

Aug. 2, 1938.

W. A. FRANTZ
ELECTRICAL CONNECTER
Filed July 9, 1929

2,125,555

FIG. 2.

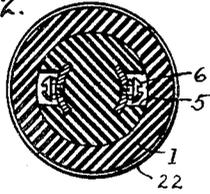


FIG. 5.

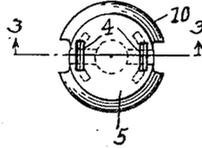


FIG. 1.

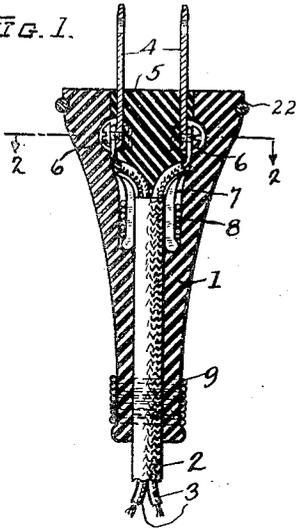


FIG. 3.

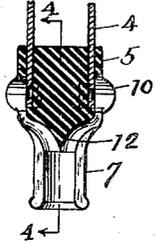


FIG. 4.

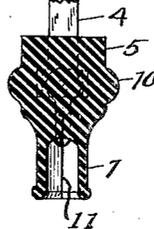


FIG. 6.

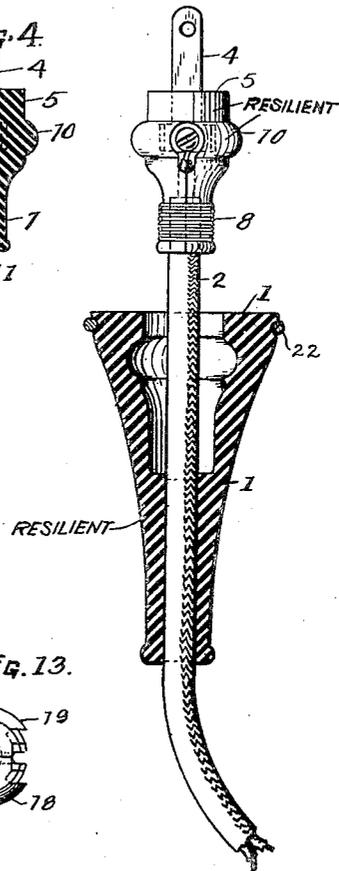


FIG. 7.

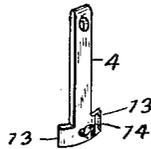


FIG. 8.

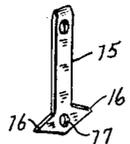


FIG. 13.

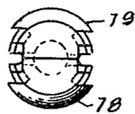


FIG. 10.



FIG. 11.



FIG. 9.

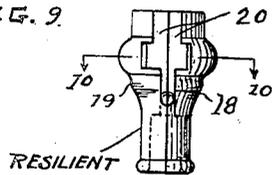
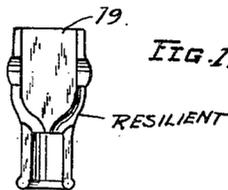


FIG. 12.



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2,125,555

ELECTRICAL CONNECTER

Walter A. Frantz, Cleveland, Ohio

Application July 9, 1928, Serial No. 291,323

15 Claims. (Cl. 173—36)

This invention relates to terminal connectors or plug caps for electric cords and in particular, it relates to detachable plug caps that may be readily secured to an electric cord.

5 Some of the objections and defects in present day plug caps are that they are easily broken and the cable is apt to become frayed and broken and tear loose at the point of its attachment to the plug cap.

10 One of the objects of my invention is to provide a terminal connector or plug cap for electric cords that is not apt to become broken in use.

Another object of my invention is to provide a terminal connector or plug cap for electric cables that protects and supports the cable at a point adjacent to the plug.

15 Another object of my invention is to provide a terminal connector or plug cap for electric cords, that minimizes the possibility of tearing the conductor strands away from the contact elements of the plug cap.

A further object of my invention is to provide a detachable terminal connector for electric cords which may be readily secured to the electric cord and its conductor strands by means of a single tool: namely a screw driver.

20 Stated in general terms, my improved terminal connector or plug cap is constructed of a soft elastic material that is not apt to become broken, through misuse or hard handling and it is arranged to extend over and grip the end portion of the cord, to relieve it of bending stresses at this point and to prevent the cord from being torn loose from the plug cap.

25 The plug cap is constructed so that it may be easily connected to the conductor strands of an electric cable. My improved plug cap or terminal connector is practically unbreakable, it is simple and inexpensive to manufacture, it may be easily and readily secured in position on an electric cable, and when once in position, it is very difficult to break or damage the wire connections at the plug.

30 These and other objects and advantages of my invention, will become more fully apparent as the description thereof proceeds and will then be more specifically defined in the appended claims.

In the accompanying drawing, forming a material part of this disclosure:

35 Figure 1 is a side elevational view in section of my improved terminal connector or plug cap.

Figure 2 is a section taken on line 2—2, Figure ..

40 Figure 3 is a side elevational view in section of the inner element of the plug cap.

Figure 4 is a view similar to Figure 3, in which the element has been rotated 90 degrees.

Figure 5 is a plan view of the inner element shown in Figures 3 and 4.

Figure 6 is a view similar to Figure 1, with the inner element ready to be received in the outer sheath of the plug cap.

Figure 7 is a perspective view of one of the contact members of the plug cap.

Figure 8 is a perspective view of a modified form of contact member.

Figure 9 is a side elevational view of a modified form for the inner element of the plug cap.

Figure 10 is a section taken on line 10, Figure 9.

Figure 11 is a side elevational view of the conductor cord end.

Figure 12 is a side elevational view of one of the complementary elements of the plug part shown in Figure 9.

Figure 13 is a plan view of the element shown in Figure 9.

20 According to my invention the terminal connector or plug cap is made of a soft, flexible, elastic material, suitably formed for the reception of a conductor cord and a pair of contact elements. This plug cap may take any known form such as a screw plug, pull plug, etc., and it may be constructed either wholly or partly of a soft resilient substance. The contact members of the plug cap may be made detachable if so desired. The body of the electric cord is detachably secured to the plug cap by suitable means, and the conductor strands are secured to the contact members by means of screws or in any other suitable manner. The composition of the plug cap is preferably rubber, of a consistency, hardness and degree of elasticity of a pneumatic casing or automobile tire.

25 I do not limit myself, however, to rubber as certain vulcanized oils can be used. Preferably the plug cap is constructed so as to afford a support for the cord for a short distance, to distribute the bending stresses imposed upon the end of the cord. Such a plug cap as I have shown and described can be readily removed and replaced. The purpose for making the cord and plug cap detachable is to facilitate the initial installation and to permit the replacement of broken plug caps of other construction with the present plug cap.

30 The construction shown would also facilitate repairs, which, however, are rarely needed, as the only ordinary possible injuries are cutting and burning, both of which are avoidable. Ordinarily the terminals cannot be bent, broken or torn.

The insulation of the cord is not apt to ravel or fray by reason of its being embraced by the plug parts. There is slight chance of the conductor cord becoming broken, as it is not subject to any sharp bends and its firm attachment to the plug cap will prevent working and twisting of the cord and its strands in the plug cap.

Because of the omission of all screws, except the two required to connect the conductor strand to the contact member, this terminal lends itself readily to high speed production methods and low manufacturing costs. It is water-proof, and may be shaped in any form desired. I do not limit myself to making the entire terminal of soft material, part of it may be made of a hard material, such as fibre or vulcanite.

Describing the parts by reference characters, 1 represents the sheath or outer casing of my improved terminal connector or plug cap and 2 represents an electric cord or cable, having conductor strands 3 which are connected to contact members 4 by means of screws 6 or in any other suitable manner. The contact members 4 and the inner plug part 5, are formed as a unit by molding or by any other process suitable for the material used. The sheath 1 of the plug cap, and inner element 5 are made of a soft flexible elastic rubber-like substance that provides a resilient anchorage for the contact members 4 and a protecting sheath for the end of the conductor cord 2. The lower end 7 of the inner element 5 is slitted at 11 to facilitate the installation of the electric cord and channels 12 are provided in this part of the plug for receiving and embracing the strands 3 of the cord.

When the cord and its conductor strands are properly located in the element 5 and secured to the contact members 4, the end 7 of the element 5 is wound with string or tape, 8, so that it securely grips the cord 2. Previous to this operation, the sheath 1 was slipped over the cord as shown in Figure 6 and now it is pulled to the end of the cord, so that the element 5 assumes the position shown in Figure 1. The lower end of the sheath 1 is wound with string or tape at 9 so that it firmly grips the cord 2. The installation is completed by slipping on the annular rigid lock ring 22 which is received in a suitable annular groove formed on the outer end of the sheath 1. The purpose of the ring is to firmly hold the inner and outer parts of the plug cap together in their assembled relation.

The inner element 5 is provided with an annular shoulder or projecting portion 10 which is received in a complementary recess, formed in the sheath 1. By this arrangement any strains which the inner plug part 5 is normally subjected to, are transferred to the outer sheath 1. The end of the cord 2 and the inner plug part 5 may be coated with a suitable cement, just before the parts are pulled together and in this manner the elements of the plug cap will be securely and adhesively held to each other. The inner ends of the contact elements 4 are provided with laterally projecting shoulders 13 to prevent their being pulled out of the element 5 and they are drilled and tapped at 14 for receiving the screws 6.

Figure 8 shows a modified form of contact member 15 having offset parts 16 of triangular shape and a threaded hole 17 for a screw such as 6. This construction would permit a greater amount of material of the inner plug 5 to surround the end of the contact member. Figures 9, 10, 12 and 13, show a modified form of inner

element that is constructed of two identical or mating parts, and the contact members are not molded or permanently fixed therein. The two halves 18 and 19 are similarly formed and are provided with recesses 20 for the reception of the contact members 4. In using the modified form of inner element just referred to the contact members are secured to the conductor strands and these parts are then placed in position in one of the plug part halves such as shown in Figure 12. The other half of the plug part is then placed in position and both halves are bound to the electric cord and the outer sheath is then pulled into position. It might be advantageous in some cases to knot the ends of the conductor strands as shown at 21 in Figure 11, which shows a rubber covered cord 22'. The enlargement formed by the knot would serve to relieve the junction of the contact members and conductor strands from stresses caused by pulling on the electric cord.

Many other modifications are available and will occur to those skilled in the art, all of which I intend to claim and secure. Owing to the flexibility and elasticity of material, no breakage is possible. Owing to the embracing effect of the composition, the protected end of the cable cannot pull out or unravel, and when a flexible extension is used, the strands are held against breakage.

Having thus described my invention, what I claim is:

1. A detachable terminal plug cap for an electric cord having conductor strands comprising, complementary separable inner and outer sections formed from a relatively soft, elastic, non-conducting, flexible material, each of said sections having extending sleeve-like portions, contact terminal members supported thereby and adapted for connection with the strands of the cord, and means engaging each of the sleeve-like portions of said sections for causing them to tightly grip the cord.

2. A detachable terminal plug cap for an electric cord having conductor strands comprising, complementary separable inner and outer sections formed from a relatively soft, elastic, non-conducting, flexible material with an annular enlargement on the inner section and a complementary groove on the outer section, contact terminal members supported thereby adapted for connection with the strands of the cord, and a relatively rigid locking ring adapted to encircle said outer section at a point intermediate the annular groove and the outer end thereof.

3. A detachable terminal plug cap for an electric cable having conductor strands protruding therefrom comprising, separable soft rubber inner and outer sections, said inner section having communicating passageways for separately receiving and embracing the body of the cable and the strands extending therefrom, contact terminal members carried by said plug cap and projecting outwardly therefrom, means for detachably connecting the conductor strands to said contact terminal members and means to tightly clamp one of said sections to the body of the cable.

4. A detachable terminal plug for an electric cable having conductor strands comprising, a separable soft rubber inner and outer sections, contact terminal members carried by said plug and projecting outwardly therefrom, means for detachably connecting the conductor strands to said contact terminal members and means to

tightly clamp both of said sections to the body of the cable.

5. A detachable terminal plug for an electric cord having conductor strands comprising, complementary separable inner and outer sections formed from a relatively soft, elastic, non-conducting, flexible material, contact terminal members carried by said plug and extending therefrom, means for detachably connecting the conductor strands to said contact terminal members and means for placing the inner and outer sections of the terminal end of said plug under compression so as to firmly yet flexibly support said terminal members.

6. A detachable terminal plug for an electric cord having conductor strands comprising, complementary separable inner and outer sections formed from a relatively soft, elastic, non-conducting, flexible material, contact terminal members supported thereby and adapted for connection with the strands of the plug and a relatively rigid locking member encircling and compressing the outer section of said plug at a point adjacent to its working end so as to firmly yet flexibly support said terminal members in place in the plug.

7. An electric plug connector comprising a body made of soft, elastic, flexible, rubber-like material, contact blades flexibly and fixedly carried by said body, means for detachably securing the conductor strands of an electric cable to said blades, said body having channels for the accommodation of the strands of said cable, and detachable electrically-insulating flexible means for covering said body after the cable strands have been connected to said contact blades and for assisting said body in supporting said blades.

8. An electric plug connector comprising a body made of soft, elastic, flexible, rubber-like material, contact blades fixedly embedded in said body and projecting therefrom, means for detachably securing the conductor strands of an electric cable to said blades, said body having channels for the accommodation of the strands of said cable, and detachable electrically-insulating flexible means for covering said first named means after the cable strands have been connected to said contact blades and for assisting said body in supporting said blades.

9. An electric plug connector comprising a body made of elastic, flexible, rubber-like material, contact blades flexibly carried by said body, said body being molded about one end portion of said contact blades, means for detachably securing the conductor strands of an electric cable to said blades, said body having channels for the accommodation of the strands of said cable, and detachable electrically-insulating flexible means for covering said first named means after the cable strands have been connected to said contact blades and for assisting said body in supporting said blades.

10. An electric plug connector comprising a body made of soft, elastic, flexible, rubber-like material, contact blades flexibly carried by said body, means at the opposite sides of the body for detachably securing projecting conductor strands of an electric cable to said blades, means for detachably securing said body about and in contact with the end of said cable, said body defining

a single passageway for the cable and communicating passageways for receiving and embracing the projecting strands of the cable, and resilient detachable electrically-insulating means for covering said first named means after the cable strands have been connected to said contact blades.

11. An electric plug connector comprising a body made of soft, elastic, flexible, rubber-like material, contact blades flexibly carried by said body, means for detachably securing the conductor strands of an electric cable to said blades, means for detachably securing said body to the cable, detachable flexible electrically-insulating means for covering said first named means after the cable strands have been connected to said contact blades, and means for detachably securing said last named means to the cable.

12. An electric plug cap comprising separable and cooperating complementary terminal supporting sections made of soft, elastic, flexible, rubber-like material, in combination with an electric cable and contact blades electrically connected to the strands of said cable, one of the sections of said plug cap being adapted to receive said contact blades and cable and to temporarily maintain them in assembled and operative position, the other section of the plug cap being adapted upon assembly of the sections to assist in the support of said contact blades.

13. An electric plug cap comprising separable inner and outer sections made of soft, elastic, flexible, rubber-like material, in combination with an electric cable and contact blades electrically connected to the strands of said cable, the inner section of said plug cap being adapted to receive said contact blades and cable and to temporarily maintain them in assembled and operative position, the outer section of the plug cap being arranged to shield and cover certain parts of said cable and its connection with said contact blades and to cooperate with said inner section in supporting said contact blades.

14. An attachment plug cap comprising a shell of soft rubber having thin walls and consisting of a tubular portion connected to an enlarged head, a groove near the end of the enlarged head of said shell, a base of resilient rubber having a shoulder seated in said groove and slots extending through the base, and contact blades passing through said slots having an enlargement at one end with adjacent shoulders abutting opposite portions of the base to prevent removal of the contact blades.

15. An attachment plug cap comprising a shell of soft rubber having thin walls and consisting of a tubular portion connected to an enlarged head, a groove near the opening of the enlarged head of said shell, a base of resilient rubber having a shoulder seated in said groove and slots extending through the base, and contact blades passing through said slots having an enlargement at one end with adjacent shoulders abutting opposite portions of the base to prevent removal of the contact blades, the enlargement of each of said blades having a threaded aperture to receive binding screws located at a side of the base away from the projecting portion of the contact blades.

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