Dec. 7, 1926. 1,610,052

C. E. HOLMES

ELECTRIC CONNECTER

Filed Feb. 21, 1923

Fig. 1.

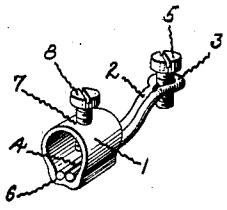



Fig. 2.

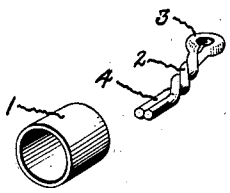



Fig. 2a.

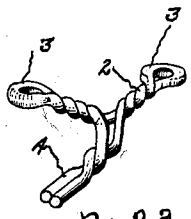



Fig. 3.

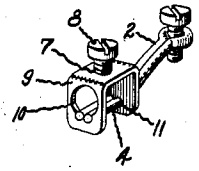



Fig. 4.

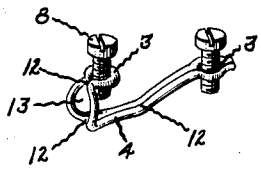



Fig. 5.

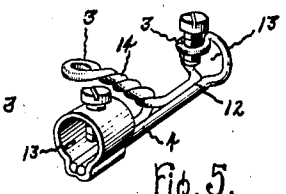
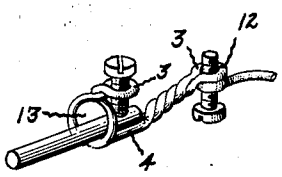



Fig. 6.




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# UNITED STATES PATENT OFFICE.

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## ELECTRIC CONNECTER.

Application filed February 21, 1923. Serial No. 620,511.

My invention relates to electric conductor terminals and connecters and more in particular to electric connecters such as those used in electrical instruments for connecting the internal instrument lead to the out-going circuit. The object of my invention is to provide an improved connecter of the class described which requires a minimum of labor and material for its construction. A further object of my invention is to provide such a connecter which is adapted to receive and firmly secure cables of various sizes without modification. A further object of my invention is an improved method of forming a screw eye for such a connecter and for electric conductors in general whereby the hole, which is threaded to form a screw eye, is made without punching or drilling the material in which it is formed. Other advantages of my improved connecter will appear as the description proceeds.

The features of my invention which I believe to be novel and patentable will be pointed out in the claims appended hereto. The structural details of my connecter will now be described in connection with the accompanying drawing in which Fig. 1 represents a connecter made up of a cylinder and a piece of wire; Fig. 2 shows the parts of the connecter shown in Fig. 1 as they appear in the process of construction; Fig. 2ª shows a part adapted for a plurality of screw eyes; and Figs. 3, 4, 5 and 6 show modifications of the connecter, the latter figure illustrating the manner of connecting the external cables to the connecter.

In Fig. 1, I have shown a connecter made up of two parts, a cylinder 1 and a wire loop 2. The wire loop 2 is preferably made of brass or copper or any other good electrical conductor of sufficient strength for the purpose specified. If its mechanical strength is more important than its electrical conductivity, it may be made of ordinary steel wire. The wire is preferably although not necessarily made of circular cross section. The wire is formed into a loop having one or more eyes 3 and a straight parallel portion 4. The eye portion is formed in any suitable manner as by clamping the wire about a rod of the proper size. The hole thus formed is then tapped out so as to form internal threads for the reception of a standard size screw 5. To prevent the eye portion from springing apart under strain, I find it desirable to twist the intermediate portion of the wire loop as shown in Fig. 2, or weld, braze or solder the wires together close up to the eye as in Fig. 1. If desirable two or more turns of the wire may be used to form the eye. This simple manner of forming a screw eye does away with the usual drilling or punching operation necessary to form a hole which is afterward tapped out. In some cases where the metal of which the wire is made is not too hard, I may clamp the wire about a threaded die or a threaded steel rod with sufficient pressure to cut the internal thread by pressure and thus form the eye and internal thread by a single operation. If desirable the die may be in continuous rotation.

The cylindrical portion 1 of the connecter may be cut from a tube of the proper dimensions and material, preferably steel. The straight parallel portion 4 of the wire loop is then inserted in the cylinder and the parts placed in a properly shaped expansible die having an internal finger to hold the wire loop against the side of the tube. The tube is then subjected to pressure so as to bend the tube into the shape shown at 6 in Fig. 1, thereby firmly clamping the portion 4 of the wire in a trough formed at one side of the tube. No solder or brazing is necessary to make this junction secure. Of course the cylindrical portion 1 may be drawn into the proper shape with a trough at one side before being cut from the tube or said portion may be drawn or bent to the desired shape from a suitable sheet of metal. A tap hole 7 for the insertion of a clamping screw 8 is made in the cylinder opposite the wire 4. This hole may be made either before or after the wire is clamped in place. It will be evident that a cable varying in size from a diameter slightly smaller than the inner diameter of the cylinder to a diameter of, say, one-third the diameter of the wire used in the loop, may be inserted in the end of the cylinder and securely clamped against the wires 4. The depression or ground formed between the two wires always centers the inserted cable in alinement with the clamping screw 8, making a good, electrical and mechanical connection. A connecter so constructed has very good heat radiating capacity in comparison to the mass of material used and consequently may be used with relatively high current densities. When

used as a meter terminal, the connecter may be secured in an insulating tube or moulded into a block of insulation. The manner of connecting the electrical conductors will be evident from an inspection of Fig. 6. It will be evident that the wire portion of the connecter may be bent into any desired direction after leaving the cylinder best suited for connecting to the corresponding cable. As shown in Fig. 2a, any number of screw eyes may be formed in this portion of the connecter.

In Fig. 3 I have shown a connecter made of a wire loop 2 and a strap 9, the latter being bent in the form of a U and provided with a large opening at 10 for the insertion of a cable, a tap hole 7 for the insertion of a clamping screw 8 and a small oblong hole 11 for inserting the straight portion 4 of the wire loop 2. In this modification the joints between the straps 9 and loop 2 are preferably secured by solder or brazing. Otherwise, the description of Figure 1 applies.

In Figs. 4 and 6, the entire connecter, with the exception of the clamping screws, is made of wire. In these figures as well as in Fig. 5, solder or brazing is preferably applied at the joints exposed to strain as at 12. Cables of various diameters may be inserted in the opening or openings 13 and clamped against the straight portion 4, the depression formed between the wires causing the inserted cable to aline up with the clamping screw 8. The screw eyes 3 are formed in the same manner as previously explained. The connecter of Fig. 5 is provided with two alined openings 13, whereby two comparatively heavy cables may be inserted at the opposite end to abut against each other and then firmly clamped in place by suitable screws. One or more screw eye connecters 3 may be branched off in the manner indicated at 14. In this modification as in the others, the body portion of the connecter is made of a single piece of wire. The ends of the wire are secured together to form one terminal by means of a cylinder as in Fig. 1 while one or more terminals of suitable shape are made in the wire itself, the screw eyes therefor being formed by internally thread substantially closed rings in the wire. In the modification shown in Fig. 6 the connecter is strengthened by twisting the wire adjacent the screw eyes. The manner of attaching the cables is also illustrated.

In the foregoing description I have specified that the wire portion of the connecters is preferably strengthened either by twisting the parts together or by applying solder or brazing at the joints exposed to strain, but it will be evident that if the wire is heavy enough these precautions will not be necessary. It will also be evident that the eye may be left unthreaded where it is desirable to use a bolt instead of a screw for securing the external cable to the eye.

Electric terminals and connecters are often subjected to slight twisting and pulling strains and sometimes are used where there is more or less vibration. A perfectly rigid terminal construction is apt to crystallize and break off under repeated strains and vibrations, whereas, if there were some flexibility in the conection, this would not occur. The type of connecter described in this specification has a certain amount of desirable flexibility between its terminals which in a measure relieves the terminals as well as the terminals of the cables connected thereto from such destructive strains.

It will be evident from the modifications shown that various other modifications shaped and arranged with the terminals best suited for the purpose at hand may be constructed without departing from the spirit of my invention and therefore I do not wish to be limited to the exact constructions illustrated but seek to cover in the appended claims all modifications coming fairly within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. An electric connecter having a portion thereof made of a wire loop, a screw eye in an end of said loop, means for securing other portions of said wire together with straight parallel portions in contact forming a groove between said portions, and means adjustably secured with respect to said straight parallel portions for clamping a conductor in the groove formed between said portions.

2. An electric connecter comprising a wire having a loop formed therein, an eye formed in the closed end of said loop, a member for securing the ends of said wire together with straight parallel end portions of the wire in contact, thereby forming a groove between said portions, said securing member having a portion spaced away from said groove, and a clamping screw threaded through said spaced portion for clamping a cable in said groove.

3. An electric connecter comprising a wire having a loop formed therein, an eye formed in the closed end of said loop, a cylindrical member, the ends of said wire being secured in parallel relation on an inner wall of said cylindrical member so as to form a groove between the end portions of said wire parallel to said wall, and a clamping screw threaded through the opposite wall of said cylindrical member.

4. An electric connecter comprising a cylinder, a clamping screw threaded through a wall thereof, a trough formed parallel to the axis of said cylinder in the inner wall thereof opposite to said screw, a looped wire having the end portions of the wire clamped

in said trough by the side wall thereof and having the closed portion of said looped wire extended out of said cylinder and a screw threaded through a circular loop of said wire outside of said cylinder.

5. In an electric connecter having its body portion made of a wire conductor, a terminal therefor formed by securing straight parallel portions of said wire in contact, bending said wire adjacent said straight parallel portions so as to form a circular opening through which a conductor may be inserted to lie in the groove formed between said straight parallel portions, and providing a binding screw in a threaded loop of said wire spaced from and facing said groove.

6. A wire connecter provided with means for securing two straight parallel portions of wire, forming a part of the connecter, in contact, whereby a groove is formed between said portions, and other means secured in adjustable relation to said groove for clamping a cable therein.

In witness whereof, I have hereunto set my hand this 2nd day of February, 1923.

CHARLES E. HOLMES.