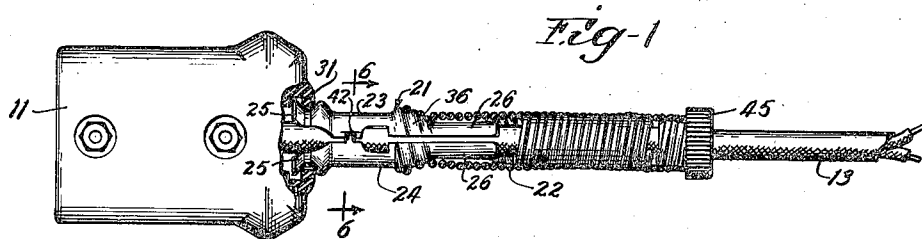
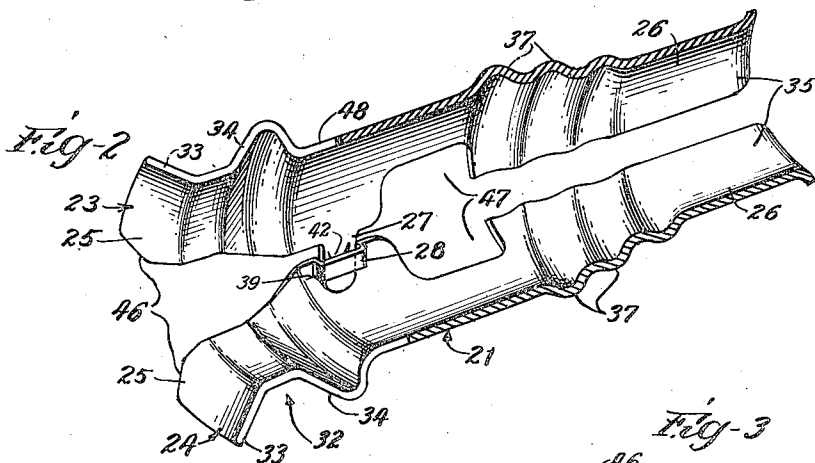
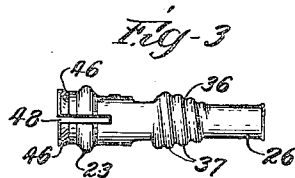
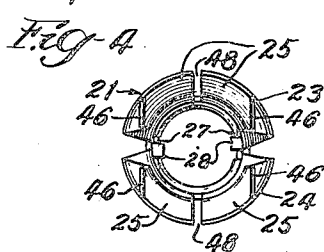
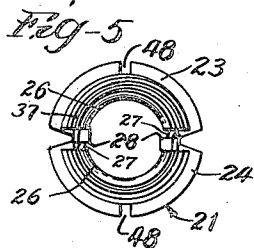
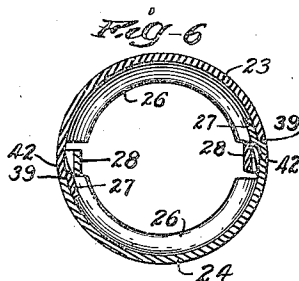
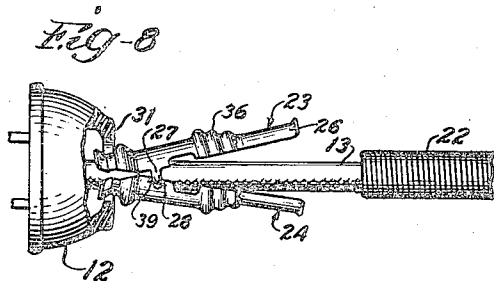
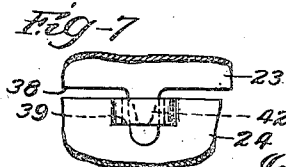


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CORD PROTECTOR AND STRAIN RELIEVER FOR
USE WITH ELECTRICAL CONNECTORS
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CORD PROTECTOR AND STRAIN RELIEVER
FOR USE WITH ELECTRICAL CONNECTORS

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4 Claims. (Cl. 173-322)

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This invention relates in general to a cord protector, and more particularly to such a device which is particularly adapted for use with electrical connectors and for protecting extension cord at and near the junction therewith.

An important object of the invention is to provide such a device which will not only protect against wire fractures due to excessive bending and consequent fatigue, but which will also form a tight anchor whereby strains normally transmitted by the electrical conductors of an extension cord to the binding screws of the connector, may be reduced or eliminated.

When the connector is disengaged from an electrical device by pulling on the cord, the tendency toward wire rupture at the connector is normally increased because the strain of the pull is applied to the binding screws by the wire. This strain is not always equal because of variations in the length of the wires due to unequal trimming or to variations in the length of wire pulled under the binding screws while tightening in place. Likewise, when the pull is applied at an angle to the axis of the connector, the wire is kinked and twisted in the connector, not only aggravating the above mentioned condition, but also causing bending fatigue in the wires of the cord and consequent ruptures in the wires.

Twisting of the cord in the connector and partially fractured wires are the common cause of short circuits at the connectors. This not only renders electrical equipment temporarily useless, but also causes many damaging fires. The inventive concept involves the provision of means for materially reducing this hazardous condition.

Other objects of the invention, such as the efficiency of operation and economy of manufacture, will be obvious as the invention is better understood from the following description, which, taken in connection with the accompanying drawing, discloses an embodiment thereof.

Figure 1 is an elevational view showing a conventional electrical connector equipped with an extension cord and a protector therefor embodying the invention.

Figure 2 is a perspective view showing portions of the cord protector illustrated in Figure 1, on an enlarged scale to show features of construction.

Figure 3 is a plan view of one of the parts of the device shown in Figure 1.

Figures 4 and 5 are end elevational views taken from the left and right ends, respectively, in Figure 1, showing more clearly the end structure of the cord protectors.

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Figure 6 is a transverse section taken substantially on line 6-6 in Figure 1.

Figure 7 is an enlarged detail view showing the fulcrum bearing parts in detail; and

Figure 8 is an elevational view illustrating assembly.

As above mentioned, the inventive concept involves the prevention of excessive wear and the consequent breakage of the conductors and insulating covering of electrical extension cords at and adjacent electrical connectors associated therewith, and to illustrate the invention I have shown means for accomplishing this purpose in operative association with conventional type connectors.

A connector 11, as shown in Figure 1, of a type in common use for making readily separable connections with electrical appliances and a similar connector 12, as shown in Figure 3, of a type in common use for making similar electrical connections with service outlet sockets. Obviously, one of each of said connectors may be attached to the opposite ends of the same extension cord and either one or both of said connectors may be equipped with cord protecting means in accordance with this invention.

Means is provided to rigidly secure the end of a cord 13 to a connector independent of the electrical connections, such as with the binding posts thereof, and so as to reduce or prevent longitudinal and twisting movement thereof. To accomplish this I have shown a clamping device 21 and a clamp closing and locking device 22, whereby the clamping device may be closed and locked in operative relationship. In the present embodiment, the closing and locking device 22 is also adapted to cooperate with the clamping device 21 in reducing or modifying cord bending action adjacent connectors.

For economy in manufacture and convenience in assembly, the clamping device 21 is formed of sheet metal substantially cylindrical in general outline and is divided longitudinally so that it may be formed by two duplicate stamped parts 23 and 24, which may be assembled into operative relationship over a cord without bending, as will be later described.

The principal features of the clamping device 21 are a series of radially spaced gripping fingers 25 forming one terminal thereof, similar clamp elements 26 spaced therefrom or forming the other terminal, and, when the clamping device is sectionally formed, an intermediately disposed fulcrum bearing including bearing elements 27 and 28.

The gripping fingers 25 are formed to readily

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engage the inner wall of the cord opening in a connector in accordance with requirements. For connectors, such as the connectors 11 and 12 illustrated, wherein the cord opening terminates in an annular inwardly extending flange or web 31, the gripping fingers 25 are preferably shaped adjacent their extremities to collectively form an interrupted annular channel 32 having tapered front and back walls 33 and 34 respectively and in which the annular web 31 of connectors may be received as shown in Figure 1. The channel 32 should be proportioned to accommodate webs 31 of different thickness and at least wide enough to accommodate normal manufacturing variations.

The clamp elements 26 are essentially clamping jaws between two or more of which an insulated extension cord may be clamped without materially mutilating the insulation. In the form illustrated, the clamp elements 26 are formed as one half cylinders between the inner surfaces 35 of which an extension cord may be tightly clamped. The ends of these half cylinders are flared outwardly to eliminate sharp edges such as may cut or otherwise damage cord coverings.

Adjacent the clamping elements 26, the exterior of the clamping device 21 is tapered outwardly and away from the clamping end to provide a substantially conical chuck 36 which may be grooved in the form of suitable guides or spiral threads 37 for engagement by the clamp closing and locking device 22, as will be later described.

When required, the fulcrum bearing elements 27 and 28 are male and female, respectively. These elements are formed in pairs along the axial parting lines of each segment of the clamping device 21 and in alignment so that when duplicate parts are assembled to form the substantially cylindrical clamping device, the element 27 of each one will engage with the element 28 of the other interlockingly and so as to prevent material relative axial displacement while permitting sufficient movement about a transverse axis extending through any two pairs of the elements, as indicated in Figure 8.

The element 27, as most clearly shown in Figures 6 and 7, is a tongue extending from an edge 38 of the stamped part 23 that is offset toward the axis to lap within the companion part 24 beyond a bearing line 39. The companion bearing element 28 is a straplike yoke formed by slitting the part 24 along the bearing line 39 and offsetting the material above that line inwardly or a suitable distance so that a slot 41 will be formed for receiving the tongue end of the element 27 and a bearing surface will be provided at the cut edge along the line 39.

The length of the slot 41 is preferably slightly greater than the width of the tongue of the element 27 so that sufficient relative rotary motion will be permitted and the tongue of the element 27 is abruptly offset to form a bearing point 42 for engaging the cut edge bearing surface 39.

The clamp closing and locking device 22 may be any suitable device for engaging the conical chuck 36 so as to tightly close and/or lock the clamping elements 26 and in the present instance I have shown a close-wound helical spring, an open end of which may be readily engaged with the threads 37 and rotated relative to the longitudinal axis to effect clamping action. The wire used for forming the helical spring should be relatively heavy and the diameter of the coil should be relatively large with respect to the cord so that

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only bending action thereof will be limited or restricted thereby directly.

A suitable trim bushing 45 may be provided for closing the free end of the clamp closing and locking coil 22 upon occasion.

To assemble the device in operative relationship, the bushing 45 and the clamp closing and locking device 22 are first assembled to the end of the cord 13, electrical connections are then made with the electrical connector 11 or 12 in accordance with the type required, the companion parts 23 and 24 may then be positioned over the cord 13, as shown in Figure 8, with the bearing elements 27 and 28 of each one engaged in the cooperating parts of the other. Upon adjustment of the parts 23 and 24 to the position shown in Figure 8, wherein gripping fingers 25 are moved toward the axis to reduce their overall diameter, they may be inserted into the cord opening in a connector. It will be noted that certain gripping fingers 25 may be cut away as at 46, Figures 2, 3 and 4, to increase this collapsing action upon occasion. When arranged as above described, the clamping elements 26 are brought together or engaged with the cord 13, thus expanding the gripper fingers 25 so that the web 31 of the connector is tightly engaged in the groove 32. The clamp closing and locking element 22 may then be engaged with the threads 37 of the chuck cone and rotated so that the end of the helical coil will tend to climb the chuck cone, thereby rigidly tightening the clamp elements 26 and similarly tightening the gripping fingers 25. When provided, the trim bushing 45 may be inserted in the free end of the coil to complete the assembly as shown in Figure 1.

It will be noted that portions of the parts 23 and 24 may be cut away as at 47 to reduce stiffness where yielding action of the gripping fingers 25 is required, and that stiffness of the fingers 25 may likewise be reduced by one or more axial slots 48. These slots effectively reduce the stiffness of the fingers and increase the number thereof.

It is believed that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention.

I claim:

1. A cord protector for electrical connectors comprising companion elongated bodies, each being of substantially semi-circular cross-sectional form and being adapted to embrace an extension cord, said bodies terminating at one end in radially spaced grippers for engaging in an electrical connector and terminating at the other end in segmental cord clamping elements, means disposed intermediate the ends of each one of said bodies and arranged to cooperate with similar means associated with the companion body to form interlocking fulcrum bearings between the companion bodies, and clamp closing means operably associated therewith.

2. A cord protector for electrical connectors comprising companion elongated bodies, each being of substantially semi-circular cross-sectional form and being adapted to embrace an extension cord, said bodies terminating at one end in radially spaced grippers for engaging in an electrical connector and terminating at the other end in segmental cord clamping elements having semi-helical grooves formed in the exterior thereof and arranged for cooperation with a similar

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groove formed in a companion body to provide a substantially continuous helical groove, means disposed intermediate the ends of each one of said bodies and arranged to cooperate with similar means associated with the companion body to form interlockingly engaged fulcrum bearings between the companion bodies, and clamp closing means operably associated therewith, said clamp closing means comprising a tubular clamp actuating element adapted for engagement with the substantially helical groove associated with said companion bodies.

3. A cord protector for use with electrical connectors comprising companion duplicate parts together forming a longitudinally parted cord embracing tube, each one of said companion parts carrying radially extending gripping fingers adjacent an end thereof for laterally engaging an electrical connector and having fulcrum bearing portions formed thereon intermediate the gripping fingers and the remote ends thereof for facilitating movement of the gripping fingers into interlocking engagement with the electrical connector while the remote ends of the companion parts are moved into clamping engagement with an embraced cord.

4. A cord protector for electrical connectors comprising companion elongated bodies of arcuate cross-sectional form together forming a substantially tubular cord embracing clamp

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whereby an electrical cord may be rigidly secured to an electrical connector, said elongated bodies being interlockingly connected intermediate the ends thereof for pivotal relative movement and having cooperating portions adjacent one extremity forming a cord clamp and similar portions adjacent the opposite extremity cooperating to simultaneously engage an electrical connector, and a tubular locking device for effecting clamping action, said locking device being extended for cord protective action.

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