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MECHANISM FOR WINDING INSULATED ELECTRIC CABLES.

APPLICATION FILED NOV. 10, 1914.

1,159,947. Patented Nov. 9, 1915.

Fig. 1

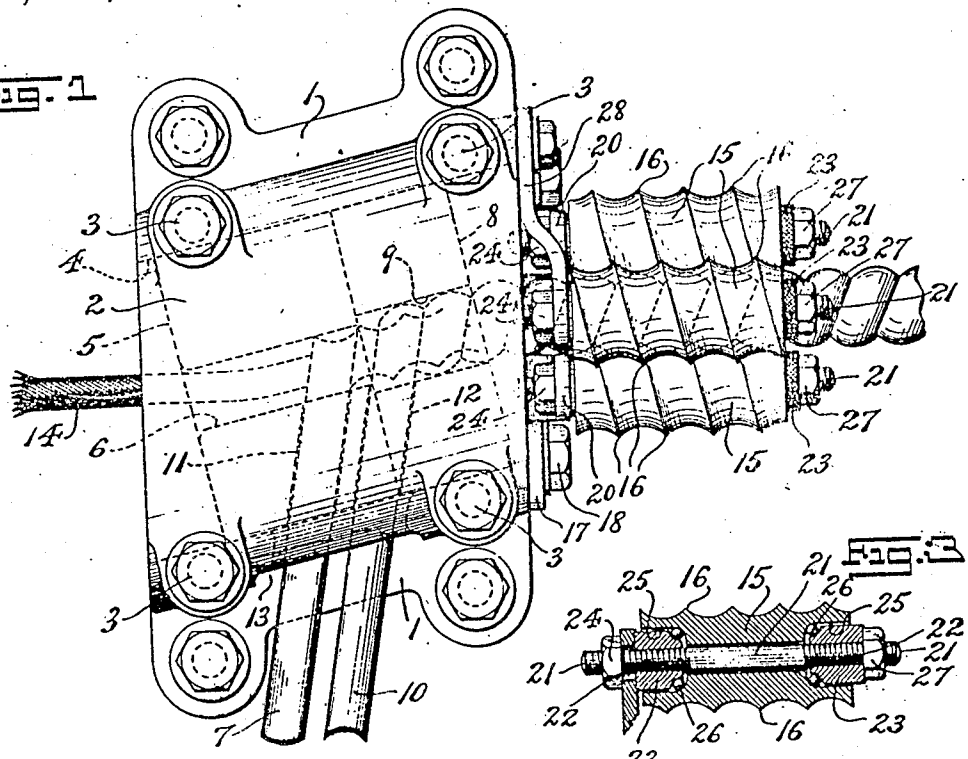


Fig. 3

Fig. 2

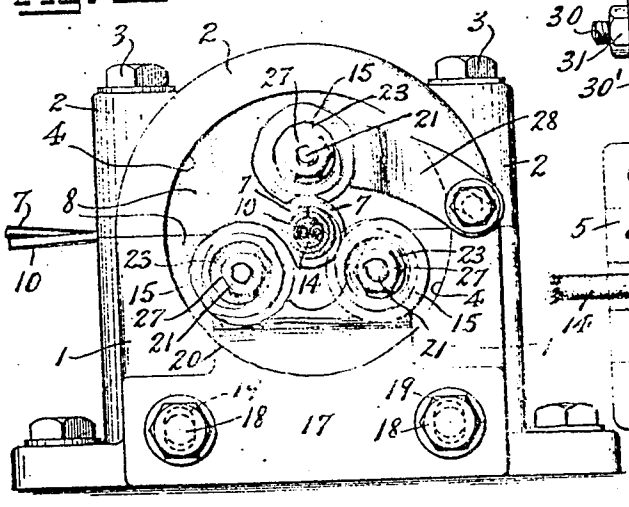


Fig. 4

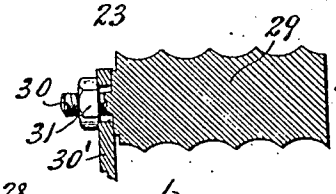
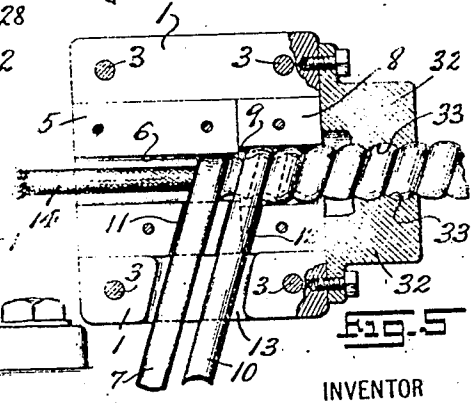


Fig. 5



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MECHANISM FOR WINDING INSULATED ELECTRIC CABLES.

1,159,947. Specification of Letters Patent. Patented Nov. 9, 1915.

Application filed November 10, 1914. Serial No. 871,221.

To all whom it may concern:

Be it known that I, GUSTAVE A. JOHNSON, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Mechanism for Winding Insulated Electric Cables; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

The present invention relates, generally, to improvements in mechanism for manufacturing armored insulated electric cable; and, the invention relates, more particularly, to a novel construction of winding die for winding armor material about insulated electric cable.

The invention has for its principal object to provide a novel construction of winding die, for the purpose above mentioned, which operates easily and quickly to wind or curl the armor material about the electric cable without danger of choking or binding the armor material within the die, and thus creating great liability of fracturing or otherwise injuring the armor material. And a further object of the present invention is to provide in combination with such novel die means at the exit end of said die for receiving and retaining the wound armored cable issuing and traveling from the die against undue longitudinal outward pulling or inward thrusting whereby danger of disturbing the proper disposition of the convolutions of the armor would result, said means serving also to crimp or press down the edges of the outer armor strip in close and proper engagement with the body of the inner armor strip.

Other objects of this invention not at this time more particularly enumerated will be understood from the following detailed description of the present invention.

With the various objects of the present invention in view, the same consists, primarily, in the novel die mechanism hereinafter set forth; and, the invention consists, furthermore, in the details of the construction of the parts of said die mechanism and the various combinations and arrangements thereof, all of which will be more fully described in the following specification, and then finally embodied in the clauses of the claim which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a plan view of the novel die mechanism made according to and embodying the principles of my present invention. Fig. 2 is an end view of the same. Fig. 3 is a detail vertical longitudinal section of one of the elements of which the guiding and crimping means is composed; and Fig. 4 is a similar view of a modified construction of said element. Fig. 5 is a detail horizontal section of a modified form of construction of the novel die mechanism, still embodying, however, the general principles of my present invention.

Similar characters of reference are employed in all of the above described views to represent corresponding parts.

Referring now to the said drawings, the reference character 1 indicates the base block of a die holder, and the character 2 indicates the cap-piece of said die holder which is secured in proper relation to said base-block by means of bolts 3, or any other suitable fastening means. Said base block and cap-piece together provide a longitudinal opening 4 in which the curling or winding dies are arranged and clamped by securing together said base-block and its cap-piece. The said winding or curling dies comprise a set of first dies 5 consisting of two halves registered together so as to provide a longitudinally extending smooth bore cylindrical die opening 6 of a diameter corresponding to the desired diameter of the convolutions of the inner or concave armor strip 7, and a set of second dies 8 consisting of two halves registered together so as to provide a longitudinally extending smooth bore cylindrical die opening 9 of a diameter corresponding to the desired diameter of the convolutions of the outer or convex armor strip 10. The first dies 5 and second dies 8 are arranged end to end, and laterally extending obliquely transverse openings 11 and 12 communicating with said respective die

openings are provided for the entrance of said respective armor strips 7 and 10 into said dies. Said base-block and its cap-piece are also provided with an opening 13 in one side registered with the openings 11 and 12 of said dies for the insertion of said armor strips.

In operation the electric cable 14, which is to be armored, is inserted in the outer end of said die opening 6 so as to pass through said die opening 6 and the die opening 9. An armor strip 7, which has been previously formed to shape the same concave in cross section, is then inserted through the entrance opening 11, the oblique direction of its entrance with reference to the longitudinal axis of the die opening 6 determining the pitch of the convolutions to be formed. Said armor strip 7 is fed forward under continuous propelling, feeding or moving pressure which results, when the strip strikes or contacts with the surface of the die-opening 6, in causing the same to curl or wind around the cable 14. In like manner an armor strip 10, which has been previously formed to shape the same convex in cross section, is then inserted through the entrance opening 12, the oblique direction of its entrance with reference to the longitudinal axis of the die opening 9 determining the pitch of the convolutions to be formed. Said armor strip 10 is fed forward under continuous propelling, feeding or moving pressure which results, when said strip strikes or contacts with the surface of the die opening 9, in causing the same to curl or wind around, the partially armored cable 14. The spacing of said feed openings 11 and 12 relatively to each other is such that the convolutions of the convex armor strip 10 straddle the convolutions of the concave armor strip 7, as is clearly shown in the drawings.

Heretofore it has been the practice to conform the surface of the respective die openings 6 and 9 to the contour or shape of, namely concave and convex, of the convolutions of the said inner and outer armor strips, but it has been found by me that such an arrangement of dies is not satisfactory, since the armor material in curling or winding contacts with more die surface than is necessary, thereby greatly increasing the friction of the moving material within the dies, and consequently greatly increasing the liability of choking within the dies which results in fractures and breaks in the finished armor rendering the finished lengths of the same worthless, since the stock length of armored cable is fixed by the trade dealing therein, and shorter pieces or lengths are practically worthless. I have found that by using my smooth bore cylindrical die openings, and feeding the armor strips obliquely therein, I can produce armored cable with greater speed, less friction, and I thereby also greatly diminish the danger of injury to the cable during the process of formation.

I have also found that when the finished armored cable emerges from the forming dies and passes to the reeling mechanism, it is subject, when wound up by the reeling mechanism, to intermittent pulls, pushes or longitudinal jerks or strains in both directions, and that such action frequently results in distorting the convolutions forming within the dies, and also tends to increase the liability of the armor material to choke up within the dies. To obviate these undesirable effects I provide at the exit end of said dies a means for holding the armored cable against such longitudinal strains as it passes to the reeling mechanism, and the means I provide for this purpose is also constructed to aid in crimping or forcing down the longitudinal edges of the convolutions of the outer or convex armor strip in close contact with the outer surface of the convolutions of the inner or concave armor strip, thus providing a higher grade and better finish in the completed armored cable. The means I employ for the above purposes comprises a series of rotary gripping rolls or members 15 the surface of which is convoluted as at 16, to provide concave convolutions adapted to embrace the convex convolutions of the outer armor strip. Preferably I employ three such gripping rolls or members 15 mounted to engage with said armored cable as it emerges from the dies at different points around its circumference, although I may use more or less than three of the same if such practice is in any case desirable.

The reference character 17 indicates a bracket member secured by the bolts 18 to the base-block 1 of the die holder, and at the exit end of the same. Said bracket-member is provided with slots 19 through which said bolts 18 pass so that the same may be adjusted to move the gripping rolls or members 15 which it carries into proper contact with the armored cable emerging from the dies. Preferably the upper portion of said bracket-member is provided with an outwardly off set upper portion 20 to which are secured the spindles 21 upon which said gripping-members or rolls are mounted. Said spindles 21 are screw threaded, as at 22, at each end and cone bearings 23 are adjusted at each end. The inner ends of the spindles are passed through perforations in said upper portion of said bracket-member until the cone-bearing at that end abuts against the said upper portion, a nut 24 then being arranged and screwed upon the inner end of the spindle to rigidly secure the same in supported extension from the upper portion of said bracket-member. Each gripping roll or member is

provided at each end with cone-receiving sockets 25, and ball-bearings 26 are interposed between said gripping rolls or members and the respective bearing-cones. The outer-bearing cone is locked in adjusted position by the lock-nut 27. As thus mounted the gripping rolls or members turn freely, with little friction, while in close contact with the armored cable.

The reference character 28 indicates a swinging bracket, one end of which is bolted to the cap-piece 2, or other suitable part of the die-holder. A spindle 21 is secured to the free end of said swinging bracket 28 and a gripping roll or member with the ball-bearings as above described is mounted thereon. Said swinging bracket may be adjusted to bring the gripping roll or member carried thereby into proper engagement with the armored cable.

Of course, the respective bracket members above described constitute only one method of mounting said gripping rolls or members, and it will be understood that other means of mounting the same may be employed, the material feature of my invention being the arrangement of the gripping rolls or members in position to properly contact with the armored cable as it emerges from the dies.

Of course it will be apparent that the surface of the gripping rolls or members conforming as it does with the conformation of the exterior surface of the armored cable, the latter is held thereby against undue longitudinal strains or jerks while still within the forming dies, while still permitting the free movement of the armored cable to the reeling mechanism, and at the same time this conforming surface of the gripping rolls tends to crimp down in proper arrangement and relation the outer armor strip upon the inner armor strip.

It may be desirable to construct and mount the gripping members so that the same are non-rotating, as shown in Fig. 4, in which there is a gripping-member 29, having at one end a screw-threaded stud 30 which passes through the bracket-member 30′, and is rigidly secured in place by the nut 31.

Referring now to Fig. 5 of the drawings I show a slightly modified form of gripping means which may be substituted for the gripping members above described, this means comprising a stationary nut member 32, secured to the die-holder at the exit end, and provided with an opening 33 threaded to conform to and receive the convolutions of the armored cable, as the same passes therethrough to the reeling mechanism.

I claim:—

1. In a device of the kind described the combination with a die holder of a first winding die provided with a smooth bore die opening, a second winding die provided with a smooth bore die opening, said second winding die being arranged end to end with said first winding die, and said dies being further provided with transverse oblique openings through which the material to be wound gains access to the die openings.

2. In a device of the kind described the combination with a die holder of a first winding die provided with a smooth bore die opening, a second winding die provided with a smooth bore die opening, said second winding die being arranged end to end with said first winding die, said dies being further provided with transverse oblique openings through which the material to be wound gains access to the die openings, said first winding die being adapted to wind an inner armor strip, said second winding die being adapted to wind an outer armor strip, and said transverse oblique entrance openings being positioned relatively to each other to feed the armor strips so that the convolutions of the outer armor strip will straddle the convolutions of the inner armor strip.

3. In a device of the kind described the combination with a die holder of a first winding die provided with a smooth bore die opening, a second winding die provided with a smooth bore die opening, said second winding die being arranged end to end with said first winding die, said dies being further provided with transverse oblique openings through which the material to be wound gains access to the die openings, and means located at the exit end of said dies for engaging the armored cable issuing therefrom and holding the same against undue longitudinal strains or jerks.

4. In a device of the kind described the combination with a die holder of a first winding die provided with a smooth bore die opening, a second winding die provided with a smooth bore die opening, said second winding die being arranged end to end with said first winding die, said dies being further provided with transverse oblique openings through which the material to be wound gains access to the die openings, said first winding die being adapted to wind an inner armor strip, said second winding die being adapted to wind an outer armor strip, and said transverse oblique entrance openings being positioned relatively to each other to feed the armor strips so that the convolutions of the outer armor strip will straddle the convolutions of the inner armor strip, and means located at the exit end of said dies for engaging the armored cable issuing therefrom and holding the same against undue longitudinal strains or jerks.

5. In a device of the kind described the combination with a die holder of a first winding die provided with a smooth bore die opening, a second winding die provided with a smooth bore die opening, said second

winding die being arranged end to end with said first winding die, said dies being further provided with transverse oblique openings through which the material to be wound gains access to the die openings, said first winding die being adapted to wind an inner armor strip, said second winding die being adapted to wind an outer armor strip, said transverse oblique entrance openings being positioned relatively to each other to feed the armor strips so that the convolutions of the outer armor strip will straddle the convolutions of the inner armor strip, a plurality of gripping rolls located at the exit end of said dies, adjustable bracket-members, spindles secured to said bracket-members upon which said gripping rolls are rotatably mounted, and convolutions formed on said rolls to conform the contour of the same to the contour of the wound material issuing from said dies.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 6th day of November, 1914.

GUSTAVE A. JOHNSON.

Witnesses:

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FRED'K H. W. FRAENTZEL.