

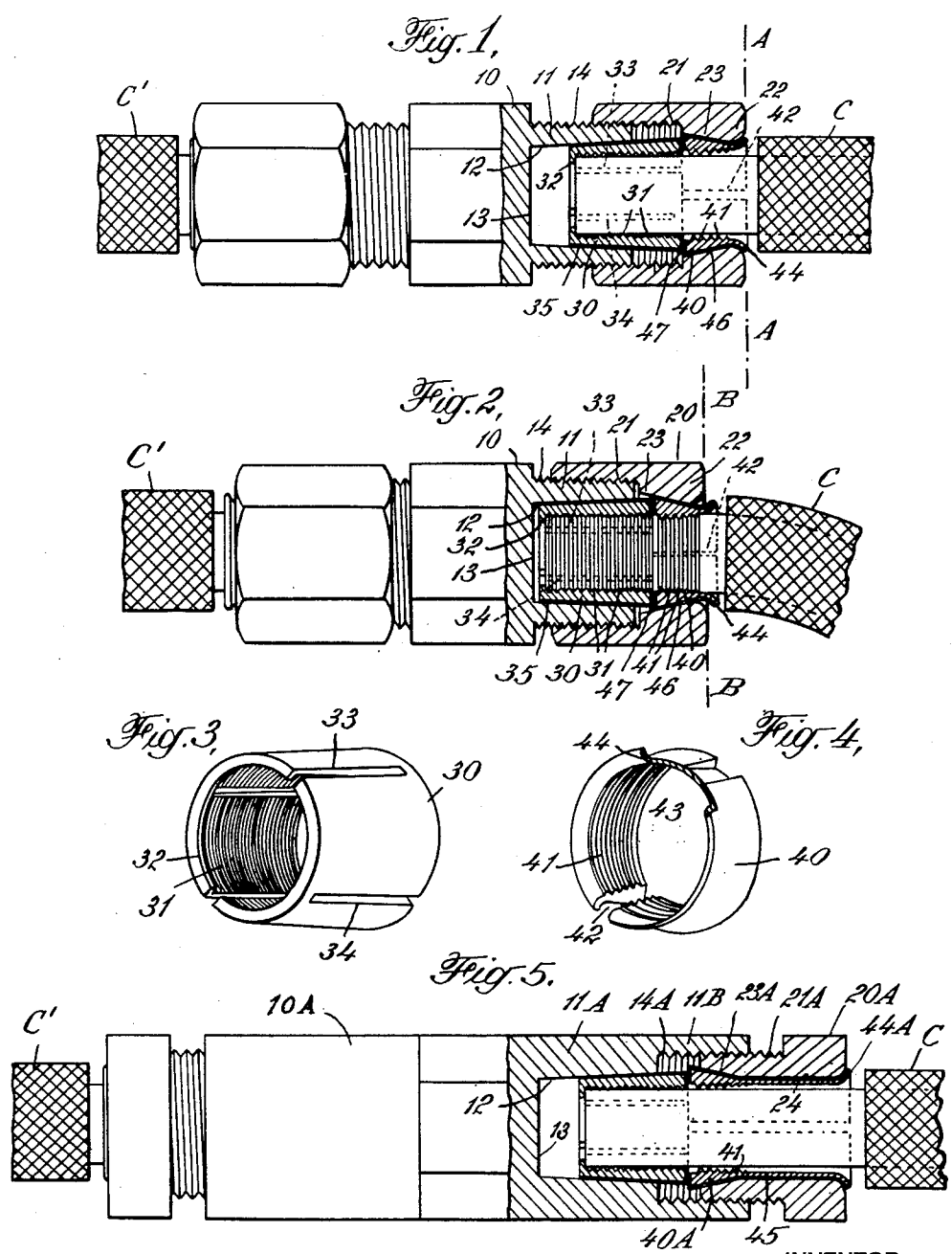
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CONNECTOR

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CONNECTOR

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3 Claims. (Cl. 287—114)

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This invention relates to a connector for electrical conductors and the like, and more specifically to the type of connector shown in my Patent No. 1,710,416, April 23, 1929. The object of the present invention is to improve the construction of connectors which employ contact and gripping bushings which are compressed by being moved longitudinally into a tapered bore, and more specifically to provide means for decreasing the friction, and thereby increasing with the same effort, the conductivity between such bushings and the surfaces of the bore into which they are moved and their grip on the conductor. Another object is to provide improvements over such a locking ring as that shown in the aforesaid patent, to prevent its removal from the compression nut and to insure its proper position in the assembly. A further object is to provide means for reducing the friction between the locking ring and compression nut and between the abutting ends of the contact and gripping bushing and the locking ring.

I will describe my invention in the following specification and will point out its novel features in the appended claims.

Referring to the drawings:

Figure 1 is a side elevation, partly in section, of a connector which is made according to and embodies my invention. In this figure parts of the connector are shown in the relative positions they assume before they are tightened and a conductor is shown inserted therein.

Figure 2 is a similar view showing the connector tightened onto the conductor.

Figure 3 is a perspective view of the contact and gripping bushing, and

Figure 4 is a perspective view of the locking ring;

Figure 5 is a view similar to Figure 1 illustrating a modified construction.

10 designates the body of the connector. This has a tubular portion 11 of reduced diameter, the inner surface of the bore of which, designated by 12, is conically tapered. This bore terminates in a transverse base 13. The outer surface of this tubular portion is threaded, as at 14, to receive an internally threaded compression nut 20.

30 is a contact and gripping bushing, the outer surface of which is conically tapered to fit the surface 12 of the portion 11 of the body. The inner surface of this bushing is provided with relatively shallow serrations 31. At its inner end is a flange 32 which limits the inward travel of the conductor C and prevents it from contacting the base 13 of the tubular portion of the body. This

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bushing is constructed with a plurality of angularly spaced longitudinal slots 33, 34 which extend inwardly from its opposite ends so that it is laterally compressible.

The compression nut is internally threaded, as at 21, and has an inwardly extending flange 22 at its outer end through which is a central opening 23 of larger diameter than that of the conductor C. This opening is tapered conically in the opposite direction from and at a steeper angle than the taper of the surface 12.

40 is a locking ring, the inner surface of which is cylindrical and provided with graduated serrations 41 which are farther apart and deeper at the end adjacent the bushing 30 than at the outer end. Its outer surface is tapered to fit the surface 23. This ring is split at 42 and a longitudinal groove 43 is cut in its outer surface opposite the split 42 to make it compressible. The rear surface of the bushing 30 and the inner surface of the ring 40 abut and are normal to the common axis of these parts.

The outer end of the ring 40 projects through the compression nut 20 and is flared over its end, as shown at 44. This retains the ring in the compression nut and properly positions it therein. It also forms a curved surface which prevents injury to the conductor C when the latter is flexed as shown in Figure 2.

When the parts are in the position in which they are shown in Figure 1, the contact and gripping bushing 30 and the locking ring 40 are expanded. The conductor C is then inserted until its end abuts the flange 32. This prevents the conductor coming into contact with the surface 13 of the body so that it is free to move longitudinally with the bushing and locking ring.

The compression nut is then screwed inwardly on the body to move the parts from the position indicated by the line A—A in Fig. 1 to the position indicated by the line B—B in Fig. 2. The longitudinal movement imparted to the contact and gripping bushing, locking ring and conductor will first compress the bushing 30 onto the conductor because of the smaller degree of the taper of its outer surface. This difference of taper between the surfaces 12 and 22 creates a greater inward pressure component on the bushing than on the locking ring for the same axial thrust. The bushing may be made more flexible than the locking ring to insure this initial compression. The engagement of the bushing and ring with the conductor causes the conductor to move inwardly with them.

Continued inward movement of the parts will

also compress the locking ring and cause its serrations to engage and grip the conductor. This locking ring is shorter axially than the gripping bushing and the contracting pressure on it is concentrated on a small number of serrations, while the contracting pressure of the contact and gripping bushing is distributed over a much larger area and a larger number of serrations. Eventually the locking ring will contract more than the contact and gripping bushing and it will engage the conductor firmly locking it into the assembly. Thereafter a pull on the conductor will tend to further tighten the locking ring because of its reverse taper.

The contact and gripping bushing is preferably made of relatively soft metal, such as copper or brass, and the locking ring of a harder metal.

It is to be understood that the opposite end of the connector may be similarly constructed to grip another conductor C' or other desired forms of attachment.

The connector shown in Figure 5 is similar to that shown in the preceding figures, but in this case the tapered surface 12 is within a portion 11A of the same outer dimensions as those of the body 10A. This portion is extended as at 11B and has an internally threaded bore 14A. The compression nut 20A is externally threaded, as at 21A, to fit the threads 14A. 24 is a cylindrical bore through the compression nut which terminates in a tapered portion 23A. The locking ring 40A has a cylindrical extension 45 which extends through the bore 24 and is flared over the outer end of the nut, as at 44A.

Some of the features herein described are shown in my Patent No. 1,710,416, issued April 23, 1929. In using connectors like those shown in this patent it has been found that there is some tendency to rotate the locking ring 40 with the compression nut 20 and for this rotation to be imparted to the gripping bushing 30 through the abutting surfaces of the ring and the bushing. I have found that this difficulty can be overcome by providing a film of an unlike metal with a low coefficient of friction and high electrical conductivity between the tapered surfaces of the locking ring and the compression nut, as shown at 46. This can be easily effected by plating the locking ring with silver, for example. I also plate the contact and gripping bushing with a similar metal, as shown at 35, for the purpose of reducing its frictional resistance to longitudinal movement, increasing its gripping effect with the same effort and increasing the electrical conductivity between the bushing and the bolt. A similar film is shown at 47 between the adjacent surfaces of the bushing and ring. Such a film also decreases any tendency of corrosion between these parts impairing their conductivity. I have found silver a suitable metal to use for this purpose, not only because of its high conductivity and low coefficient of friction, but also because if there is any corrosion, oxide of silver is a good conductor of electricity. Although at present I prefer to use silver, I do not limit myself to this particular metal, in fact I intend no limitations other than those imposed by the following claims.

What I claim is:

1. In a gripping device for the end of a cylindrical member, said device comprising a body having a tapered bore, a compressible contact and gripping bushing having an external surface tapered to fit said bore, said bushing having an internal bore adapted to receive an inserted member, a compression nut threaded on the body and axially movable thereon, said nut having a flange with a tapered inner surface and a locking ring having a tapered outer surface engaging the inner surface of the flange, in which the outer end of the locking ring is flared over the outer end of the nut and in which the inner surface of the locking ring is provided with graduated serrations diminishing in size toward said outer flared end.

2. In a gripping device for the end of a cylindrical member, said device comprising a body having a tapered bore, a compressible contact and gripping bushing having an external surface tapered to fit said bore, said bushing having an internal bore adapted to receive an inserted member, a compression nut threaded on the body and axially movable thereon, a flange on the nut having an axial opening with an inner surface tapered in the opposite direction from and at a steeper angle than the bore in the body, and a compressible locking ring having a tapered outer surface engaging the inner surface of the flange, in which the outer end of the locking ring is flared over the outer end of the nut and in which the inner surface of the locking ring is provided with graduated serrations diminishing in size toward said outer flared end.

3. In a gripping device for the end of a cylindrical member, said device comprising a body having a tapered bore, a compressible contact and gripping bushing having an external surface tapered to fit said bore, said bushing having an internal bore adapted to receive an inserted member, a compression nut threaded on the body and axially movable thereon, said nut having a flange with a tapered inner surface, a locking ring having a tapered outer surface engaging the inner surface of the flange, in which the outer end of the locking ring is flared over the outer end of the nut, and a film of metal of low frictional coefficient and high electrical conductivity interposed between the external surface of the bushing and the bore in the body to form a surface contact.

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