April 20, 1943. M. G. HEISER ET AL 2,317,189

WIRING DEVICE

Filed Jan. 9, 1942

Fig. 1.

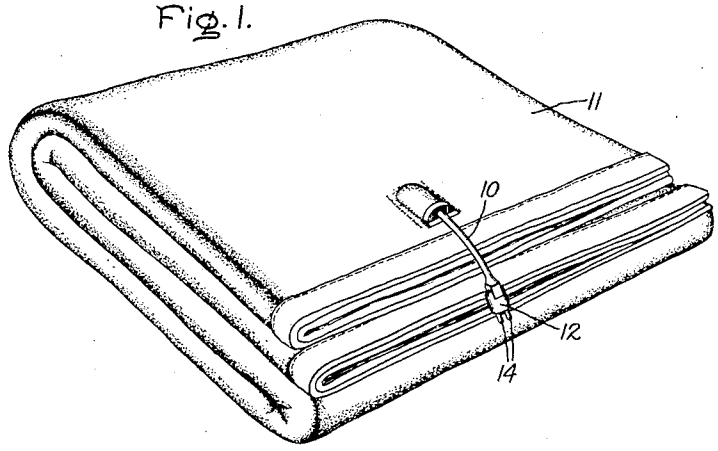


Fig. 4.

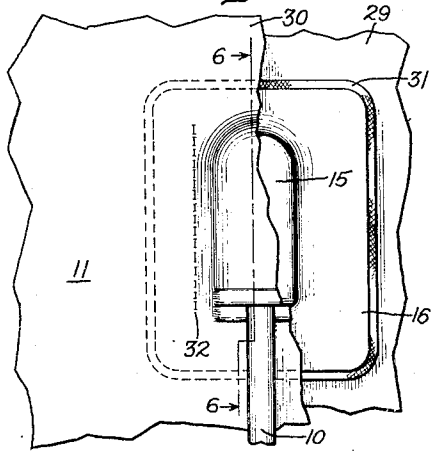


Fig. 6.

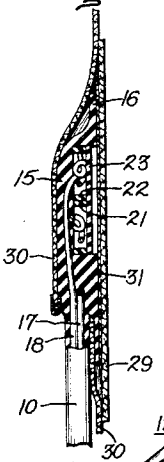


Fig. 2.

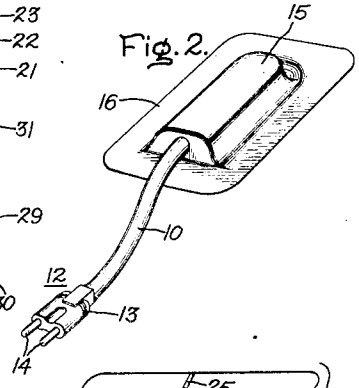
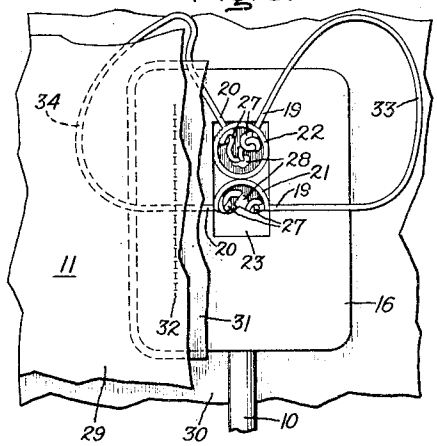


Fig. 5.



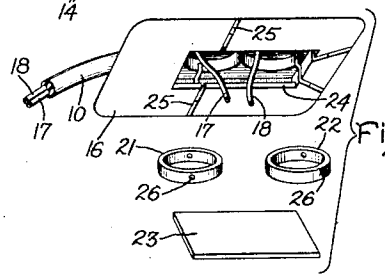


Fig. 3

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Patented Apr. 20, 1943 2,317,189

UNITED STATES PATENT OFFICE

2,317,189

WIRING DEVICE

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Application January 9, 1942, Serial No. 426,210

9 Claims. (Cl. 219—46)

Our invention relates to wiring devices and more particularly to an improved strain relief for the terminal connection of an electric cord. Our invention is particularly well adapted for use in connection with wired fabrics such as those employed in the manufacture of electrically heated blankets, pads and the like.

Constructions heretofore employed for making electrical connections between the conductors of wired fabrics and the attachment cord for making the necessary connections with a power supply have lacked durability and have caused considerable trouble in use and while not limited thereto our invention is directed especially to overcoming the weaknesses of the prior art constructions employed for the power supply connections of electric blankets and the like.

It is an object of our invention to provide a new and improved strain relief for flexible conductors.

It is another object of our invention to provide a new and improved cord terminal construction including a strain relief for the connection between the conductors of a power supply cord and the conductors of a load, such as a wired fabric, with which the cord is associated.

It is a still further object of our invention to provide a new and improved cord terminal construction including a strain relief, particularly adapted for use with wired fabrics which is relatively simple in construction and easily assembled with the wired fabric.

Further objects and advantages of the present invention will become apparent as the following description proceeds, reference being had to the accompanying drawing in which Fig. 1 is a perspective view illustrating the present invention applied to an electric blanket; Fig. 2 is a perspective view of the attachment cord and strain relief removed from the blanket; Fig. 3 is an exploded view of the cord end including the strain relief of Fig. 2; Figs. 4 and 5 are fragmentary views showing in detail the assembled relation of the strain relief and the fabric layers of the electric blanket, and Fig. 6 is a cross sectional view taken along the line 6—6 of Fig. 4.

Referring to Figs. 1 and 2 of the drawing, the power supply cord 10 for the electrically heated blanket 11 is provided at one end with an attachment plug cap 12 which, in the particular arrangement illustrated, comprises a body of insulating material 13 such as a resilient rubber compound molded directly on the outer sheath of the cord 10 and supporting the contact prongs 14 of the plug cap. The other end of the cord which is to be secured to the blanket is provided with a body 15 of insulating material preferably also of a resilient material and molded directly on the outer sheath of the cord 10. The body 15 is provided with a peripherally extending flexible flange 16 which provides means for securing the power supply cord in fixed relation with the blanket.

Figures 3 and 5 show in detail the arrangement provided in accordance with the present invention for relieving the electrical connections between the conductors 17 and 18 of the cord 10 and the conductors 19 and 20 of the blanket. As shown in Fig. 3, the body portion 15 of the strain relief portion is recessed from the lower face thereof to receive a pair of substantially circular force transmitting members 21 and 22, preferably of a rigid insulating material. The conductors 17 and 18 of the cord are molded in the body 15 so that the ends thereof extend outwardly into the recessed portion of the body at substantially the center of the rigid force transmitting members 21 and 22, respectively. The bottom part of the recess in the body 15 is shaped to conform with the outer surface of the insulating members 21 and 22 to retain them in assembled relation with the body 15. The recess is somewhat deeper than the thickness of the force transmitting members and provides a rectangular opening for the reception of a cover plate 23. As shown, the cover plate is formed of rigid insulating material and is held assembled on the body 15 to close the recess formed therein by an overhanging lip 24 formed on each side of the recess. The cover plate serves to complete the enclosure of the electrical connections between conductors 17 and 18 and 19 and 20 and to insure against accidental removal of members 21 and 22. The lower face of the flange 16 as well as the side wall of the recess formed in the body are provided with suitable grooves 25 for the reception of the conductors of the load circuit such as the conductors 19 and 20 of the electric blanket. It should be noted that the grooves 25 are located so that the four conductors do not cross each other so that tendency for wear and eventual short circuiting is minimized.

The manner in which the connections with the load circuit are made to utilize the members 21 and 22 as force transmitting members, is more readily understood by reference to Fig. 5. The conductors 19 and 20 are secured in force transmitting relation to the insulating members 21 and 22 and in the embodiment illustrated this is accomplished by passing the conductors 19 and

20 through openings 26 formed in the cylindrical insulating members and knotting them on the inside thereof as shown at 27 in Fig. 5. The bared ends of one pair of conductors 19 and 20 are electrically joined with the bared end of conductor 17 and are preferably soldered as shown at 28. The other pair of conductors 19 and 20 are connected with the bared end of conductor 18 in a similar manner. A portion of the closure member 23 is shown in position in Fig. 5 to show how it overlies the upper surfaces of the force transmitting members 21 and 22 to enclose completely the flexible connections and maintain them in insulated relation with respect to each other.

The manner in which the cord and strain relief are secured to the blanket is shown in detail in Figs. 4, 5 and 6. In these figures the body portion 15 and extending flange 16 of the strain relief are positioned between the two layers of fabric 29 and 30 which comprise the blanket. The layer 30 is slotted to provide an opening through which the cord 10 extends. A layer of reinforcing material, such as muslin or duck, 31, is placed between the recessed side of the body 15 and the layer of fabric 29 and the cord secured in fixed relation to the blanket by sewing through the layers 29 and 30 of the blanket, the reinforcing material 31 and the flange 16, as illustrated at 32.

In Fig. 5 the parallel heating circuits for the blanket have been shown schematically as loop conductors 33 and 34, forming part of conductors 19 and 20, respectively, and energized from conductors 17 and 18. It is to be understood that in an actual blanket construction the conductors comprising loops 33 and 34 are distributed over the entire surface to be heated.

From the foregoing detailed description it is apparent that our invention provides a simple and durable cord terminal construction and particularly provides improved means for securing the power supply cord to a wired fabric and for securing the conductors of the wired fabric in force transmitting relation with the body of the cord terminal.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In combination, a wired fabric including two layers of fabric and a pair of flexible conductors, means for supplying power to said conductors comprising a second pair of conductors, a strain relief comprising a body of resilient insulating material including flexible flange portions extending from at least two sides of said body, said body being positioned between the layers of said fabric, means extending through said fabric and said flanges for securing said body in fixed relation to said fabric, said body being shaped to provide a recess therein, the ends of both said pairs of conductors extending into said recess with each conductor of one pair being electrically connected with a different conductor of the other pair, and means for closing said recess and maintaining the ends of said conductors in spaced insulated relation.

2. In combination, a wired fabric including a pair of flexible conductors, a power supply comprising a second pair of conductors, a strain relief comprising a body of resilient insulating material having a flange portion extending from at least two sides thereof, said flange portions being sewed to said fabric to secure said body in fixed relation to said fabric, said body being shaped to define a recess therein opening on one face thereof, the ends of said second pair of conductors being supported in said body and communicating with said recess at spaced points, the ends of the flexible conductors of said fabric also extending into said recess and having the ends thereof electrically connected respectively with the ends of the said second pair of conductors, and means of insulating material closing said recess.

3. In combination, a wired fabric including a plurality of flexible conductors, a cord including a plurality of conductors and a sheath surrounding the same, a strain relief secured to one end of said cord and comprising a body of resilient insulating material having a flange portion extending from at least two sides thereof, and fastening means extending through said flange portions and engaging said fabric to secure said cord in fixed relation with respect to said fabric, said body being shaped to provide a housing for the ends of the conductors of said fabric and said cord and the electrical connections therebetween.

4. In combination, a flexible cord including a plurality of conductors and a sheath surrounding the same, a strain relief comprising a body of resilient insulating material molded about said sheath and having a recess formed therein, a pair of rigid insulating members positioned in said recess and providing spaced compartments, the conductors of said cord being molded in said body and each having an end thereof terminating within the confines of one of said compartments so that electrical connections made between said cord ends and the ends of external circuit conductors are maintained in spaced insulated relation, and closure means closing said recess to close the compartments formed by said rigid insulating members.

5. In combination, a strain relief comprising a body of insulating material shaped to define a recess opening on one face thereof, a pair of conductors supported in said body and having the ends thereof communicating with said recess, force transmitting means of rigid insulating material positioned in said recess and providing means for securing external circuit conductors in force transmitting relation with said body of insulating material and also subdividing said recess to provide mutually insulated compartments for the electrical connections between said first pair of conductors and external circuit conductors, and means for closing said recess to close said mutually insulated compartments.

6. In combination, a flexible cord including a plurality of conductors and a sheath surrounding the same, a strain relief secured to one end of said cord comprising a body of resilient insulating material shaped to define a recess opening on one face thereof, substantially circular members of rigid insulating material positioned side by side in said recess and providing means for securing external circuit conductors in force transmitting relation with said body of insulating material and also subdividing said recess to provide mutually insulated compartments for the electrical connections between the conductors of said cord and external circuit conductors, and means for closing said recess to close said mutually insulated compartments.

7. In combination, a wired fabric including a plurality of flexible conductors, a flexible cord including a plurality of conductors and a sheath surrounding the same, a strain relief secured to one end of said cord comprising a body of resilient insulating material, means for securing said

body in fixed relation with said wired fabric, means defining a recess in said body, a pair of substantially circular force transmitting members positioned in said recess, one end of each of the conductors of said cord extending into said recess within the confines of one of said annular members, the conductors of said fabric each being secured in force transmitting relation with one of said members and each having an end extending within the confines thereof and electrically connected with the end of one of the conductors of said cord, and means for closing the outer ends of said members and cooperating therewith to define mutually insulated compartments surrounding the electrical connections between the conductors of said fabric and the conductors of said cord.

8. In combination, a wired fabric including two layers of fabric and a plurality of flexible conductors, a flexible cord including a plurality of conductors, a strain relief secured to one end of the conductors of said cord comprising a body of resilient insulating material having flanged portions extending from at least two sides thereof and shaped to define a recess opening on one face thereof, said body being positioned between layers of said fabric, means extending through said fabric and said flanges for securing said body in fixed relation to said fabric, the ends of the conductors of said cord extending into said recess in spaced relation, force transmitting members positioned in said recess and surrounding the spaced ends of the conductors of said cord, the conductors of said fabric each being secured to one of said force transmitting members and having the end thereof electrically connected with the end of the conductors of said cord, and means for closing said recess to complete the enclosure of the connections between the conductors of said fabric and the conductors of said cord.

9. In combination, a wired fabric including a pair of flexible conductors, means for supplying power to said conductors comprising a second pair of conductors, a strain relief comprising a body of resilient insulating material having a flange portion extending from at least two sides thereof and fastening means extending through said flange portion and engaging said fabric to secure said body in fixed relation with respect to said fabric, said body being shaped to provide a housing for the ends of the conductors of said fabric and said power supply and the electrical connections therebetween, and means for securing all of said conductors in force-transmitting relation with said body.

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