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E. S. McLARN

2,316,267

SLEEVE CONNECTOR

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Fig. 1.

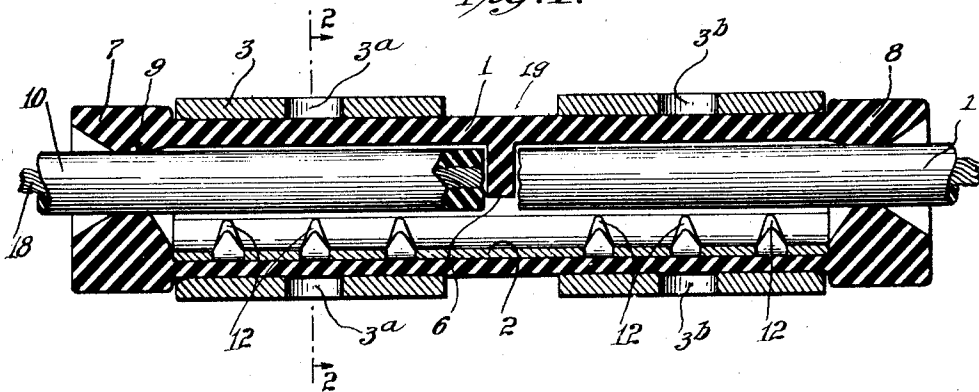


Fig.2.

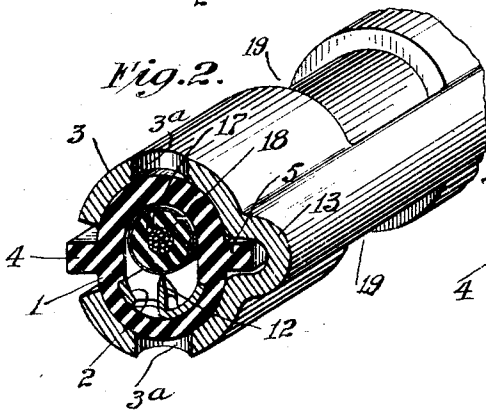


Fig. 3.

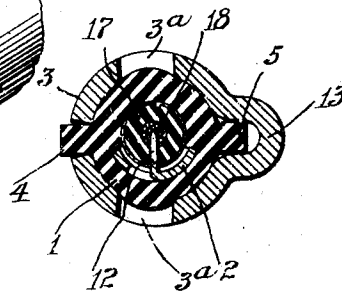
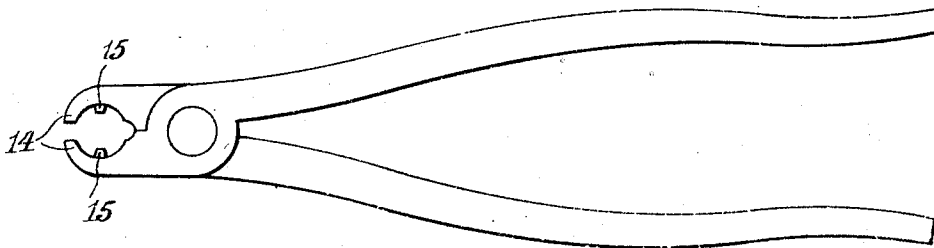


Fig. 4.



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SLEEVE CONNECTOR

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7 Claims. (Cl. 174—84)

This invention relates to new and useful improvements in sleeve connectors for joining insulated electric conductors.

The objects of the invention are to provide a connector that will produce a good joint, that is waterproof, and that can be installed quickly.

With these objects in view, I provide a connector in which the conductors are placed within a sleeve of collapsible material. A rubber sleeve was found suitable for this purpose. A metal plate within the sleeve is equipped with prongs to penetrate through the insulation of the conductors into contact with the metal cores when the sleeve is collapsed. The sleeve is held in collapsed condition and the conductors firmly gripped by means of a clamp around the sleeve.

More clearly to set forth the nature of the invention, I shall describe a preferred embodiment thereof in connection with the drawing in which

Fig. 1 is a longitudinal cross-section of a connector just before the completion of the assembly;

Fig. 2 is a cross-section along lines 2—2 of Fig. 1 showing a part of the connector in perspective;

Fig. 3 corresponds to Fig. 2 but shows the completed assembly; and

Fig. 4 is a side elevation of a tool (shown on a reduced scale as compared to the other figures) used in the installation of the connector.

The connector consists of a sleeve 1 of rubber or other suitable resilient, collapsible insulating material, a metal insert 2 in the sleeve, and a metal clamp or clamping sleeve 3 around the rubber sleeve 1.

The rubber sleeve 1 is made up of two semi-cured parts the vulcanization of which is completed when they are put together in a mold with rims contacting and forming two longitudinal ribs 4 and 5 along the completed sleeve 1. A transverse wall 6 projects from the upper half of the sleeve 1 dividing its inside into two compartments. The two ends of the rubber sleeve are formed into thick lips 7 and 8 constricted at 9 to a diameter smaller than that of the conductor 10, 11 to be inserted in the sleeve. The wall 6 serves as a stop for the ends of the conductors to ensure that a substantial portion of each conductor will be inserted in the sleeve.

The insert 2 consists of a curved trough-shaped metal plate which is placed within a pocket in the lower half of sleeve 1 prior to the assembly of the sleeve. The insert is substantially co-

extensive with the length of the sleeve 1 and has a row of swaged prongs 12 projecting therefrom.

The open clamping sleeve 3 has a pocket 13 into which rib 5 fits, and its open edges are spaced from rib 4 when clamp 3 is snapped around sleeve 1. The clamp 3 is made of soft steel which will remain set once it is collapsed and will hold the rubber sleeve 1 collapsed and firmly gripping the conductors.

When the connector is assembled as shown in Figs. 1 and 2, then the conductors 10 and 11 are inserted in the sleeve 1 until their ends contact with wall 6. The clamp 3 is now grasped in the jaws 14 of the pliers shown in Fig. 4 so that pins 15 projecting therefrom will be aligned with perforations 3a in the sleeve. This tool has fairly wide jaws spanning almost one-half of the length of the metallic sleeve 3, the holes 3a ensuring that the pins 15 are correctly placed so that when force is applied the lower pin will be directly beneath a prong 12 of the insert and the other directly above the conductor 10 diametrically opposite the prong. This ensures that the pressure is applied in the right direction to cause the prongs 12 to pierce the insulation 17 of the insulated wire directly in line with the conductor. Any deformation in the sleeve 3 takes place at the hinge section 13. By means of the pliers the structure is forced into the shape shown in Fig. 3 with prongs 12 projecting through insulation 17 and approximately halfway into the stranded wire core 18 of conductor 10. The same operation is repeated in alignment with holes 3b in clamp 3.

The constricted ends 9 of the rubber sleeve will form water-tight seals around the conductors.

The parts of the clamp 3 which grip the sleeve 1 are cut away at the center to form gaps 19 which extend to the hinge or channel section 13. The clamp 3 is thus in effect divided into two halves united by the hinge section 13. This enables the two halves of the clamp 3 to be squeezed on to the sleeve 1 by two separate applications of the tool. Since the two halves of the clamp 3 are joined only by the hinge section 13, the operation of squeezing one half of the clamp to force the prongs 12 into the core 18 of one conductor 10 or 11 will not substantially deform the other half of the clamp. The tool is so designed that the halves of the clamp 3 will be collapsed a sufficient amount when the jaws 14 are completely closed against the definite stops provided in the tool.

What I claim is:

1. In a connector for insulated electric conductors having metal cores, a collapsible insulating sleeve for holding the ends of a pair of conductors in co-axial relationship, a metal plate in said sleeve having prongs projecting therefrom and of such length and so disposed that when the sleeve is collapsed they will penetrate through the insulation into the cores of the conductors within the sleeve, and a clamp disposed on the outer surface of said sleeve overlying the conductors therein for holding the sleeve collapsed.
2. In a connector for insulated electric conductors having metal cores, a collapsible sleeve of insulating material for receiving and holding in co-axial relationship the unbared ends of a pair of conductors to be connected, the open ends of the sleeve having restricted passageways of smaller diameter than the outside diameter of the conductor, a metal plate in said sleeve retained from endwise movement by said restricted passageways and having prongs projecting therefrom and of such length that when the sleeve is collapsed they will penetrate through the insulation into the cores of the conductors within the sleeve, and a clamp comprising a pair of deformable substantially ring-shaped metal members joined to each other and disposed on the outer surface of said sleeve overlying the ends of the conductors therein for collapsing said sleeve when deformed on conductors held therein.
3. In a connector for insulated electric conductors having metal cores, a sleeve of resilient insulating material, the inside surface of the sleeve having a pocket formed therein extending over a portion of the inside diameter thereof, thickened lips on the open ends of the sleeve having restricted passageways of smaller diameter than the outside diameter of the conductor for receiving in co-axial relationship the unbared ends of a pair of conductors to be connected, a clamp comprising a metal member having deformable sections overlying the outer surface of said sleeve in the area enclosing the end portions of the conductors to be connected, a metal insert in said pocket having prongs projecting therefrom and of such length that when the sleeve is collapsed due to the deforming of said clamp they will penetrate through the insulation into contact with the cores of the conductors within the sleeve.
4. A connector for connecting insulated con-

- ductors in co-axial relation to each other comprising a collapsible tube of insulating material; a trough shaped member extending the greater part of the length of said tube, a plurality of tines formed on said member projecting upward in the direction of the axis of said tube, an eccentrically disposed opening at each end of said tube, each designed to receive an end portion of one of the two conductors to be connected, said openings being positioned so as to guide said conductors over said tines, a clamping member disposed on the outer surface of said tube comprising sleeve sections overlying the respective insulated conductors within said tube, said sleeve sections being adapted to be compressed and permanently deformed by a portable deforming tool during which operation said tines are forced through the insulation of the respective conductors into engagement with the conductors therein.
5. A connector according to claim 4 in which the tube has a bead formed on its outer surface, and in which said clamping member is provided with a recess to fit over said bead whereby said clamping member is effective in a predetermined position in respect to said tines.
6. A connector according to claim 4 in which said clamping member is adapted to be deformed by a deforming tool provided with jaws and in which each of said sleeve sections is provided with means for positioning said jaws in respect to the clamping member before the deforming operation.
7. A connector for connecting insulated conductors comprising a collapsible tube of insulating material, a pocket formed in the bore of said tube extending the greater part of the length of said tube, a trough-shaped metal connector disposed in said pocket having tines projecting upward toward the bore of said tube, means at each end of said tube for receiving an unbared end section of an insulated conductor, a stop member disposed midway along said bore to gauge the length of the conductors inserted, a clamping member disposed on the outer surface of said tube comprising sleeve sections disposed to overlie the respective insulated conductor sections within the tube, and means to permanently deform said sleeve sections so as to collapse said tube and thereby force said tines through the insulation of the conductors and into contact with the respective conductors.

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