C. D. PLATT.

SEPARABLE ATTACHMENT PLUG.

APPLICATION FILED JULY 25, 1913.

1,123,002. Patented Dec. 29, 1914.

Fig. 1.

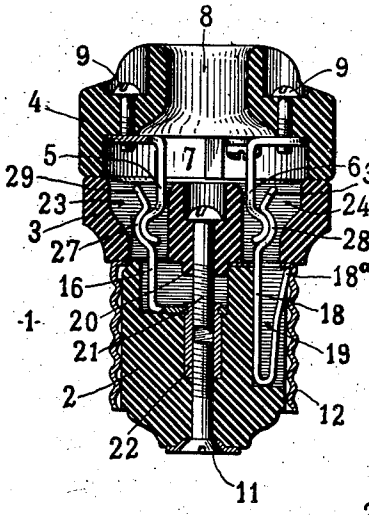
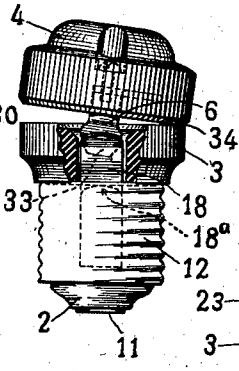


Fig. 7.



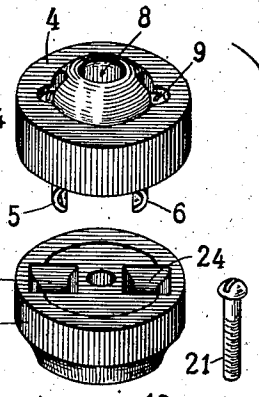
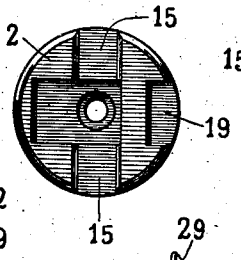


Fig. 6.

Fig. 4.



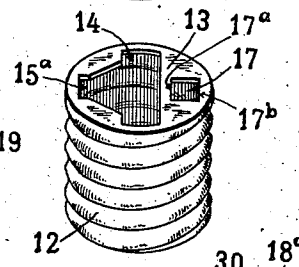
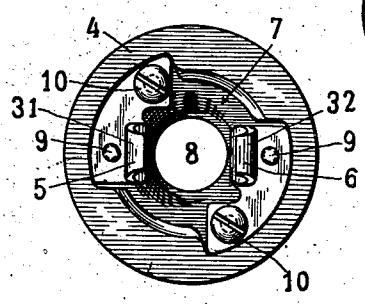


Fig. 2.



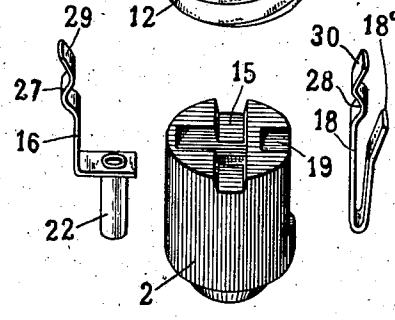


Fig. 3.

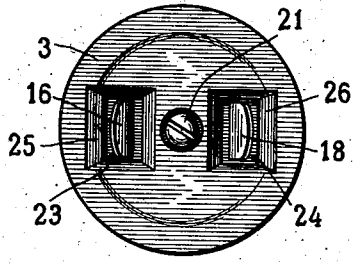
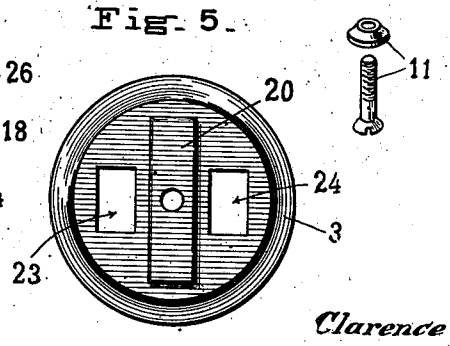


Fig. 5.



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SEPARABLE ATTACHMENT-PLUG.

1,123,002. Specification of Letters Patent. Patented Dec. 29, 1914.

Application filed July 25, 1913. Serial No. 781,136.

To all whom it may concern:

Be it known that I, CLARENCE D. PLATT, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Separable Attachment-Plugs, of which the following is a full, clear, and exact description, whereby any one skilled in the art may make and use the same.

The invention as indicated by its title, relates to separable attachment plugs, in contra-distinction to attachment plugs having conductors secured thereto.

In the device herein contemplated, the conductors are secured to a removable cap portion, having contact members which removably engage the contact members arranged in the body-part of the plug.

The body of the plug may be inserted and held in the receptacle, while the removable portion may be detached from or attached to the body-part, providing for the necessary electrical connection for transmitting current to any translating device, which it is desired to connect with the line wires, which are connected to the receptacle.

The objects of the invention are to provide for a very simple and compact device in which the coöperating contact members may be engaged and disengaged without liability of straining the parts or fracturing the insulating members upon which said parts are mounted.

A further object is to provide for the easy assembly of the various parts, making up the structure, with features of inter-engaging and inter-locking members which securely hold the various elements in definite and pre-determined position of attachment.

A still further object is to provide a plug, in which the contact members of the removable cap, may be inserted in the body-part and engaged with the coöperating contacts or may be removed therefrom without liability of the said contact members binding or cramping against the insulating body-part of the plug.

Referring to the drawings: Figure 1 is a view in central vertical section of the plug. Fig. 2 is a bottom plan view of the removable cap. Fig. 3 is a top plan view of the plug to which the cap may be secured. Fig. 4 is a plan view of the lower portion of the plug. Fig. 5 is a bottom plan view of the upper section of the plug, which fits upon the lower section illustrated in Fig. 4. Fig. 6 is a detailed view, showing the various parts of the plug in perspective and in relative position for assembly. Fig. 7 illustrates the clearance of the members during engagement and disengagements of the contact members of the body-part and removable cap.

Devices of the general character to which this invention relates are not new in the art. It has long been a practice to construct attachment plugs in which there is a base adapted to be screwed into a receptacle and provided with a central stud contact and a threaded sleeve contact so arranged as to engage the contacts of the receptacle.

The threaded sleeve contact and central stud contact are ordinarily mounted upon and in a body part of insulating material and are connected respectively with contact members usually in the form of spring clips which clips are in turn adapted to be engaged by contact members arranged upon a cap. This cap, with its contact members, provides a convenient means for attaching conducting wires and usually the contact members are of considerable length and extend a comparatively long distance below the base of the cap so that they may be inserted through perforations in the insulating body-part to engage the contact clips of said body-part. They are usually of such a form as to be clamped and held against accidental engagement when once inserted and engaged with the contacts of the plug member although they may be readily disengaged therefrom.

In all such devices, complete and thorough insulation of the parts is primarily essential and in order to secure proper insulation and at the same time sufficient holding effect between the contact members of the body of the plug and contact members of the cap, the cap contacts have been of a form to project well into the insulating body-part.

In such devices, so far as known, the removal of the cap and its contacts from engagement with the coöperating contacts of the body-part of the plug has necessitated a direct straight pull in order to prevent injury to the more or less frangible insulation of the body-part. Obviously, with cap contacts of considerable length, a sidewise pull upon the cap in either direction causes the

contacts to bind against the perforations of the body-part and thus fractures the porcelain or other insulating material.

It is one of the objects of the herein described invention to obviate breakage, cramping and binding and provide a substantially short contact member upon the cap which will be very firmly engaged and held by the body-part of the plug and yet of a form which, in conjunction with the form of perforations in the body-part and its contact members, will permit removal of the cap by a tilting movement as well as by a straight withdrawal of the cap from the body-part. There is a great advantage in such an arrangement inasmuch as in common practice, the cap is ordinarily connected with flexible conductors and it is a common practice to pull the cap from the plug by jerking upon the conductor. If care is used to pull the conductors in a straight line with reference to the axial line of the body-part, the parts may disengage without the cap contacts binding against the insulation of the body-part of the plug. If, however, they are pulled at an angle, the long contacts of the cap will necessarily bind against the apertures in the body of the plug and will either cramp and prevent removal of the cap or cause breakage of the plug.

Referring to the drawings the numeral 1 denotes the body-part of the plug which is composed essentially of a base section 2 of insulating material and a cover section 3 also of insulating material. Coöperating with this sectional body-part is a cap 4 of insulating material which has a pair of depending contact members 5, 6, conveniently secured in a depressed recess 7, about a central opening 8 by screws 9. These contact members, as illustrated in Fig. 2, are provided with binding screws to which the line wires or conductors may be conveniently attached, said wires passing out through the central opening 8.

The lower portion 2 of the body-part is provided with a central stud contact 11 and a threaded sleeve contact 12. The threaded sleeve contact 12 is of cup form and has a base 13 best illustrated in Fig. 6. This base fits over the upper end of the insulating section 2 and is provided with a transverse opening 14 overlying similarly formed slot 15 which projects entirely across the surface of the plug member 2. It is also cut away, as at 15ª, to clear the contact clip 16 which is connected with the central stud contact 11. It is also provided with a perforation 17 located substantially diametrically opposite of the contact clip 16 and through this perforation 17 projects a contact clip 18 which is in engagement with the threaded sleeve contact member 12. This threaded sleeve 12 is made in its peculiar form to serve not only as a contact member to engage the contact member of the receptacle but also to form a closure for the plug portion 2 and its contact recess 19.

A transverse opening 14 permits the passage of a barrier 20 depending from the under side of the insulating body-part 3 and engaging the slot 15 in the upper surface of the body-part 2. This prevents relative rotation of the body-parts 2 and 3 when they are bound together by a screw 21 which projects into a threaded boss 22 centrally seated in the body-part 2 and also engaged by the central stud contact 11. This boss 22 is in electrical connection with the contact clip 16.

The contact pocket or opening 19 is arranged to receive the lower end of the contact clip 18 and is of substantially rectangular form opening into the side of the body portion 2. The perforation 17 is of such a form that its inner wall 17ª registers will the wall of the opening 19, there being a slight lip 17ᵇ at the opposite side of the perforation which will be engaged by one end 18ª of the contact clip 18. The lower end of the contact clip 18 is of U form and being of a springy material may be compressed down through the perforation 17 whereupon the end 18ª will move outward against the threaded sleeve contact 12 and form the electrical connection between the clip and the sleeve. It would also prevent withdrawal of the clip 18, yet permitting a spring action of said clip for engagement and disengagement of the coöperating contact member 6 of the cap 4.

The body-part 3 is provided with perforations 23 24, which are beveled about their edges and have angularly formed faces toward the outer periphery of the plug member as at 25, 26. This angular formation gives the required room for the springing back of the contact clips 16, 18 during the engagement and disengagement of the coöperating cap contacts 5, 6. The remaining beveled edges provide for clearance of the contact members 5 and 6 which are of a peculiar form hereinafter described.

Each of the contact clips 16, 18, adjacent to their uper ends are of substantially semi-circular form as illustrated at 27, 28 and terminate in angularly formed ends 29, 30. As the semi-circular portions are opposed to each other, the angularly disposed ends 29, 30 form a convenient guide for engaging and guiding the contact members of the cap into locking engagement with the semi-circular portions 27, 28.

The contact members 5, 6 of the cap project a slight distance below the bottom of the cap and terminate in substantially semi-circular bends 31, 32 which are adapted to

fit closely within the bends 27, 28 of the contact clips of the base of the plug. It will be noted that the semi-circular bends 31, 32 of the contact members 5 and 6 bow outwardly so that in disengagement of the cap and base portion, nothing but round surfaces can possibly come in contact with the edges of the openings through which the contact members are inserted. The contacts 5 and 6 are of comparatively stiff material with little or no spring and are tapered at their ends as at 33 so that the extereme lower end is considerably narrower than the bent portion, said bent portion being considerably wider than the main dependent portion of the contacts. This peculiar form of contact member, in conjunction with the beveled openings of the plug member, provides for ample clearance when the cap is removed from the plug. This clearance is clearly illustrated in Fig. 7 where the cap 4 is tilted to an extreme position with its edge 34 resting against the edge of the body-part. In fact, the beveling of the ends of the contact members 5, 6 is substantially upon a curve having a radius extending from the edge of the cap. With this arrangement of parts it is obvious that the contacts of the cap may be of comparatively short length and yet will be firmly held by the semi-circular contact clips which bind against the curved lower ends of the cap contacts while the inner sides of said contacts are parallel with the walls of the perforation of the body-part.

The bevels around the upper edges of the perforations are such as to permit withdrawal of the cap contacts by a tilting movement of the cap in any direction due, of course, in part, to the tapered form of the lower ends of the contacts 5, 6. Even when the cap is tilted directly in the line of the two contact members, the springy contacts of the body part will give way and permit removal of the cap and its contacts without placing undue binding strains upon the insulation about the perforations.

It will be observed that the device is capable of very ready and quick assembly.

The screw of the central stud contact 11 is inserted through the lower end of the base-part 2 and engages with the boss 22 of the contact clip 16 which rests within a depressed pocket. The threaded sleeve contact 12 is then dropped over the upper end of the base-part 2. The spring contact clip 18 is then forced down through the perforation 17 into its pocket 19 whereupon the end 18^a snaps below the lip 17^b and securely holds the clip in its pocket which is re-inforced by the edge 17^a of the metallic sleeve. The end 18^a forms a positive electrical connection with the threaded sleeve. The upper insulating section 3 is then placed over the body-part 2 with its barrier 20 engaging the slot 15 formed in the upper face of the body-part 2. The contact clips 16, 18 thus project into the perforations 23, 24 in position to be engaged by the contact members 5 and 6 of the cap. A binding screw 21 engaging the boss 22 securely binds both sections of the plug together. It will be noted that there is full and ample insulation provided for all of the contact members and the cap may be removed by tilting in any direction without liability of fracturing the insulating material of the body-part and without liability of the contact members cramping and binding to an extent to prevent ready removal of the cap.

Obviously, the exact form and detail of the parts of the device might be varied to a considerable extent without departing from the spirit or intent of the invention which contemplates a compact form of plug having its contacts and appurtenant parts so arranged that the cap contacts may be readily inserted or removed from the body-part without liability of fracturing the insulation and without a cramping or binding of the parts.

It will be noted that the bevels about the perforations 23, 24 also serve as a guide when the bevel contact members of the cap are inserted to engage the contact clips of the body-part.

It is, of course, apparent that the arrangement of the contact members with the enlarged or swirled semi-circular holding faces and beveled ends may be used in conjunction with any type of plug-in device and are not necessarily limited to the specific type of separable attachment plugs.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a separable attachment plug comprising a body portion of insulating material formed in sections and having recesses for the reception of contact clips, a central stud contact engaging one of said contact clips, a threaded sleeve contact having a base clamped between the sections of the body portion and encircling one of said sections, said sleeve contact having a perforation in its base registering with a contact recess of the body portion, and a spring contact clip having one end projecting through the perforation and the other end in spring locking engagement with the base of said sleeve below the perforation.

2. A separable attachment plug comprising a body portion of insulating material formed in sections, one of said sections provided with contact recesses, the other of said sections provided with perforations, contact clips arranged in the recesses of the first-named section and projecting into the perforations of the coöperating section, a central stud contact connected with one of said contact clips and a threaded sleeve contact engaging the second of said contact

clips, said sleeve having a perforation through which the clip is inserted with its upper end projecting therethrough and bearing against one wall of the perforation and its opposite end in spring contact with the threaded sleeve contact, and a cap having contacts adapted to engage the contact clips of the body-part.

3. A separable attachment plug comprising a body-portion of insulating material formed in sections, the lower section having contact recesses, a threaded sleeve contact having its base clamped between said sections and provided with a perforation registering with one of the contact recesses, a U-shaped contact member having one arm longer than the other, the long arm projecting through the perforation and the short arm resting expanded against the sleeve below the perforation and a contact clip connected with a central stud contact, perforations extending through the upper member of the body-part to receive said contact clips and a cap having contact members adapted to engage the contact clips of the body portion.

4. An attachment plug comprising a base of insulating material, contact perforations extending into said base, said perforations having beveled walls at their outer ends to provide enlarged openings, contacts mounted in inclosed recesses in the base and projecting into the enlarged openings and having at their outer ends outwardly bowed semicircular locking members and a cap having substantially short dependent contact members provided with coöperating semicircular locking members bowed outwardly and having their ends below the central portion of the bow beveled to the end of the contact, whereby the cap may be separated from the base by an angular pull in any direction.

5. A separable attachment plug comprising a body part of insulating material formed in sections, the lower section having contact recesses and contacts mounted therein and projecting therefrom, a central stud contact and a threaded sleeve contact connected respectively therewith, a coöperating body part of insulating material having perforations with beveled walls at their outer ends to provide enlarged openings and into which openings the said contact members of the lower section extend, said contacts having at their outer ends outwardly bowed semicircular locking members, and a cap having substantially short dependent contact members provided with coöperating outwardly bowed semicircular locking members, said members being beveled from the central portion of the bow to the ends of the contacts, whereby the cap may be separated from the base by an angular pull in any direction, and whereby there is a maximum contact and holding surface between the engaging contact members.

6. A separable attachment plug comprising a body-part of insulating material formed in sections, the lower section having a contact recess formed in one side thereof, a threaded sleeve contact closing said opening and provided with a perforation through which a contact member may be inserted and held within the contact recess, a coöperating contact member arranged in a recess in said body-part and connected with a central stud contact, an insulating body-part having perforations fitting over said contact members, means for preventing relative rotation of the body-parts and threaded sleeve contact, a cap having contact members provided with substantially semi-circular locking members, the locking members being beveled at their lower ends and adapted to engage the contact members of the lower base section within the perforations of the upper base section, said contact members of the lower base section having substantially semi-circular locking members coöperating with the contacts of the cap and provided with angularly disposed ends projecting above the semi-circularly formed locking members.

7. In combination in a separable attachment plug having a base part, contacts, and a removable cap, contact members for said cap having enlarged and substantially semi-circular holding faces, bowed outwardly with reference to the center of the cap and fitting similarly formed sockets of the base contacts, said semicircular enlargements tapered from the central portion of the bow toward the ends of the contacts, whereby the contacts may be engaged and disengaged by a pull of the cap in any direction without binding upon the base part, and whereby there is a maximum contact and holding surface between the contact members.

8. In combination in an attachment plug having a base-part and removable cap, contact members for said cap having enlarged and substantially semi-circular holding faces bowed outwardly, said semi-circular enlargements providing maximum contact and holding members, said members tapered from a central portion of the enlargement toward the end of the contact and coöperating contacts mounted in the body part and having substantially semi-circular holding recesses to engage the outer sides of the enlargements of the cap contacts and provided with angularly disposed ends projecting outwardly above the semi-circular holding faces.

9. In a separable attachment plug an insulating body part having recesses for con-

tact clips, a threaded sleeve contact having a perforation through its base registering with one of said recesses, and adapted to receive and lock a contact clip within the recess, and a spring contact clip having one end projecting through the perforation of the threaded sleeve and its opposite end in spring engagement with the base of the threaded sleeve below the perforation.

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Witnesses:
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