June 30, 1942. L. JUGLE 2,288,138

WIRE GRIP

Filed Dec. 13, 1940

Fig. 1

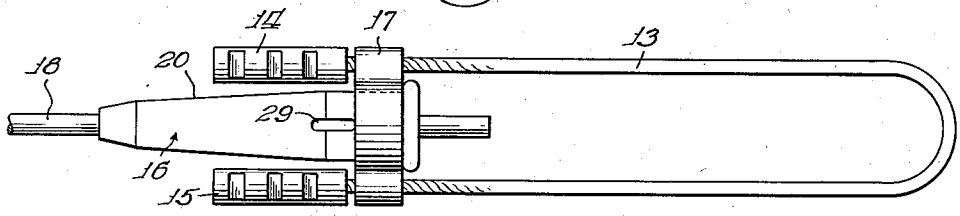


Fig. 2

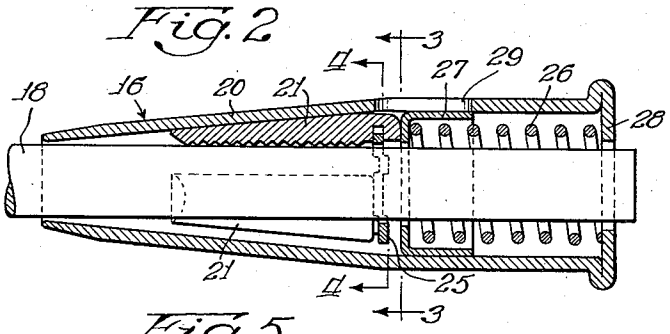


Fig. 3

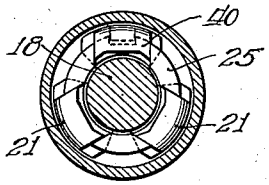


Fig. 4

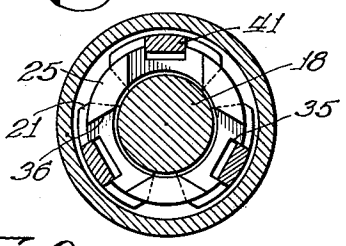


Fig. 5

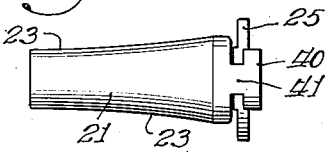


Fig. 6

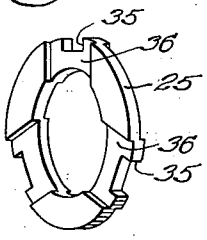


Fig. 7

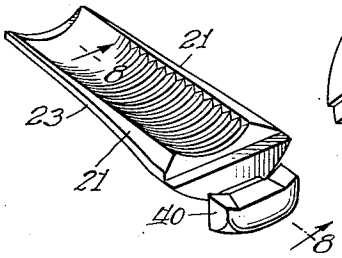


Fig. 8

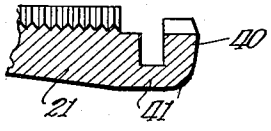


Fig. 9

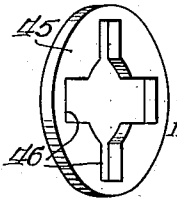


Fig. 10

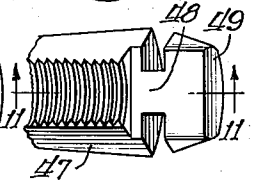
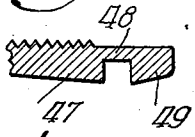


Fig. 11



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UNITED STATES PATENT OFFICE

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WIRE GRIP

Leonard Jugle, Chicago, Ill., assignor to Reliable Electric Company, Chicago, Ill., a corporation of Illinois

Application December 13, 1940, Serial No. 370,017

6 Claims. (Cl. 24—126)

The present invention relates to a wire grip of the character comprising a tapered tubular shell and a plurality of gripping members or jaws contained within said shell. It is particularly directed toward a means for holding the gripping jaws in spaced relationship within the shell.

The principal purpose of the present invention is to provide a wire grip of this character which has a central opening throughout its length whereby an inserted wire may pass completely through the device. Prior devices of this general character have been in use for many years, but no satisfactory jaw mounting arrangement has been devised which will permit passage of the end of the wire beyond the ends of the gripping jaws. Passage of the wire has been obstructed by the prior jaw mounting arrangements. Therefore, in the use of these prior devices it has been necessary to cut the wire to such a length that the end of the wire will terminate short of the ends of the gripping jaws. As the wire grip may be relatively short in length, great care must be taken to cut the wire to the proper length. If by mistake, the wire is cut so short that it does not reach the gripping device, which may be a dead end connector, the whole length of the wire must be replaced by a wire of greater length. In order to avoid cutting the wire and at the same time to maintain proper relationship between the jaw members, applicant has evolved the present invention.

A prior line grip of this general character is disclosed in Patent No. 2,138,913 to Fotsch. As pointed out therein, it is necessary to provide means to retain the gripping jaws against circumferential and longitudinal displacement and at the same time to allow a certain amount of radial "float." The amount of "float" required depends upon the range of wire sizes intended to be used with a particular grip. The provision for radial "float" of the gripping jaws allows the gripping surface of the jaws uniformly to contact the inserted wire and avoids pinching of the wire by the free ends of the jaws in case a wire of a minimum size is used. The radially slotted jaw holding disk of said Patent No. 2,138,913 performs the required functions very successfully. However, it is not possible to perforate this disk to permit passage of wire of a maximum size. The present invention specifically deals with a jaw holding device which is perforated to receive the maximum size wire which can be used with a particular grip.

In its preferred form, the present invention includes a combination of two cooperating elements. A perforated disk or washer is provided with relatively short radial slots extending inwardly from its periphery. Coincident with each of said radial slots but of a somewhat greater width and extending across the surface of the washer is a radial recess in the surface of the washer. The recesses may be stamped in the washer. Each gripping jaw has a head which is connected to the jaw proper by a reduced neck portion. The neck portion is adapted to enter a radial slot of the washer while the head portion is received on the recess in the face of the washer. The sides of the recess form a guide for the received jaw head. This construction permits a liberal amount of "float" and yet retains the jaws against circumferential and longitudinal displacement.

A modified form of my invention is one which provides only a small amount of "float," as it is intended to be used only with wires of substantially the same size. This form utilizes gripping jaws having head and neck portions and washers having radial slots extending outwardly from the inner edge of the washer. Both forms of the invention, however, permit passage of the wire through the unit.

Other and more specific objects and advantages of the invention will appear more fully as the description proceeds, reference being had to the accompanying drawing wherein a preferred embodiment of the line grip is disclosed. It is to be understood however that the drawing and description are illustrative only and are not to be taken as limiting the invention except in so far as it is limited by the claims.

In the drawing,

Fig. 1 is a view illustrating a dead end unit which is one possible embodiment of the wire grip of the present invention;

Fig. 2 is a longitudinal sectional view of the present invention;

Fig. 3 is a sectional view on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view on the line 4—4 of Fig. 2;

Fig. 5 is a plan view of a gripping jaw showing its association with the cooperating washer;

Fig. 6 is a perspective view of my preferred form of washer;

Fig. 7 is a perspective view of the gripping jaw which cooperates with the washer shown in Fig. 6;

Fig. 8 is a sectional view on the line 8—8 of Fig. 7;

Fig. 9 is a perspective view of my modified form of washer;

Fig. 10 is a fragmentary perspective view of the gripping jaw which cooperates with the washer of Fig. 9; and,

Fig. 11 is a sectional view on the line 11—11 of Fig. 10.

Referring now to the drawing, the dead end assembly shown in Fig. 1 is the subject matter of the J. B. Cook Patent No. 2,180,977. Briefly described, this dead end unit includes a length of wire 13 which is provided with heads 14 and 15 at its opposite ends. The heads 14 and 15 may be provided on the length of wire 13 in any suitable fashion. Here I have shown them as comprising tubes of metal which are compressed on the wire 13 by applying pressure to the opposite sides thereof at spaced points. A wire grip 16 has the length of wire 13 connected thereto by means of a yoke member 17. The yoke member has a circular opening of a diameter to receive the wire grip 16 and oppositely disposed side openings of sufficient diameter to receive the wire 13 and to refuse passage to the heads 14 and 15. The unit is assembled by first threading the wire 13 into its openings in the yoke and then inserting the wire grip into the circumferential opening of the yoke. This assembly is described more fully in the J. B. Cook Patent No. 2,180,977, and, as such, forms no part of the present invention.

The wire grip 16 receives conductor 18 which may extend through the grip as shown in the drawing.

The wire grip 16 comprises a tubular shell 20 which is tapered throughout a substantial portion of its length. The shell 20 may be given its taper by means of an ordinary swaging process. A plurality of gripping jaws 21, ordinarily three or four in number, are disposed within the tapered end of the tubular shell 20. A surface of each of the jaws is tapered and curved to conform to the interior of the tapered portion of the shell 20. The opposite surfaces of the jaws are roughened in any suitable fashion in order to securely grip an inserted wire. Sides 23 of each of the jaws are tapered to permit the jaws to move toward the reduced end of the shell. The jaws 21 are positioned within the shell by means of a cooperating washer 25 hereinafter to be described in detail. A spiral spring 26 is provided to urge the gripping jaws toward the reduced end of the tapered shell 20. A cup-shaped member 27 bears upon the head ends of the gripping jaws and receives one end of the spring 26. The other end of the spring 26 bears against an annular flange 28 provided at the end of the tubular shell opposite the reduced end. An elongated slit or opening 29 in the portion of the tubular shell which contains the spring 26 permits entrance of a pin or tool (not shown) for the purpose of releasing the spring whereby a gripped wire may be released and withdrawn from the unit.

The jaw positioning washer 25 is provided with radial slots 35 of relatively short length extending inwardly from its periphery. The shortness of the length of the slots 35 is, of course, an important feature, as this permits the perforation in the washer to be of the necessary size and yet maintains the necessary strength in the washer. Coincident with and somewhat wider than the slots 35 and extending radially across the surface of the washer are recesses 36. The sides of the recesses form guides for the jaw heads presently to be described. The recesses 36 conveniently may be produced by means of a stamping process which results in raised bosses on the opposite surface of the washer. To cooperate with the configurations of the washer 25, the large end of the jaws 21 is provided with a head portion 40. The head portion 40 is of such a width as to be received within and guided by the recesses 36 in the washer. A neck portion 41 connects the head 40 to the main body of the jaw 21. The neck portion 41 has its outer surface a continuation of the curved outer surface of the jaw 21. The neck 41 is of such a width that it may be received within the radial slots 35 of the washer. The thickness of the neck corresponds substantially to the length of the said radial slots.

As will be understood, when the jaws are opening up to permit wire of a maximum size to enter, they are pushed back to a larger part of the tapered tube. In this case the jaws may radially "float" to a point where the neck 41 no longer is within the radial slot 35 in the washer. However, the jaws are retained in proper position both circumferentially and longitudinally due to the cooperation between the heads 40 and the recesses 36. In other words, the recesses 36 act as a guide for the heads 40 of the jaws throughout a greater "float" distance than would be obtained from the slots and necks alone. The slots and necks, however, permit additional "float" distance in the inward radial direction.

In the modified form shown in Figs. 9 and 10, a jaw positioning and retaining means is provided for use in grips wherein only a relatively small amount of radial "float" in the jaws is required. A perforated disk or washer 45 has radial slots 46 extending outwardly from the inner edge. Gripping jaws 47 having reduced neck portions 48 and head portions 49 are adapted to be retained in proper relationship by means of the slotted washer 45. It is to be noted that the neck portion 48 of this jaw is narrow in radial depth and is spaced inwardly from the outer surface of the jaw whereby said neck portion and the slot in the washer may cooperate to permit a certain amount of radial "float" in the jaw. Structurally speaking, both of the described embodiments comprise jaws having neck portions offset radially on the jaws from the center line thereof and slotted washers which cooperate therewith to provide the required "float." A grip of this character is adapted for use with wire of substantially uniform cross sections, although variations, such as caused by manufacturing irregularities or stretch in the wire, are readily compensated for by the limited "float" provided.

From the above description, it is thought that the details and advantages of the present invention will be readily apparent to those skilled in this art. Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A wire grip comprising a tapered tubular shell, gripping jaws within said shell, jaw positioning means comprising a washer having radial slots therein and radially extending surface recesses coincident with but wider and longer than said slots, said jaws including neck and head portions, the former being received in said slots and the latter being received in said recesses, and means for urging said jaws toward the reduced end of said shell.

2. A wire grip comprising a tapered tubular shell, gripping jaws within said shell, jaw posi-

tioning means which permit an inserted wire to pass therebeyond, said means comprising a washer having a central opening to permit passage of wires up to the size of said opening, and means comprising radial slots in said washer, neck portions on said jaws received in said slots, said neck portions being narrow in radial depth with respect to said jaws and offset radially on the jaws from the center line thereof and head portions on said jaws bearing on unbroken surfaces of said washer.

3. In a wire grip of the character described, gripping jaws including neck and head portions and a jaw positioning means comprising a washer, radial neck receiving slots in said washer, and head receiving guides on a radial surface of said washer whereby to maintain proper circumferential position of said jaws when the necks thereof are removed from said slots.

4. In a wire grip of the character described, gripping jaws including neck and head portions and a jaw positioning means comprising a washer, radial neck receiving slots in said washer extending inwardly from the periphery thereof, and head receiving recesses in a surface of said washer coincident with but wider and longer than said slots whereby to maintain proper longitudinal and circumferential position of said jaws when the necks thereof are removed from said slots.

5. In a wire grip comprising a tapered tubular shell, gripping jaws within said shell, jaw positioning means comprising a centrally apertured washer having radial slots extending from the inner annular edge of said washer, said jaws including head and neck portions, said neck portions being spaced from the shell engaging surface of the jaws and received in said slots, and means for urging said jaws toward the reduced end of said shell.

6. In a wire grip of the character described, gripping jaws including a head portion and a reduced neck portion which substantially is flush with the gripping surface of said jaw and a jaw positioning means comprising a centrally apertured washer having radial neck receiving slots extending outwardly from the inner annular edge of said washer.

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