

R. B. BENJAMIN.
SEPARABLE ATTACHMENT PLUG.
APPLICATION FILED NOV. 21, 1908.

1,022,815.

Patented Apr. 9, 1912.

2 SHEETS—SHEET 1.

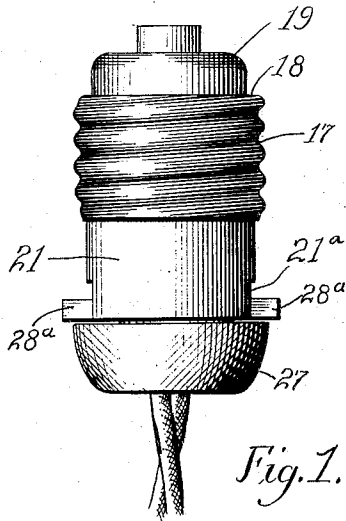


Fig. 1.

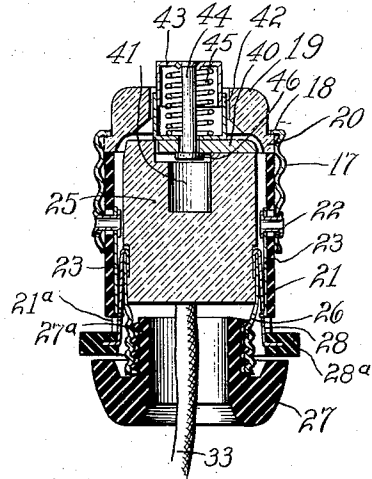


Fig. 5.

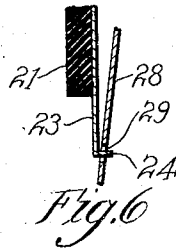
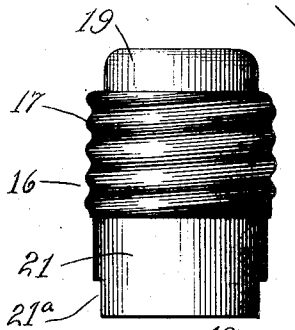


Fig. 6.

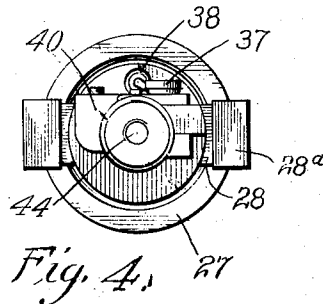


Fig. 4.

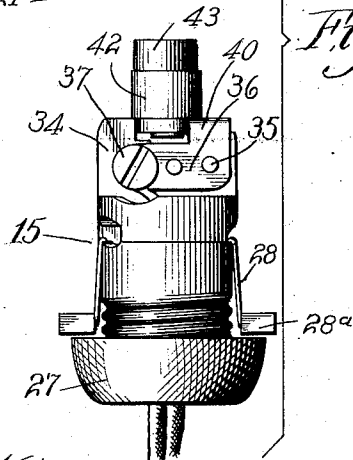


Fig. 2.

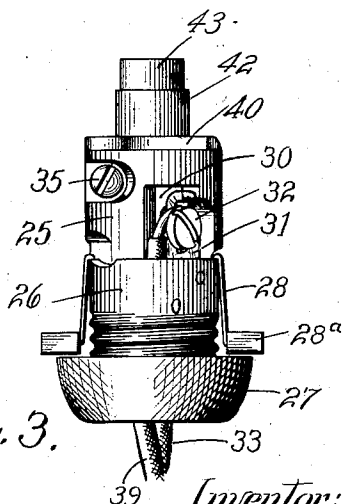


Fig. 3.

Witnesses:
Wm. M. Haenel
C. L. Hopkins

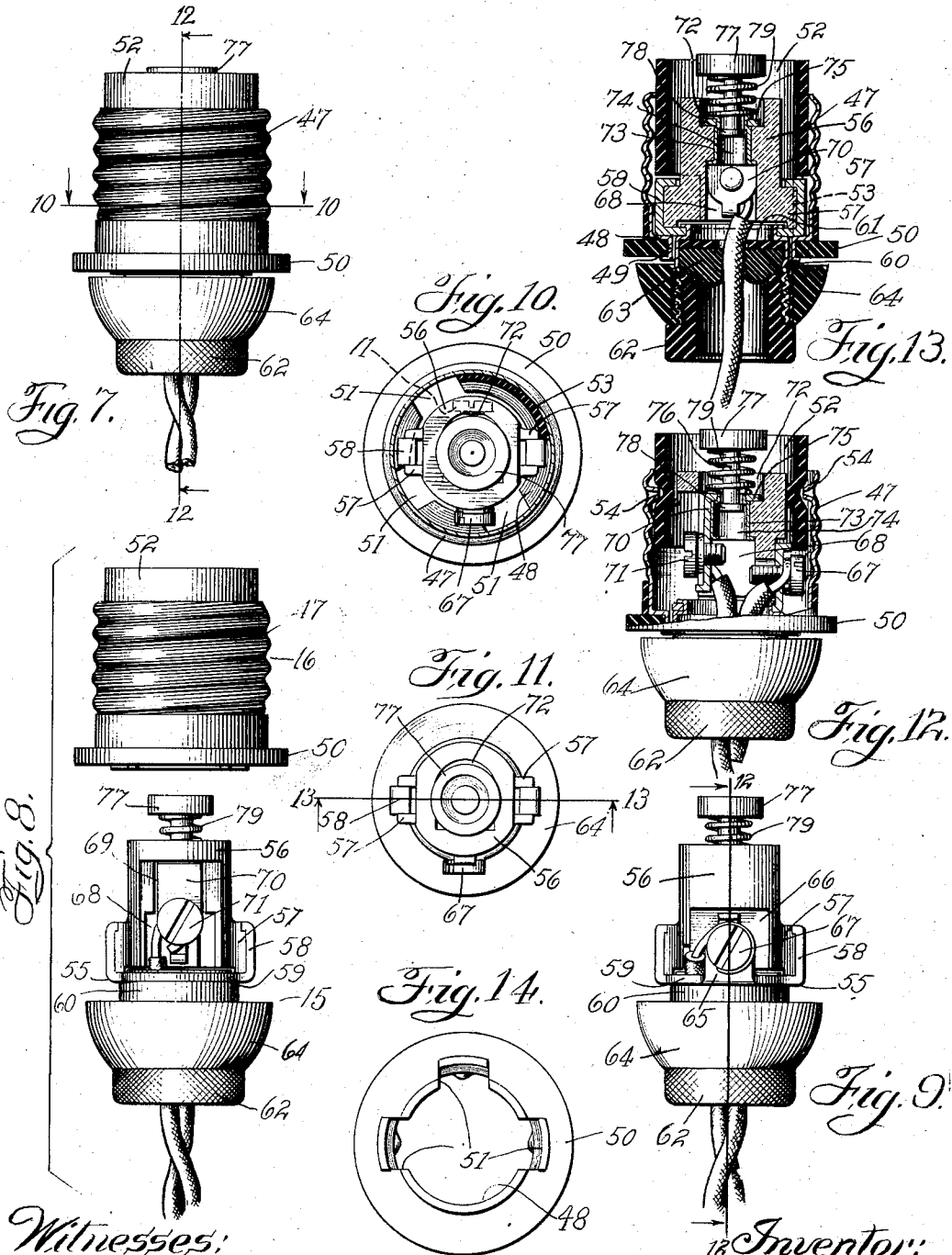
Inventor:
Reuben B. Benjamin,
By Jones, Addington & Ames,
Attorneys.

R. B. BENJAMIN.
SEPARABLE ATTACHMENT PLUG.
APPLICATION FILED NOV. 21, 1908.

1,022,815.

Patented Apr. 9, 1912.

2 SHEETS—SHEET 2.



Witnesses:
Wm. M. Haenel.
C. L. Hopkins.

By Reuben B. Benjamin,
Jones, Addington & Ames,
Attorneys.

UNITED STATES PATENT OFFICE.

REUBEN B. BENJAMIN, OF CHICAGO, ILLINOIS, ASSIGNOR TO BENJAMIN ELECTRIC MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SEPARABLE ATTACHMENT-PLUG.

1,022,815.

Specification of Letters Patent.

Patented Apr. 9, 1912.

Application filed November 21, 1908. Serial No. 463,763.

To all whom it may concern:

Be it known that I, REUBEN B. BENJAMIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Separable Attachment-Plugs, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to attachment plugs; and its object is the provision of a simple and efficient device by the use of which the feed conductors leading to movable electrical devices, such as fan motors, table lamps, etc., can be readily brought into connection with the terminals of a socket or similar fixture disposed in an electric circuit.

Attachment plugs of ordinary construction are subject to the disadvantage that in connecting them to any of the kinds of sockets in general use, it is very difficult to avoid twisting and consequent kinking of the conductors and, furthermore, considerable time has to be spent in making the connection. This waste of time becomes of great importance when the connection has to be very frequently made and broken, as would be the case, for instance, in the use of electrically heated flat-irons and similar household implements.

In an attachment plug constructed in accordance with the invention forming the subject of this specification, the outer corrugated or threaded contact member is arranged to be readily separated from the body of the plug. With such a device the corrugated contact member may be first inserted into a socket so as to make connection with one of the contacts thereof, and the plug body may be then connected with this contact member or disconnected therefrom as occasion requires. When the plug body is connected with the corrugated contact member an end contact carried by said plug body engages one of the contacts of the socket, and, at the same time, suitable coengaging means on the corrugated contact member and the plug body make electrical connection with each other and thus place the corrugated contact member in communication with a binding terminal car-

ried by the plug body, the other binding terminal being always connected with the end contact. By this means I obtain a plug of simple and economical construction which has a neat appearance and is efficient and convenient in use.

In the accompanying drawings I have shown two embodiments of my invention, Figures 1 to 6 inclusive illustrating one of the embodiments, while Figs. 7 to 14 inclusive illustrate the other embodiment. Fig. 1 is an elevational view of the first form of plug, showing the removable corrugated contact in place on the plug body; Fig. 2 is a view similar to Fig. 1 showing the removable contact member separated from the plug body; Fig. 3 is an elevational view of the plug body separated from the removable contact member, and turned to present the side opposite that seen in Fig. 2; Fig. 4 is an end view of the plug body separated from the removable contact member; Fig. 5 is a view similar to Fig. 1, but showing the plug in longitudinal section; Fig. 6 is a fragmentary view illustrating a detail of the device upon an enlarged scale; Fig. 7 is an elevational view of the other form of the device, showing the removable contact member in place on the plug body; Fig. 8 is a view similar to Fig. 7 but showing the removable contact member separated from the plug body; Fig. 9 is an elevational view of the plug body separated from the removable contact member and turned to present the side opposite to that seen in Fig. 8; Fig. 10 is a plan view of the device, partly sectional, on the line 10—10 of Fig. 7; Fig. 11 is an end view of the plug body separated from the removable contact; Fig. 12 shows a partial longitudinal section taken on the line 12—12 of Fig. 7, looking in the direction indicated by the arrows; Fig. 13 shows a longitudinal section as on the line 13—13 of Fig. 11; and Fig. 14 is an inverted plan of the removable contact member.

Like reference characters refer to like parts throughout the specification and drawings.

The attachment plug, in both forms of the device, consists of a plug body 15 and a removable outer part 16, which latter will preferably have the form of a tubular shell, through the end of which the end contact

on the plug body extends when the parts are placed together. Throughout the following specification, the plug body will be referred to as the "body" and the removable contact member as the "shell".

Referring first to Figs. 1 to 6 inclusive, the shell, in this form of the device, consists of a corrugated or screw threaded conducting member 17, which may be similar in character to the outer contact member on plugs of ordinary construction, and is formed with an inwardly extending end flange 18. Disposed within the upper part of the corrugated contact member 17, and extending beyond the end thereof, is an insulating block 19, formed with a central aperture through which the end contact of the body 15 is adapted to pass. The block 19 is formed with an outwardly extending flange 20 bearing against the flange 18. An insulating sleeve 21 is also disposed within the contact member 17 and is secured thereto by rivets 22. The insulating sleeve 21 abuts, at its upper end, against the block 19, which latter is thus clamped between the flange 18 and the upper end of the insulating sleeve 21. The lower end of the sleeve 21 extends beyond the lower end of the corrugated contact member 17 and forms, with the block 19, an insulating chamber for receiving the body 15. Secured beneath the inner ends of the rivets 22 are conductor strips 23, which extend downwardly within the sleeve 21. The conductor strips 23, which are preferably two in number, are bent over at their ends to form inwardly extending tongues 24, adapted to cooperate with spring members upon the body 15, as will be hereinafter described.

The body 15 comprises an insulating base 25 carrying the terminals which receive the ends of the leading-out wires. Secured to the base 25 is a metallic collar 26 which is screw threaded at its lower end to receive a thumb piece 27 which is formed with a screw threaded neck 27^a entering the screw threaded portion of the collar 26. The collar 26 is preferably secured to the base 25 by bending its top edge over one or more projections formed on the base.

Secured to the collar 26 adjacent the upper edge thereof, and extending rearwardly along the exterior of the collar, are a pair of metallic spring strips 28. The spring strips 28 are bent outwardly at their rearward ends and to the outwardly bent portions are affixed insulating knobs 28^a. The springs 28 are also formed with apertures 29 for receiving the tongues 24 on the conductor strips 23 when the plug body is inserted in the shell. The contact springs 28 tend to spring apart slightly, and away from the plug body, but may be forced in toward the collar 26 by pressure of the fingers upon the knobs 28^a. When the body is

inserted into the shell the spring strips 28 are forced to move inward until the tongues 24 reach, and enter, the openings 29, whereupon these strips are enabled to spring outward to a slight extent, the body being then locked within the shell and not releasable until the knobs 28^a are pressed to disengage the tongues 24 from the openings 29, when the body may be removed. Recesses 21^a may be formed, if desired, in the sleeve 21 of the shell for receiving the knobs 28; thus enabling the sleeve 21 to extend downward in close proximity with the thumb piece 27.

The side of the base 25 is formed with a recess 30 (See Fig. 3) for receiving a plate 31 for a binding screw 32, which plate is secured to the collar 26. The recess 30 extends longitudinally of the base 25 to the lower end of the same and is of sufficient width to receive the lead wire 33, the bared end of which is attached to the screw 32.

The base 25 is formed, near its upper end, with a flattened portion 34, to which is secured, by means of a screw 35 passing through the upper end of the base, a plate 36 which carries the end contact of the device, this plate carrying also a binding screw 37. Extending longitudinally through the base 25, and opening below the plate 36, is a passage 38 through which extends lead wire 39, the bared end of which is secured under the screw 37. The plate 36 is formed with an extension 40 extending beyond the end of the base and bent at right angles to lie flat thereupon. The extension 40 has an aperture formed therethrough in such a position as to lie approximately over the axis of the insulating base. An axial well or recess 41 is formed in the base immediately below this opening. To the extension 40 is secured a cup 42 having an aperture in its bottom registering with the aperture of the plate. Telescoping within the cup 42 is an inverted cup 43 which forms the end contact of the device, from the center of which a pin 44 extends downward through the apertures of the cup 42 and plate 40. Between the cups 42 and 43 is arranged a spiral spring 45 tending to separate the cups and force the inner cup forward beyond the end of the insulating member 19. The pin 44 is formed with an enlargement 46 on its inner end, which enlargement engages with the lower face of the plate 40 and thus limits the forward travel of the cup 43. It will be seen that by pressing upon the upper end of the cup 43 it may be made to telescope into the cup 42, the pin 44 entering the well 41.

In using the device the shell 16 is firmly screwed into the socket, the effect of which may be said to be that a second socket is formed, the terminals of which are the ordinary center contact of the socket, accessible through the opening of the insulating block 19, and the conductor strips 23, which are in

electrical connection with the sleeve 17 through the rivets 22. The body 15 may be said to now form a plug, of which the cup 43 forms a compressible end contact and the contact springs 28 form the other contact. The body 15 is pushed into the shell 16 in such manner that the contact springs 28 engage the tongues 24 as above described. When the body has been pushed in to a certain extent, the yielding end contact 43 engages the center contact of the socket through the opening of the insulating block 19. The body being now pushed farther into the shell 16, the cup 43 telescopes into the cup 42, until the tongues 24 enter the openings 29, locking the parts together. When it is desired to remove the body from the shell 16, it is only necessary to press with the fingers upon the knobs 28 when the body may be withdrawn.

Separable plugs as heretofore known were usually constructed so that a projection on one member engaged between spring clips on the other, and considerable force was necessary to effect separation of the members. This often resulted in damage to the plug itself as well as to the socket and fixtures carried thereby. This disadvantage is obviated by my invention since the plug 15 may be withdrawn from the shell 16 with the expenditure of very little force, the spring 45 aiding in the separation of the members.

Referring to Figs. 7 to 14, the shell 16 in this case consists of a contact sleeve 47 flanged inwardly at its end to form a shoulder 48 and a neck 49. Upon the neck 49 is secured an insulating ring 50 having an upwardly extending flange surrounding the sleeve 47 for a portion of its height, the sleeve 47 being flanged over beneath the ring 50 to retain the latter in position. The ring 50 is formed with three outwardly extending recesses 51, the purpose of which will be hereinafter described. An insulating lining sleeve 52 is arranged in the metallic sleeve 47 and extends from a point about midway between the ends thereof to a short distance beyond the outer end of the metallic sleeve. A part 53 of the insulating sleeve 52 is extended to the bottom of the sleeve 47 for a purpose to be hereinafter described. The lining sleeve 52 is secured in the conductor sleeve 47 by punching the latter inward to form projections 54 entering corresponding recesses formed by punching in the side of the lining sleeve 52.

The body 15 comprises an insulating base 56 having laterally projecting lugs 57 formed thereon. Radially extending arms 58, formed on a ring 59 upon which the base is seated, are bent up to extend along the lugs 57, and have their ends bent inward over the tops of these lugs to secure the parts together. The base is thus clamped

between the ring 59 and the turned over ends of the arms 58.

The ring 59 is formed with a lug 65 bent upward to lie in a recess 66 formed in the insulating base 56. The lug 65 carries a binding screw 67 for holding the end of one of the lead wires.

Flanged over within the ring 59 is the reduced upper end of an internally and externally screw threaded collar 60. Within the collar 60, and abutting against the shoulder formed by the reduced end thereof, is an insulating disk 61 having a center aperture of sufficient size to receive the two leading-in wires. A screw threaded bushing 62 is screwed into the lower end of the collar 60 and compresses between it and the disk 61, a ring 63 of rubber or other flexible material, the aperture of which ring is normally sufficient to allow the passage of the lead wires therethrough. When the bushing 62 is screwed inward to compress the flexible ring 63, the latter is distorted, as shown in Fig. 13, and contracted so as to grip the conductors, whereby they are securely clamped in position and any danger of damage being done to the terminals of the plug by an accidental jerk upon the conductors is precluded. An insulating ring 64 is externally screwed upon the collar 60 to provide means for holding the body when being inserted in, or withdrawn from, the shell.

The insulating base 56 is formed with a central chamber 68 into which the lead wires can enter through the bushing 62 and compressible ring 63. Leading from the recess 66 is an aperture connecting it with the chamber 68, so that the conductor to be secured under the terminal 67 may be drawn therethrough. The insulating base is also formed with a second recess 69, communicating with the chamber 68, in which is arranged a plate 70 carrying the second binding terminal 71. A depression 72 is formed in the outer end of the insulating base and communicates, by means of a well 73, with the chamber 68. The upper end of the plate 70 is bent over so as to form an ear 75, lying in the depression 72. This ear is formed with an aperture approximately coaxial with the well 73. A metallic lining 74 is provided in the well 73, which lining is reduced at its upper end to enter the aperture of the ear 75 and flanged at its lower edge over the end of the well 73, thus securing the plate 70 in position.

Slidably mounted in the aperture of the ear 75 is a plunger 76, formed at its upper end with a head 77 which constitutes the center or end contact of the device, and is enlarged at 78 below the ear 75 to limit the forward movement of the plunger. Between the head 77 and the ear 75 of the plate 70 is disposed a spiral compression spring 79.

The plunger 76 may be forced downward into the well 74 by pressure upon the head 77, but when this pressure is removed, the plunger will be thrust out to its normal position by the action of the spring 79.

In using the plug, the shell 16 is first screwed into the socket. The body 15 is then inserted in such manner that the binding screw 67 and the arms 58 register with the recesses 51 of the ring 50. The body may be then pushed in until the yielding contact 77 engages the center contact of the socket. The plug is then pushed farther in, the spring 79 becoming compressed, until the shoulders 55, formed by the lower end of the arms 58, pass beyond the upper face of the shoulder 48 of the shell. The body may then be rotated until the sides of the arms 58 strike against the edge of the downward extension 53 of the insulating sleeve 52, as shown in Fig. 10. When the plug has been rotated to this position the terminal 71 will be located opposite the downward extension 53, whereby any chance of sparking from the terminals 71 to the sleeve 47 is precluded. The body is now locked in position in the shell. One edge of the downward extension 53 is located at the side of one of the openings 51, as will be clearly seen from Fig. 10, whereby the turning of the body in the wrong direction is rendered impossible. In this form of my invention, also, the exercise of very little force is necessary in order to effect the separation of the body from the shell.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. An attachment plug made in two separable parts, a corrugated contact member carried by one of said parts, the other of said parts being insertible therinto from the rear, and an end contact carried by said insertible part for engagement with the center contact of a socket.

2. An attachment plug constructed in separable parts, one of said parts being insertible into the other from the rear and carrying a yielding contact for engagement with the center contact of a socket, binding terminals also carried by said insertible part, one of said binding terminals being electrically connected to said yielding contact, the other of said separable parts including a corrugated contact member, and means for making electrical connection between said corrugated contact member and the other of said binding terminals when said separable parts are put together.

3. An attachment plug made in separable parts, one of which is insertible into the other from the rear, an end contact carried by said insertible part for engagement with the center contact of a socket, binding terminals also carried by said insertible part,

a side contact member carried by the other of said separable parts, and means for connecting said side contact with one of said binding terminals when said separable parts are put together.

4. An attachment plug made in separable parts, one of which is insertible into the other from the rear and carries an end contact for engagement with the center contact of a socket, said part carrying also binding terminals, one of which is connected with said end contact, a side contact member carried by the other of said separable parts, and means detachably locking said separable parts together and electrically connecting said side contact with another binding terminal when said separable parts are put together.

5. An attachment plug made in two separable parts, one of which is insertible into the other from the rear, a yieldingly mounted end contact carried by the inner of said parts arranged for engagement with the center contact of a socket, binding terminals also carried by said part, one of said binding terminals being connected with said end contact, the other part having a corrugated contact, and cooperating means carried by said parts for electrically connecting said corrugated contact with the other binding terminal when one of said parts is inserted into the other.

6. A separable attachment plug comprising a shell and a body insertible therinto from the rear, binding terminals carried by said body, a yieldable end contact connected with one of said binding terminals and arranged to extend forward beyond said shell, said shell having a corrugated contact, and co-engaging means carried by said body and shell respectively for connecting said corrugated contact with the other of said binding terminals.

7. A separable attachment plug comprising a shell and a body insertible therinto from the rear, binding terminals carried by said body, a yieldable end contact connected with one of said binding terminals and extending forward beyond said shell, said shell having a corrugated contact, co-engaging means carried by said body and shell respectively for connecting said corrugated contact with the other of said binding terminals, and means for locking said body and shell together.

8. A separable attachment plug comprising a body and a shell, said body carrying binding terminals and having an end contact connected with one of said terminals and arranged to extend through said shell when the parts are put together, said shell including a corrugated contact, means carried by said shell and body for detachably securing said shell and body together and making electrical connection between said

corrugated contact and the other binding terminal.

9. In an attachment plug, a shell comprising a threaded contact, a body for insertion into said shell from the rear, an end contact carried by said body, said body carrying also binding terminals, and means for locking said body and shell together with said outer contact and one of said binding terminals in electrical connection when said body is inserted into said shell, said locking means being manually releasable to permit the parts to be readily separated.

10. An attachment plug comprising, in combination, a body, a yielding end contact carried thereby, binding terminals also carried by said body, a removable outer contact, and manually releasable interlocking means for securing said outer contact on said body with said outer contact in electrical connection with one of said binding terminals.

11. An attachment plug comprising an insulating block, a current carrying bracket secured to said block and a spring-controlled

plunger passing through an arm of the bracket and adapted to engage a center contact.

12. An attachment plug comprising an insulating block having a recess, a current carrying bracket secured in said recess, a plunger socketed in the recess and engaging the bracket and a spring acting to retain the plunger in position to engage a center contact.

13. An attachment plug comprising an insulating block, a current carrying bracket secured to said block, a plunger socketed in the block and having a reduced end passing through the bracket and leaving a shoulder and a spring surrounding the plunger and bearing against the shoulder and the bracket to retain the plunger in operative position.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

REUBEN B. BENJAMIN.

Witnesses:

M. L. FARRAR,

C. L. HOPKINS.