(No Model.)

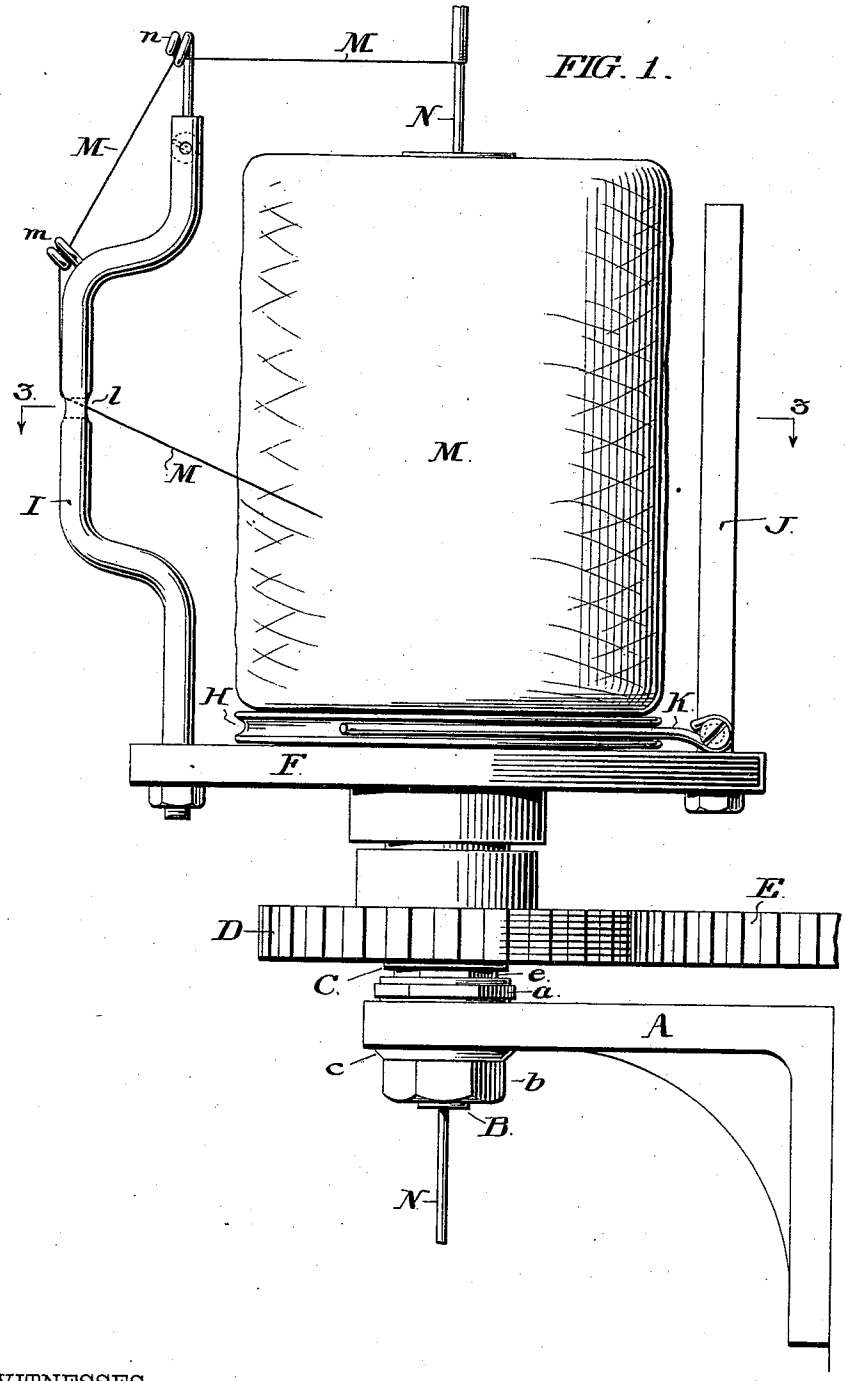
4 Sheets—Sheet 1.

E. F. CABEZOLA.

APPARATUS FOR INSULATING MAGNET WIRE.

No. 563,564. Patented July 7, 1896.

FIG. 1.



WITNESSES:

W. F. Lee
Aubrey Love

INVENTOR

Eusebio F. Cabezola.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

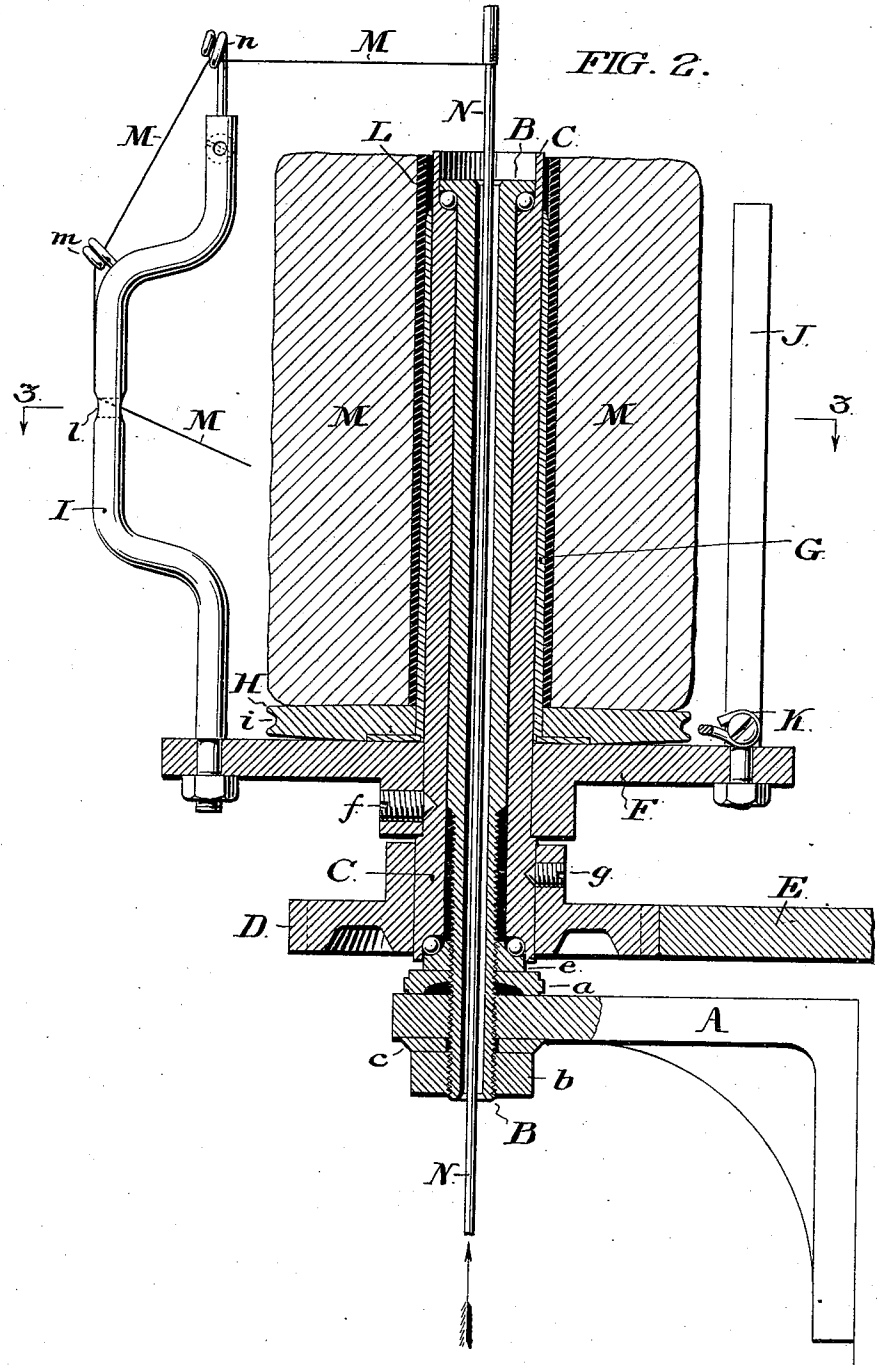
(No Model.) 4 Sheets—Sheet 2.

E. F. CABEZOLA.

APPARATUS FOR INSULATING MAGNET WIRE.

No. 563,564. Patented July 7, 1896.

FIG. 2.



WITNESSES:

B. F. Lee

Aubrey Love

INVENTOR

Eusebio F. Cabezola.

THE NORRIS PETERS CO. PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

4 Sheets—Sheet 3.

E. F. CABEZOLA.

APPARATUS FOR INSULATING MAGNET WIRE.

No. 563,564. Patented July 7, 1896.

FIG. 3.

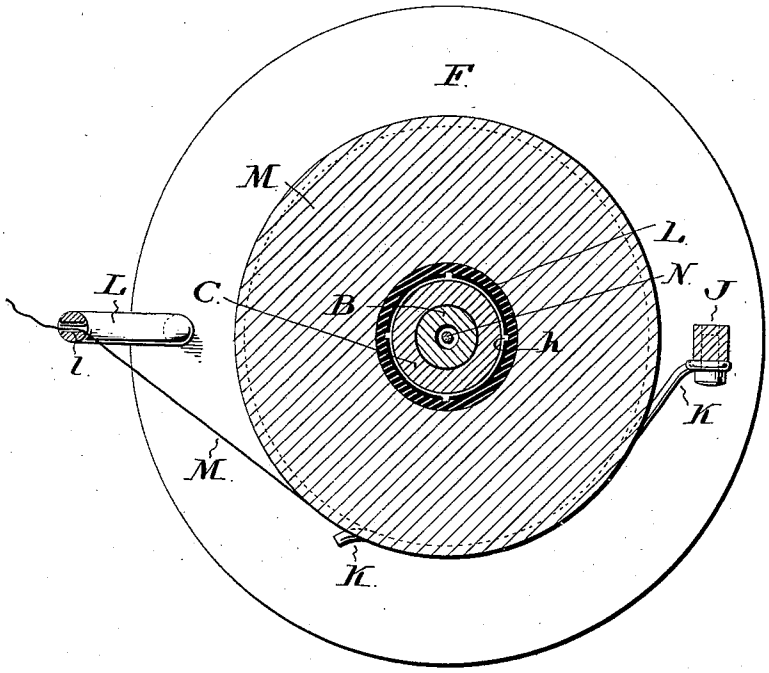
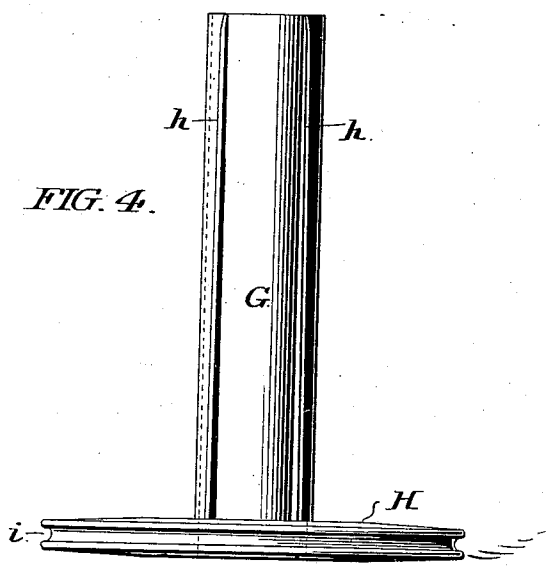


FIG. 4.



WITNESSES:

W. F. Lee

Aubrey Love

INVENTOR

Eusebio F. Cabezola.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

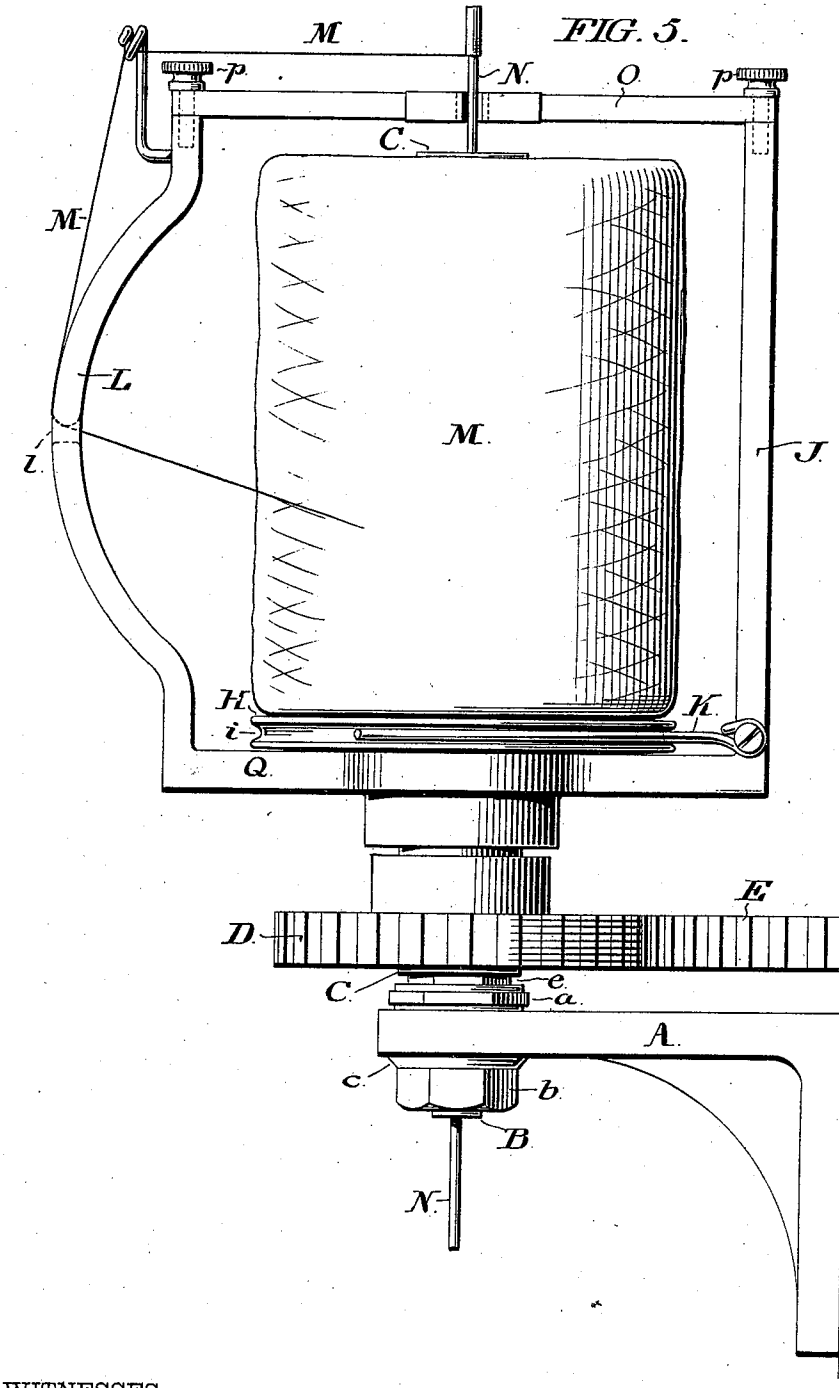
(No Model.) 4 Sheets—Sheet 4.

E. F. CABEZOLA.

APPARATUS FOR INSULATING MAGNET WIRE.

No. 563,564. Patented July 7, 1896.

FIG. 5.



WITNESSES:

B. F. Lee

Aubrey Love

INVENTOR

Eusebio F. Cabezola.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EUSEBIO F. CABEZOLA, OF TRENTON, NEW JERSEY.

APPARATUS FOR INSULATING MAGNET-WIRE.

SPECIFICATION forming part of Letters Patent No. 563,564, dated July 7, 1896.

Application filed June 30, 1894. Serial No. 516,142. (No model.)

To all whom it may concern:

Be it known that I, EUSEBIO F. CABEZOLA, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Insulating Magnet-Wire, of which the following is a specification.

My invention relates to that kind of insulating apparatus which is used in covering the wire with a wrapping of cotton or other thread, and operates to wind the thread closely around the wire; and the objects of my invention are to provide means for obviating the use of the spools, now universally used in such winding mechanisms, from which the thread is supplied, and winding the thread on the wire directly from the cops, and also to facilitate more rapid work in winding the thread on the wire than can now be accomplished with the existing apparatus.

As is well known to those conversant with the art of insulating magnet-wire, the wire to be insulated is drawn from a reel or coil fixed on or near the insulating-machine, and is moved at the requisite speed through that part of the machine where the thread is wrapped upon the wire, and is wound, as it is insulated, upon another reel in an entire coil. The thread used in the insulating work comes to the manufacturer of insulated wire in cops and has to be unwound from the cops and rewound on the spools, from which it is finally taken and wound upon the wire. It is commonly necessary to have a number of these spools filled with thread to secure enough of the thread to cover the desired length of wire, and as cutting the wire to place the spools in position is highly objectionable, the wire, before the insulating work begins, is run through the hollow barrels of a number of these spools which are held in reserve to succeed in turn the first spool placed in the flier or the revolving frame which surrounds the wire and serves to wind the thread upon it. When the thread on the spool in the flier is exhausted, the spool is removed by passing it off sidewise from the wire, a slot being formed on one side of the barrel and the heads of the spool to permit of this, and a full spool is slid along the wire into the flier, the thread ends are connected, and the work proceeds. These spools are expensive to make and being of wood are liable to warp and split, and their making and winding form a heavy item of expense in the manufacture of insulated wire. These difficulties are obviated in the use of my invention.

In the drawings forming a part of this specification, Figure 1 shows a side elevation of my winding device as the same appears when in use. Fig. 2 shows a vertical sectional view thereof. Fig. 3 is a horizontal sectional view of my device, taken on the line 3 3 of Fig. 1. Fig. 4 is a side view of the tension-flange and the metallic thimble mounted thereon, and Fig. 5 is a view of a modified form of flier-frame combined with my improvement.

In the drawings, A is the supporting-bracket. B is a hollow spindle, in this instance attached to the bracket A by screwing it through a threaded aperture in the bracket, as shown in Fig. 2.

C is a metallic tube or spindle surrounding the spindle B and adapted to revolve upon it.

D is a pinion mounted on and rigidly attached to the tube or spindle C.

E is a gear-wheel engaging with the pinion D, and serves to furnish motion to the winding mechanism.

F is a metal disk, which I call the "face-plate," and which is rigidly attached to the tube or spindle C.

G is a metal tube or thimble, which is rigidly attached to the tension-flange H.

H is the tension-flange.

I is the guide-frame attached to the face-plate near its periphery.

J is the counterbalance and tension-support attached to the face-plate diametrically opposite to the guide-frame I.

K is the tension.

L is the tube of the cop. M is the thread wound on said tube L, and N is the wire undergoing insulation.

In illustrating my improved device I have shown it as it appears when attached to an ordinary frame of an insulating-machine, though, as is well known, the wire itself may be fed horizontally through the machine and be insulated as it is fed in that position. The bracket A, then, is attached to one of the vertical members of the machine, and in

a circular threaded aperture near the outer end of the bracket A is screwed the spindle B, which is provided with a thread upon its lower end, as shown in Fig. 2. The spindle is fixed tightly at the desired point in the bracket A by means of two jam-nuts *a* and *b*, a washer *c* being preferably placed between the under side of the bracket A and the jam-nut *b*. There is also screwed upon the threaded portion of the spindle B a collar *e*, which has formed upon it a circular groove or channel surrounding its upper side, as shown in Fig. 2. The tube or spindle C has a corresponding annular groove or channel formed within its lower end, and between these channels in the collar *e* and the tube C are placed a number of steel balls to overcome friction between the parts.

The upper end of the spindle B has a projecting flange, between which and the wall of the spindle is formed a groove, while the upper end of the tube C is provided with a grooved or curved offset, and between said offset and the curve under the flange of the spindle B are placed a number of other steel balls, which likewise assist in overcoming friction between the spindle B and the tube C.

As has been above explained, the face-plate F and the pinion D and its hub are rigidly attached to the tube C by the set-screws *f* and *g*, respectively. The tube or thimble G, which is rigidly attached to the tension-flange H, is provided with corrugations or ridged projections *h*, and the tension-flange has a peripheral groove *i*. The tension-flange H and its thimble are passed down over the tube C until the tension-flange rests upon the top of the face-plate F. Before the wire N is run up through the hollow spindle B and connected with the winding or take-up reel the cop M, which is formed upon a cylinder or tube L, is pushed down upon the thimble G from the top until the lower end of the cop rests upon the upper side of the tension-flange.

The tube of the cop may be made either of ordinary pasteboard or thin leather, metal, or other material, and, if made of pasteboard or thin leather, the corrugations or longitudinal flanges *h h* on the thimble G press into the material of the cop-tube and form slight grooves or furrows therein, while if the cop-tube be made of metal the furrows or longitudinal grooves should be formed in it when made. The close fitting of the cop-tube upon the thimble G and the engaging of the longitudinal corrugations or flanges *h* with the grooves formed in the cop-tube prevent the cop from turning or revolving relatively to the tension-flange H and the thimble G.

The tension-spring K, attached to the counterbalance or tension-support J, is placed within the groove *i* on the tension-flange H, and by a slight adjustment of the screw holding the tension-spring to the tension-support J the proper action of the tension-flange and its thimble and the cop is secured. The outside end of the thread M is then carried from the cop through the eye *l* in the guide-frame I, and the thread is carried through the small wire-eyes *m* and *n* and its end is firmly attached to the wire, which is carried up through the spindle B and attached to the winding-reel above.

The gear-wheel E, meshing with the pinion D, receives its motion from the actuating mechanism of the machine, and when the machine is started up the magnet-winding head revolves with great rapidity around the wire N, which is drawn up through the spindle B by the winding-reel at the requisite speed. The revolution of the magnet-winding head about the wire N causes the thread from the cop to be wound closely around the wire, and, of course, causes a simultaneous draft upon the thread, which causes the cop to revolve relatively to the face-plate F and the rest of the magnet-winding head. This relative motion of the cop is governed by the tension K, and a sufficient strain is constantly put upon the thread to cause it to be wound tightly and evenly upon the wire N. This work is continued until all the thread upon the cop-tube L is exhausted, when the machinery is stopped and the cop-tube is removed from the thimble G.

If the cop-tube be made of pasteboard or light leather, it is simply cut from end to end and stripped off of the thimble. If, however, it be made of metal, it should be made in two longitudinal halves or portions capable of separation at one or both sides for removal from the thimble. This being done, the next cop, which is stored above for use and through which the wire has been passed, is pushed down upon the thimble and tension-flange, as was the first cop, the outside end of the thread on the cop is connected with the last end of the thread upon the cop previously in position on the magnet-winding head, and the machine is again started up and the work of winding proceeds, and so on until all the stored cops are exhausted or the entire coil of wire has been insulated.

In Fig. 5 I have shown a modified winding-frame in which I dispense with the disk F (shown in the form above described) and connect the guide-frame L with the counterbalance J at their tops by the cross-bar O, which is adjustable by means of the thumb-screws *p p*. At the bottom is a connecting-piece Q, cast integral with the guide-frame and counterbalance, in which is formed an eye to permit it to swivel upon the spindle B. Its general operation is similar to the form of apparatus first described.

From what has been shown it will be seen that by the use of this device I am enabled to have the cops wound at the cotton or silk mills upon tubes made of pasteboard or other materials, and they may be directly placed upon the winding apparatus of the insulating-machine, thus avoiding the use of the spools

now in vogue and saving much expense and time in consequence thereof.

Having thus described my invention, I claim—

1. In a wire covering or insulating machine, the combination of a fixed tubular spindle, a revoluble tubular spindle fitting over the fixed spindle, a face-plate secured to said revoluble spindle, a tubular cop-holder provided at its lower end with a disk or flange, and fitting loosely upon the revoluble spindle, a spring-tension for the cop-holder, carried by the face-plate, and a thread-guide projecting from said face-plate, and disconnected from the spindles whereby the cop-holder may be readily removed from the revoluble spindle, without removing any other parts of the device; substantially as described.

2. In a wire covering or insulating machine, the combination with a fixed tubular spindle, a revoluble tubular spindle removably fitted to said fixed spindle, and provided with a face-plate, a thread-guide and a counterbalance arranged upon said face-plate at diametrically opposite points, a tubular cop-holder provided with a disk or flange, and adapted to be applied to, and removed from, the revoluble spindle, without adjustment or removal of the other parts, and a spring-tension brake carried by the face-plate and bearing upon the cop-holder; substantially as described.

3. In a wire covering or insulating machine, the combination of a fixed tubular spindle, a revoluble tubular spindle fitting over the fixed spindle, a face-plate secured to said revoluble spindle, a tubular cop-holder fitting loosely upon the revoluble spindle and having a disk or flange at its lower end and ribs or projections for engaging the cop or its tube, a thread-guide carried by the face-plate, a counterbalance on said plate diametrically opposite the guide, and a spring-tension brake for the cop-holder also carried by the face-plate; substantially as described.

EUSEBIO F. CABEZOLA.

Witnesses:
SAML. D. OLIPHANT, Jr.,
B. F. LEE.