Oct. 21, 1941. A. C. GROHSGAL 2,259,444

ELECTRIC CORD CLAMPING DEVICE

Filed March 2, 1938

Fig. 1.

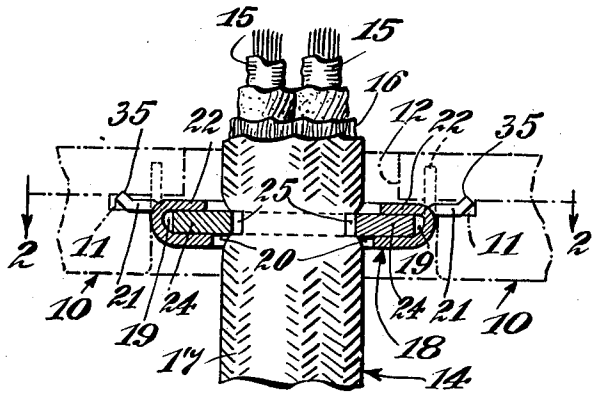


Fig. 3.

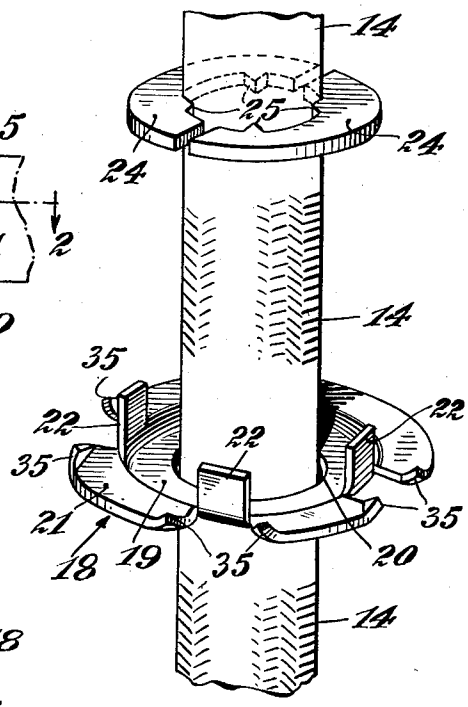


Fig. 2.

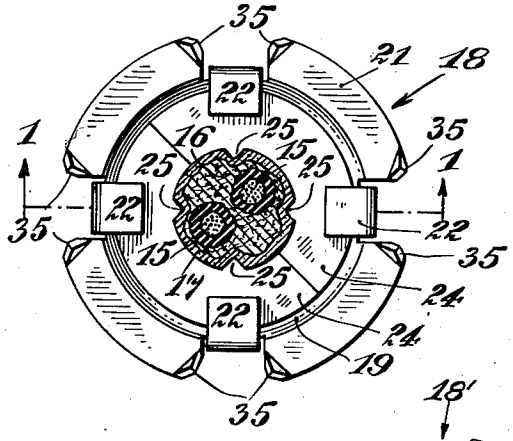


Fig. 4.

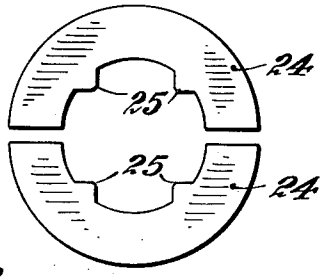
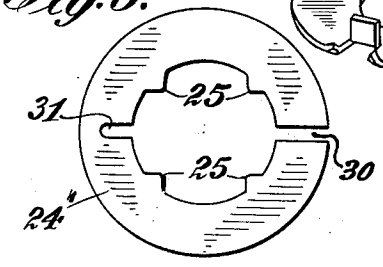


Fig. 5.



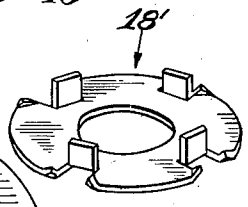


Fig. 6.

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UNITED STATES PATENT OFFICE

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ELECTRIC CORD CLAMPING DEVICE

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Application March 2, 1938, Serial No. 193,412

8 Claims. (Cl. 173—322)

This invention relates to improvements in attaching devices and more particularly to improvements in such devices for attaching and locking electric cords of various character to housings.

In the manufacture and use of electric appliances it is desirable to attach electric cords thereto in such fashion that any force applied to the cord which would normally disengage the ends of the conductors thereof from the terminals of the appliance should not be communicated directly to such conductor ends. Heretofore various methods of obviating such application of force have been employed, but all of such methods have possessed some disadvantages either in cost of manufacture and assembly or in efficiency.

An object of the present invention is to provide a new, simple, inexpensive, and efficient device for attaching an electric cord to a housing in such fashion that strains applied externally to the cord to pull the same from the housing will be taken up entirely by the cord and the housing.

Another object of the invention is to provide a device in accordance with the foregoing, which is effectively clamped onto the cord at some desired point in the length thereof, and which can be locked in a suitable recess in the housing.

Another object of the invention is to provide a device of the foregoing character which can be so locked in a housing as to resist any turning or rotation therein due to externally applied torque.

A still further object of the invention is to provide a device of the foregoing character, which is so constructed that it does not mutilate a cord clamped thereby and does not serve to break down the insulation of the individual conductors in the cord.

In carrying out the above and other objects of the invention use is made of a metallic cage which has a central portion of substantially cup-shape and centrally orificed for the passage freely of an electric cord. The outer portion of this cage has a plurality of tongues struck up therefrom, which tongues terminate substantially at the outer edge of the cup-shaped portion thereof. In conjunction with this cage use is made of insulating clamping means which may be in a number of forms. In one form the insulating clamping means comprises a complemental pair of semi-ring-like members, each having a number of tongues extending inwardly from the normal arcuate inner edge thereof. These complemental members have an external arcuate dimension of such character that when the two parts are brought together the dimension of the inner opening defined thereby will be substantially less than the external diameter of an electric cord which is to be clamped by these members. Likewise the members are so dimensioned that they may be positioned in the cup-shaped part of the cage in such fashion that they can be brought together to complete a substantially uninterrupted ring. The clamping of these members about a conductor passing through the central orifice of the cage can be accomplished by turning the cage tongues before-mentioned inwardly to extend over the top surface of the two complemental members and to thereby lock these members in the cup-shaped part. In another form of the invention the clamping device, instead of being made of two complemental members, may be made of a single member having a radial slot extending across one expanse thereof, and having a radial slot diametrically oppositely disposed but not extending completely across the device. This member may be clamped in the same manner as the two complemental members resulting in bringing the normally separate edges into contact to reduce the size of the opening originally appearing in the member.

Preferably but not necessarily the insulating member utilized in conjunction with the cage has an external circular form, but such form is not necessary. The cage may have what corresponds to the cup-shaped portion thereof of any desired configuration, with a corresponding shape imposed upon the insulating member. A cage and insulating member properly locked to an electric cord may be secured in a suitable housing associated with an electric appliance, which housing may either be in the form of a connection plug or may be an integral part or permanently attached to the appliance. The housing is provided with an internal recess shaped to receive the annular flange part of the cage beyond the bent-over tongues. When the cage is so located in the recess considerable force can be applied to the cord exterior of the housing without withdrawing the cord from the housing and without communicating the applied force to the ends of the enclosed conductors of the cord, which ends are usually secured to terminals within the housing. It is also desirable that torque applied to the cord externally of the housing shall not be communicated to the individual conductors within the housing.

The present invention provides means for preventing such communication of torque. In one form, a plurality of teeth are stuck up from the flange part of the cage, preferably at the boundary edges of the recesses formed by the displacement of the various tongues. These teeth can be utilized to bite into the walls of a housing recess receiving the flange of the cage in such fashion that rotation of the cage in such recess is substantially prevented. If the shape of the recess is other than circular in cross section, the cage may have the flange thereof correspondingly shaped so that when the cage is properly seated in the recess rotation thereof will be prevented.

Other features, objects, and advantages of the invention will become apparent by reference to the following detailed description of the accompanying drawing, wherein:

Fig. 1 is a side view partially in vertical section of an installation embodying the invention;

Fig. 2 is a section taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is a view of a cage electric cord and insulating gripping member immediately prior to assembly of the parts;

Fig. 4 is a plan view of the complemental gripping members shown in Fig. 3,

Fig. 5 is a similar view of a modified form of the invention, and

Fig. 6 is a perspective view of a modified form of cage member.

Referring now to the drawing, 10 indicates generally a housing associated with an electric appliance, which housing is preferably made of some suitable insulating material. The housing may be in the form either of an attaching plug or may be formed as a member permanently attached to the appliance. The particular form of the housing does not form any part of this invention, the only requirement being that the housing be provided with an internal recess indicated at 11, which recess extends completely around an opening 12 utilized for the passage of an electric cord. A cord has been indicated at 14, which cord, as illustrated is made up of a pair of conductors 15 surrounded by thermal insulating material 16 and enclosed in a fabric covering 17. This cord is of the character known as heater cord, but it is to be understood that the invention can be used equally well with other types of cords having included therein either a single conductor, a pair of conductors, or a plurality of conductors. Since it is customary to secure the bared ends of the wires in the respective conductors 15 to terminals in the housing, it is desirable that some means be provided for preventing strains externally applied to the cord from being communicated to the ends of the conductors, which strains might tend to separate the conductor ends from their terminals. Accordingly use is made of an attaching and clamping arrangement as shown herein.

This arrangement comprises a disc-like metallic member indicated generally at 18, which member is provided with a centrally disposed cup-shaped portion 19 having a central orifice 20 therein. The orifice 20 is of such size as to permit the cord 14 to pass therethrough with considerable clearance. The flange part 21 of the cage or member 18 has a plurality of tongues 22 struck up therefrom with the tongues terminating substantially at the edge of the cup-shaped portion 19. In conjunction with this cage use is made, in one form of the invention, of a pair of clamping members 24 which are made of some suitable insulating material, such as a phenol condensation product, or any other desired material fulfilling the requirements of this invention. These complemental members 24 are of such shape that when they are brought together their outer edges define substantially a complete circle and their inner edges likewise define an interrupted circle. This latter circle is interrupted by the intrusion of a number of fingers 25 which extend inwardly and are separated substantially as shown.

The operation and use of the arrangement just described is substantially as follows: The cage 18 is slipped over an electric cord and positioned at the desired point along the length thereof at which clamping of the cord is to be accomplished. With the cage in the position shown in Fig. 3 the two complemental clamping members 24 are introduced around the cord 14 and into the space defined by the upturned fingers 22. The members fit snugly within said fingers, and by the operation of a proper tool these members can be forced into the cup-shaped part 19 of the cage. Due to the angularity of the wall of this cup-shaped part 19 the two parts 24 are forced together until their adjacent edges are brought into contact. As this contraction of the members is being carried out by the proper tool, at the same time the fingers 22 may be bent over until they completely overlie the two parts 24, or in other words assume the position shown in Fig. 1. Due to the contraction of the two parts by such operation, it follows that the cord is rigidly clamped between the two parts and particularly the fingers 25 extend into tight gripping relation with the cord. When the cord has been assembled with the device in the manner shown in Figs. 1 and 2, the cord can be attached to a housing having electric terminals therein by positioning the flange part 21 of cage 18 in the recess 11 of the housing. When so positioned the cord is so locked relative to the housing that a pull of many pounds applied to the exterior part of the cord will be resisted in such fashion that the ends of the conductors of the cord will not be subjected to such a pull as would separate them from their terminals.

If desired, instead of using two complemental members 24 use may be made of a single member 24' which is provided with a radial slot 30 and at a diametrically opposite position is provided with a shorter radial slot 31. This member can be slipped over a cord and locked in the cage in the same manner as the complemental parts 24 since the short slot 31 permits the edges formed by slot 30 to be brought into contact.

While the complemental members have been shown as being so shaped as to have a circular periphery when brought into contact, and the same being true of member 24', it is possible that other shapes of clamping members can be used.

In addition to providing a clamp for causing a cord to be able to withstand separation from a housing, it is also desirable to prevent torque applied to the cord outside the housing from being transmitted to the conductors inside the housing to any appreciable extent. Accordingly the cage 18 has been shown as being provided with upturned teeth 35 punched at the boundary edges of the slots formed by the displacement of fingers 22. These teeth can be turned away from the surface of the cage an amount sufficient to cause them to bite into the wall of a recess 11 in the housing 10 with such penetra-

tion as to effectively lock the cage 18 against rotation in the recess. This penetration of tongues 35 into the recess wall has been shown clearly in Fig. 1. It will be understood, however, that other arrangements may be utilized for the same purpose.

While the cage has been shown as being so formed as to have a cup-shaped middle portion, it is possible that the cage may be made in simple disc form and reliance placed entirely on the locking fingers 22 for contracting the insulating gripping member or members sufficiently to grip the cord. A cage of this character is shown in Fig. 6, wherein it will be seen that the member indicated generally at 18' corresponds in shape to the member 18 of Fig. 3 with the exception that the cup shaped depression 19 has been omitted and instead, the major portion of this modified embodiment is flat. The locking tongues for holding insulating gripping member or members corresponds to those previously described and also the rotation prevention tongues are of form previously described. The cup-shaped formation, however, has the advantage that as the gripping members are forced thereinto they are automatically contracted. It will be apparent from the foregoing that this invention provides new, simple, and efficient clamping devices for use in definitely and rigidly locking an electric cord to a housing. Changes in shape, form, and the like may be made without departing from the scope of the invention, and accordingly any limitations imposed thereupon are to be only those set forth in the following claims.

What is claimed is:

1. A device of the character described, comprising a metallic cake having an opening therein for the free passage of an electric cord, said cage having a plurality of tongues struck therefrom, and clamping means surrounding and gripping a cord passing through said cage, said clamping means being held in cord clamping position and locked to said cage by said tongues which are bent over said clamping means.

2. A device of the character described, comprising a metallic cage having an opening therein for the free passage of an electric cord, said cage being substantially cup-shaped in the portion thereof surrounding said opening and having a flange-like portion extending therearound from the outer edge of said cup-shaped portion, a plurality of tongues struck out of said flange portion, and insulating means positioned in said cup portion around a cord passing through said cage and retained therein in cord clamping position by said tongues.

3. A device of the character described, comprising a metallic cage having an opening therein for the free passage of an electric cord, said cage having a plurality of tongues struck therefrom, and clamping means surrounding and gripping a cord passing through said cage, said clamping means being held in cord clamping position by said tongues bent over said clamping means, the edge of said cage being insertable in the recess in a housing, said cage having formations cooperating with the recess walls to prevent relative rotation of the cage and the housing.

4. A device of the character described, comprising a metallic cage having an opening therein for the free passage of an electric cord, said cage being substantially cup-shaped in the portion thereof surrounding said opening and having a flange-like portion extending therearound from the outer edge of said cup-shaped portion, a plurality of tongues struck out of said flange portion, and insulating means positioned in said cup portion and surrounding a cord and retained therein by said tongues in cord clamping position, said flange being adapted to be seated in a recess in a housing, said cage having formations cooperating with the recess walls to prevent relative rotation of the cage and the housing.

5. A device of the character described, comprising a metallic cage having an opening therein for the free passage of an electric cord, said cage having a plurality of tongues struck therefrom, and a pair of flat complemental members of insulating material forming a flat ring surrounding a cord passing through said cage, said members being held in cord clamping position by said tongues bent over said members.

6. A device of the character described, comprising a metallic cage having an opening therein for the free passage of an electric cord, said cage having a plurality of tongues struck therefrom, and a split flat ring clamping member surrounding a cord passing through said opening, said clamping member being held in cord clamping position by said tongues bent over said member.

7. A device of the character described comprising a metallic cage having an opening therein for the free passage of an electric cord, said cage being substantially cup-shaped in the portion thereof surrounding said opening and having a flange-like portion extending therearound from the outer edge of said cup-shaped portion, a plurality of tongues struck out of said flange portion, and flat complemental insulating members forming a ring surrounding a cord passing through said cage, said members being positioned in said cup portion and retained therein by said tongues in cord clamping position.

8. A device of the character described, comprising a metallic cage having an opening therein for the free passage of an electric cord, said cage being substantially cup-shaped in the portion thereof surrounding said opening and having a flange-like portion extending therearound from the outer edge of said cup-shaped portion, a plurality of tongues struck out of said flange portion, and insulating means positioned in said cup portion surrounding a cord and retained therein by said tongues in cord clamping position, said flange having teeth struck therefrom to engage the wall of a housing recess to hold said cage in such recess against rotation.

ALEXIS C. GROHSGAL.