

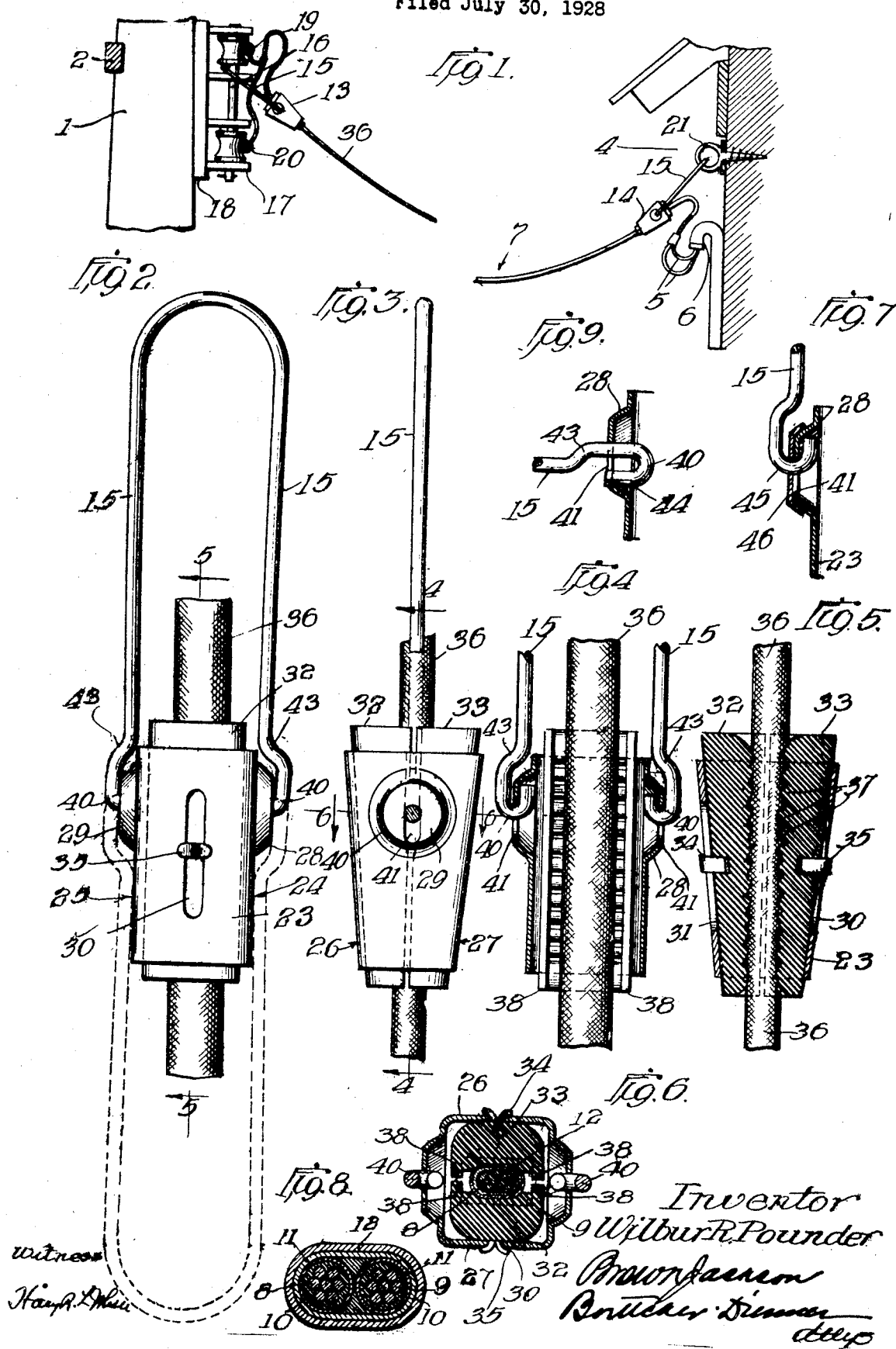
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W. R. POUNDER

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DROP SUSPENSION

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UNITED STATES PATENT OFFICE

WILBUR R. POUNDER, OF CHICAGO, ILLINOIS, ASSIGNOR TO HUBBARD & CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

DROP SUSPENSION

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My invention relates to the matter of insulating supports for conductors and more particularly a suspension support for conductors transmitting electrical power as from the low tension side of a transformer to a consumer's premises. Such connection is known as a drop, and the present invention is directed to the matter of providing an improved drop suspension.

While my invention is particularly useful in connection with the stringing of duplex conductors or multiplex conductors and the preferred embodiment of the invention herein illustrated and described in detail is shown as applied to that service, I do not intend to limit the invention to such use nor to the specific construction herein shown. It may obviously be employed for suspending a single wire or a plurality of individual wires.

In electric power distribution to the consumer, such as the occupant of a residence and the like, it is common practice to run a so-called drop from the transformer on the pole to the outlet on the building. This drop comprises generally a pair of wires (sometimes three) suspended in an overhead position between the pole and the building.

It has been customary heretofore, according to the best practice, to string individual insulated wires and support them upon so-called secondary insulator racks secured upon the pole or its crossarm and upon the wall or cornice of the building.

I have conceived the possibility of a cheaper and more sightly drop by the employment of a duplex or triplex parallel conductor cable and a suitable suspension insulator at one or both ends.

The manufacturers of wire and cable are able to supply duplex and triplex parallel conductor cable of excellent insulating qualities and of long life. However, drops employing such cable have not come into use generally because heretofore attempts to use such multi-conductor cable have encountered the difficulty of equalizing the strain upon the conductors. Where multi-conductor cable is employed it is found, according to prior practice, that the strain of the suspension comes either upon a single conductor or comes upon the

insulating sheath connecting the conductors where one wire is connected to take the strain at one end and the other wire is connected to take the strain at the other end.

According to the present invention I provide means for applying the strain substantially equally to both conductors at each end, or to all three conductors at each end in the case of triplex cable.

According to the preferred form of the suspension device, a pair of jaws of insulation or faced with insulation having a self-energizing grip are applied to the cable at either or both ends, and by means of a bail or the like the tension on the cable is transmitted centrally to the support in such a manner that an equalized clamping effect is secured upon all the conductors of the cable and a straight pull is exerted upon the suspension device directly in the line of the axis of the cable. Preferably I use a wire bail for equalizing the pull upon the gripping member and preferably the bail is hooked about a closed loop, ring or the like from which it cannot escape, and the ends are interlocked with the gripping device so that the support cannot loosen or release its grip under the conditions which are encountered in use.

The result is a suspension which has ample strength both mechanically and electrically, is permanent, sightly and inexpensive. In making up the device I have arranged to have all of the parts assembled in a permanent assembly so that there are no loose parts to drop out and become lost when the lineman is on the pole or on a ladder.

Now in order to acquaint those skilled in the art with the manner of constructing and operating a device embodying my invention, I shall describe in connection with the accompanying drawings a specific embodiment of the same. In the drawings

Fig. 1 is a side view with parts broken away, showing the application of my invention to the usual form of drop for supplying electric current to the consumer.

Fig. 2 is a side view of the suspension device as applied to a duplex cable.

Fig. 3 is an edge view of the same.

Fig. 4 is a longitudinal section taken on the line 4—4 of Fig. 3.

Fig. 5 is a section at right angles taken on the line 5—5 of Fig. 2.

Fig. 6 is a transverse section taken on the line 6—6 of Fig. 3.

Fig. 7 is a fragmentary sectional view showing a modification of the attachment of the bail to the sleeve.

Fig. 8 is a cross sectional view showing the construction of the duplex cable; and

Fig. 9 is a fragmentary sectional view showing a modification of the bail.

The power wires from the secondary side of the transformer are carried on the pole 1 on suitable insulators (not shown) on the crossarms such as 2 shown in Fig. 1, or they may be run directly from the transformer to the secondary insulator racks and it is desired to run aerial conductors to the consumer's premises for the purpose of supplying electric current, the consumer's building being indicated at 4, the consumer's outlet conductors being indicated at 5. The conductors 5 preferably pass up through a weatherproof conduit outlet 6 and into the building. The aerial span 7 in this case is formed of a suitable length of duplex cable of the type shown in cross section in Fig. 8. While the construction of the duplex cable forms no part of the present invention, I shall explain the same for the sake of clarifying the illustration and the mode of use of the present device. The cable comprises stranded conductors 8 and 9 covered with a rubber insulation 10—10' for each individual stranded conductor. Outside of the rubber insulation, there is a woven fabric individual sheath or sleeve 11—11', and then a common woven sleeve 12 embracing both insulated conductors with a layer of impregnated paper and compound under the same.

The fabric or woven parts of the insulation are thoroughly impregnated with an insulating compound which, at the same time, is weatherproof. The conductors and their insulation extend in parallel relation throughout the entire length of the cable which is therefore flat sided as will be seen in Figures 6 and 8. At each end of the aerial span 7, I provide a self-energizing gripping insulator indicated at 13 and 14 suspended by a wire bail 15 in each case on a suitable support. The bail of the device 13 at the left of Fig. 1 is hooked about the rod or bolt 16 of the secondary rack 17. This secondary rack comprises a base 18 mounted directly upon the body of the pole 1. The power conductors are shown at 19 and 20 mounted on suitable spool insulators through which the bolt or rod 16 extends. The bolt or rod 16 extends loosely through suitable bracket arms extending from the base 18 in a well-known manner. The outer end of the duplex cable outside of the suspension member 13

is split so that the conductors 8 and 9 may be connected to the low tension supply conductors 19 and 20.

At the right of Fig. 1, the wire bail 15 is looped through a closed eye or ring 21 of a suitable screw eye or the like which is placed on the side of the building well up under the overhanging eaves or other suitable location. The cable is bent down out of the way of the bail 15, and conductors 8 and 9 at the right hand end of the span 7 are separated and connected to the conductors 5—5 which extend into the building.

The bails 15—15 are suitably connected to the main parts of the gripping devices 13 and 14 in such a manner that they will not become disengaged therefrom, as will be explained later, and hence the suspension is permanent after once being installed although the same may be readily taken down if desired.

Referring now to Figs. 2 to 6 inclusive, the construction of the individual suspension insulator such as 13 will now be described. The bail 15 is preferably formed of heavy wire. This bail supports a unitary metallic sleeve 23 preferably formed of a heavy gauge sheet metal suitably galvanized. The sleeve 23 has substantially parallel sides 24 and 25 and tapered sides 26 and 27. The straight sides 24 and 25 have hollow bosses 28 and 29 formed therein, these bosses having a flat top and conical sides to form shoulders. Longitudinal slots 30 and 31 are formed in the tapered sides 26 and 27. A pair of jaws 32 and 33 having substantially parallel edges and tapered backs fit inside of the tapered sleeve 23, and are suitably held in place by split rivets 34, 34 which are embedded in the insulating jaws 32 and 33 and extend out through the slots 31, 30 and are clinched or bent over, as indicated at 35 in Fig. 2, so as to prevent disengagement of the jaw members 32 and 33 from the sleeve member 23 when the jaws are not in gripping engagement with the cable 36.

The jaws 32 and 33 have gripping faces provided with teeth shaped somewhat like a ratchet although the same are rounded so as to prevent any cutting of the insulation of the cable.

The toothed faces 37 terminate in rounded approaches at each end so that no sharp corners appear at either end of the gripping faces to injure the insulation of the cable. Flanges 38—38 extend forwardly on each side of the gripping faces a suitable distance so that when the cable is gripped by the jaws as shown in Figs. 5 and 6, the flanges 38—38 are substantially closed together both to limit the jaws against excessively biting into the insulation and to provide a lateral guard of insulation to keep the cable from accidental contact with the metallic sleeve 23. The jaws 32 and 33 extend beyond the ends

of the sleeve 23 at each end when the cable is properly gripped so that there is no opportunity for the insulation of the cable to come in contact with a metal part. The cable is, therefore, entirely gripped and surrounded by insulation of a high grade so that even if accidental injury to the cable sheath should occur it will not cause a fault. The jaws 32, 33 are preferably formed of molded synthetic resin or material of equal insulating and mechanical properties. It is to be understood that the same may be reinforced by metal or that the jaws may be formed of metal parts either with or without an insulating facing, all within the scope of my invention. I prefer, however, that the wedges be made as above explained so as to grip the sheath of the cable entirely by insulation.

The toothed faces 37 of the jaws 32, 33 are substantially parallel, and the flanges 38 are substantially parallel, so that as nearly as is mechanically feasible the two conductors of which the duplex cable 36 is composed will be gripped equally.

Even if triplex cable were employed, the same equalized grip upon the conductors would be secured by the aforesaid device.

It will be observed by reference to Fig. 6 that the backs of the jaws 33, 32 are apparently curved transversely, whereas the walls 26, 27 of the sleeve 23 are substantially plain or flat. This permits of a certain degree of rocking of the jaws 33, 32 sidewise so as to accommodate themselves to the cable 36 to insure equalization of pressure upon the two parts or three parts of the cable.

If desired, the backs of the jaws 32, 33 may be made flat to fit flat against the inside of the walls 27 and 26, thereby depending upon the predetermined configuration and exactness of the parts to give a parallel or practically parallel gripping action to the jaws 32 and 33.

The bail 15 is preferably made of iron or steel wire coated with a non-corrosive coating, and it has its ends formed to provide hooks 40 adapted to enter slots 41 in the bosses 28 and 29, the slots 41 being eccentrically formed as shown in Fig. 3. Intermediate shoulders 43 are formed in the bail 15 adjacent the hooked ends 40, and these shoulders 43 are adapted to bear against the conical sides of the bosses 28, 29 to prevent disengagement of the hoops when the bail is in the normal position shown in Figs. 1, 2 and 3. The bail can therefore be disengaged from the sleeve 23 only by swinging the bail down into the position shown in dotted lines in Fig. 2, that is, substantially 180 degrees from the normal position, whereupon the hooked ends may be released out of the slot 41 by lateral movement.

If desired the hooked end 44 of one of the sides of the bail 15 may be made of such a length that it will not pass out of the slot

laterally, as shown in Fig. 9, so that only one side of the bail will become disengaged when the bail is turned to the dotted line position shown in Fig. 2. It will then be necessary to move the bail to substantially the right angle position as indicated in Fig. 9 in order to release the said hooked end from the boss 28. This is done to prevent complete separation of the bail and the sleeve so that the lineman may not accidentally drop the bail apart from the sleeve or vice versa. With the hooked end 44 thus made longer than the slot 41 the said end of the bail is first inserted laterally through the slot 41 and then turned to take a position substantially at right angles to that shown in Fig. 9, and thereupon the hook on the opposite end of the bail may be inserted through the corresponding slot 41 and then the bail may be turned from the dotted line position as shown in Fig. 2 to the full line position as shown in Fig. 2, whereupon the bail is secured to the sleeve 23.

Fig. 7 shows a slight modification in which the bail 15 has a hooked end 45 extending through a shouldered washer 46, which shouldered washer embraces the boss 28 and covers the slot 41. The shouldered washer 46 which is cupped over the boss 28 serves the same function of preventing disengagement of the hook with the boss that is performed by the shoulders 43 upon the bail 15.

The cupped washer is first put over the hooked end 45 and then the bail is turned to the position shown in dotted lines in Fig. 2 to slip the end of the hook through the slot 41, then the bail is turned to the position shown in full lines in Fig. 2, whereupon the bail and boss are interlocked.

The operation of the suspension device is as follows: The screw eye 21 or equivalent closed loop is attached to the building or other support at one end of the drop. The bail which preferably has previously been removed is hooked through the eye 21 and the body of the gripping device 14 is turned to a point where the hooked ends of the bail may be inserted through the slot 41 fastening one device 14 in place. The adjacent end of the cable is then inserted between the jaws 32 and 33 and these jaws are wedged tightly in the sleeve 23. The joint with the house wires 5 may also now be made. The bail of device 13 is released and is then hooked about the bracket pin 16 or like closed loop-like support. The bail is turned with respect to the body of the supporting device to enter the hooked ends in the slot 41, and is then turned to normal position. The adjacent end of the cable is then passed through the jaws of device 13 and thereafter the conductors of the cable joined to the supply wires 19, 20. Obviously the order of making connections may be reversed, or the devices 13 or 14 first mounted on the cable and then the bails ap-

plied. After the connection is once made it is neat and permanent. Obviously if the drop is to be removed the conductors of the cable may be loosened from the service wires 19 and 20, the cable released from the grip of the supporting device 13 to provide sufficient slack for turning of the bail with respect to the body of the device, or to completely free the cable from the grip of the device.

Obviously, if desired, the supporting devices may be first put in place and then the ends of the cable inserted through the jaws and drawn taut, the pole on the cable in each case drawing the wedged jaws 32, 33 into the tapered sleeve to secure a firm grip which is self-energizing up to the desired limit of pressure where the flanges 38—38 limit the development of any further pressure.

Obviously, the details may be varied without departing from the spirit of the invention, and numerous ways to embody the invention will be apparent to those skilled in the art. I consider the feature of providing an equalizing grip upon both conductors to be broadly new.

I claim:

1. As an article of manufacture, a drop wire anchoring and insulating device comprising in combination a pair of insulating blocks having longitudinal rectangular grooves containing transversely corrugated bottoms, and having flat outside surfaces adjacent the bottoms of said grooves and inclined with respect thereto, a unitary metallic band shorter than said blocks and having flat faced sides engaging the inclined surfaces of said blocks to hold the bottoms of said grooves parallel to each other, means including pins projecting through slots in the flat sides of said band and into said blocks for retaining them in said band, and a bail attached to said band by pivotal connections extending into bosses disposed on the faces interposed between the inclined flat faces of the band.

2. As an article of manufacture, a drop wire anchoring and insulating device comprising in combination a pair of insulating blocks each having a flat transversely corrugated gripping surface disposed adjacent to the surface of the other block, a flange on each end of the transverse corrugations of each block extending beyond it and terminating in a plane parallel to the plane of the gripping surface, flat outside surfaces on said blocks adjacent said gripping surfaces and inclined with respect thereto, a wedging ring having a pair of flat surfaces engaging the inclined outside surfaces of said block and tapered at the same angle as those surfaces, said ring being slidable longitudinally of the blocks to move them toward each other and said inclined and tapered surfaces cooperating to always keep the plane of one gripping surface parallel to the plane of the other, and

a bail pivoted in bosses disposed on the walls of said ring that connect its tapered walls together.

3. As an article of manufacture, a drop wire anchoring and insulating device comprising in combination a pair of insulating blocks each having a flat transversely corrugated gripping surface disposed adjacent to the surface of the other block, a flange on each end of the transverse corrugations of each block extending beyond it and terminating in a plane parallel to the plane of the gripping surface, flat outside surfaces on said blocks adjacent said gripping surfaces and inclined with respect thereto, a wedging ring having a pair of flat surfaces engaging the inclined outside surfaces of said block and tapered at the same angle as those surfaces, said ring being slidable longitudinally of the blocks to move them toward each other and said inclined and tapered surfaces cooperating to always keep the plane of one gripping surface parallel to the plane of the other, means projecting through said inclined and tapered surfaces for retaining said blocks loosely in said ring, and a bail pivoted in bosses disposed on the walls of said ring that connect its tapered walls together.

In witness whereof, I hereunto subscribe my name this 18th day of July, 1928.

WILBUR R. POUNDER.