No. 651,610. Patented June 12, 1900.

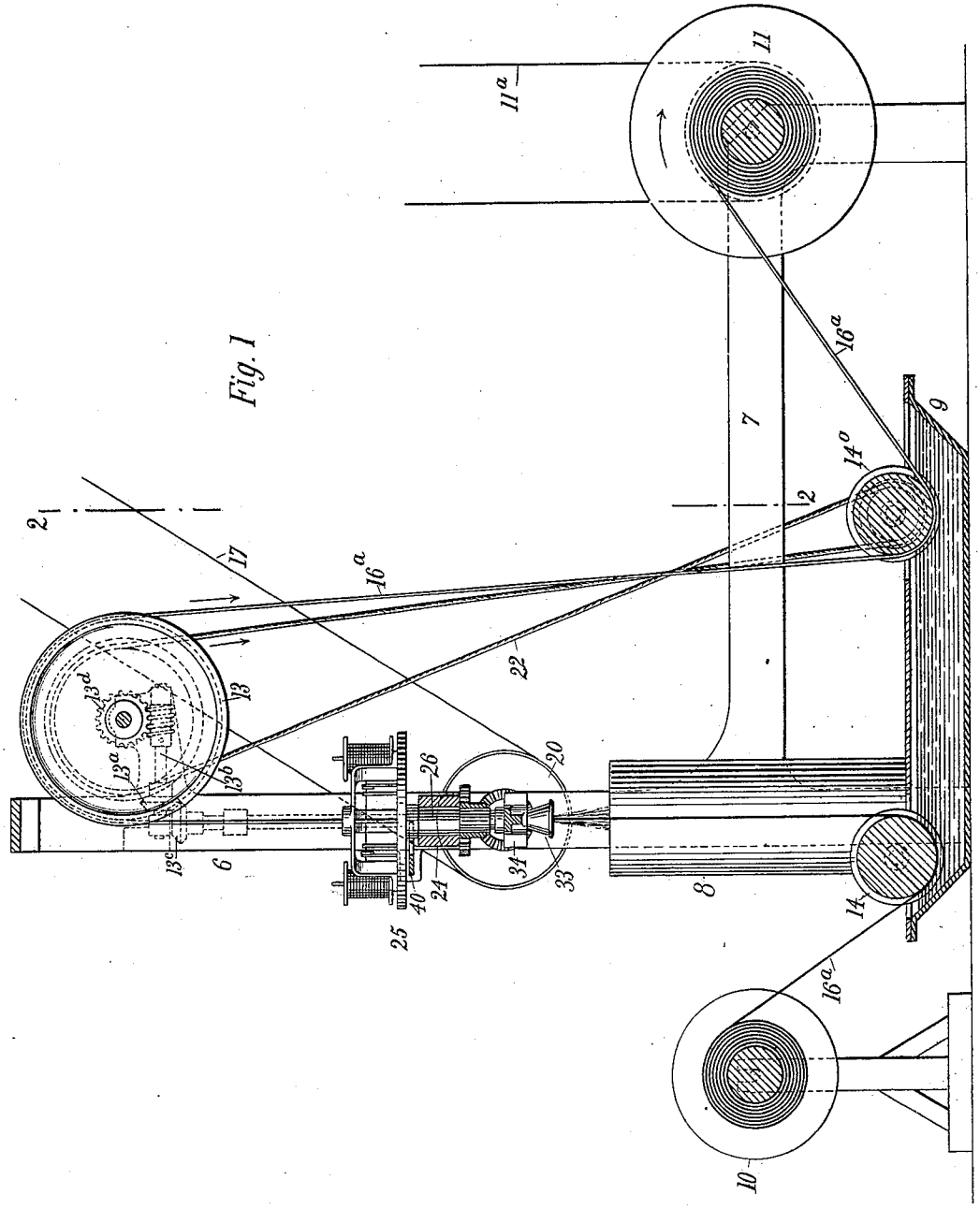
F. S. RANDALL.

MACHINE FOR COVERING WIRES OR CABLES WITH LOOSE FIBERS SUITABLE FOR INSULATION.

(Application filed Jan. 10, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1



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Fig. 4

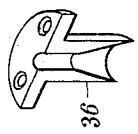


Fig. 5

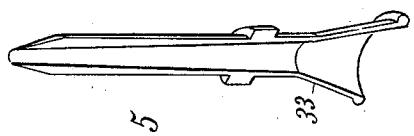


Fig. 3

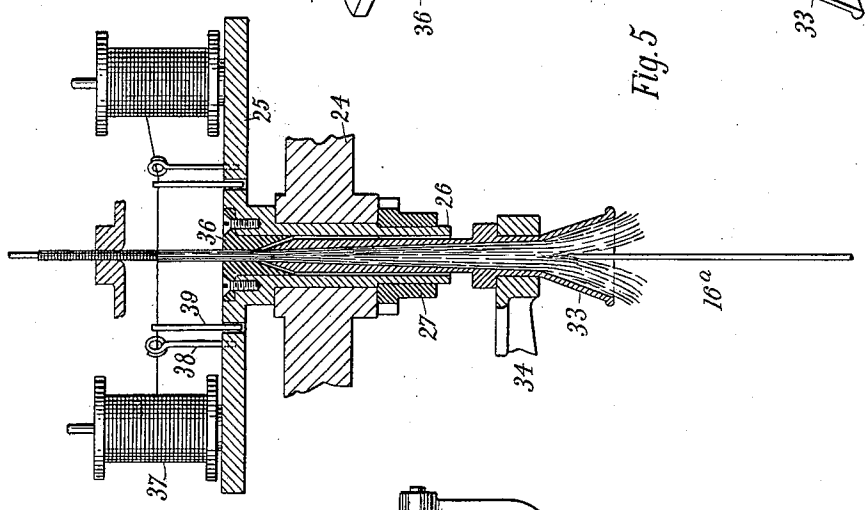
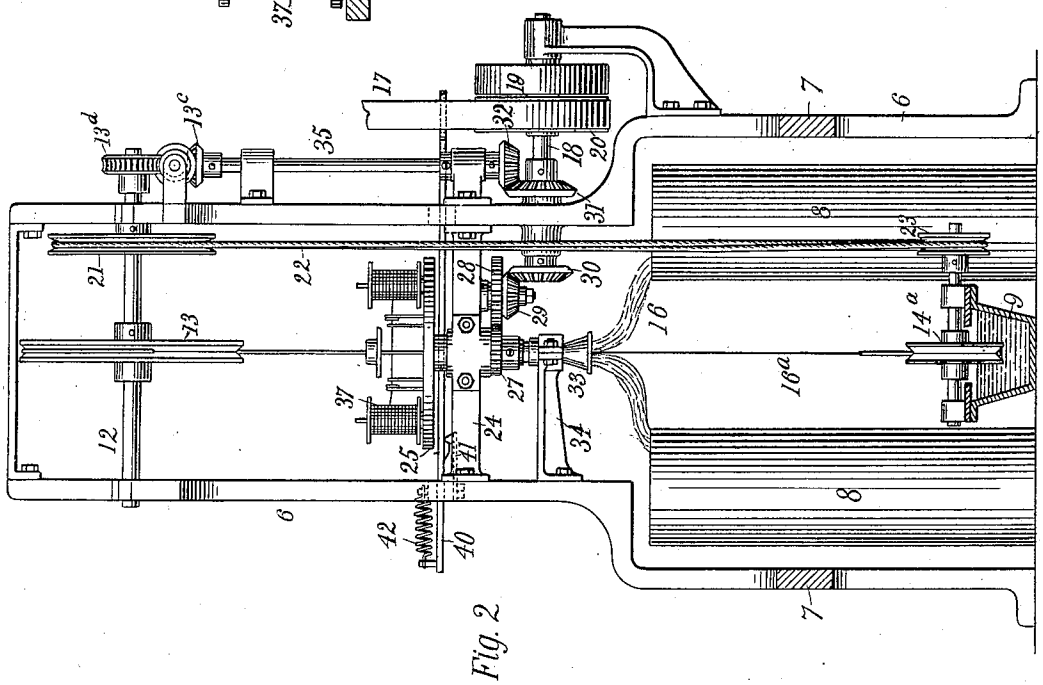


Fig. 2



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UNITED STATES PATENT OFFICE.

FRANKLIN S. RANDALL, OF WILKES-BARRÉ, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM G. HARDING, OF SAME PLACE.

MACHINE FOR COVERING WIRES OR CABLES WITH LOOSE FIBERS SUITABLE FOR INSULATION.

SPECIFICATION forming part of Letters Patent No. 651,610, dated June 12, 1900.

Application filed January 10, 1900. Serial No. 1,257. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN S. RANDALL, a citizen of the United States, and a resident of Wilkes-Barré, county of Luzerne, State of Pennsylvania, have invented certain new and useful Improvements in Machines for Covering Wires or Cables with Loose Fibers Suitable for Insulation, of which the following is a specification.

This invention relates to means for insulating wires and cables to be used for electrical purposes, and particularly to means for covering such wires and cables with loose fibers suitable for insulation.

The object of the invention is to apply to the wire, parallel with its length, strips or ribbons of untwisted cotton, jute, flax, or similar fiber (usually called "sliver") in such manner that the covering will be in alinement with the axis of the wire, or when viewed in cross-section at any point in its length the wire will occupy a central position with relation to the covering.

Attempts have heretofore been made to place loose fibers on a wire by winding such fibers spirally around the wire; but such method was abandoned for the reason that the sliver is not sufficiently strong to withstand twisting without breaking. It has also been attempted to comb the loose fiber around the wire; but the combing could not be effected evenly, at times taking more off at one place than at another, with the result that the covering would not be of uniform thickness throughout the length of the wire or cable. Efforts have also been made to roll or crush the fiber or sliver around the wire by means of rollers; but a covering of uniform thickness and evenness could not be obtained in this way, because the sliver would not withstand the tension and when being wound the rollers would crush the covering close to the wire. It has furthermore been attempted to draw the loose fiber longitudinally with the wire through stationary tubes or rings; but when such tubes or rings were made sufficiently small to fold the sliver around the wire they would act often to strip the sliver off the wire, and when made large enough to permit the sliver to draw through without stripping the necessary folding of the sliver around the wire, whereby the latter would be left centrally within the covering—which is essential to render the wire at all serviceable—could not be obtained.

By the present invention the sliver can be so applied to the wire or cable that the covering will be of a uniform thickness throughout the length of the wire, and consequently the wire will be centrally within the covering.

In carrying out the invention means are provided for subjecting the bare wire to a bath of suitable insulating compound before the sliver is brought in contact with the wire; also, means for lashing the sliver to the wire to hold the covering in place when being treated to a bath of suitable insulating compound, and also means for uniformly drawing the wire through the sliver-applying mechanism and for conducting it to the bath of insulating compound and for winding it upon a receiving-reel, the entire operation being a continuous one.

The invention will now be described in connection with the accompanying drawings, which form a part of this specification, and wherein—

Figure 1 is a side elevation, partly in section, of an apparatus embodying my invention. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is an enlarged detail of the parts of the mechanism adapted to evenly apply the sliver to the wire and to lash it to the wire. Fig. 4 is a detail of one-half of the two-part short tapering tube, hereinafter referred to; and Fig. 5 is a detail of one-half of the two-part stationary tube, also hereinafter referred to.

Referring to the drawings, 6 6 indicate two uprights which furnish a support for certain of the mechanism of the apparatus, and 7 7 horizontal members connected to said uprights near their bottom and supporting the reel for the covered wire. The cans which hold the sliver to be applied to the wire are shown at 8, and the tank to contain the insulating compound at 9. The reel from which the bare wire is drawn is indicated at 10, and the reel upon which the finished or covered wire is wound at 11.

Above the sliver-applying mechanism, presently described, there is mounted on the shaft

12, supported in a bracket on upright 6, the sheave-wheel 13, which serves to guide the covered wire to the tank of insulating compound. Suitably supported over tank 9, so as to revolve in the insulating compound contained therein, are the sheave-wheels 14 14^a. As the bare wire is unwound from the reel 10 it passes under sheave-wheel 14, and hence through the insulating compound in tank 9, and passes thence to the mechanism which applies the sliver, which is shown at 16, emerging from the cans 8 and entering, together with the wire, the sliver-supplying mechanism. The course of the covered wire after leaving the sliver-supplying mechanism is over the guide-wheel 13, thence to the sheave-wheel 14^a, where the covered and lashed wire is saturated with the insulating compound, and thence to the take-up or receiving reel 11, which may be driven from an overhead hanger by belt 11^a. The speed of the guide-wheel 13, and hence the lift of the wire, is regulated by the bevel-gear 13^a, carried by the counter-shaft 13^b and meshing with the bevel-gear 13^c, carried at the top of the upright shaft 35. The bevel-gear 13^a may be changed for another suitable gear when it is desired to increase or decrease the speed of the guide-wheel 13, and the bevel-gear 13^c is so mounted on the upright shaft 35 that it may be raised or lowered thereon and fixed in position to mesh with the gear 13^a. At the opposite end of the counter-shaft 13^b is a worm which meshes with the gear 13^d on the end of the shaft 12 to communicate the movement of the upright shaft 35 to the shaft of the guide-wheel 13.

The machine is driven by belt 17, the numeral 18 indicating the shaft, suitably supported by a bracket on the standards 6, which carries a fixed pulley 20 and a loose pulley 19.

On the shaft 12, which carries the guide-sheave 13, is mounted the pulley 21, by which the belt 22 is driven, the said belt passing around the pulley 23 on an extension of the shaft carrying the sheave 14^a. By this means the desired motion is communicated to the sheave 14^a, around which the covered wire is drawn through the saturating compound in tank 9.

The arrangement of mechanism above described is an example only of what may be employed, and hence the arrangement may be modified as may seem desirable without departing from the spirit of the invention.

The principal feature of the invention and that which imparts to it special value—to wit, the mechanism for evenly folding the sliver around the wire, so as to leave the latter perfectly in the center of the covering—will now be described.

Supported in the cross-beam 24 is a plate 25, upon which are mounted spools of yarn or thread for the purpose of lashing the sliver to the wire. The plate 25 has formed integral with it a central hollow spindle 26, fitting into a suitable socket in the beam and extending below it and provided with a gear 27, which meshes with a gear 28, the spindle of which is supported in the beam 24 and is provided at its lower end with a bevel-gear 29, which meshes with bevel-gear 30, carried at the end of the driving-shaft 18, which shaft is also provided with the gear 31, which meshes with the gear 32 on the end of the vertical shaft 35. The belt 17 when shifted onto the fixed pulley 20 drives the shaft 18, and thus imparts movement through the gearing mentioned to the spindle 26 and its connected plate 25 and at the same time to the vertical shaft 35, which is provided at its top with the bevel-gear 13^c before mentioned.

Inside the hollow spindle 26 is arranged a tube 33, which is held stationary by being fixed in bracket 34, secured to the frame of the machine. This tube 33 is flared at its lower end to better adapt it to receive the strips of sliver that enter with the wire, and at its upper end it is reduced in diameter or preferably tapered on the outside at its top. Interiorly it is tapered gradually from bottom to top, and its external diameter is such compared with the bore of the spindle 26 that the latter revolves around it without creating friction. The stationary tube 33 is made in two parts or divided longitudinally in order that it may be removed without cutting the wire, if there should be occasion for removing it. The function of the stationary tube 33 is to partly fold the sliver around the wire as the latter is drawn through the machine.

Immediately over the stationary tube 33 within the revolving plate 25 there is secured a short tube 36, which is also made in two parts for the reason given for dividing the stationary tube into two parts, and it is secured in position in the revolving plate 25 by screws or otherwise. The short tube 36 extends down just over the upper end of the stationary tube 33, and it is tapered on the inside at the bottom, where it extends over the stationary tube, the taper being as great as it is practicable to make it. Above the taper, where the wire and surrounding sliver emerge from the tube 36, its bore is straight and of just the diameter that the wire should be with the covering of sliver thereon. The straight part of the bore of the revolving short tube 36 is preferably about one-half of an inch in length only, so that as the wire covered with sliver is drawn up through the stationary tube 33 (which has folded the sliver around the wire) the revolving tube has but a short hard bearing on the wire as the latter is drawn therethrough. This bearing is sufficient, however, to properly support and relieve the wire from undue strain, while at the same time permitting it to be drawn up through the machine. In the passage of the wire throught the short bore of the revolving tube 36 the process is completed of evenly folding the sliver in place around the wire with the latter perfectly in the center of the sliver.

As the covered wire emerges from the short revolving tube 36 the sliver is lashed in place on the wire by the thread or yarn carried by the reels or spools 37, mounted on the revolving head or plate 25. Guides for the thread are indicated at 38, and 39 indicates an automatic drop which coacts with the rod 40 (held in the position shown in Fig. 2 by the spring 41, provided with a beveled stud at its end which coacts with a similar stud on the under surface of the rod 40) to release said rod when the thread or yarn breaks and shift the belt to the loose pulley 19, and thus stop the machine. The spring 42 forces the rod 40 to the right when it is released, as explained. Any other automatic stop mechanism may be employed in place of that shown.

In the drawings the wire or cable is designated by 16^a and is drawn from the reel 10 and is wound in its finished condition upon the reel 11.

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

1. In a machine for covering wires or cables with strips of loose fiber (called "sliver") without winding or twisting the fiber, the combination with a stationary tube in which the sliver is preliminarily folded around the wire, of a short tube having a bore partly conical and straight the rest of its length, a head or plate carrying said short tube and means for revolving the head or plate.

2. In a machine of the character described, the combination of a revolving head or plate provided with an integral hollow spindle, and a stationary tube entering said spindle from the bottom, of a short tube fixed in said revolving hollow spindle over the stationary tube and having the lower part of its bore conical and extending over the upper end of the stationary tube, and the upper part of its bore straight and of a diameter to correspond to the covered wire or cable and adapted to evenly fold the sliver around the wire.

3. The combination with the revolving plate or head provided with a hollow spindle integral therewith, a stationary tube entering said spindle from the bottom and serving to preliminarily fold the sliver around the wire, and thread-carrying spools mounted on said revolving head, of a short tube fixed in said revolving head and extending into the hollow spindle and over the upper end of said stationary tube and having a short straight bore for a part of its length of a diameter equal to that of the covered wire.

4. The combination with the revolving head or plate and its hollow spindle, of a stationary tube divided into two parts lengthwise, and a short tube fixed in the revolving head or plate over the stationary tube and likewise divided into two parts longitudinally.

5. In a machine for covering electric wires or cables with strips of fiber, a tube adapted to be held in a revolving head for completing the folding of the fiber around the wire, and provided with a conical bore at its lower end and a short straight bore above the conical bore.

6. In a machine for covering electric wires or cables with strips of fiber, a tube adapted to be held in a revolving head for completing the folding of the fiber around the wire, and provided with a conical bore at its lower end and a short straight bore above the conical bore and divided longitudinally into two parts.

Signed at New York, N. Y., this 6th day of January, 1900.

FRANKLIN S. RANDALL.

Witnesses:
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C. HOLLOWAY.