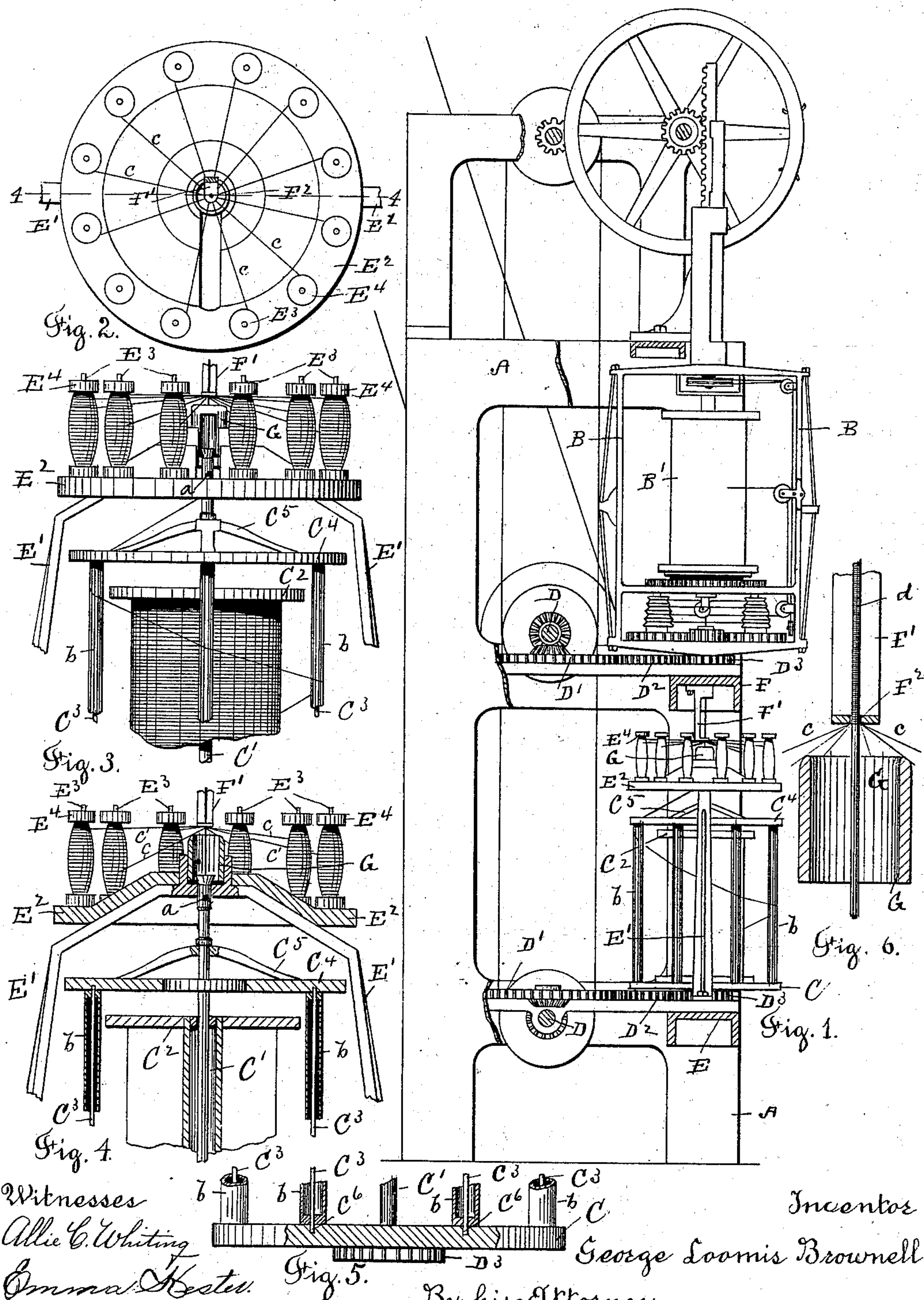


(No Model.)

G. L. BROWNELL.
MACHINE FOR COVERING WIRE OR CORD.

No. 560,681.

Patented May 26, 1896.



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GEORGE L. BROWNELL, OF WORCESTER, MASSACHUSETTS.

MACHINE FOR COVERING WIRE OR CORD.

SPECIFICATION forming part of Letters Patent No. 560,681, dated May 26, 1896.

Application filed August 5, 1892. Serial No. 442,208. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. BROWNELL, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Machines for Covering Wire or Cord, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the same, and in which—

Figure 1 represents a side view of the mechanism embodying my invention, a part of the supporting-framework having been removed in order to disclose the operating parts. Fig. 2 is a top view of the creel supporting the spools which carry the strands by which the wire or cord is to be covered. Fig. 3 is a side view of the creel shown in top view in Fig. 1, and also representing a portion of the spool containing the wire or cord to be covered. Fig. 4 represents the same parts in central vertical sectional view on line 4-4, Fig. 2, as are shown in elevation in Fig. 3. Fig. 5 represents the rotating table upon which the spool carrying the wire or cord to be covered is supported, a portion of the plate or table having been removed in order to show the engagement of the plate or table with a series of vertical pins arranged around the spool containing the wire or cord to be covered; and Fig. 6 represents in an enlarged view and in central vertical sectional view the annular collar and "die" through which the wire or cord to be covered passes and between which the covering-strands are conducted.

Similar letters refer to similar parts in the different figures.

My invention has for its object to provide a mechanism for covering wire or cord by a process of winding whereby the outer surface of the wire or cord shall be completely and uniformly covered, one object or design of my improvement being to provide a suitable mechanism by which wire to be used for electrical purposes can be thoroughly and smoothly covered with an insulating material with a minimum thickness of the covering material, and also by which the operation of covering the wire can be performed with greater rapidity.

In the accompanying drawings, A denotes the supporting-framework; B, a revolving

frame or "head," carrying concentrically therewith a winding-spool B'. Beneath the rotating frame or head B is a rotating table or spool-support C, having its axis coincident with the axis of the revolving head B, and both being revolved at the same speed by the driving-shafts D D through the gears D', D², and D³.

Mounted upon the table C is a central spindle C', upon which the spool C², containing the wire or cord to be covered, is placed. Arranged concentrically around the spindle C' are the pins C³, with their upper ends held in an annular ring C⁴, to which are attached the arms of a spider C⁵, by which the ring C⁴ is held concentrically with the center spindle C'. The lower ends C⁶ of the pins C³ enter sockets in the revolving table C, causing the ring C⁴ and pins C³ to rotate with the table. To the girth E, by which the rotating table C is supported, I attach the stand E', extending upwardly upon each side of the table C and ring C⁴, and to the top of the stand E', I attach the circular disk E², forming a creel provided with pins E³, upon which are placed spools E⁴, containing the strands which are to be wound upon the wire or cord to be covered. Suspended below the girth F is an arm F', forming the die, with its lower end bent at right angles with the wire or cord to be covered and provided with a circular hole F², having its axis coincident with the axes of the table C and head B. Supported upon the stand E' is an annular collar G, with its upper edge a short distance below the end of the die F'. The upper end of the spindle C' is hollow and is provided with a hole a, communicating with the interior of the spindle, in order to allow the wire or cord to be delivered from the end of the spindle in a line coincident with its axis of rotation, and upon the pins C³ are placed rolls b, in order to reduce the wear upon the pins. The wire or cord is taken from the spool C² over one or more of the rolls b and through the hollow end of the spindle C', passing through the annular collar G and die F' to the winding-roll B', carried in the revolving head B. The strands c, held upon the spools E⁴, are carried between the annular collar G and die F' and through the hole F² and attached to the wire or cord to be covered. Uniform rotary motion is then imparted to the head

B and table C, the winding-spool B' being at the same time rotated through connected actuating mechanism, in order to draw the wire or cord from the lower spool C² and wind it upon the upper spool B', the relative speed of the winding-spool B' and the rotating head B determining the "pitch" of the strands c as they are laid upon the wire or cord.

The distance between the upper edge of the annular collar G and the under side of the die F' determines the limits of the angle between the wire or cord to be covered and each of the strands c as the strands traverse the spools E⁴ in the process of unwinding. Sufficient tension is applied to the strands c to hold them taut, which is ordinarily secured by the friction between the revolving spools E⁴ and the surface of the disk E². The die F' prevents the strands c from being carried upward by the ascending wire or cord and causes the strands to be uniformly laid side by side spirally around the wire or cord, as shown at d, Fig. 6.

That part of the mechanism comprised in the revolving head B, including the actuating mechanism by which the winding-spool B' is rotated, forms no part of my present invention, it being well known and in common use in its essential features in twisting-machines for twisting twine or cord, and any of the well-known forms of twisting and winding mechanism can be employed for that portion of my improved machine.

It has been customary heretofore to rotate the spools containing the covering material around the wire or cord to be covered, and I am also aware that wire-covering machines have been employed having stationary spools containing the covering material arranged at the side of the wire to be covered, while the wire itself has been rotated, drawing the covering material from the spools. It is the object of my present invention to provide means whereby a large number of threads can be simultaneously wound upon the wire and laid uniformly side by side and in close contact with each other, so as to cover the wire uniformly with the covering material and prevent the overlapping of the covering-strands upon each other in order to preserve a uniform diameter of the covered wire. In order to accomplish this result, I arrange the covering-spools upon stationary spool-supports arranged concentrically around the wire to be covered and in a plane at right angles with the axis of the wire, and I conduct the strands from the spools to the wire between the die F' and an annular collar G. The die F' is arranged substantially in the same plane as the upper ends of the covering-spools, and at a short distance below the die I place the annular collar G, considerably larger in diameter than the wire to be covered and arranged concentrically with it, so that as the covering-strands are conducted from the lower portions of the spools they will be brought in contact with the upper edge of the annular col-

lar G, thereby limiting the angle between the covering-strands and the axis of the wire. A light and delicately-adjusted tension, usually produced by the friction between the spools and the fixed spool-support, is applied to the covering-strands c just sufficient to hold the strands taut and allow the strands to crowd each other into place as they are laid upon the surface of the wire, so they will lie side by side and be wound in a single thickness around the wire with the strands in close contact so as to completely cover the surface of the wire without any overriding or overlapping of the strands one upon the other as the wire is rapidly rotated and the strands c drawn off the spindles E⁴. This result could not be accomplished if the spools E⁴ were to be rotated around the wire to be covered, for the reason that the centrifugal force imparted to the spools by a rotary motion equaling that which I impart to the wire to be covered would render it impossible to adjust the tension of the covering-strands c with sufficient lightness and delicacy to permit the strands as they are wound upon the wire to crowd themselves into place and prevent the overriding or overlapping of the strands. The rotation of the wire and the arrangement of the spools upon fixed spool-supports at the side of the wire, as heretofore done, does not allow the simultaneous winding of all the strands around the wire as is secured by the concentric arrangement of the spools in the same horizontal plane at right angles to the axis of the wire and by the employment of the die F' and annular collar G, arranged with reference to the covering-spools, as I have already described.

In order to evenly lay the covering material upon the surface of the wire, so as to uniformly and completely cover the surface of the wire with but a single thickness of the covering material, it is necessary that each of the strands c as it is applied to the wire shall be able, if necessary, to crowd the next adjacent strand upon the surface of the wire, so that each individual strand may be wound directly upon the surface of the wire and not override the next adjacent strand. To accomplish this result, I place the die F' in the same plane as the upper end of the spools E⁴, so that when the covering-strands are taken from the upper ends of the spools they will be conducted to the wire at right angles with its axis, as the hole in the die F' is of the same diameter as the wire when wound, and when the wire is taken from the lower ends of the spools it will be carried over and in contact with the upper edge of the annular collar G, thereby limiting the angle between the strand and the axis of the wire, while at the same time the inner diameter of the annular collar is sufficiently great to allow the strand to be pushed down along the surface of the wire by the next adjacent strand as they are being wound, so as to prevent the overriding of the strands.

The mechanism forming the subject of my present invention is especially adapted for covering wire to be used for electrical purposes with an insulating material composed of strands of fibrous material, it being desirable in a machine for this purpose that the insulation be perfect by the complete covering of the entire surface of the wire, and that the diameter of the wire when covered be uniform throughout its length, and that the process of covering be accelerated by the simultaneous winding of a large number of strands.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for covering wire or cord, the combination with mechanism for imparting a longitudinal and a rotary motion to the wire or cord to be covered, of a series of fixed spool-supports arranged around the wire to be covered and in a plane at right angles to the axis of said wire or cord, and adapted to hold spools containing strands of covering material with the axes of said spools parallel with the axis of said wire or cord, a die having a hole the size of the wire or cord and with its lower surface in the same plane as the upper end of the spools held on said spool-supports, an annular collar with its inner diameter considerably larger than the wire or cord and having a clear space between said collar and the wire or cord to be covered,

and also a clear space between the plane of the upper surface of said collar and the lower surface of said die, whereby the pressure of the covering-strands against each other as they are laid upon the wire will crowd them into place so they will be wound in a single thickness upon the wire or cord.

2. In a machine for covering wire or cord, the combination with mechanism for imparting a longitudinal and a rotary motion to the wire or cord to be covered, of a rotating spool-support C having its axis coincident with the axis of said wire or cord, a stand E', a disk E² supported on said stand, pins E³ held in said disk, and adapted to hold spools containing strands of the covering material, a die F' having a hole the size of the wire or cord to be covered and having its lower surface on a plane with the upper end of the spools held on said spool-support, and a collar G, with its upper surface some distance below the lower surface of said die, said collar being arranged concentrically with said wire or cord to be covered and having a clear space between said collar and said wire or cord, substantially as described.

Dated this 28th day of July, 1892.

G. L. BROWNELL.

Witnesses:

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