March 7, 1933. W. C. TREGONING 1,900,139

ATTACHMENT PLUG CAP AND METHOD OF MAKING THE SAME

Filed Oct. 19, 1929

Fig. 1

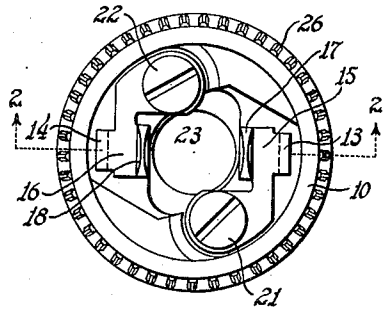


Fig. 2

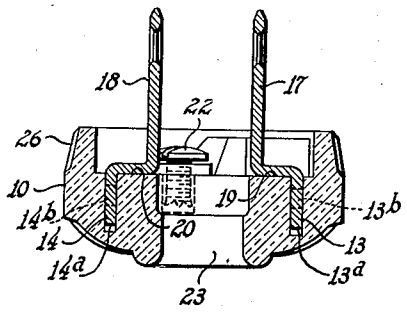


Fig. 3

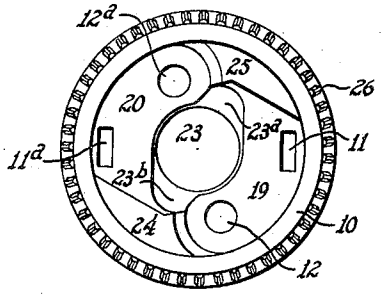


Fig. 4

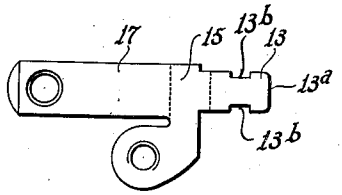


Fig. 5

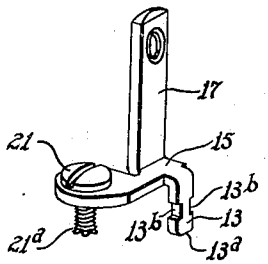


Fig. 6

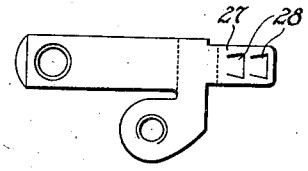


Fig. 7



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UNITED STATES PATENT OFFICE

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ATTACHMENT PLUG CAP AND METHOD OF MAKING THE SAME

Application filed October 19, 1929. Serial No. 400,881.

This invention relates to improvements in attachment plug caps and methods of making the same.

An object of the invention is to provide a method of making plug caps wherein the use of molded in metal eyelets or inserts is eliminated,—thereby facilitating or speeding up production of the molded pieces.

Another object is to minimize the number of metal parts required for production of a plug cap.

Another object is to facilitate assembly of the metal parts with respect to the molded cap.

Another object is to provide a stronger and more rigid connection between the metal parts and the insulating cap.

Another object is to provide a method of making plug caps wherein the shrinkage characteristics of the molded piece may be utilized as the sole means for effecting a rigid bond between the same and the metal parts associated therewith.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawing illustrates certain embodiments of the invention which will now be described, it being understood that the invention is susceptible of modification in certain details thereof without departing from the scope of the appended claims.

Referring to the drawing, Figure 1 is an enlarged bottom plan view of a plug cap constructed and assembled in accordance with my invention.

Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a bottom plan view of the cold molded insulating piece prior to assembly of the combined contact and terminal members with respect thereto.

Fig. 4 is a plan view of one form of punched metal blank from which each of the combined contact and terminal members may be produced.

Fig. 5 is a perspective view of one of the combined contact and terminal members, with the binding screw attached thereto, and

Figs. 6 and 7 are plan and fragmentary sectional views, respectively, of a modified form of blank.

Referring first to Figs. 1, 2 and 3, the numeral 10 designates the insulating body portion of a cap, and said body portion may comprise any suitable or preferred composition which is adapted for cold molding under relatively heavy pressure while plastic and to be thereafter subjected to the usual prolonged heat treatment for curing or hardening. Thus I may employ the well known cold molding composition which comprises a comminuted asbestos filler and a pitch binder.

Heretofore it has been customary to either provide within the insulating body a pair of molded in metal eyelets or inserts to which the contact and terminal members of the cap may be subsequently attached, or to mold in integral portions of the contacts or terminal members themselves. However, the necessity for providing molded in metal parts renders production of the molded pieces comparatively slow and tedious. By my improved method the necessity for use of molded in metal parts or inserts is eliminated, whereby the rate of production of the molded pieces by a single press may be greatly increased.

Thus as is well known the insulating material after cold molding thereof to the desired form is still somewhat plastic, or of a consistency known in the cold molding art as "mud". Also as is well known the usual prolonged heat treatment to which these cold molded pieces are subjected for curing or hardening thereof inherently results in a considerable degree of shrinkage of the material of which the pieces are composed. I have discovered that it is possible to utilize this shrinkage characteristic of the cold molded material to provide for rigid and permanent securement of a metal element pressed or inserted therewithin after the molding operation and before the heat induration treatment.

Thus I preferably mold or otherwise form in the piece 10 a pair of diametrically opposed groups of recesses 11, 12 and 11^a, 12^a. The recesses 12, 12^a as shown may be circular and of a size to freely accommodate the shank of the usual binding screw. Recesses 11, 11^a

as shown may be of rectangular shape in cross section, and the cross sectional dimensions thereof are preferably slightly (say two thousandths of an inch) less than the corresponding dimensions of metal members or shanks 13, 14 to be pressed or inserted thereinto.

The lower ends 13ª, 14ª of said shanks are preferably slightly rounded to assist in guiding the same into said recesses, said shanks being integral with and bent downwardly at right angles from the portions 15 and 16 respectively, which form the terminal plates of the plug cap. Also integral with said portions 15 and 16 and bent upwardly at right angles therefrom are the portions 17 and 18, respectively, which form the jacks or blade contacts of the plug cap, said contacts being provided with the usual beveled upper ends and the usual perforations intermediate the ends thereof for detachable interlocking engagement with the cooperating contacts of a receptacle (not shown). Also as shown at 13ᵇ, 14ᵇ in Figs. 2, 4 and 5 the shanks 13, 14 are preferably provided with suitable notches or indentations forming inwardly extending shoulders in the sides and edges thereof for more positive engagement by the material of the insulating cap after shrinkage of the latter.

As best illustrated in Fig. 2 the shanks 13 and 14 are pressed downwardly into the respective recesses 11 and 11ª until the terminal plates 15 and 16 engage or rest upon the ledges 19 and 20 formed in the insulating cap. The binding screws 21 and 22 are preferably threaded into tapped openings in the terminal plates 15 and 16 prior to insertion of the shanks 13 and 14 into the aforementioned recesses, the shanks of said screws being upset or staked as indicated at 21ª (Fig. 5) to prevent subsequent entire removal of said binding screws.

The molded insulating cap 10 is provided with the usual central perforation 23 to permit passage of the wiring cord or conductors (not shown),—the recesses 23ª, 23ᵇ being arranged to communicate therewith for reception of the usual strain relieving knot or other type of strain relieving means, and to permit attachment of the wires by leading the same directly to the respective binding screws or by "snubbing" said wires around the respective contact jacks. The ledges 24 and 25 provide a seat for the usual thin fiber enclosing disk (not shown). The exterior surface of the molded cap may be of any desired contour, but the cap is preferably of slightly tapered form and milled or otherwise roughened, as indicated at 26 (Figs. 2 and 3) to facilitate gripping thereof by hand.

With the combined contact and terminal members assembled with respect to the molded piece in the manner aforedescribed, the latter is subjected to the usual prolonged heat treatment for curing or hardening, whereupon it is found that the shrinkage effect aforementioned results in rigid and permanent securement of said metal parts with respect to the insulating cap.

In the modified form of blank shown in Figs. 6 and 7 the shank 27 of the combined contact and terminal member is provided with a pair of spaced angular depressions or pockets 28 having horizontal or right angular shoulders at the lower ends thereof, into which pockets the insulating material is adapted to project upon insertion of the shank into its corresponding recess, or as a result of the shrinkage of the insulating material as aforestated.

By my improved method of making plug caps it will be noted that the contact and terminal members may be formed of a single piece of metal and that the binding screw may be assembled and staked to the terminal member in the first instance. The contact and terminal members are rigidly and permanently secured to the molded cap without the use of molded in eyelets or inserts and without the necessity for the usual riveting or upsetting operations incident to use of such additional parts.

After the completely assembled caps have been heat treated for hardening of the insulating material the same may be dipped or momentarily immersed in a suitable acid bath to clean the surfaces of the metal parts, including removal of any oxide which may have formed upon such surfaces as a result of the heat treatment.

While I prefer to provide notches or depressions of the character illustrated for positive and cooperative engagement by the shrunken walls of the recesses, I have nevertheless demonstrated in practice that the slightly rough and irregular edges formed on the shanks by the punching or shearing of the blanks will be sufficiently tightly interlocked with the shrunken walls of the recesses to resist or withstand all pulling strains to which the parts of the cap will ordinarily be subjected when in use.

Similarly, while I have shown but one form of molded insulating cap, it will be understood that the form of the molded piece may be modified as desired without departing from the scope of the appended claims.

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

1. The method of making an attachment plug cap, which comprises cold molding a mass of insulating material to form an article of the desired shape, then pressing into the molded article an integral portion of a combined contact and terminal member, and thereafter subjecting the article to the usual heat treatment for curing, whereby said combined contact and terminal member is rigidly and permanently secured in position through shrinkage of the insulating material.

2. The method which comprises cold molding a mass of insulating material to provide an article of the desired shape and providing within said article a recess of predetermined size and shape, then inserting within said recess a metal shank the cross sectional dimensions of which are at least as great as the cross sectional dimensions of said recess, and then subjecting said article to heat treatment for curing whereby said shank is permanently secured within said recess by shrinkage of the walls of the latter.

3. The method which comprises cold molding a mass of insulating material to provide a plug cap having recesses therein, thereafter inserting within said recesses the integral projecting shanks of combined contact and terminal members, then subjecting said cap to curing treatment to permanently secure said shanks within said recesses through shrinkage of the walls of the latter.

4. The method which comprises cold molding a mass of plastic insulating material to provide a plug cap having diametrically spaced pairs of recesses therein, thereafter inserting within certain of the recesses of each pair the integral projecting shanks of a pair of one-piece combined contact and terminal members, said shanks having inwardly extending shoulders formed in the surfaces thereof, and simultaneously inserting within the other recesses of each pair the shanks of binding screws carried by said terminal members, then subjecting said cap to the usual heat treatment for curing whereby said first mentioned shanks are rigidly and permanently secured within their respective recesses through contraction or distortion of the walls of the latter.

5. The method which comprises cold molding a mass of plastic insulating material to provide a plug cap having diametrically spaced pairs of recesses therein, thereafter inserting within certain of the recesses of each pair the integral projecting shanks of a pair of one piece combined contact and terminal members, said shanks having inwardly extending shoulders formed in the surfaces thereof, simultaneously inserting within the other recesses of each pair the shanks of binding screws carried by said terminal members, then subjecting said cap to the usual heat treatment for curing whereby said first mentioned shanks are rigidly and permanently secured within their respective recesses through contraction or distortion of the walls of the latter, and thereafter subjecting at least the metal portions of the assembled cap to the action of an acid bath to clean the surfaces thereof.

6. As an article of manufacture, an attachment plug cap comprising a body of insulating material cold molded to the desired shape, said cap having a recess formed therein by the molding operation, and a one-piece combined contact and terminal member having an integral projection inserted within said recess, said projection being permanently secured within said recess by contraction of the walls of the latter as a result of the usual heat induration treatment of the molded cap.

7. As an article of manufacture, an attachment plug cap comprising a body of insulating material cold molded to the desired shape, said cap having a recess formed therein by the molding operation, a one-piece combined contact and terminal member having an integral projection inserted within said recess, said projection being permanently secured within said recess by contraction of the walls of the latter as a result of the usual heat induration treatment of the molded cap, the terminal portion of said member carrying a screw, and said cap having a recess formed therein to provide clearance for the shank of said screw.

8. In combination, a pre-formed plug cap of cold molded insulating material, said cap having a recess formed therein by the molding operation, and a one-piece combined contact and terminal member, said member having an integral projection inserted within said recess and permanently retained therein by shrinkage of the insulating material.

9. An attachment plug cap comprising an insulating body molded free from inserts of any kind, said body having a plurality of recesses formed therein by the molding operation, and a plurality of one-piece combined contact and terminal members having integral projections inserted within said recesses and permanently retained therein by shrinkage of the material of said body.

10. In combination, a pre-formed base of cold molded and heat-induratable insulating material, said base having a plurality of recesses formed therein by the molding operation, a punched sheet metal member formed to provide a horizontally extending terminal plate, an arm integral with said plate and bent upwardly at right angles thereto to provide a contact blade, a second arm integral with said plate and bent downwardly at right angles thereto, said plate having a tapped opening therethrough, a binding screw having threaded engagement with said opening, the end of said screw being upset to prevent complete separation thereof from said plate, and the upset end of said screw and said second mentioned arm being simultaneously inserted into said recesses in the base prior to heat-induration treatment of the latter.

11. An attachment plug cap comprising a heat-induratable insulating body cold molded free from inserts of any kind, said body having a plurality of recesses of predetermined cross-sectional dimensions formed therein by the molding operation, a plurality

of one-piece combined contact and terminal members, said members having integral anchorage projections of relatively larger cross-sectional dimensions inserted within said recesses, and said body being heat-indurated whereby the walls of said recesses are shrunk into gripping engagement with said projections to permanently retain the latter in position.

In witness whereof, I have hereunto subscribed my name.

WILLIAM C. TREGONING.