May 12, 1936. J. VAN BUSKIRK 2,040,678

LINE SPLICE

Filed Sept. 4, 1934

Fig. 1

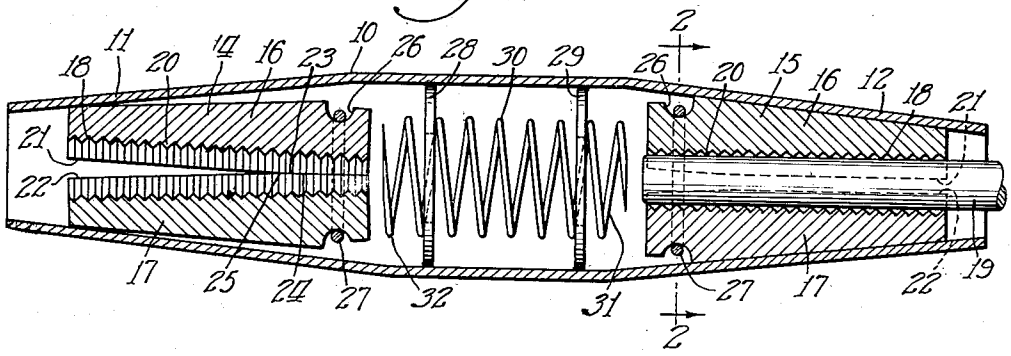


Fig. 2

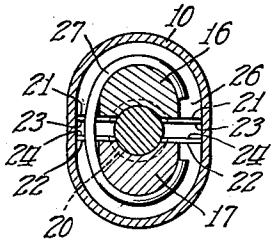
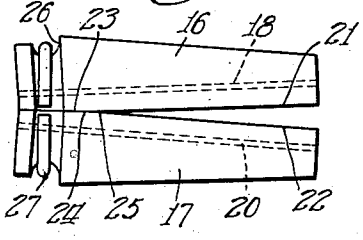


Fig. 3



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LINE SPLICE

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16 Claims. (Cl. 24—126)

The invention relates to a splicing device and primarily to that type which is designed to connect adjacent ends of a line wire to hold said ends against separation and also effect a proper electrical connection between said ends.

The invention has among its various objects the production of a simple and inexpensive device capable of accomplishing the above functions in which, the number of elements employed is materially reduced and in which the holding effect is augmented as the force tending to separate said wires is increased.

The invention also has as an object the provision of a device in which separable wire gripping elements are employed which when in one position assume a relation to accept a wire, the gripping elements being held in this condition through the agency of means resisting, although permitting relative or separable movement of said elements and a gripping effect to be applied thereby to a wire introduced thereto, to thus connect the gripping elements and the wire for unitary movement by the wire, into engagement with a portion of a casing for said elements, and thus cause an increased holding effect to be applied by said elements to thus prevent withdrawal of the wire from said elements and casing.

The invention also has as an object the provision of gripping elements which are pivotally associated with each other, said elements having means associated therewith for maintaining one end of said elements in spaced relation to each other for the reception of a wire, the means allowing separation of said elements by the wire, as said wire is introduced thereto to thus cause separation of said elements and movement thereof into wedging relation with the casing.

The invention has these and other objects, all of which will be explained in detail and more readily understood when read in conjunction with the accompanying drawing which illustrates one embodiment of which the invention is susceptible, it being manifest that changes and modifications may be resorted to without departinf from the spirit of the appended claims forming a part hereof.

In the drawing:

Figure 1 is a central longitudinal section of a device constructed according to one embodiment of the invention showing the respective gripping elements in positions to receive a wire and in a position effecting holding of a wire.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a side elevation of one of the gripping elements.

The structure illustrated in the drawing for accomplishing the above enumerated and other objects contemplates the utilization of a casing generally designated 10, the opposite ends of which are formed to provide the tapered or reduced ends respectively designated 11 and 12.

The use of sets of wire engaging elements generally designated 14 and 15 is contemplated, each set including pairs of elements respectively designated 16 and 17. These elements 16 and 17 are of a tapered formation and are formed to provided a centrally disposed passage 18 for the reception of a wire such as 19. This passage may be provided with serrations, such as 20, to thereby provide means augmenting the holding effect of these elements upon the wire.

These elements 16 and 17 have edges 21 and 22 which are formed to provide the angularly disposed portions designated 23 and 24, the juncture 25 of these angularly disposed faces forming a pivot upon which the elements 16 and 17 may rock to arrange the forward ends thereof in engagement with the casing to frictionally hold said elements against movement relatively to said casing and in addition allow said elements to assume a relation to receive a wire.

Means is provided to hold said gripping elements in associated relation and also hold said elements in engagement with said casing. To accomplish these functions one end of each of the gripping elements 14 and 15 is formed to provide a recess 26 for the reception of a split spring ring 27 which acts upon the rear end of the gripping elements 16 and 17 to maintain the forward ends of said elements in separated and in engaging relation with the casing 10 as shown at the left of Figure 1.

Introduction of a wire between said gripping elements or to the passage 18 of the elements 16 and 17 causes the rear end of said gripping elements to be arranged in separated relation to each other against the action of the split spring ring 27, as shown to the right of Fig. 1, thus causing this last mentioned end of the gripping elements to be brought into engagement with the wall of the casing, in wedging relation with said wall.

Movement of this last mentioned end of the gripping elements 16 and 17 into the relation just referred to, causes a gripping effect to be applied to the wire, and causes movement of the gripping elements with the wire upon the application of a pulling effect upon said wire.

This movement of the gripping elements by the wire causes the gripping elements to be moved toward the smaller end of the casing which causes the gripping elements to close upon the wire and the gripping action of said elements to be augmented, thus preventing withdrawal of the wire and separation of the wire from the device.

The invention also contemplates the utilization of means for preventing a wire introduced to one end of the casing from engaging and interfering with the proper operation of the other gripping elements. The means herein shown for accomplishing this feature includes the abutment elements 28 and 29 and a coiled spring 30 upon which the abutment elements are mounted for movement within the casing. This coiled spring acts to maintain the abutment elements in spaced relation to each other, yet allows said abutment elements to move when engaged by the wire. The inner dimension of the coiled spring is of a diameter sufficient to receive a wire such as 18, which thereby allows the wire to be introduced to the spring and engage its respective abutment element and cause movement thereof and compression of that portion of the spring extending between said abutment elements. It will be noted that the abutment elements are arranged upon the spring so that portions 31 and 32 are provided which extend beyond the respective abutment elements.

The portions 31 and 32 and that portion of the spring extending between the abutment elements and the abutment elements provide means for regulating the degree of inward movement of the gripping elements 15 and 16 and in addition controls the distance the end of a wire such as 19 may project beyond the inner end of the gripping elements.

Manifestly upon introduction of a wire to one or the other of the gripping elements these elements engage the wire and move with the wire into engagement with an end such as 31 of the coiled spring 30, causing compression of this portion of the spring and movement of the abutment element such as 28 and compression of that portion of the spring extending between said abutment elements. When the various elements, such as the spring, abutment elements and gripping elements have been moved into the above mentioned relation, further inward movement of said elements is arrested, however, the wire may be moved in an inward direction relatively to the gripping elements until the end of said wire engages its respective abutment. Since the portion such as 31 of the coiled spring is at this time also under compression this defines the distance between the abutment plate and the inner end of the respective gripping elements which thus determines the distance which the inner end of the wire may project beyond the inner end of the gripping element.

From the foregoing description of the structure it is believed evident that a mechanism is provided in which pivoted gripping elements are employed, the forward ends of which are maintained in spaced relation to each other and in engagement with the walls of the casing through the agency of means such as the split spring ring 27 which acts upon the rear end of said elements 16 and 17 to cause movement of said elements on the pivot 25 to thus retain the forward end of said elements in said last mentioned condition.

It is also believed manifest that upon introduction of an end of a wire to between said elements 16 and 17, the spring ring 27 allows separation of said elements so that they may assume the position thereof shown at the right of Figure 1 in which position said elements are disposed in wedging relation to the casing 10. It is believed evident that when the gripping elements are arranged in this last mentioned relation a gripping action is applied by said elements 16 and 17 to the wire which connects these elements to the wire which upon movement of the wire in an endwise direction relative to the casing 10 causes the gripping effect to be augmented and the wire to be securely held against disconnection from the device.

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

1. A gripping device comprised of a plurality of gripping elements each having a longitudinal groove formed therein, the groove of one element cooperating with the groove of another element to provide a longitudinal passage for the reception of a wire, the longitudinal edges forming the termination of the walls defining said groove having surfaces extending lengthwise of said elements arranged at an angle to each other the vertex of said angles providing a pivot for said elements and the surface extending in one direction from said vertex providing an element of a stop to limit movement of said elements toward each other.

2. A gripping device comprised of a plurality of gripping elements each having a longitudinal groove formed therein, the groove of one element cooperating with the groove of another element to provide a longitudinal passage for the reception of a wire, the longitudinal edges forming the termination of the walls defining said groove having surfaces extending lengthwise of said elements arranged at an angle to each other, the vertex of said angles providing a pivot for said elements and resilient means for holding one angular surface of one of said elements in engaging relation to the angular surface of the other of said elements and holding the opposite end of said elements distended relatively to the first mentioned end of said elements.

3. A gripping device comprised of a plurality of gripping elements each having a longitudinal groove formed therein, the groove of one element cooperating with the groove of another element to provide a longitudinal passage for the reception of a wire, the longitudinal edges forming the termination of the walls defining said groove having surfaces extending lengthwise of said elements arranged at an angle to each other, the vertex of said angles providing for pivotal movement of said elements relatively to each other and means for holding one angular surface of one end of said elements in engagement with a corresponding angular surface of another element and permitting separable movement of said elements.

4. In a line splice the combination of a casing having a tapered portion and a plurality of gripping elements slidably arranged in said casing, said gripping elements each having a longitudinally extending groove formed therein which together form a passage for a wire introduced to said gripping elements, said edges of one of said elements having surfaces extending lengthwise of said elements arranged at an angle to each other, the vertex of said angles providing a pivot for said elements and means for maintaining one end of said elements in engagement with the casing and the opposite end in engagement with each other and in spaced relation to said casing, said means permitting separation of said last

mentioned end of said elements and engagement thereof with the taper of said casing.

5. In a line splice the combination of open ended casing tapered toward the opening of said casing and a plurality of gripping elements slidably mounted in said casing adopted to grip a wire upon movement of said elements toward said opened end of said casing, said gripping elements each having a longitudinally extending groove formed therein which together form a passage for a wire introduced to said gripping elements, the longitudinal edges forming the termination of the walls defining said groove having surfaces extending lengthwise of said elements arranged at an angle to each other, and means for maintaining one end of said elements in slidable engagement with the taper of said casing and the opposite end in spaced relation to said taper and in engagement with each other said means permitting separation of said last mentioned ends of said elements and movement thereof into functionally operative relation with the tapered portion of said casing.

6. In a line splice the combination of a casing having an open end and tapered toward said end and gripping means in said casing comprised of a plurality of gripping elements slidable longitudinally of said casing, the forward end of said gripping means being spaced from each other and being in engagement with said casing and extending therefrom at an angle to the tapered portion of said casing to thereby arrange the opposite end of said gripping element in spaced relation to said casing, means for applying a compressive action to said last mentioned end for holding said first mentioned end in said spaced relation, said last mentioned end of said gripping elements being separable and movable into functionally operative relation with the tapered portion of said casing upon the introduction of a wire thereto.

7. In a line splice the combination of a casing and gripping elements arranged in said casing for the reception of a wire, said casing being open at its end and being tapered toward said end, said gripping elements having one end in slidable engagement with said casing and extending therefrom at an angle to the taper of said casing, the opposite ends of said gripping elements being mounted to pivot upon each other, means applying a compressive action to said pivoted end of said elements and holding said elements in pivoted relation, said means permitting separation of said elements and movement thereof to a position substantially corresponding to the taper of said casing.

8. In a line splice the combination of a casing having a tapered portion and means in said casing for gripping a wire, said gripping means including a plurality of elements unitarily connected with each other and being pivoted upon each other, and separable at said pivot, and means for maintaining said gripping means in unitary pivotal relation said means applying a compressive action to said elements and, maintaining one end of said gripping means in spaced relation to each other and in engagement with said casing and the opposite end in spaced relation to said casing, said last mentioned means permitting lateral separation of said elements into a relation substantially corresponding to the inclination of said wedge shaped portion of said casing by a wire introduced to said gripping means.

9. In a line splice the combination of a casing having a tapered portion and gripping elements slidable longitudinally of the casing, said gripping elements being pivoted adjacent one end, said end being spaced from the casing, the opposite end being engagement with said casing, said gripping elements being separable and movable to a position substantially corresponding to the inclination of the tapered portion of said casing upon the introduction of a wire thereto, and means resisting said movement of said elements said means maintaining said elements in pivotal relation to each other.

10. In a line splice the combination of a casing having a tapered portion and gripping elements slidable longitudinally of said casing, said gripping elements being pivoted adjacent one end, said end being spaced from the casing, the opposite end of said elements being in engagement with said casing, said first mentioned pivotal end being separable and movable to a position substantially corresponding to the inclination of the tapered portion of said casing upon the introduction of a wire thereto and means resisting said movement of said elements tending to maintain said pivotal relation of said elements.

11. A gripping device comprised of a plurality of gripping elements each having a longitudinal groove formed therein, the grooves cooperating with each other to provide a longitudinal passage for the reception of a wire, the longitudinal edges forming the termination of the walls defining said groove of one of said elements having surfaces extending lengthwise of said element arranged at an angle to each other, the vertex of said angle providing a pivot for said element and means for holding said gripping elements in associated relation.

12. A line splice consisting of a casing imperforate excepting at its ends and gripping devices comprised of a plurality of gripping elements, said casing being oblong in cross-section intermediate the ends thereof and having portions extending in opposite directions from said intermediate portion, said last mentioned portions being substantially oblong in cross-section to the extremities thereof and having opposed sides which are inclined in opposite directions and provide a casing having tapered end portions, means arranged in said intermediate portion of oblong cross section tending to maintain the elements of said gripping devices toward the smaller end of said tapered end portions and in engaging relation with each other, said means permitting inward movement of said gripping devices upon the introduction of a wire to said gripping elements, said elements of the gripping devices being separable relatively to each other upon introduction of a wire thereto, said oblong formation of said casing providing means permitting separation of said elements of the gripping devices and providing means preventing relative rotative displacement of said gripping elements upon introduction of a wire thereto and movement thereof by said wire endwise of said casing, said inclined portions of said casing and said gripping elements having surfaces which are upon separation of said gripping elements.

13. A line splice consisting of a member providing a casing imperforate excepting at the ends, and pairs of gripping devices for gripping a wire introduced to the respective ends of said casing, said casing being oblong in cross section and having ends opposed sides of which are inclined in opposite directions to thereby provide a casing having an integral intermediate portion of oblong cross section and integral tapered oblong end por-

tions, means arranged in said intermediate portion tending to maintain the front end of said gripping devices in engagement with the smaller end of the taper of said casing, the opposite end of said gripping devices being spaced from the inclined portions of said casing, said last mentioned ends of said gripping elements being separable and movable into engagement with the inclined sides of the tapered end of said casing upon the introduction of a wire thereto, the walls of the tapered end portions which connect the inclined walls providing guide means preventing relative lateral displacement of the elements of the gripping devices upon said separable movement thereof, said inclined portions of said ends and said gripping elements having portions which are complemental to each other and engageable with each other upon separation of said gripping elements.

14. A line splice consisting of a member providing a casing imperforate excepting at the ends thereof and pairs of gripping devices providing means for gripping a wire introduced to the respective ends of said casing, means acting upon said gripping devices tending to maintain an end of said gripping devices in engagement with the respective ends of said casing, said casing being oblong in cross section and having ends opposed sides of which are inclined in opposite directions to thereby provide a casing having an intermediate portion of oblong cross section and tapered oblong end portions which terminate in open ended portions, the diameter of the open ended portions being less than the diameter of the adjacent end of said gripping devices to thereby maintain the ends of said gripping devices substantially within the ends of said casing.

15. A line splice consisting of a member providing a casing imperforate excepting at the ends thereof and pairs of gripping devices providing means for gripping a wire introduced to the respective ends of said casing, means acting upon said gripping devices tending to maintain an end of said gripping devices in engagement with the respective ends of said casing, said casing being oblong in cross section and having ends opposed sides of which are inclined to opposite directions to thereby provide a casing having an intermediate portion of oblong cross section and tapered oblong end portions which terminate in substantially circular open ended portions, the diameter of the open ended portions being less than the diameter of the adjacent end of said gripping devices to thereby maintain the ends of said gripping devices substantially within the ends of said casing.

16. A line splice consisting of a member providing a casing imperforate excepting at the ends thereof, gripping devices arranged in the opposite ends of said casing providing means for gripping a wire introduced to the respective ends of said casing and means tending to maintain an end of said gripping elements in engagement with the open end of said casing, said gripping devices consisting of elements which are separable upon the introduction of a wire thereto, said casing being oblong in cross section and having ends opposed sides of which are inclined in opposite directions to thereby provide a casing having an intermediate portion of oblong cross section and tapered oblong end portions, said gripping elements and said inclined sides having portions which are complemental to each other, one end of said gripping elements being spaced from said inclined sides and being movable into engagement therewith upon the introduction of a wire to said gripping devices, the walls of said casing forming the connection between said inclined walls providing guides for said gripping devices upon said last mentioned movement thereof.

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