into engagement with said seats, certain other of said positioning means being located adjacent the inner ends of said channels and adapted to engage complementary cooperative formations on said prongs, an outer covering of flexible rubber-like material enclosing said core, said outer covering having an opening adjacent said core orifice to pass conductors therethrough, and means cooperating between the core and the covering to prevent the core from turning within the covering.

JOSEPH WERTZHEISER.