

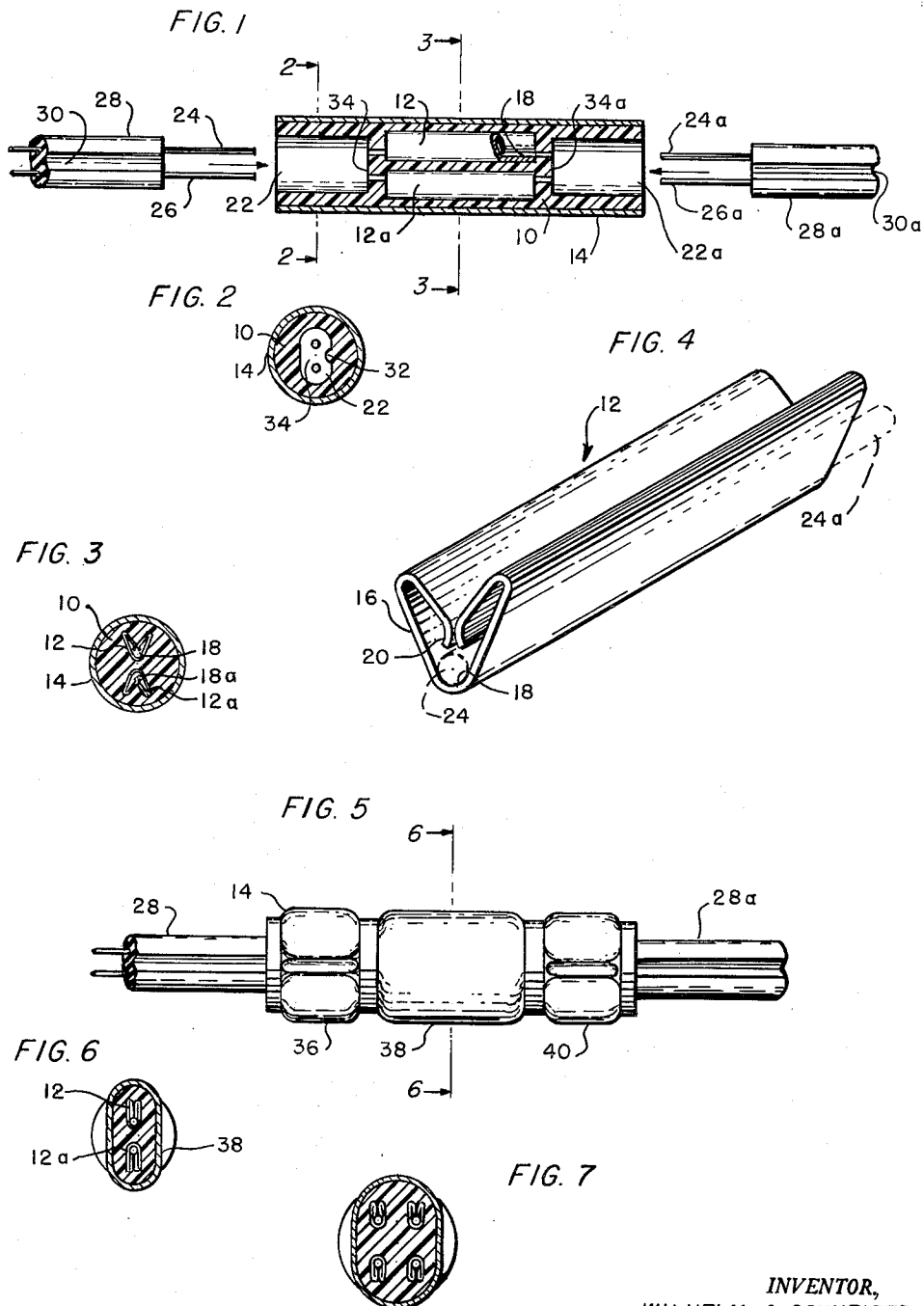
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W. A. SCHNEIDER

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INSULATED ELECTRICAL CONNECTOR

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INVENTOR,
WILHELM A. SCHNEIDER.
BY
Harry M. Saragovitz
ATTORNEY.

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INSULATED ELECTRICAL CONNECTOR

Wilhelm A. Schneider, Fair Haven, N.J., assignor to the United States of America as represented by the Secretary of the Army

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1 Claim. (Cl. 174-88)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment of any royalty thereon.

This invention relates to solderless connectors of the type used for joining the ends of electrical conductors to provide an electrical conductive joint therebetween. More particularly the invention relates to a novel pre-insulated connector which is adapted to receive the stripped ends of insulated conductors and to be crimped to provide a joint that has good electrical conductivity and is substantially water tight.

In military field operation, it is frequently necessary to make a large number of electrical connections between the conductors of cables coupling telephones and the like. Such work necessarily requires a relatively simple and certain method of making connections between conductors under adverse environmental conditions, and still provide the desired electrical connection.

The main object of the present invention is to provide a simple and effective connector that is operative to produce a joint of good electrical conductivity under a wide variety of environmental conditions.

For a more detailed description of the invention, together with other and further objects thereof, reference is had to the following description taken in connection with the accompanying drawing, wherein:

FIG. 1 is a longitudinal section through a connector, embodying the present invention, applied as a coupling for a pair of conductors;

FIG. 2 is a sectional view taken on the line 2-2 of FIG. 1;

FIG. 3 is a sectional view taken on the line 3-3 of FIG. 1;

FIG. 4 is a perspective view, on an enlarged scale, illustrating one of the metal clamps of the uncrimped connector of FIG. 1;

FIG. 5 is a side elevation of the exterior of a crimped connector;

FIG. 6 is a sectional view taken on the line 6-6 of FIG. 5; and

FIG. 7 is a sectional view through a modified form of connector, embodying principles of this invention, applied as a coupling between two pairs of insulated cables.

Referring to the drawing, FIG. 1 shows a connector comprising a plastic insulating material 10 molded over and around a pair of similar clamps 12 and 12a made of a malleable electrically conductive metal. Material 10 is preferably made of nylon in order to secure the desired crimping characteristics when the material is crimped. A seamless malleable metal tube 14, co-extensive with material 10, forms the outer casing for the connector. Each of the metal clamps 12 and 12a, one of which is shown in detail in FIG. 4, is formed of a metal sheet longitudinally folded on its center line in a generally V-shaped cross-section having its longitudinal side walls 16 forming a channel 18 therebetween; a similar channel 18a is formed in clamp 12a. The longitudinally extending ends 20 of the side walls 16 are flexed inwardly and reach lengthwise into each channel 18, respectively. As shown in FIGS. 1 and 3, clamps 12 and 12a are positioned diametrically opposed to each other and have their respective channels 18 in parallel alignment.

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At both ends of the connector, as shown in FIG. 1, material 10 is provided with axially aligned passages 22 and 22a in alignment with each end of clamps 12 and 12a. Assuming that the connector is to be used to couple the two stripped end portions 24 and 26 of the conductors of cable 28 to the corresponding stripped end portions 24a and 26a of the conductors of cable 28a, end portions 24 and 26 are passed through passage 22 into the ends of clamps 12 and 12a. Likewise stripped end portions 24a and 26a are inserted through passage 22a into the opposite ends of clamps 12 and 12a.

The cables 28 and 28a are of the conventional oval cross-sectional type having a groove 30 and 30a, respectively, in the insulation on one side of each cable between both electrical conductors. Each of passages 22 and 22a are provided with a guide nob 32, shown in FIG. 2, so that cables 28 and 28a can only be inserted in one position into the passages. In this way, end portions 24 and 26 will be joined to end portions 24a and 26a through clamps 12 and 12a respectively. At the inner portions of passages 22 and 22a, shoulders 34 and 34a, respectively, form annular abutments for stopping the insulated portions of cables 28 and 28a. Shoulders 34 and 34a may be advantageously used for limiting the insertion of the insulated portions of cables 28 and 28a as the stripped end portions are inserted into clamps 12 and 12a. In FIG. 4, the dotted lines represent the stripped end portions 24 and 24a inserted at each end of clamp 12 in channel 18 with the longitudinal ends 20 abutting the end portions.

This tubular form connector is the completed device and ready for use. It will be understood that various sizes will be made up for use with various size conductors, and in each instance a connector can be chosen with passages 22 and 22a and channels 18 in which the conductor can be inserted readily. In other cases, the respective parts of the connectors can be of different sizes for use with conductors carrying different potentials.

In use, desired sections of the insulated cables 28 and 28a to be joined are stripped in the usual manner, but only for distances approximating one half the longitudinal length of clamps 12 and 12a. As shown in FIG. 1, the stripped end portions 24 and 26, and 24a and 26a, respectively, may be positioned within channels 18 from opposite ends of clamps 12 and 12a. The layer of insulation on cables 28 and 28a, which has an external diameter approximately the same as the internal diameter of passages 22 and 22a, extends into the apertures and abuts the shoulders 34 and 34a.

As indicated in FIG. 5, the connector is crimped by a conventional hand-tool at three points designated 36, 38 and 40. At points 36 and 40, metal tube 14 is squeezed against the insulated portion of cables 28 and 28a to a flattened, generally elliptical cross-section shape in such manner as to provide water tight seals at the ends of the connector. At point 38, tube 14 and clamps 12 are crimped to a configuration, best shown in FIG. 6, to provide a good electrical connection, between the opposing stripped end portions, through the clamps. Of particular interest is the fact that the flexed ends 20 enhances the gripping power of the clamps 12 and 12a when flattened out on stripped end portions 24, 26, 24a and 26a to form an efficient electrical connection and a firm interlocking of the end portions.

The embodiment depicted in FIG. 7 is similar to the embodiment shown in FIGS. 1 through 6 except that the connector in this modification comprises four diametrical opposing clamps having their channels in parallel alignment, and is applied as a coupling between two pairs of insulated cables, each of which has four conductors.

While there has been described what is at present con-

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sidered to be the preferred embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is therefore aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

A connector for the stripped ends of a pair of insulated conductors comprising a pair of spaced metal clamps, each of said clamps formed of sheet metal longitudinally folded on its centerline with the longitudinal edges of the respective walls bent inwardly and extending longitudinally over the channels formed by the folded metal clamps, said clamps having a V-shaped cross-section and being diametrically opposed to each other with said respective channels being in parallel alignment, said longitudinal edges of said respective walls disposed in a direction facing the fold line of each of said clamps, each of said

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channels adapted to receive the stripped ends of said conductors, tubular insulating material surrounding said clamps and extending on each side thereof, said insulating material provided with separate passages at opposite ends of said clamps and aligned with said channels to permit entry of the stripped ends of said conductors in the opposite ends of each of said channels, discrete shoulders formed by said insulating material at the inner terminations of said passages, and a malleable metal tube surrounding said insulating material and co-extensive therewith for providing means for crimping said clamps upon the stripped ends of each of said respective conductors.

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