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K. RANSONE

2,148,392

ELECTRICAL CONNECTION SEAL.

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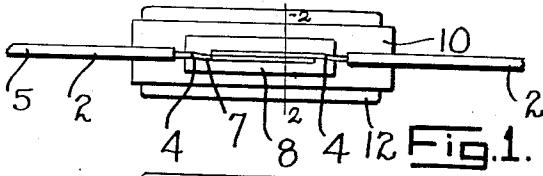


Fig. 1.

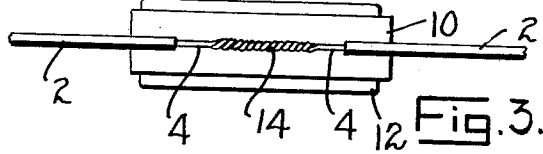


Fig. 3.

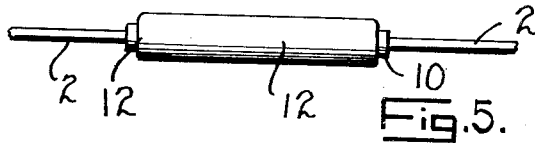


Fig. 5.

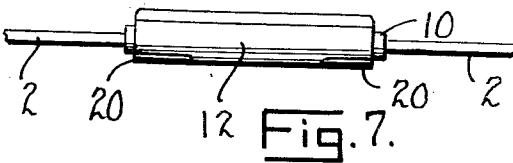


Fig. 7.

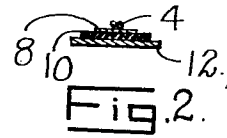


Fig. 2.

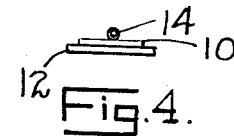


Fig. 4.

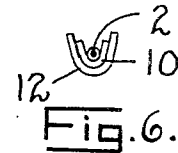


Fig. 6.

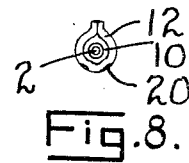


Fig. 8.

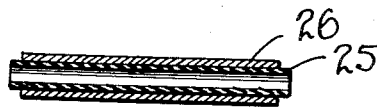


Fig. 9.

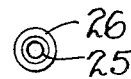


Fig. 10.

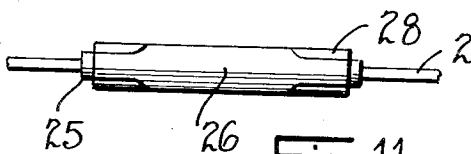


Fig. 11.



Fig. 12.

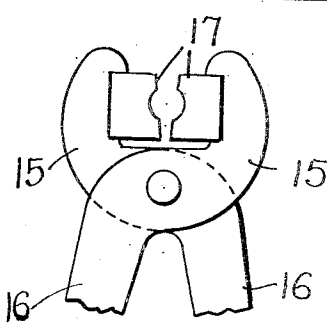


Fig. 13.

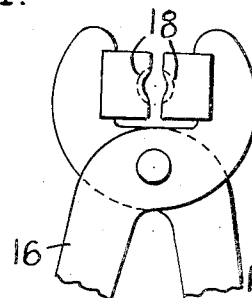


Fig. 14.

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ELECTRICAL CONNECTION SEAL

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Application June 20, 1936, Serial No. 86,249

2 Claims. (Cl. 174-84)

This invention relates to a seal and shield for electrical wiring connections and particularly of a type where a rugged waterproof connection is desired.

5 In many instances it is desirable to make electrical connections where the wires must thereafter be submerged or exposed to considerable hydrostatic pressure, and difficulty has been encountered in the past in providing a suitable combination seal and shield which can be readily affixed to protect the connection and which is simple and economical in its construction.

While it is intended that the present seal may be applied in any desired location it has a particular application to making the connection for primer caps and fuses which are to be set off electrically after they have been submerged or exposed to hydrostatic pressure. It is applicable to connections with primer caps employed in setting off explosive charges located in wells or bored openings. The primer caps now generally provided for such use are constructed with a considerable length of wiring attached thereto so that the electrical connection to the control switch or source of electricity can be made at a location which is not submerged. Thus, if a primer cap is to be submerged from ten to one hundred feet it would ordinarily come provided with electric wiring attached thereto of the desired length. Such an arrangement is objectionable not only because of the increased cost, but because of inconvenience in manufacturing, shipping and handling of a small primer with a considerable length of wire attached thereto.

35 It is one of the objects of the present invention to provide the primer cap with but a very short length of wire and to use the present seal to effect a water tight connection with any desired length of wire at a time most convenient directly prior to the time that the primer is submerged.

40 It is one of the objects of the invention to provide an electric connection seal which can be readily placed about the connection to completely enclose the same and be held in fixed position.

45 Another object of the invention is to provide an assembled protector for electrical connections which is made up of a small conductor member which will contact the wires to improve the connection, an insulating body to enclose the conductor plate and a shield or protector to hold the insulation in position.

50 It is intended that the insulator may be affixed in any desired manner as by means of a pair of pliers or any suitable crimping tool.

Other and further objects of the invention will be readily apparent when the following description is considered in connection with the accompanying drawing wherein:

Fig. 1 is a top plan view looking down on an electrical connection which is about to be sealed with the present device.

Fig. 2 is a section taken on line 2-2 of Fig. 1 and illustrating the respective positions of the parts.

Fig. 3 is a view similar to Fig. 1 of a slightly modified form where the insulating material directly contacts the wiring.

Fig. 4 is an end view of Fig. 3.

Fig. 5 is a view of the protector when it is substantially enclosing the electrical connections and illustrates the manner of affixing the connector.

Fig. 6 is an end view of Fig. 5.

Fig. 7 shows the protector in permanent position with the connection fully sealed and the protector crimped in position.

Fig. 8 is an end view of Fig. 7.

Fig. 9 shows a modified form of protector wherein it is made up of a cylindrical sleeve into which the wires to be connected can be inserted.

Fig. 10 is an end view of Fig. 9.

Fig. 11 is an elevation showing the protector of Fig. 9 in affixed position with the outside sheath crimped into position to form a seal and hold the wires permanently together.

Fig. 12 is an end view of Fig. 11.

Figs. 13 and 14 are fragmentary views of a tool to be used in crimping the protectors.

In Fig. 1 an electrical conductor is illustrated at 2 and this conductor as is usual is made up of a wire 4 which is covered with an insulating material 5. When an electrical circuit is to be established by making an electrical connection between two such wires the insulation 5 will be stripped from a short length 7 of the wire so as to expose the wire 4. Two such wires will be then laid closely adjacent each other as seen in Fig. 1 and twisted or otherwise engaged with each other as seen in Fig. 3.

In the Fig. 1 form of the protector or seal a thin plate 8 of conducting material such as copper will be positioned closely adjacent the exposed portions 7 of the two adjacent wires. Next a body 10 of insulating material will be positioned adjacent the plate 8 and of such a size that it will overlap the plate 8 both as to width and length. A support or shield for the insulating body 10 is then placed adjacent the insulating material. This plate or shield is shown at 12 and is of greater width and shorter than the insulating

material. The parts will be assembled as seen in section in Fig. 2.

In Fig. 3 a form of the seal is shown where the entire connection to transmit the electricity is formed by twisting the ends 4 of respective wires to form a connection 14. The insulating body 10 and the protector shield 12 are then placed adjacent such connection. This arrangement is seen in end view in Fig. 4.

Regardless of whether the Fig. 1 or the Fig. 3 form of the protector is to be employed, the parts will be assembled as seen in either Fig. 1 or Fig. 3 with the wires to be connected in position. It is to be understood that the plate 8 and the shield 12, as well as the insulating body 10 are more or less flexible or pliable so that they can be readily wrapped about the bare ends of the wires to be connected and so that they will assume the position shown in Figs. 5 and 6; that is, with the wires to be connected on the inside and the sealing members enclosing the same.

With the parts in this position any suitable tool may be used to crimp or clamp these parts about the electric wires.

In Figs. 13 and 14 the crimping tool is shown in the form of a pair of jaw members 15 having handles 16 thereon, crossed in the usual manner, said jaw members carrying suitable contoured clamping blocks 17. In Fig. 13 the blocks are shown substantially identical in shape so that the two of them will fit within the two jaws so as to engage about the protector and clamp the same in the desired position. In Fig. 14 the blocks are formed with a mold recess 18 therein between the opposite sides so that the ends of the shield 12 will be depressed or crimped a greater amount than will the central portion. Fig. 7 shows the protector as having been crimped by the Fig. 14 type of tool so that the ends are provided with the depressed areas 20 as seen in both Figs. 7 and 8.

It is obvious from the foregoing that a simple and economical protector can be readily affixed in position with a minimum of effort. It will be understood that the plate 8, the insulating sheet 10 and the shield 12 may come assembled and attached together in flat position as seen in Fig. 2 so that the wires to be connected can merely be laid on the top thereof and the protector then bent about the wires and crimped into position.

Fig. 9 shows a modified form of the protector wherein a cylindrical sleeve 25 of insulating material has been disposed within a cylindrical pro-

5 tector sleeve 26. With this form of construction the stripped portions 7 of the wires to be connected will be inserted in the opposite ends of the sleeve until they overlap and the crimping tool then used to crimp down the ends and form the depression 23 as seen in Figs. 11 and 12. This will hold the wires connected in the absence of longitudinal tension thereon.

In this form of device of course the insulator can be slipped over either one of the wires and after the wires are twisted and the connection is made the insulator will be slipped along the wires until it arrives at the desired position.

It is to be understood that the conducting material may be either copper, aluminum or any other desired material while the insulating material may be of either tar, impregnated cloth, rubber, asphalt or other suitable waterproofing material which is plastic and can be formed and held in position, whereas the protective sheath will be sufficiently rugged to remain in crimped position but sufficiently pliable so that it may be bent between fingers in initially seating it about the connections.

Various materials may be employed for this sheath but I prefer lead.

What is claimed is:

1. A waterproof electrical connection comprising engaged electric wires from which the normal insulation has been removed in order to make electric contact, a conducting member about said connection to assist in maintaining the electrical connection, a body of flexible and waterproof insulating material about the connection and circumferentially and longitudinally overlying said member and the ends of the insulation on the wires, and a sheath for said body enclosing the same and crimped areas on said sheath to embed it in said material to effect a seal about said member and connection.

2. A waterproof electrical connection comprising electrical interconnection of the bared ends of aligned insulated conductors, a sheath of deformable insulating material covering said interconnection and overlying the ends of the insulation on each of said conductors, and a second sheath closely surrounding the insulating sheath and substantially coextensive therewith, said second sheath having its ends crimped into close sealing engagement with the underlying sheath and insulation.

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