July 24, 1928. 1,678,350

W. N. OTT

ELECTRIC CLAMP CONNECTER

Filed Nov. 5, 1926

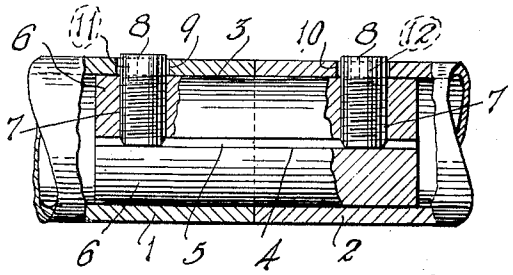


Fig. 1.

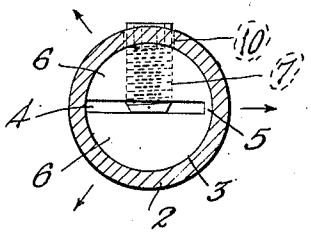


Fig. 2.

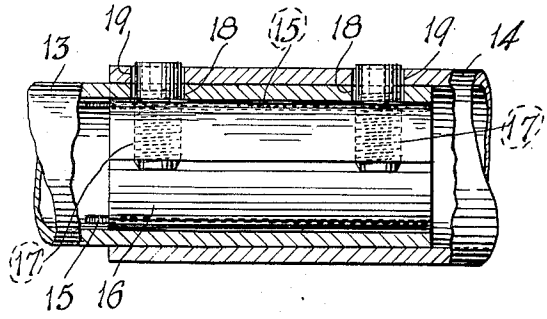
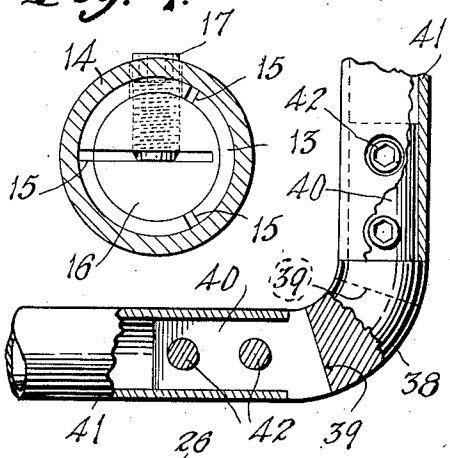


Fig. 3.

Fig. 9.

Fig. 4.



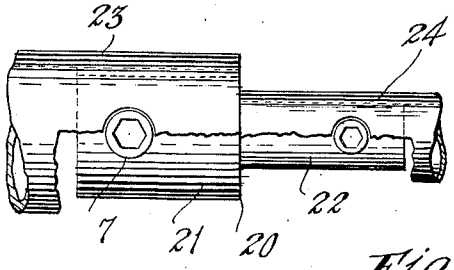


Fig. 5.

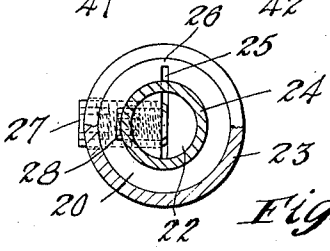


Fig. 6.

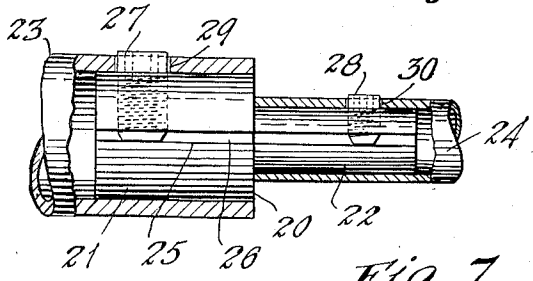


Fig. 7.

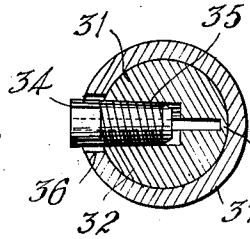


Fig. 8.

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UNITED STATES PATENT OFFICE.

WILLIAM N. OTT, OF BLOOMFIELD, NEW JERSEY.

ELECTRIC CLAMP CONNECTER.

Application filed November 5, 1926. Serial No. 146,457.

This invention relates especially to electric clamp connecters for copper tubing and similar hollow conductors such as are used in high tension bus construction out of doors, although of course the invention can be put to any use for which it is adapted.

The objects of the invention are to provide an improved clamp connecter which will effectively secure hollow conducting parts together and obtain a good electrical contact between them; to secure a clamp connecter which will lie inside a tubular conducting part and is expanded into frictional contact with the interior thereof by means transverse thereto; to provide such a coupling which is readily adapted to various fittings now in use in the said electrical art; to secure minimum parts, simplicity of construction and installation, and maximum efficiency, and to obtain other advantages and results as may be brought out by the following description.

Referring to the accompanying drawing, in which like numerals of reference indicate the same parts throughout the several views,

Figure 1 is a side view of my invention in its straight form as applied to the abutting ends of two conductors, shown partly in longitudinal section;

Figure 2 is an end view of the same;

Figure 3 is a side view of the invention applied to the end of a conductor which is telescoped with respect to the end of another conducting part, terminal or the like;

Figure 4 is an end view of the same;

Figure 5 is a plan of the invention in the form of a reducing connecter, the connected parts being partly broken away;

Figure 6 is an end view of the same;

Figure 7 is a side view of the construction shown in Fig. 5, the connected parts being in longitudinal section;

Figure 8 illustrates a modified arrangement of expanding screws, and

Figure 9 shows a modified form of connecter.

The utilization of tubular conductors for high tension currents has become a recognized practice in the electrical art, but the problem of connecting such conductors to one another or to fittings of various types has not been heretofore satisfactorily solved.

The present invention contemplates primarily the use of an interior member which is substantially a length of solid metal, such as copper, brass, Monel metal or the like, of suitable conductivity, preferably of the interior diameter of the conductor in which it lies and slotted from end to end inwardly from one side close enough to the other side to enable the wings into which the member is thus divided to be moved, as if hinged, toward and away from each other to a limited extent. Means transverse to the interior member and accessible from outside the conductor is provided for spreading said wings, and thus the interior member can be forced into such intimate frictional engagement with the interior wall of a conductor as to resist any normal tendency to displace it therefrom longitudinally. The normal size of the said interior member of the connecter is that of the inside of the tubular conductor, so that it is inserted only by compressing it, by virtue of the longitudinal slot, and when expanded it very closely and snugly fits the conductor.

It is within the scope of the invention to have my improved connecter join not only one conductor to another similar conductor, but to join a conductor to a dissimilar conductor, as for example one of different diameter or to any kind of a fitting which acts as a conductor, and indeed my improved connecter itself may serve as a conductor or fitting between two spaced conductors either similar or dissimilar, and of any kind whatever. In such cases it is not necessary that the connecter be slotted end to end or even less than entirely transverse of itself, but it may be slotted in other ways to divide it into wings which are joined by a portion of the connecter so that they can move toward and away from each other. Indeed, as hereinafter pointed out, many forms of my connecter can be entirely divided into two separate pieces instead of connected wings, if so desired.

It is a feature of my invention that the expanding means is transverse to the conductor, because this provides ready access to said means and great freedom in its operation, and, although not the only means that can be employed, the simplest and most preferable is screws each threaded in one wing of the interior member and abutting the other wing, the outer ends of said screws being exposed by registering apertures in the wall of the conductor. Preferably I employ a set screw near each end of the coupling so there will be one for each of the ends of the

conductor, but this may be varied if found desirable. Likewise, I have shown both set screws as being screw-threaded into the same wing of the coupling and as pushing against the other wing, but here likewise the construction may be varied if it is found more desirable to have them oppositely arranged. It is within the scope of the invention to utilize transverse screws in any way to expand the wings or relatively movable parts of my improved connecter into engagement with a conductor.

In the specific embodiment of the invention shown in Figures 1 and 2, the reference numerals 1 and 2 indicate the alined ends of tubular conductors to be connected, and 3 indicates the interior member of my improved connecter, said member being cylindrical in this particular instance and slotted longitudinally and diametrically, as at 4, so as to leave a hinge portion 5 for the two wings 6, 6. Screws 7, 7 are threaded through one wing 6 to bear against the other, and the outer ends 8, 8 of said screws are exposed and rendered accessible from outside the conductors 1 and 2 by apertures 9, 10 in said conductors respectively. While I have shown said outer ends of the screws projecting slightly, they could be shortened so as not to project at all or if desired they could be lengthened and provided with any kind of a head. Usually the less projection the better, and I have shown the outer ends of the screws provided with angular sockets 11, 12 respectively, to receive a wrench for turning. As already stated, the interior member 3 normally has an exterior diameter substantially equal to the interior of the conductors 1, 2, and is inserted by compressing it. Preferably, it is first inserted in one conductor end, as 1, and that clamping screw 7 applied through the aperture 9, and then the other conductor end 2 is slipped onto the interior member and the other clamping screw applied through the aperture 10.

In Figures 3 and 4, I have shown an end 13 of a tubular conductor telescopically inserted in another tubular end 14, which might be another conductor, a terminal or any kind of a fitting. In this form of the invention, the interior tubular end 13 is split, preferably at three circumferential points, as at 15, 15, 15, so that when the interior member 16 of my improved connecter is spread by its screws 17, 17, the interior one of the telescoped ends 13 and 14 of the conductors can expand outwardly against the other. It will be understood that the interior member 16 lies wholly within the end 13 of the inner conductor and that the end 14 of the outer conductor preferably extends telescopically over the inner one a distance substantially equal to the length of the connecter member 16. Preferably, the normal exterior diameter of said member 16 is substantially equal to the normal interior diameter of the inner conductor end 13 and that in turn is substantially equal to the internal diameter of the outer end 14. The clamping screws 17 having been removed, the interior member 16 is inserted in the inner end 13, by expanding said end due to its splits 15 or by compressing the member 16, and the outer end 14 slipped on by compressing the split end 13 and interior member 16 therein. The tapped holes for said screws being brought into registration with lateral apertures 18, 18 in the inner end 13 and 19, 19 in the outer end 14, tightening of the screws 17 clamps the whole firmly together into a good connection.

Where it is desired to connect conductors of different diameter, a reducing connecter such as illustrated in Figures 5, 6 and 7 may be employed. In those views, an interior member 20 is provided having one end portion, as 21, of one diameter and the other end portion, as 22, of another diameter, here referred to for brevity as the large and small ends, respectively. The large end 21 is of appropriate size to properly fit within the end 23 of a large conductor, while the small end 22 is of proper size to fit the end 24 of a small conductor. The said ends 21 and 24, while of different sizes or diameters, are nevertheless integral and may be considered as together constituting the interior member 20 for purposes of this specification. Said interior member as in the previous constructions described, has a longitudinal and substantially diametric slot 25, which extends less than clear through the large end 21 so as to leave a hinge portion 26, but extends clear through the small end 22, enabling the opposed wings to have a contracting and expanding movement, and the ends 21 and 22 of said interior member are shown provided with set screws 27 and 28, respectively, threaded through one wing and abutting the other wing substantially perpendicular to the plane of the slot 25, access to these screws being provided by apertures 29, 30 in the conductors.

It will be understood that in any of the forms of the interior member of my invention, the slot could extend clear through transversely and the member be in two parts, but it would not be so convenient to handle the connecter or to get said parts in proper position. Said parts might also be secured to each other in any other suitable way than by the integral hinge portion illustrated, but that is especially effective in that it gives what may be described as a three-point engagement with the interior wall of the conductor, the two wings spreading apart at their free edges and exerting a wedging tendency to force the hinge portion outward, something as indicated by the three arrows on Figure 2.

Preferably, the interior member is made of some metal, such as brass or Monel metal, which expands, when heated, more than the material of the conductors, which is usually copper, and thus the connection will not be loosened by heat, but on the other hand will be tightened.

Another arrangement of expanding screws is shown in Figure 8, as applied to the construction of Figs. 1 and 2, although it is equally applicable to other constructions. Here, 31, 32 indicate the wings of an interior member connected by a hinge portion 33 and adapted to be spread apart by tapered screws 34 in tapered threaded seats 35 in the plane of the slot but which seats are of greater diameter than the width of the slot so as to cut into the opposite walls of the wings. As many of these screws can be used longitudinally of the connecter as desired, preferably two as in the other forms of connecter shown. An opening 36 in the tubular conductor 37, for each screw, enables them to be manipulated.

Figure 9 shows a form of my improved connecter in which it constitutes an elbow for connecting tube conductors or the like at right angles to each other, 38 being a curved solid portion of the connecter the ends of which are split or slotted for their entire width as at 39, 39 and each end reduced as at 40 to the interior diameter of the conductor 41 which it is to enter. At each end of the connecter transverse screws 42 similar to those already described serve to clamp the connecter to its conductors 41 or other eqivalent parts. Obviously the curved middle portion of the connecter just described could be made sharply right-angular and could be reduced in diameter so that the conductor ends, if beveled, could abut and conceal the connecter, analogous to the straight construction shown in Figure 1. Furthermore, instead of the connecter taking the form of an elbow as shown, obviously it could take the form of a T or other fitting common and well known in the art.

Obviously various other detail adaptations, changes and modifications may be made in the manufacture and use of my improved connecter, without departing from the spirit and scope of the invention, and I do not wish to be understood as limiting myself to the exact structure shown or described except as set forth in the following claims when construed in the light of the prior art.

Having thus described the invention, what I claim is:

1. An electrical clamp connecter, comprising an expansible member for insertion in a tubular conductor, said member having wings hinged longitudinally of the member and otherwise free from each other and adapted to be spread apart, and means transverse to the member for spreading said wings.

2. The combination with two tubular telescoped conductor ends, the inner one being longitudinally split, of an expansible member in said inner tubular end adapted to be expanded and frictionally secure all of said parts together, and transverse means for expanding said expansible member.

3. An electrical clamp connecter, comprising a member having a longitudinal slot extending partly across said member for its entire length and providing wings adapted to be spread apart, and means transverse to the member for spreading said wings.

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