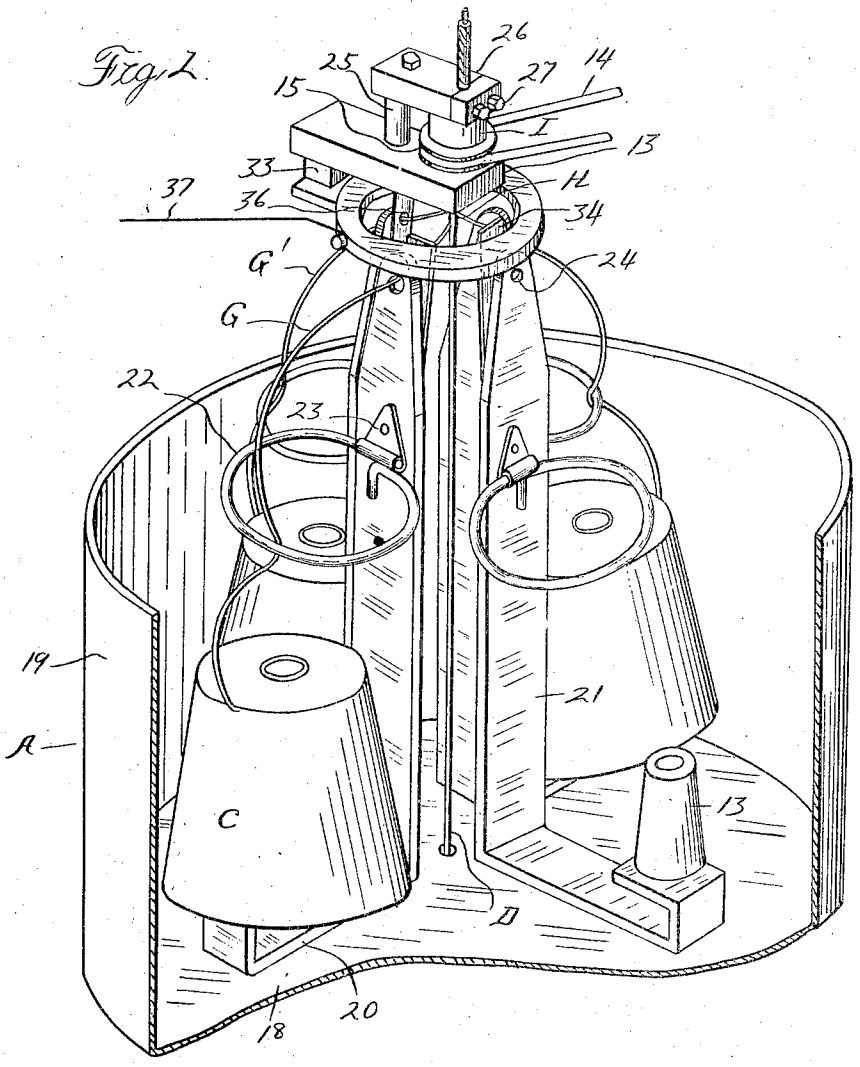
Oct. 18, 1927. 1,645,884

L. H. THOMAS ET AL

MACHINE FOR MAKING ASBESTOS COVERED WIRE

Filed Sept. 28, 1925 3 Sheets-Sheet 1

Fig. 1.



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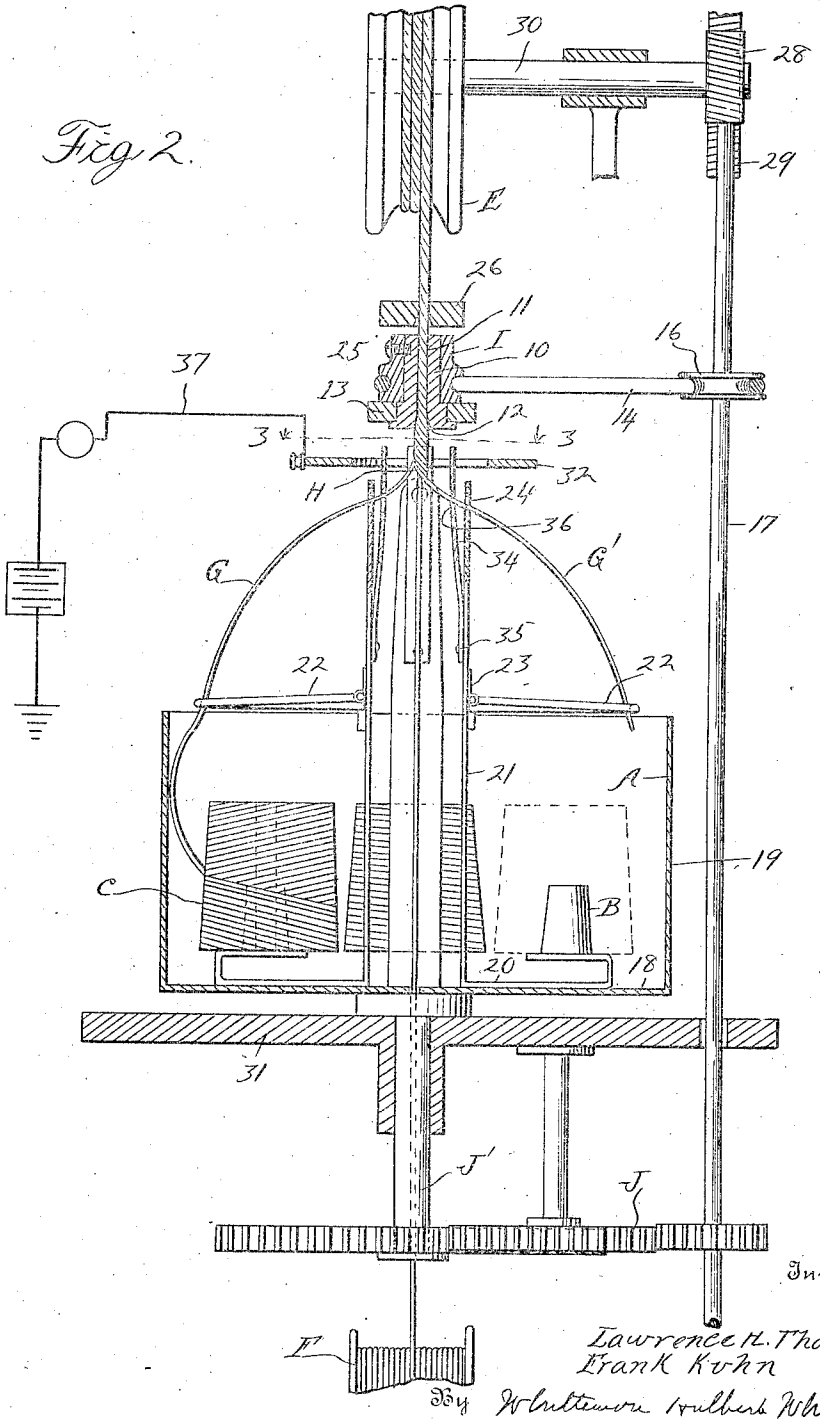
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MACHINE FOR MAKING ASBESTOS COVERED WIRE

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Fig 2.



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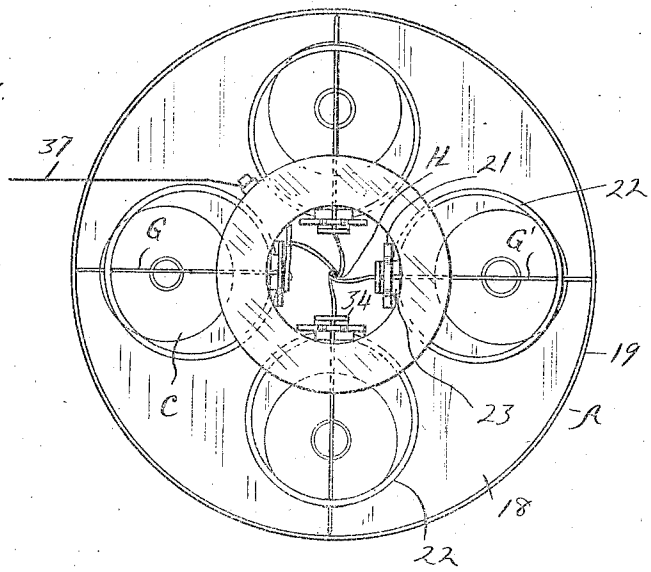
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MACHINE FOR MAKING ASBESTOS COVERED WIRE

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Fig. 3.



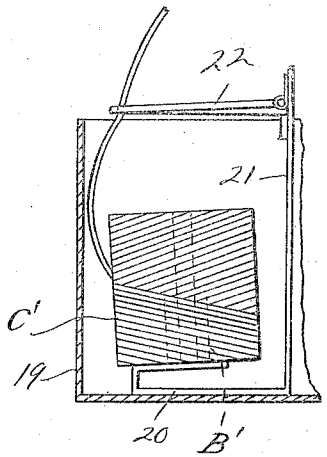


Fig. 4.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING ASBESTOS-COVERED WIRE.

Application filed September 28, 1925. Serial No. 59,118.

The invention relates to machines for winding coverings on strands or wires and is particularly adapted for winding asbestos on electrical conductors. Machines for this purpose as heretofore constructed have required the use of a special type of asbestos yarn having a central strand of cotton or other suitable material in order to provide sufficient tensile strength to prevent breakage of the cords during winding. Our improved machine is designed to operate with asbestos roving which consists of a cord composed of untwisted asbestos fibers having no central strand of foreign material. The roving may be obtained wound upon spools, but it has so little tensile strength that it would be impossible to use it in the ordinary machines for covering wire.

The primary object of our invention is to produce a machine adapted to operate with asbestos roving or other material having similar physical characteristics. Another object is to provide a machine in which a minimum amount of pull is necessary to unwind the cord from the spools. A further object is to secure a tightly wound covering capable of withstanding the ordinary usage to which the covered wire is put.

These and other objects are accomplished by providing the novel construction as hereinafter described. In the drawings:

Figure 1 is a perspective view of the machine;

Figure 2 is a longitudinal section through the axis thereof;

Figure 3 is a sectional plan view on the line 3—3 of Figure 2;

Figure 4 illustrates a modified arrangement of spool on the rotatable carrier.

In general, the machine comprises a rotatable carrier A on which are mounted a plurality of holders B for the spools or roving C. The wire or strand D on which the roving is to be wound is drawn axially through the carrier A by rotation of a sheave E, while being unwrapped from a drum F preferably arranged below the carrier. The cords G, G′, etc., extend from the spools of roving through suitable guides and are secured to the wire D at the winding point H and the cords are wound about the wire D by rotating the carrier in timed relation to the advancement of the wire to be covered.

Since the roving has practically no tensile strength and can be ruptured by a very slight resistance to its movement it is impossible to place any tension upon the cords and consequently the material is wound very loosely upon the central wire. It is, therefore, necessary to provide additional means for tightening the winding after it is initially placed upon the central strand and this is accomplished by providing a fiber tightener I which surrounds the covered wire at a point adjacent the point of winding and is rotatably driven by suitable means at a faster rate of speed than the carrier A. As specifically shown this fiber tightener consists of a bushing 10 having a central bore 11 of a diameter smaller than the loosely wound covering and provided with the rounding entrance portion 12 of slightly larger diameter. The bushing is journaled on a fixed portion 13 of the frame and is provided with suitable driving means such as the belt 14 engaging in the groove 15 and extending to a driving pulley 16 on the main vertical shaft 17. The rotation of the fiber tightener causes the inner surface of the bushing to frictionally engage the loosely wound roving and to tighten the same upon the central wire. From the fact that the fiber tightener rotates at a greater speed than the carrier, it is possible to prevent any tension being placed upon the cords prior to their being initially wound upon the central wire.

Referring now more particularly to the specific embodiment of the invention as illustrated in the drawings the carrier A preferably consists of a table 18 and an annular shield 19 extending upwardly therefrom forming a container open at the upper end. The holders B are spaced circumferentially of the carrier and each are preferably mounted upon the return bent portion 19 of a reinforcing strip 20 secured to the plate 18 and having an upwardly extending portion 21 rising above the shield 19 to a point slightly below the winding point H. 22 is a ring-shaped guide, one end of which is secured to a bracket 23, the latter being attached to the strip 21 at a point above the spools C. A second guide is formed by an aperture 24 in the upper end of the strip 21 and the arrangement is such that the cord

from the spool passes through the ring 22 then through the aperture 24 and finally is attached to the central wire. As shown in Figures 1 and 2 the spool of roving C is of conical form, the smaller end being upward and with this arrangement the cord while being unwound from the spool tends to clear the upper portion of the spool and consequently avoids any friction while being withdrawn therefrom. Furthermore, when the carrier is rotating the centrifugal force acting upon the cords G, G′ etc., tends to throw the same outward causing them to assume the shape illustrated in the drawings. In this way the cords avoid undue frictional contact with the guide apertures 24 and little tension is placed on the roving. As the cord is unwound around the spool it is permitted to rest against the ring-shaped guide 22 at various points on its surface, particularly when it is being unwound from the portion of the spool furthest from the carrier axis it is forced outward by centrifugal force into contact with the shield 19. Thus, by reason of the conical form of the spools and the centrifugal action the cord avoids undue frictional engagement and it is found that the roving has sufficient strength to be wound without breakage.

It is not essential that conical spools be employed and in the modification illustrated in Figure 4, an arrangement of cylindrical spools is shown. With this construction, however, it is preferable to have the axis of the spools inclined outward slightly with respect to the axis of the carrier so that when the cord is unwound from the portion of the surface adjacent the carrier axis it will avoid contact with the upper portion of the spool. When the cord is being unwound from the portion of the spool furthest from the carrier axis, the centrifugal force is sufficient to cause a "ballooning" of the cord and thus avoid contact with the spool at this point also. In the modification, therefore, the holders B′ are inclined and support the cylindrical spools C′.

Spaced above the frame portion 13 and secured thereto by the member 25 is a die 26 preferably formed of complementary portions secured together by the bolts 27. The covered wire after passing through the fiber tightener is subsequently passed through this die, thus smoothing out any irregularities in the surface covering.

Any suitable driving mechanism for the machine may be employed, but as shown a vertical shaft 17 is the power shaft and is connected to the carrier A by a gear train J and a spindle J′. The sheave E is also driven from the vertical shaft 17 by means of the worm 28, worm gear 29 and horizontal shaft 30. Thus, as shown, the carrier, fiber tightener and sheave are all driven in timed relation. Preferably, the fiber tightener I is rotated at twice the speed of the carrier A.

It will be understood that any suitable frame work for the machine may be employed, this frame work including the subbase 31 on which the carrier is journaled and the portion 13 above referred to.

It is preferable to provide means for notifying the operator if for any reason any of the cords are broken and for this purpose, we have provided a ring 32 surrounding the vertical strips 21 substantially at the winding point of the machine. This ring is fixed to the frame member 13 by a suitable connection 33. 34 represents a finger guide pivotally mounted at 35 on the vertical strip 21 and adapted to move transversely of the cord. The mounting is such that the finger normally tends to fall by gravity and contact with the ring 32, but when the cord is unbroken the finger is held out of contact with the ring 32 by the cord which extends through the guide aperture 36 in the finger, the latter being in substantial alignment with the aperture 24. By reason of the fact that the movement of the finger is transverse to the cord, the slight force necessary to maintain the apertures in alignment is not sufficient to add any appreciable tension on the roving. The ring 32 is preferably insulated from the frame and connected by a conductor 37 in an electrical circuit which also includes the finger 34. Thus, the circuit is normally opened, but if for any reason the cord is broken the contact of the finger with the ring will complete the circuit. It will be understood that the circuit may be used either to operate an indicating device or to automatically stop the machine in the manner well known in the art.

What we claim as our invention is:—

1. In a machine of the class described, the combination with a strand or wire, and means for advancing the same, of a rotatable carrier surrounding said wire having a plurality of holders thereon, spools of winding material mounted on said holders having the free ends of their strands connected to said wire, means for rotating said carrier at sufficient speed to free said strands by centrifugal action from contact with the portions of the spool surface, furthest from said strand or wire and means for limiting the outward swing of the strands and for guiding the same toward the said wire.

2. In a machine of the class described, the combination with a strand or wire, and means for advancing the same, of a rotatable carrier surrounding said wire having a plurality of holders thereon, spools of winding material mounted on said holders having the free ends of their strands connected to said wire, and means for rotating said carrier at sufficient speed to free said strands by centrifugal action from contact with the

portions of the spool surface, furthest from said strand or wire, said spools being arranged to have the portions of their surfaces adjacent said wire inclined away therefrom in the direction towards the point of winding.

3. In a machine of the class described, the combination of a revoluble carrier, a plurality of spools having the winding material wound thereon, means for drawing a wire axially of said carrier, means for loosely winding the winding material about the wire, a fiber tightener surrounding said wire adjacent the point of winding, and means for revolving said fiber tightener faster than said carrier whereby the said winding material may be tightened about the wire without increasing the tension on the winding material.

4. In a machine of the class described, the combination of a rotatable carrier having an axial aperture therein for receiving the wire to be covered, a plurality of spools of covering materials on said carrier arranged circumferentially of said wire, guides mounted on said carrier adapted to support the strands of covering material adjacent the point of winding and a revolving bushing surrounding said covered wire and closely fitting the same adjacent said point of winding, the said bushing being adapted to tightly wind the covering material on the wire without placing tension on the said material prior to its initial winding about the wire.

5. In a machine of the class described, the combination with a strand or wire, and means for advancing the same length-wise, of a rotatable carrier surrounding said wire having a plurality of holders thereon, spools of roving supported on said holders and having the roving secured to said wire, said spools being arranged to have the surface adjacent said wire inclined away therefrom in the direction towards the point of winding, and means for rotating said carrier at sufficient speed to free said roving from the surface of said spool.

6. In a machine of the class described, the combination with a rotatable carrier having a plurality of holders thereon, means for advancing a strand or wire axially of said carrier, spools of low tensile strength cord mounted on said holders and having the free ends connected to said wire, apertured fingers mounted on said carrier and extending adjacent the point of winding adapted to permit the passage of the strands therethrough and to support the strands of covering material at said point of winding, guides arranged between said spools and said fingers, means for rotating said carrier, a bushing surrounding the covered portion of said wire, and means for rotating said bushing faster than said carrier.

7. In a machine of the class described, the combination of means for advancing a strand or wire, and means for loosely winding continuous strands of low tensile strength material thereon, of rotatable means for tightening the wound material on said wire without placing tension on the strands prior to their loose winding on the wire.

8. In a machine of the class described, the combination of means for advancing a strand or wire, means for loosely winding cords of low tensile strength thereon, of a bushing immediately adjacent the point of winding having a cylindrical opening therein smaller than the outer diameter of the windings for tightening the loosely wound cords about the wire, and means for rotating said bushing in the direction of winding and at a faster rate than the said winding means.

9. In a machine of the class described, the combination with a rotatable carrier having a spool of roving thereon, and means for advancing the strand axially of said carrier, of a member on said carrier having a guide for the roving adjacent the point of winding, a second member pivotally supported to swing transversely of the direction of said roving at said guide, said second member having a guide for said roving held in substantial alignment with said first mentioned guide by said roving, said second member being urged out of alignment with said first mentioned guide, and a cooperating contact member adapted to receive said second mentioned member upon the breakage of said roving.

10. In a machine of the class described, the combination of a guide member and a strand of material extending through said guide member, of a second guide member pivotally mounted to move substantially transverse of said strand, means for urging said second mentioned member out of alignment with said first mentioned member, and a cooperating member adapted to contact with said second mentioned member upon breakage of said strand.

11. The method of covering a strand or wire which consists in loosely winding unreinforced asbestos roving around the wire while axially advancing the latter, and tightening the wound roving on the wire without placing tension on the said roving prior to its initial winding on the wire.

12. The method of covering a wire which consists in loosely winding unreinforced asbestos roving around the wire while axially advancing the latter, and tightening the loosely wound roving while maintaining a portion of the roving loosely wound in advance of the said point of tightening.

13. In a machine of the class described, the combination with a wire and means for

advancing the same, of means for winding a cord of low tensile strength about the wire, said means including a support for a spool of the said cord, means for freeing the cord from the surface of the spool by centrifugal force and a plurality of guides for directing the cord toward the said wire.

14. In a machine of the class described, the combination with a rotatable carrier having a plurality of holders thereon, of means for advancing a wire axially of said carrier, spools of low tensile strength cord mounted on said holders and having the free ends of the cord connected to said wire, a contact member surrounding the wire, and members pivoted on the said carrier adapted to contact with the said contact member but being normally spaced therefrom by the said cords.

15. In a device of the character described, a cup shaped rotatable carrier, means for advancing a wire axially therethrough, a plurality of L-shaped brackets annularly arranged within the carrier, the said L-shaped brackets having base portions forming spool supports and leg portions apertured to form thread guides, spools of asbestos roving on said spool supports, and means for feeding the roving from said spools through said apertures to the wire.

In testimony whereof we affix our signatures.

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