May 22, 1951 J. J. SAUL 2,554,387

WIRE GRIP

Filed Oct. 17, 1949

Fig. 4

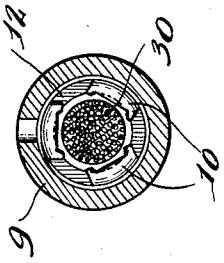


Fig. 3

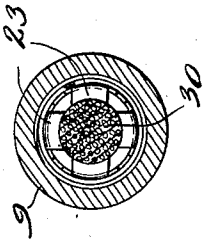


Fig. 1.

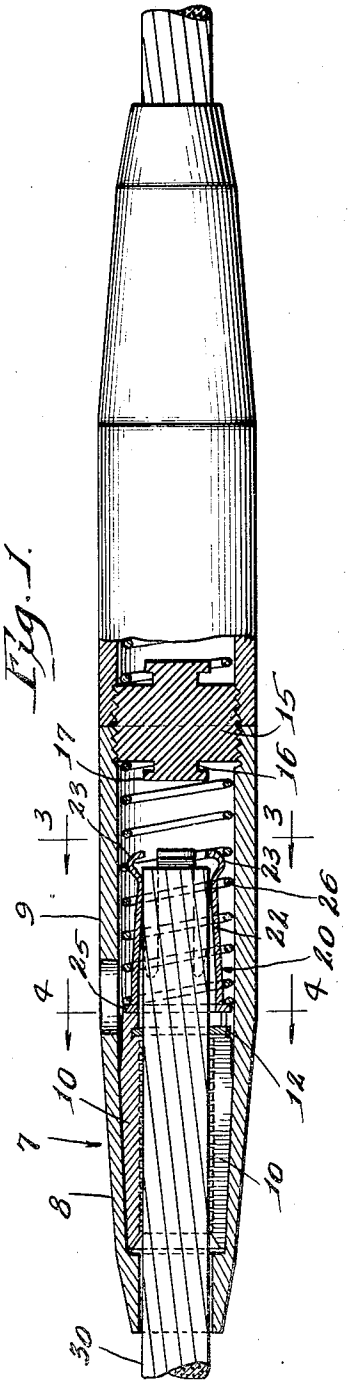
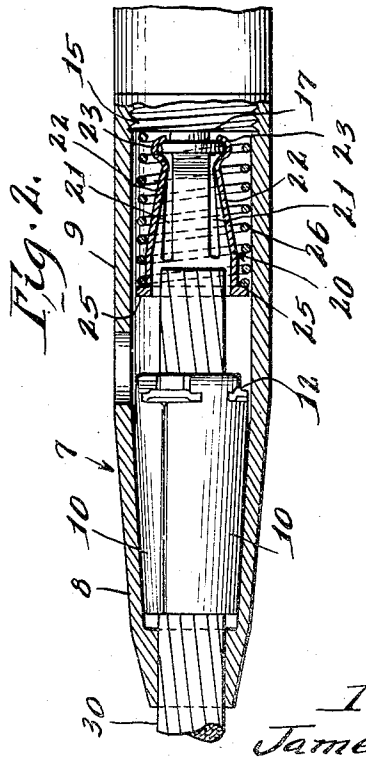


Fig. 2.



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UNITED STATES PATENT OFFICE

2,554,387

WIRE GRIP

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3 Claims. (Cl. 287—75)

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This invention relates to a wire grip of the type wherein wire gripping jaws cooperate with a tapering tubular shell to produce wire gripping action. The invention resides in the provision of means whereby the jaws are in a free or unbiased condition until such time as the end of the wire to be gripped passes completely through the jaws, thereby assuring gripping action throughout the entire length of the jaws.

The usual wire grip of this type has a resilient element such as a spiral spring that applies a continuous bias to the jaws. In other words, the spring continuously urges the jaws toward the small end of the tapering shell. When a wire or conductor is inserted in a grip of this kind, the end of the wire pushes the jaws against the spring and moves the jaws to a shell region of greater diameter. This permits radial expansion of the jaws so that the wire end may be pushed into and, in fact, completely through the jaws. Thereafter, the spring urges the jaws in the opposite direction to produce an initial gripping action between the jaws and the wire. As the wire is normally under tension, the stress in the wire itself further moves the jaws into the shell taper, thereby increasing the gripping force to a sufficient amount.

While in most cases a grip of this type functions in a satisfactory manner, experience has shown that difficulties resulting in faulty connections sometimes occur. Many wires used are of the stranded type, and occasionally a strand at the wire end becomes "out of lay" when the wire is inserted in the grip. Such an "out of lay" strand may enter the space between adjacent jaws with the result that proper relationship between the jaws and the wire is never established. A connection wherein an "out of lay" strand is disposed between adjacent jaws will withstand some tension, but it will ordinarily fail when subjected to normal and sometimes variable tension.

A more or less similar difficulty occasionally arises when solid wires are used. The cut end of such a wire may have a burr, a departure from proper wire shape. If the wire is inserted only part way through the jaws, the burr surface may engage one or more of the jaws. In this case, gripping occurs over a reduced area, and proper gripping relationship between the jaws and the wire is not established.

Accordingly, it is desirable to provide an arrangement whereby the jaws do not initially grip the wire until it is certain that the wire end has passed completely through, and perhaps beyond, the gripping jaws. One object of the invention is to provide such an arrangement.

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Another object is to provide a wire grip having a trigger element that initially holds the jaw biasing spring out of engagement with the jaws. The trigger element is actuated by engagement thereof by the end of an inserted wire. This engagement occurs only after the wire end has passed completely through and beyond the wire gripping jaws.

Other objects and advantages of the invention will be apparent as the description proceeds, reference being had to the accompanying drawing wherein one form of the invention is shown. It is to be understood that the description and drawing are illustrative only, and are not to be taken as limiting the invention except insofar as it is limited by the claims.

In the drawing:

Fig. 1 is a side view, partly in section, showing my improved wire grip embodied in a wire splice with the grip shown in engagement with a wire;

Fig. 2 is a sectional view showing the wire grip prior to final engagement with a wire;

Fig. 3 is a sectional view on line 3—3 of Fig. 1, and Fig. 4 is a sectional view on line 4—4 of Fig. 1.

Referring to the drawing, my improved wire grip is illustrated as embodied in a line splice of the general type shown in U. S. Patent No. 2,138,913 to W. G. Fotsch. The grip, however, may equally well be used in other devices such as deadend connectors and the like.

The wire splice illustrated is symmetrical, so only a single half portion will be described in detail.

The left hand half of the splice comprises a wire grip having a tubular shell 7. The left end of shell 7 is tapered interiorly throughout a portion 8, while adjacent shell portion 9 is generally non-tapering.

A plurality of gripping jaws 10, three jaws in the example shown, are contained within tapered portion 8. Jaws 10 are interconnected by means of an annular member 12 in such a manner that the jaws may "float" radially of shell 7 and at the same time may maintain a uniform circumferential spacing. Annular member 12 also insures uniform longitudinal motion of the jaws.

Jaws 10 and annular connecting member 12 may be of the type described in detail in U. S. Patent No. 2,288,138 to L. Jugle. Regardless of the particular structure used in the jaws and jaw connecting member, it is necessary that the latter be provided with an aperture of sufficient

size to pass wire of the greatest diameter with which the grip is to be used.

Shell portion 9 is provided with a stop member 15 at a point remote from jaws 10. This member has an axially extending stud 16 which terminates in a flange 17. In the illustrated wire splice, stop member 15 is a threaded plug to which shell 7 and its right hand counterpart are attached. A flanged stud also is provided at the right hand end of the member.

A trigger element 20 is located within the shell between jaws 10 and stop member 15. Trigger element 20 is a sleeve of spring metal material having a plurality of longitudinal slots 21 (Fig. 2) extending inwardly from the end adjacent stop member 15. Sleeve portions 22 between the slots 21 are inclined toward the sleeve axis, the free ends of such portions being bent to form inwardly facing hooks 23. These hooks are adapted to engage flange 17 of stop member 15 as shown in Fig. 2.

The end of trigger element 20 adjacent jaws 10 has an annular flange 25 that forms a seat for one end of a compressed spiral spring 26. The other end of spring 26 is seated against stop member 15.

The various parts of the wire grip prior to connection to a wire are in the respective positions shown in Fig. 2. The hooks 23 of inclined sleeve portions 22 engage flange 17 of the stop member. Spring 26 is compressed to a relatively high degree. Jaws 10 are normally disposed within taper portion 8, although they are free to move from an extreme position within the taper to the trigger element 20.

A wire 30, which may be of the stranded type as shown, is inserted into the tapered end of the shell. The wire pushes the jaws back as far as is necessary to expand them to permit wire passage. Since spring 26 is initially out of engagement with jaws 10, there is no bias on the jaws at this time. As shown in Fig. 2, the wire end, after passing through the jaws, enters trigger element 20. Continued inward positioning of the wire causes the wire end to engage the conical surface defined by the inclined sleeve portions of the trigger element, thereby radially expanding the portions so that hooks 23 become disengaged from flange 17. This disengagement releases trigger element 20 so that spring 26 with a more or less snap action moves the element into engagement with jaws 10. The spring further functions to urge jaws 10 into the tapering end of the shell to effect an initial gripping relation between the jaws and wire 30. Thereafter, the wire is properly "sagged in," and that plus the normally present tension on wire 30 increases the gripping action to an amount sufficient to provide a firm connection.

This arrangement insures that no gripping action will occur before the wire end has passed completely through the jaws. Since "out of lay" strands usually occur, if at all, at the wire end, it will be seen that such a strand cannot result in an improper connection with my improved grip. The same is true with respect to a burred end on a solid wire. Since the jaws engage the conductor throughout their length, a connection of maximum resistance to separation is insured.

From the above description it is thought that the construction and advantages of my invention will be readily apparent to those skilled in the art. Various changes and modifications may be made without departing from the spirit or losing the advantages of the invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A wire grip comprising a tubular shell tapering interiorly toward one end, wire gripping jaws within said shell, a stop member at the other shell end, said stop member having a flanged stud facing said jaws, a trigger element between said jaws and said stop member, said trigger element comprising a sleeve of spring metal having a plurality of longitudinal slots extending inwardly from the end adjacent said stop member and an annular flange on the other end, the sleeve portions between said slots being inclined toward the sleeve axis with the portion ends being bent to form inwardly facing hooks adapted to engage said flanged stud, and a compressed spiral spring between said stop member and said annular flange whereby after release of said hooks from said flanged stud upon expansion of said sleeve portions by an inserted wire, the spring pressed trigger element forces said jaws into the tapering shell end in gripping relation with the wire.

2. A wire grip comprising a tubular shell tapering interiorly toward one end, wire gripping jaws within said shell, a stop member at the other shell end, a trigger element between said jaws and said stop member, said trigger element comprising a sleeve of spring metal having a plurality of longitudinal slots extending inwardly from the end adjacent said stop member and an annular flange on the other end, the sleeve portions between said slots being inclined toward the sleeve axis with the portion ends being bent to form inwardly facing hooks adapted to engage said stop member, and a compressed spiral spring between said stop member and said annular flange whereby after release of said hooks from said stop member upon expansion of said sleeve portions by an inserted wire, the spring pressed trigger element forces said jaws into the tapering shell end in gripping relation with the wire.

3. A wire splice comprising a pair of wire grips as defined in claim 2, the stop members of the two grips comprising a threaded plug to which the tubular shells are attached in end to end relation.

JAMES J. SAUL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
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1,854,783	Cook	Apr. 19, 1932
2,314,579	Frank	Mar. 23, 1943