

June 17, 1924.

1,498,196

L. G. PACENT

ELECTRIC PLUG

Filed Dec. 5, 1921

2 Sheets-Sheet 1

Fig. 1,

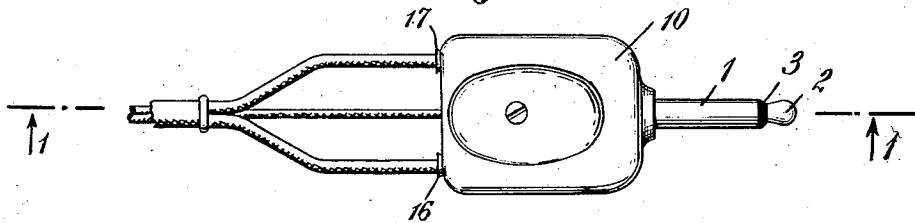


Fig. 2,

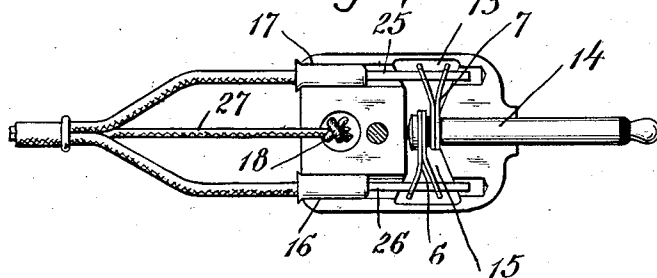


Fig. 3,

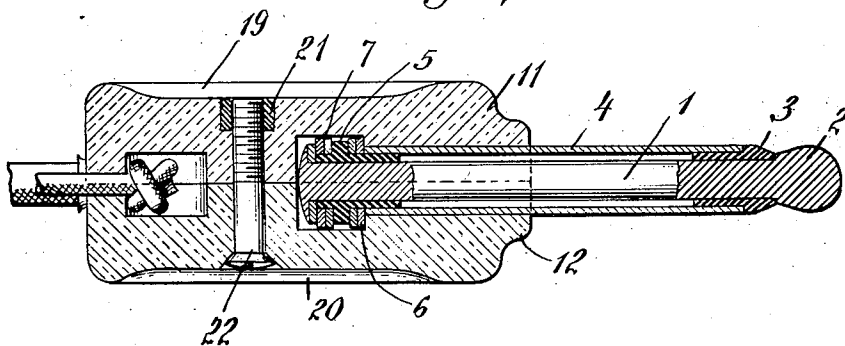
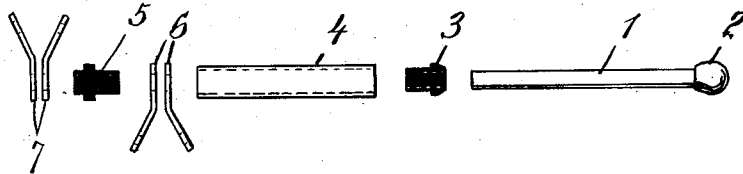


Fig. 4,



Inventor
Louis G. Pacent
By his Attorney's
Pennie, Davis, Marvin and Edwards.

June 17, 1924.

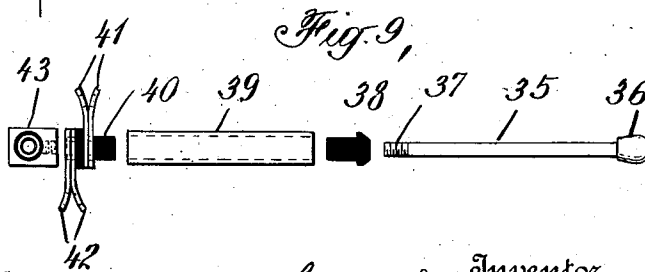
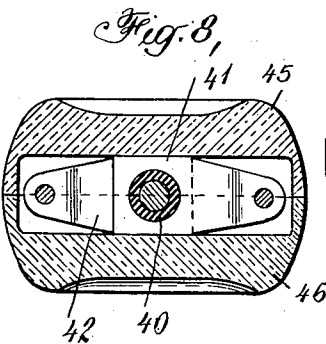
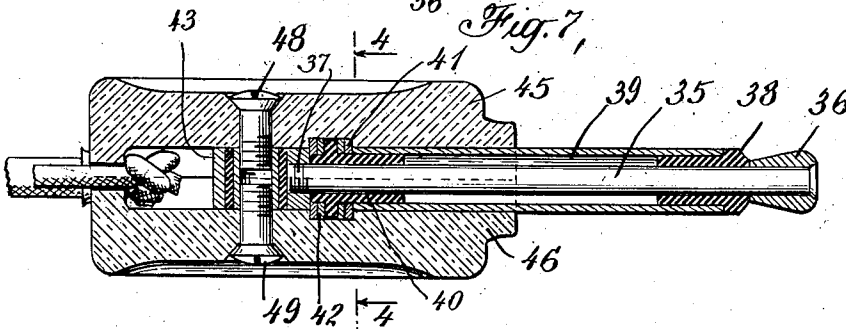
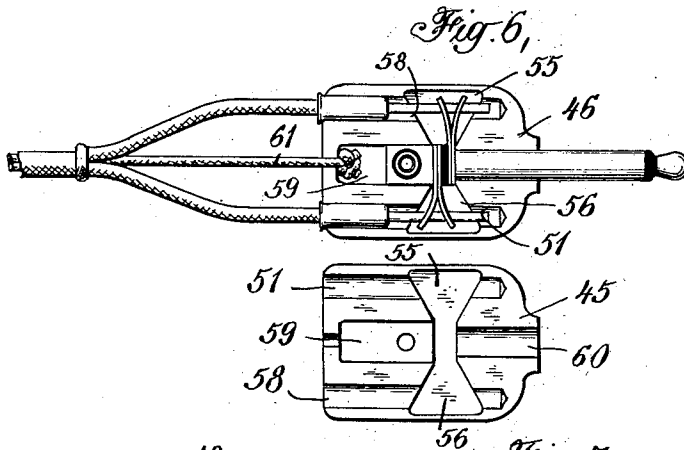
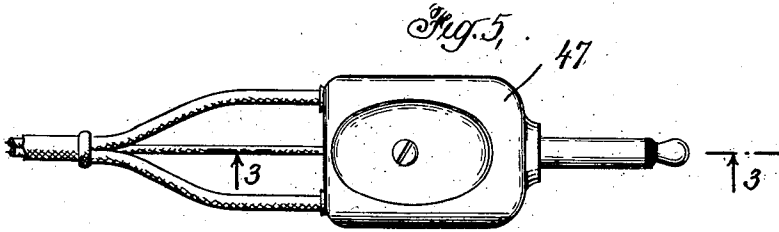
1,498,196

L. G. PACENT

ELECTRIC PLUG

Filed Dec. 5, 1921

2 Sheets-Sheet 2



Inventor
Louis D. Pacent
By his Attorney's
Perrin, Davis, Marvin & Edwards

UNITED STATES PATENT OFFICE.

LOUIS G. PACENT, OF WINFIELD, LONG ISLAND, NEW YORK, ASSIGNOR TO PACENT ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ELECTRIC PLUG.

Application filed December 5, 1921. Serial No. 520,025.

To all whom it may concern:

Be it known that I, LOUIS G. PACENT, a citizen of the United States, residing at Winfield, Long Island, in the county of Queens, State of New York, have invented certain new and useful Improvements in Electric Plugs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object, first, the provision of an unusually simple and economical, but highly electrically efficient structure for electric plugs, particularly of the so-called telephone type, wherein standard material, for example, standard metal tubing and rods, may be employed, thereby both simplifying the manufacture and reducing the cost thereof; and second, the provision of a structure which eliminates the necessity for solder or screw connections, and wherein because of simplicity of structure, enables the plug to be unassembled, the leads connected, and the plug reassembled for use with but few manual operations.

To this end a plug is provided in which the main contacts may be, for example, of standard metal tubing and standard brass rod, respectively, the rod or shank at one extremity, being provided with a knob or head of suitable diameter. The inner rod contact may be insulated from the outer tubular contact by collars of insulating material supported on the inner rod contact and in turn supporting the outer tubular contact. Two such collars may be utilized, one at one end of the tubing and another at the other end thereof. Spring pressed clips or connectors are also provided for connecting the lead or leads to the contact portions thereby eliminating screw or solder connections.

The spring pressed clips may be supported in electrical contact with each of the contact portions and may be insulated from each other in any suitable manner, for example, by the collar of insulating material which supports the outer tubing contact from the inner rod contact. A simple means has been devised for retaining the spring pressed contacts on the rod or shank and comprises spinning or attaching a small

amount of metal from or on the rod contact, thereby permanently assembling the plug contacts with the spring pressed clips or connectors. For convenience the plug structure may be provided with a moulded handle of insulating material having recessed finger grips.

It will, therefore, be seen that the improved plug consists of two parts: a moulded grip or handle which may comprise two moulded bakelite pieces, each with a recessed finger grip, and the plug with its spring pressed conductors or clips. The two bakelite pieces comprising the handle also retain the plug contacts and may be held together with a screw which is threaded into a brass insert in one of the two bakelite pieces. The screw should be "dead" electrically, an advantageous precaution when the plug is utilized in connection with high potentials.

A plug constructed in accordance with this invention is particularly adapted for use in connection with the operation of modern radio apparatus which is generally provided with telephone jacks or plug receptacles in place of binding posts. Heretofore plugs adapted to be used in the course of the operation of such sets require, for example, that the cord tips of the telephone headsets be removed, and the fragile tinsel conductors be soldered to the plug contacts. This is an extremely difficult and tedious operation. On the other hand, the present plug structure accommodates telephone cord tips or solid conductors of any description without soldering or preparing the conductor or lead ends in any manner. If stranded conductors are employed, however, it may be found advantageous to stiffen the end or ends thereof by dipping them in hot solder and permitting them to cool before inserting them in the spring pressed conductors.

Any of the usual forms of leads or conductors may be employed and connected to the plug contacts by inserting the tip or conductor end within the spring clip which has been compressed or pressed to permit the insertion thereof. After the spring pressed clip or connector is permitted to return or partially return to its normal position, it will be found that the leads are securely retained by the clip and cannot readily be

withdrawn until the connectors or clips are again compressed. This form of connection assures a substantially perfect and permanent electrical contact which is readily effected in a few moments without the use of special tools.

If it is desired to remove the possibility of accidental withdrawal of a lead or leads from the spring pressed connectors or clips, a recess may be provided in the moulded handle pieces of the plug wherein a knotted portion of the insulating covering, for example, the usual cotton covering of telephone cords, may be inserted and retained between the two moulded pieces comprising the handle. In this way all strain is relieved from the leads themselves and is assumed by the covering material.

Referring now to the drawings and the following description thereof, from which a more complete understanding of the invention may be had:

Figure 1 is a top view of an assembled plug having the leads inserted therein and ready for use; Fig. 2 is a top view of the plug having one of the moulded handle pieces removed to show the manner of inserting the leads in the spring pressed clips or connectors; Fig. 3 is a cross-sectional view taken along lines 1—1 of Fig. 1; Fig. 4 illustrates the manner of assembling the contact portions and connectors of the plug; Fig. 5 is a top view of a modified form of plug structure; Fig. 6 is a view of the plug of Fig. 5 having one of the handle pieces removed to show the manner of the arrangement of the spring pressed connectors or clips, and arrangement of the modified plug structure; Fig. 7 is a cross-sectional view of the plug taken along lines 3—3 of Fig. 5; Fig. 8 is a cross-sectional view of the plug structure taken along lines 4—4 of Fig. 7; and Fig. 9 illustrates the mode of assembling the modified plug structure.

In Figs. 1, 2, 3 and 4, it will be seen that the plug structure comprises a brass rod or shank 1 having a head 2 of similar material brazed or otherwise fixed upon the shank 1 and of the proper size or diameter for making contact with an element of the usual telephone jack receptacle. A collar 3 of insulating material, such as fiber or bakelite, is supported adjacent the head 2 upon the shank 1 for insulating and supporting the tubular contact portion 4 of the plug, in the manner illustrated in Fig. 3. A second collar 5 of insulating material also serves to support the tubular contact portion 4 out of electrical contact with the opposite extremity of the shank 1, and incidentally serves to retain the spring connector clips 6 in electrical contact with the tubular portion 4. The collar 5 also serves to support the spring pressed connector clips 7, which are electrically connected to the shank or rod 1 by

flattening or spinning the end of the shank 1 in the manner illustrated in Fig. 3. In this way the plug contacts and spring connectors are conveniently and permanently assembled into a single unit, as more clearly shown in Fig. 2.

Other forms of spring pressed clips or connectors may be employed, but it has been found that the type of clip illustrated in Fig. 4 formed of either steel or phosphor bronze enables excellent electrical connections to be made with telephone cord tips and solid or stranded conductors, and is furthermore economical and simple to manufacture.

The completed electrical plug structure is most conveniently retained by the moulded handle 10 of bakelite or other moulded insulating material comprising two pieces 11 and 12, provided with recesses 13, 14, 15, 16, 17 and 18, as well as two recessed finger grips 19 and 20. Each half or each of the pieces comprising the handle 10 are identical and are adapted to be held together with a screw threaded into a brass insert 21 in one of the halves or pieces, for example, the piece 11. It will, therefore, be seen that when the screw 22 is threaded into the brass insert 21 the two halves of the handle 10 enclose and effectively retain the electrical plug structure into which the leads or solid conductors have been connected by inserting them in the spring pressed clips 6 and 7, for example, the pin type telephone cord tips 25, 26 shown in Fig. 2.

The accidental withdrawal of the telephone cord tips 25, 26 shown in Fig. 2 may be prevented by placing a portion of the insulating covering material of the telephone cords into the recess 18, and knotting the covering material or otherwise retaining it within the recess 18. In this way when the plug is completely assembled by screwing the two halves or pieces together, the material 27 will assume all strains which are put upon the cords, and will effectively prevent the accidental withdrawal of the cord tips 25, 26 from the spring pressed connectors 6 and 7, respectively.

Referring now to Figs. 5, 6, 7, 8 and 9, which illustrate a modified form of the electrical structure of the plug, 35 is a brass rod or shank having a head 36 of the same material and of proper diameter affixed upon the rod 35, the head and shank comprising one contact portion of the plug. It will be noted that the rod 35 is provided with threads 37 at one end thereof for purposes which will be explained hereinafter.

As in the case of the plug structure illustrated in Fig. 4, a suitably formed collar 38 of insulating material is adapted to be positioned adjacent the head 36 and supported upon the rod 35 for the purpose of insulating the tubular contact portion 39

from both the shank 35 and the head 36 of the inner contact. A second collar 40, upon which the connector clips 41 and 42 are adapted to be supported, is also arranged to be supported upon the shank 37, and in turn to support the opposite extremity of the tubular contact portion 39 out of electrical contact with the shank 35.

In order that the electrical structure of the plug may be assembled into one unit, a threaded brass nut 43 is adapted to be screwed to the shank portion 35 by means of the threads 37. In this way the spring pressed clips 41 and 42 are brought into electrical contact respectively, with the tubular portion 39 and the shank portion 35. The brass threaded nut 43 is provided with threads which enable it to serve as the central uniting member for the two halves 45, 46 of the handle 47. In this way, when the screws 48, 49 are threaded into the nut 43 the complete structure of the plug is assembled into a unit similar to the manner described in connection with the plug structure illustrated in Fig. 1. It will be observed, however, that in this instance two screws are necessary to retain the halves or pieces of the handle instead of one as is the case with the structure illustrated in Figs. 1, 2 and 3.

As in the case of the plug structure illustrated in Fig. 2 the handle grip of the modified plug is also provided with recesses 55, 56, 57, 58, 59 and 60, into which the electrical plug structure is adapted to be fitted. The accidental withdrawal of the telephone cord tips 50, 51 is prevented from being accidentally withdrawn by knotting a portion of the insulating covering material and telephone cords, and placing it in the recess 59. Therefore, when the plug structure is completely assembled the material 61 will effectively prevent the accidental withdrawal of the cord tips 50, 51 in the manner described in connection with Fig. 2.

As pointed out hereinabove, the contact portions 1, 4 and 35, 39 may be made from standard brass rod and standard brass tubing, respectively, which enables a great reduction in the cost of manufacturing a plug constructed in accordance with the present invention as compared with the cost of manufacture of telephone plugs heretofore constructed in the usual manner. Further, the method of assembling the improved plug is extremely simple as compared with the mode of assembling the well known types of telephone plugs, and again because of the size and character of the moulded handle or grip of the improved plug, it makes it a very convenient plug to use and handle, particularly when it is considered that because of the recessed finger grips an excellent grasp, suitable for all types of fingers, may be readily had. In this connection it will be understood that the handle itself of the im-

proved plug is also both cheap and simple to manufacture because it may be of moulded insulating material, and further, the two halves being identical require but one die for the manufacture thereof.

It should be understood that various modifications may be made in both the electrical and mechanical arrangements of the plug without departing from the spirit and scope of this invention, particularly if the modified structure employs contact portions and spring pressed connectors associated therewith, which are adapted to be assembled into a moulded handle or grip of insulating material and retained therein as a unit.

I claim:

1. In combination with an electric plug of the telephone type, including a contact portion, a connector electrically associated with said contact portion, said connector comprising two adjacent members, at least one of which is resilient, each of said members having a hole therein through which a conductor may be inserted, the openings in said members aligning to permit insertion of the conductor when the resilient member is flexed and disaligning when said resilient member is released, the conductor being retained by the pressure exerted by the resilient member tending to assume its free position.

2. In combination with an electric plug of the telephone type, including a contact portion, a connector electrically associated with said contact portion, comprising two adjacent members, each of said members having a hole therein to permit the insertion of a conductor, one of said members being resilient and adapted to normally engage and retain the electrical conductor and to release said conductor when moved from its normal position.

3. An electric plug of the telephone type, comprising a contact portion having a rod-like shank and a head, a collar of insulating material supported on said shank adjacent the head, a tubular contact portion supported out of electrical contact with the shank by the collar, a second collar of insulating material supporting the opposite end of said tubular contact portion, a plurality of spring-pressed connectors electrically associated with said rod and tubular contact portion, said connectors being supported and retained on said second collar, and a split handle of insulating material for retaining said contacts and connectors.

4. An electric plug of the telephone type, comprising a contact portion and a spring-pressed connector associated therewith, said connector comprising two diverging flat springs, each spring having a hole therein, the holes in said springs registering one with the other when said springs are pressed together to permit the easy insertion of an

electric conductor, said springs being operable, when released, to grip the said conductor.

5. In combination with an electric plug of the telephone type including a contact portion, a spring-pressed connector electrically associated with said contact portion, said connector comprising two adjacent contact springs, each of said springs having a hole therein positioned so that the two holes register when said contact springs are flexed out of their normal positions to permit insertion of an electrical conductor, whereby said conductor is retained by the tendency of said contact springs to resume their normal position and thus disalign the holes therein.

6. An electric plug of the telephone type comprising a rod contact portion having a head and a rod-like shank, a tubular contact portion surrounding said rod contact portion, a spring-pressed connector associated with each of said contact portions, said connectors being diametrically opposed, means for retaining said contact portions and connectors together as a unit, and a flat two-piece insulating handle adapted to partially enclose said unit.

7. An electric plug of the telephone type comprising a contact portion, and means associated with said contact portion for effecting a releasable gripping engagement on a conductor whereby said conductor is retained in electrical connection with said contact portion, said means being operable to increase its grip on the conductor in response to increased pull on the conductor tending to withdraw the latter from engagement with the plug.

8. An electric plug of the telephone type comprising a contact portion, and resilient means associated with said contact portion for effecting a releasable gripping engagement on a pin type cord tip whereby said cord tip is retained in electrical connection with said contact portion, said means being operable to increase its grip on the cord tip in response to increased pull on the conductor with said cord tip tending to withdraw the latter from engagement with the plug.

9. An electric plug of the telephone type comprising a contact portion having a rod-like shank and a head, a contact portion of metal tubing shorter than said rod contact portion and mounted concentrically therewith, a dielectric tubing mounted on said rod contact portion and supporting said

tubular contact portion, said dielectric tube projecting beyond said metal tubing contact portion, a spring-pressed connector supported on the end of said dielectric tubing and abutting said metal tubing contact portion, a spring-pressed connector mounted on said rod contact portion and insulated from said first-mentioned connector, said connectors being diametrically disposed, and means including said rod-like contact portion for securing said contact portions and connectors together as an electrical unit.

10. An electric plug of the telephone type comprising a contact portion having a rod-like shank and a head, a contact portion of metal tubing shorter than said rod-like contact portion and mounted concentrically therewith, a dielectric tubing mounted on said rod-like contact portion and supporting said tubular portion, said dielectric tubing projecting beyond said metal tubing contact portion, a spring-pressed connector supported on the end of said dielectric tubing and abutting said metal tube contact portion, a spring-pressed connector mounted on said rod contact portion and insulated from said first-mentioned connector, said connectors being diametrically disposed, means including said rod-like contact portion for securing said contact portions and connectors together as an electrical unit, and a two-piece insulating handle adapted to retain and partially enclose said plug unit by clamping said unit between the parts thereof.

11. An electric plug of the telephone type, comprising a contact portion adapted to be inserted in a spring jack, spring-pressed connectors electrically connected to said contact portion, said connectors each being operable to grip a wire-like conductor and further operable upon being flexed to release said conductor, and a handle for said plug, said contact portion together with said connectors and said handle forming a self-contained structure.

12. An electric plug of the telephone type, comprising a contact portion adapted to be inserted in a spring jack, conducting means connected with said contact portion for releasably securing a wire-like conductor thereto, said means comprising a resilient member operable to effect a gripping action on the wire-like conductor.

In testimony whereof I affix my signature.

LOUIS G. PACENT.