Nov. 24, 1931. H. F. WILHELM 1,833,145

CONNECTER

Filed July 7, 1925

Fig. 1

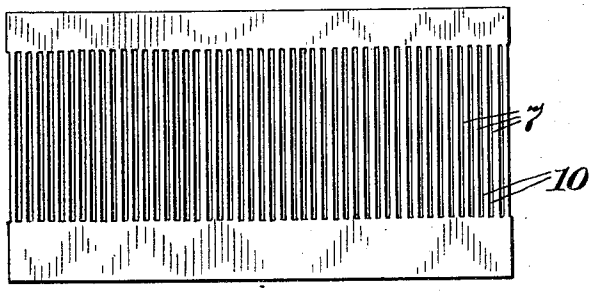


Fig. 2

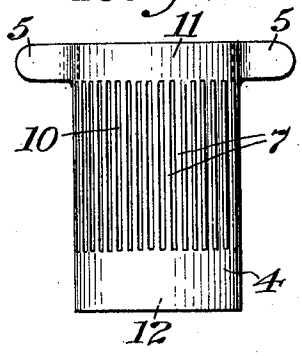


Fig. 3

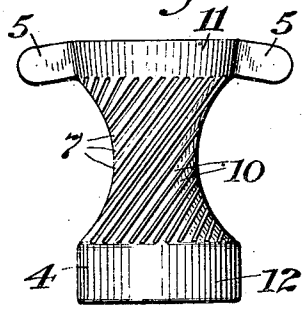


Fig. 4

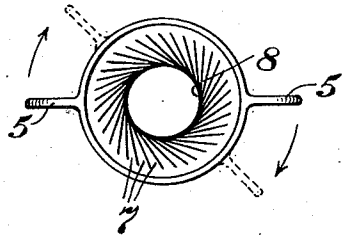


Fig. 5

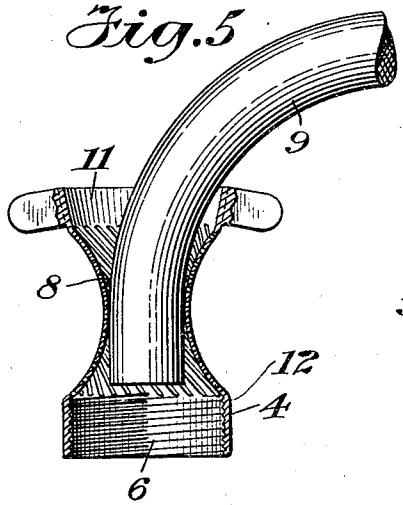


Fig. 6

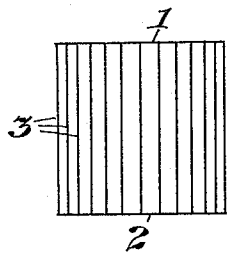
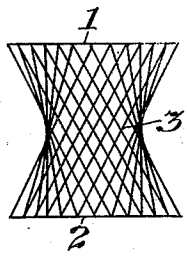


Fig. 7



INVENTOR

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UNITED STATES PATENT OFFICE

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CONNECTER

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My invention relates to devices for connecting rods, wires, etc. to other members, as, for instance, binding posts and the like. More specifically, my invention relates to a connecter which may be secured to an ordinary binding post and to which an electric wire may be quickly attached or detached.

One of the principal objects of the invention is to provide a connecter which will tenaciously grip a rod or wire inserted therein by spring action and yet provide adequate and large contacting area between said connecter and rod, so that the connection will be both mechanically and electrically excellent.

Other objects will be apparent from the following description and appended claims when considered with the accompanying drawings in which

Fig. 1 shows a development of a sheet metal tube having slots cut therein, from which the connection is made.

Fig. 2 shows an elevation of the sheet metal tube from which the connecter is made with finger pieces thereon.

Fig. 3 shows an elevation of my connecter ready for use.

Fig. 4 shows a plan view of my connecter ready for use, the dotted lines representing the position of the finger pieces when they are rotated to enlarge the throat to allow insertion of a conductor.

Fig. 5 is a sectional elevation of my connecter showing a conductor being gripped thereby, and,

Figs. 6 and 7 are diagrams to aid in the explanation of the operation of the invention.

Referring first to Figs. 6 and 7, if two circular disks 1 and 2 are connected by a plurality of straight line elements 3 of equal length at corresponding points throughout their circumferences, and the disks 1 and 2 are rotated relatively a small angle, the elements 3 will move from their position parallel to the axis of rotation as shown in Fig. 6 to an angular position shown in Fig. 7. The elements 3 will still be straight lines. The figure shown in Fig. 7 is known as a hyperboloid of revolution and its inner and outer surfaces are known as warped surfaces.

It should be noted that the portion of the hyperboloid between its ends is contracted to form a gorge or throat. The size of the gorge or throat depends upon how large an angle the disks 1 and 2 are moved relatively to each other. If the disks are moved thru a sufficient angle the size of the gorge or throat can be reduced to zero.

To apply this principle to make a good connecter, a material is used which can be worked soft and then subsequently tempered to give spring and elasticity after the connecter is formed into shape. A sheet brass is a suitable material.

The material may be initially in either sheet or tube form. If initially in tube form, as shown in Fig. 2 longitudinal slots 10 are cut in the tube 4 to provide longitudinal strips or members 7 connecting an upper ring 11 and lower ring 12. If the material is initially in sheet form, the longitudinal slots 10 may be cut to provide the strips 7 while the material is in sheet form. The sheet is then rolled into cylindrical form, its edges being suitably secured together to form the tube 4 as shown in Fig. 2. At this point the finger pieces 5 may be suitably attached to the upper ring 11.

The tube 4 is then twisted to form a connecter of the shape shown in Fig. 3. The upper ring 11 is rotated relatively to the lower ring 12 by a suitable device, the rings being held apart as far as possible so that the elements 7 remain as straight as possible in the twisting process, all of the bend taking place at the points where the strips or elements 7 join the rings 11 and 12.

The width of the slots 10 before forming the connecter depends on the amount the upper and lower rings are to be relatively twisted. It should be noted that as the upper and lower rings are moved from the position shown in Fig. 2 to that shown in Fig. 3, the slots 10 become narrower. In order to provide maximum area of contact between the connecter and an inserted conductor, the distance between adjoining elements 7 when a conductor is gripped should be substantially zero. Therefore, when forming the connecter, before tempering, the rings 11 and 12 should be moved relatively till the elements 7

touch each other at the throat or gorge 8, if maximum area of contact is desired. The upper ring 11 now may be flared slightly outwardly and the lower ring may be provided with internal screw threads 6.

After the connecter has been formed in the shape shown in Fig. 3, it may be tempered. The shape shown in Fig. 3 now is the normal shape of the connecter and force is required to deform it from its normal shape, the elasticity of the material resisting force to change its shape and acting to bring the connecter back to normal shape when the deforming force is removed.

If it is desired to connect the conductor 9, the upper ring is gripped by means of the finger pieces 5 and twisted in such a direction as to open the throat 8. The conductor 9 is inserted and the elasticity of the material causes the conductor to be tenaciously gripped.

If desired, the inside edges of the elements 7 may be slightly burred or roughened to provide a slight biting action into the conductor.

The connecter should be formed in such manner that when the upper ring 11 is twisted to open the throat 8, the force of twisting will tighten the engagement of the screw threads 6 with those on the binding post (not shown).

It is known that spring type connecters are cheap to make and permit a conductor to be easily attached or detached. By spring type connecters it is meant those made of spring metal which must be manually deformed to admit a conductor and which then grip the conductor by their elasticity or tendency to return to their normal shape.

They are subject to two general defects, however. First it is sometime difficult to thread a wire into the connecter if the connecter is in a position not easily accessible, and second, they contact the conductor only at about two points and therefore do not provide a good low resistance, high current carrying connection.

By means of the invention, both these disadvantages are overcome without sacrificing any of the general advantages of a spring type connecter. A connecter according to the invention grips a conductor practically throughout the entire circumference of the conductor and due to the resilience or bend in the metal of the connecter, it grips the conductor for a substantial part of its length, thereby insuring a continuous cylindrical surface of contact of large extent compared to the cross section of the conductor. Furthermore, due to the funnel shape opening of the connecter and its disposition in line with the longitudinal axis of the binding post, it is very easy to thread a conductor into it. If the conductor is fairly stiff, in some cases, it may be forced directly into the connecter without opening the connecter by the usual twisting operation.

Having described my invention, I am entitled to all modifications thereof that fall fairly within the spirit and scope of the invention as defined in the following claims:

1. A connecter comprising an upper ring, a lower ring, a plurality of substantially straight elements connecting said rings making an angle with the axis thereof, said rings being adapted to be rotated relatively to cause said elements to bend at their junctions with said rings to increase the distance between said elements to allow a conductor to be inserted.

2. A connecter comprising, spaced metal rings, metal strips of equal lengths connecting said rings, said strips defining the surface of a hyperboloid of revolution and forming a gorge, said rings being adapted to be twisted relatively against the elasticity of the metal to open the gorge to receive and clamp a member to be connected.

3. A connecter comprising, a plurality of spaced straight line elements, and means whereby said elements are positioned to surround an inserted member and whereby said elements may grip the same, said elements defining a warped surface.

4. A sheet metal connecter comprising an upper closed ring, a lower closed ring, member-gripping means between said rings and means for relatively rotating said rings to enlarge said member-gripping means to receive the member to be connected, said rings and member-gripping means being of one piece of sheet metal.

5. In a spring connecter, a member-gripping portion comprising a plurality of uniformly spaced, annularly arranged elements, an operating portion for causing said member-gripping portion to expand, means for causing said member-gripping portion to yieldably resist opening by said operating portion whereby said member-gripping portion may grip inserted members of greatly differing sizes uniformly about their peripheries.

6. A connecter comprising spaced rings of fixed size, a plurality of elements connecting said rings, said elements having their ends maintain a substantially fixed position relative to given portions of the respective rings so that said ends partake of movement of said rings, and means whereby relative rotation of said rings causes a member inserted into the connecter to be released.

HAROLD F. WILHELM.