(No Model.)

5 Sheets—Sheet 1.

W. H. AVIS.

WIRE COVERING MACHINE.

No. 512,146. Patented Jan. 2, 1894.

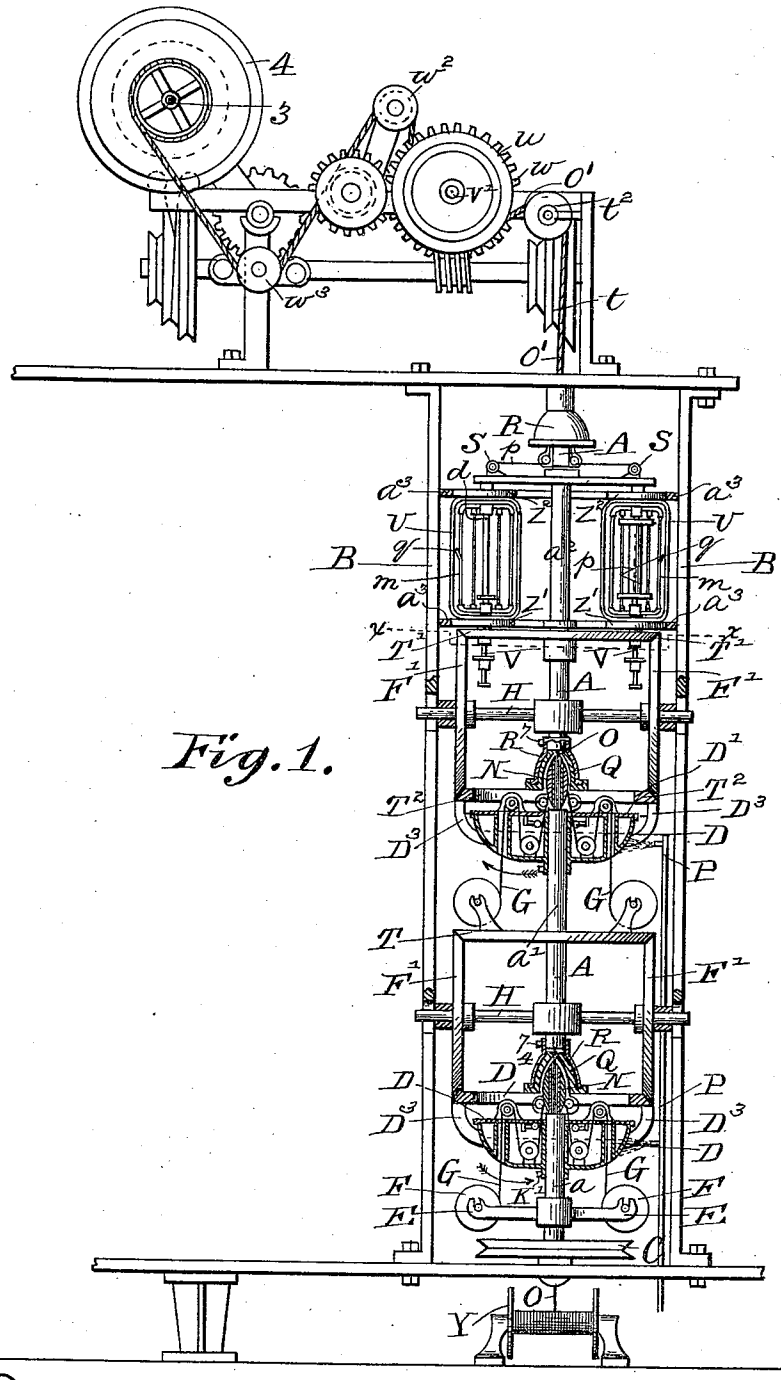

Fig. 1.

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Fig. 2.

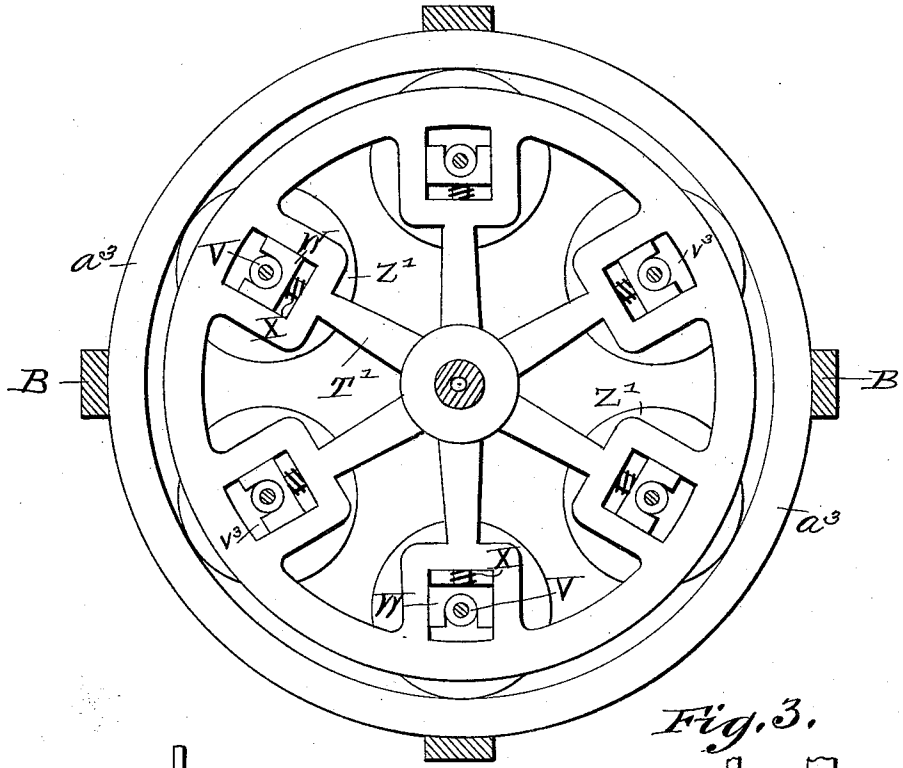

Fig. 3.

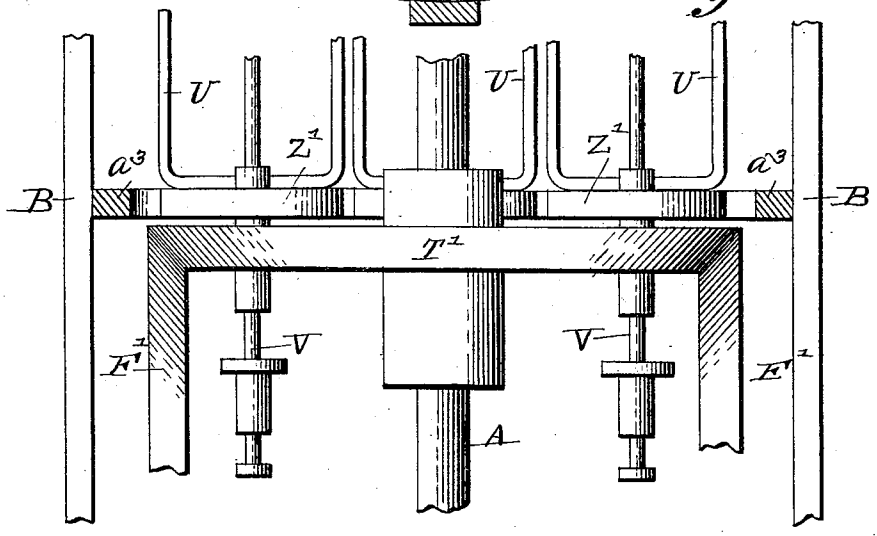

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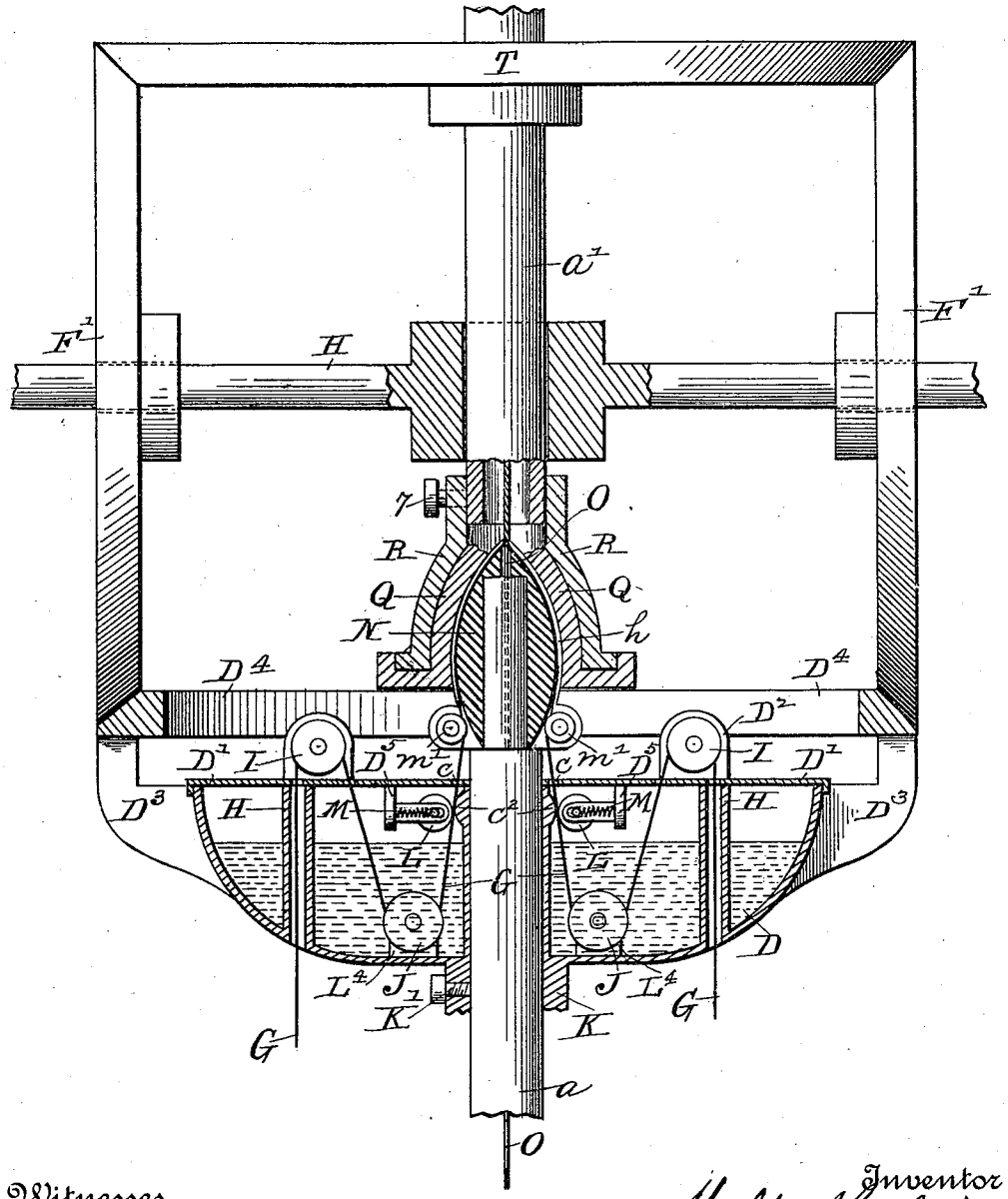
Fig. 4.



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WIRE COVERING MACHINE.

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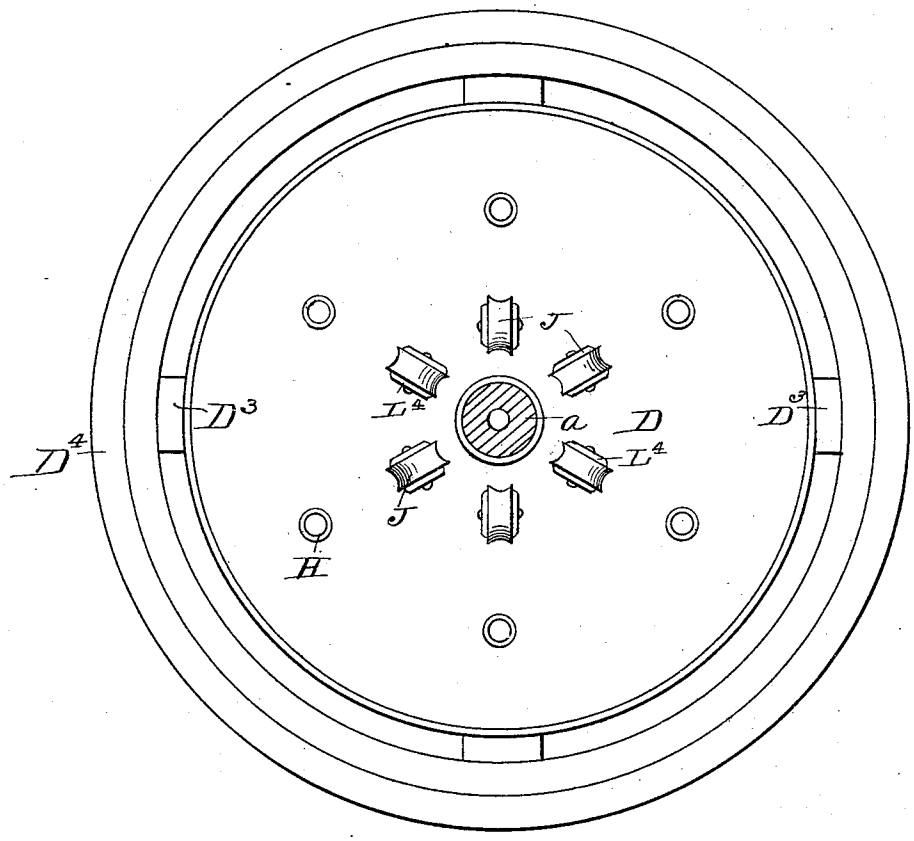
Fig. 5.



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(No Model.) 5 Sheets—Sheet 5.

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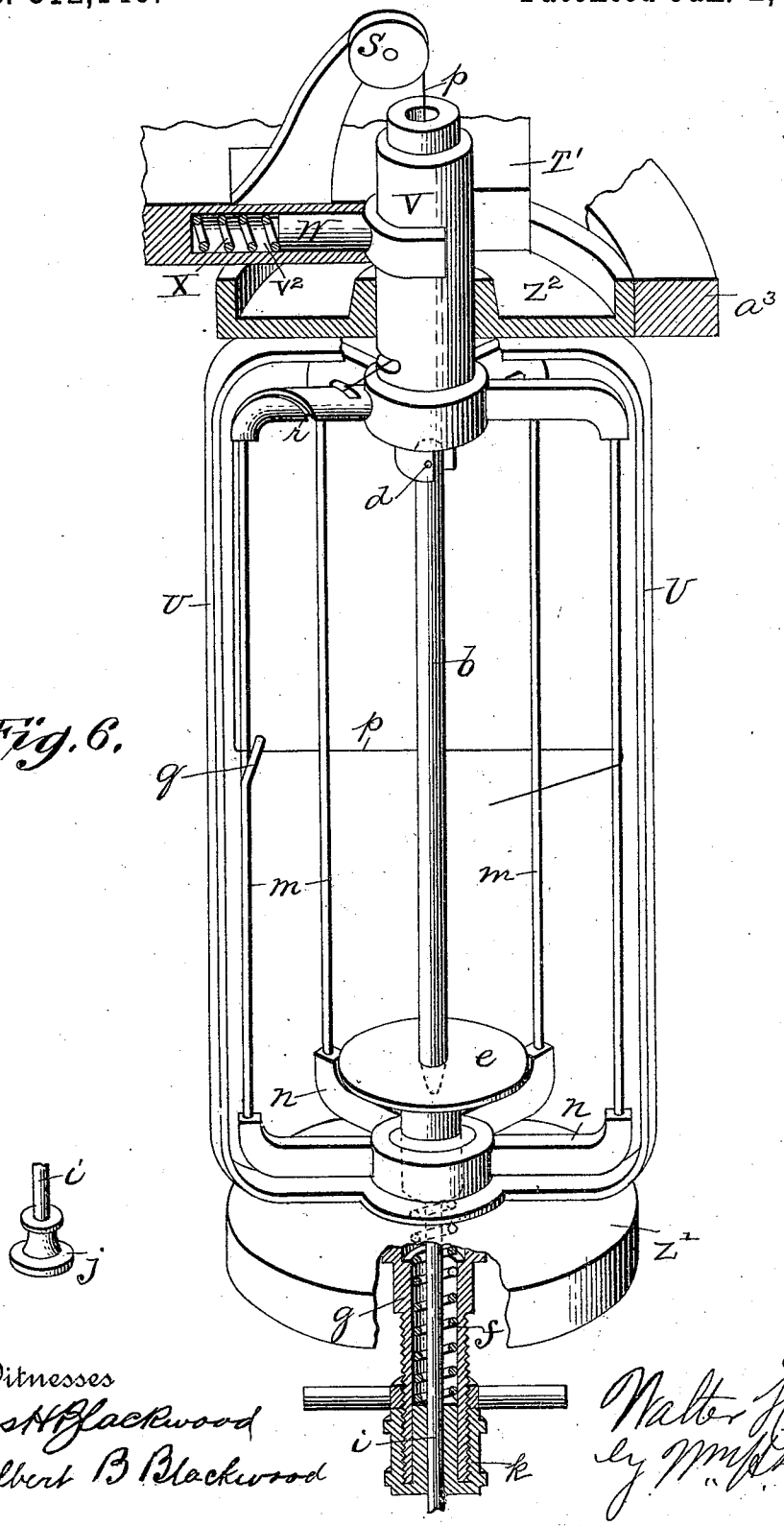

Fig. 6.

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UNITED STATES PATENT OFFICE.

WALTER HERBERT AVIS, OF TORONTO, CANADA, ASSIGNOR OF ONE-HALF TO ROBERT C. FISHER, OF SAME PLACE.

WIRE-COVERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 512,146, dated January 2, 1894.

Application filed June 7, 1893. Serial No. 476,869. (No model.)

To all whom it may concern:

Be it known that I, WALTER HERBERT AVIS, a subject of the Queen of Great Britain, residing at Toronto, in the county of York and Province of Ontario, Canada, have invented certain new and useful Improvements in Wire-Covering Machines; 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.

The object of the invention is to design a simple, effective and quickly operating machine for covering wire or other cords with insulating material, and it consists of mechanism, substantially as hereinafter described and more particularly claimed.

Figure 1 is a side elevation partly in section of my improved machine; Fig. 2, a bottom plan view on line *x x* of Fig. 1; Fig. 3, a sectional transverse view in elevation on the same line. Fig. 4, is an enlarged sectional detail of the dish used to contain the insulating material and its connections; and Fig. 5, a plan view of same with the cover removed; Fig. 6, a detail in elevation of flier and immediate connections.

A is a hollow spindle made in three parts, a, a', a^2, carried vertically in suitable bearings formed in the frame B.

C, is a pulley connected to any suitable driving power for the purpose of revolving the spindle A, at a high rate of speed.

D, is a dish fixed to the spindle A, and designed to contain prepared starch or other insulating or covering compound or material.

E, represents an arm fixed to the spindle A, and designed to carry a bobbin F, on which is wound the yarn intended to form the first covering of the wire. Two arms and two bobbins are shown in the drawings, but I do not confine myself to any special number, but find that about six bobbins will be the proper number.

On reference to Fig. 4, the special construction of the dish D, will be understood. It is composed preferably of a single piece of light metal, and has a central sleeve K, by which it is secured by means of a set screw K', to the revolving spindle. D', is a detachable cover on which are mounted brackets D^2, carrying pulleys I. The dish is also provided with tubes H, running through the same toward said pulleys. There are holes c, in the cover through which the yarn is admitted, all as presently described. Inside the dish is provided with lower brackets D^4, to carry pulleys J, and upper brackets D^5, each to carry a roller L, and a spring M. Each piece of yarn G, is carried through a tube H, in the dish, then around a pulley I, down through the insulating material and around a pulley J, placed in the bottom of the dish D, thence upwardly between projections c^2, on the sleeve K, and squeezing roller L, which is elastically held by the spring M, on bracket D^5, and squeezes out any surplus insulating compound which may adhere to the yarn. The insulating yarn is then carried up through holes c, in the cover and against guide rollers m', through grooves h, in the surface of the conical top N, to its upper point, which directs the yarn to the wire O, on which it is laid as the machine revolves. The wire or core is carried upward from a reel Y, at the bottom of the machine. By passing the yarn G, through the insulating material while the yarn is loose, the said yarn is more thoroughly impregnated with the insulating material than it would be if the yarn were carried through it after being twisted or wound upon the wire, and in this way I secure a more thoroughly insulated wire than is possible in any other process with which I am familiar.

In order to keep the prepared starch or other insulating material contained in the dish D, in proper condition to penetrate the yarn I keep it hot, as desired, by providing a gas jet P, held close to the dish D, as indicated. Instead of the gas jet P, a coil of steam pipe or other means for applying the heat to the dish may be adopted.

In the drawings I have shown an arrangement of two dishes having similar parts and connections. The dish D, is provided with a bracket D^3, carrying at its top a ring friction roller D^4, and which has a beveled face. The roller D^4, engages with vertical beveled edged frictional rollers F', mounted on a horizontal axis H, and the rollers F', engage with a horizontal friction disk T, mounted on part a', of spindle A.

The object of duplicating the dishes and

their operating and connecting parts is to apply to the wire O, an additional layer of insulating yarn. The arrangement is shown in Fig. 1. The upper dish D′ is placed on the part a^2 of the spindle, and the two dishes are run in reverse directions so that the yarn wound upon the wire by the lower device shall be closed by the yarn applied by the upper device. In this arrangement the upper disk T′, carries the fliers as and for the purpose hereinafter explained, and the fliers are revolved in a direction opposite to that of the dish D′ below them.

The spindle A, is provided with a cap joint Q, made substantially as shown in Fig. 4, coupling the parts of the spindle a, a', a^2, and allowing them to work independently of each other. This cap Q, is shaped as shown to fit over the conical top N. It is placed over the top N, and forms a step on which the bell-shaped end R of each of the spindle parts rests. The end R is secured by a screw 7 to the spindle. This cap Q, effectually protects the top N, from oil and dirt and not only constitutes a suitable step to support a portion of the spindle A, but also aids to keep the spindle in line above the dish D.

With the view of giving a handsome finish to the insulating covered wire, I provide the following device for twisting and laying in one operation an outer coating of yarn or similar material, which may be of various colors. To accomplish this, I connect to the upper spindle part a^2, frictional disks T′, T², and arrange a series of fliers U, journaled in rollers Z′, carried by the said disks. Only two fliers are shown in the drawings, but at least four should be employed and as many more as desired be used. A slot v^3 is made in the disk T′, through which the spindle V, of the flier U, is inserted. In the bottom of each slot and at right angles to the spindle another slot v^2, is made into which the plunger W, is placed, a spring X, being placed behind each plunger. On the end of each plunger a fork is made, the said fork constituting a bearing into which the spindle V, is fitted. On this spindle V, I fix a friction roller Z².

a^3, are rings fixed to the frame B.

The revolving of the part a^2, of spindle A, causes the disks T′, T², to revolve, and as all the fliers U, are carried in slots made in the disks the centrifugal force produced by the rotary movement will throw all the fliers outwardly forcing the friction rollers, Z², against the rings a^3, thereby imparting a rotary movement to each of the fliers U. The tension of the springs X, is arranged to force the rollers Z², against the rings a^3, thereby insuring the revolving of the fliers immediately upon the disk T′, revolving.

b, is a bobbin spindle pivoted at d, to the spindle V, its bottom fitting into a recess or hole made in the top of the step e, which step is supported by a spring f, fitted into the bearing spindle g, fixed to the center of the lower friction roller Z′, corresponding with the upper friction roller Z². The step e, being elastically supported by the spring f, it may be moved down so as to permit the end of the bobbin spindle b, to be pressed into place or removed as required. For that purpose I provide a light spindle i, provided with a button j, so that by pulling upon the button j, the step e, may be pushed down clear of the spindle b, to permit it to be moved out so that the bobbin may be taken off, or a fresh one put on.

With the view of increasing or decreasing the tension of the spring f, I provide an adjustable nut k, which may be moved for that purpose.

A series of vertical rods m, is arranged around the bobbin spindle b, and is carried on spiders n, suitably journaled as indicated in Fig. 6. These spiders are held by frictional contact so that they will revolve with the spindle V, but not sufficiently to prevent them revolving on their own axes should it be necessary to prevent the breaking of the yarn p, which is carried around the rods m, arranged as shown for the purpose of imparting the necessary friction of the said yarn. It will be observed on reference to Figs. 1 and 6, that the yarn p, is carried from the bobbin around the rods m, thence through the loop q, up to the spiral groove r, in the spindle V, to the central hole in the said spindle, thence over the pulley S, to the center of the hollow spindle A, where it is wound upon the wire O. By carrying the yarn p, through the center of the spindle V, which is revolving, the yarn is twisted before it reaches the wire O, and when every flier is supplied with a different colored yarn, the twisted yarns thus applied impart a very handsome finished appearance to the covered wire O′. By carrying the yarn p, through the spiral groove r, located at the bottom of the hole through the spindle V, I insure that the twisting of the yarn p, shall be completed at the commencement of the spiral groove r, which is a very important factor in the manipulation of the yarn. By the time the wire O, has reached the top of the frame B, the covering of the said wire is completed, first, with yarn thoroughly impregnated with a suitable insulating compound soaked through in an untwisted condition before it is applied to the wire, and secondly, by twisted yarns preferably of contrasting colors which impart to the covered wire a handsome finished appearance. The flier and bobbin arrangement above described is not claimed herein.

In order to draw the wire O, through the covering mechanism described, and wind the same on bobbins ready for commercial purposes, I provide the following simple and effective machinery:

The covered wire O′, extends from the top of the idle pulley t, over roller t^2, which directs it to a clutching device, consisting of a disk u, fixed to the shaft v', which is caused to revolve from some convenient driving mechanism,

and over a series of fingers w, on disk u, thence over pulley w^2, then down around pulley w^3, thence up over a removable reel 3, journaled in a drum 4.

It will of course be understood that instead of using my machine for covering wire with insulating material, the upper portion of the machine which is used for laying the twisted yarn on the covered wire, will be found equally as serviceable for laying the cover on a core of any other kind of material.

What I claim as my invention is—

1. In a machine for covering a core with insulating material, one or more arms carrying bobbins of yarn or similar material, in combination with a revolving spindle to which said arms are attached, and a dish containing suitable insulating compound fixed to the revolving spindle, and through which compound the strands to be covered therewith are carried, substantially as and for the purpose specified.

2. In a machine for covering a core with insulating material, one or more arms carrying bobbins of yarn or similar material, in combination with a revolving spindle to which said arms are attached, and through which the core to be covered is carried, a dish containing a suitable insulating compound and fixed to the revolving spindle, and rollers arranged within the dish to direct the yarn through the said compound onto the core, substantially as and for the purpose specified.

3. In a machine for covering a core with insulating material, one or more arms carrying bobbins of yarn or similar material, a revolving spindle to which said arms are attached and through which the core to be covered is carried, a dish containing a suitable insulating compound and fixed to the revolving spindle, a roller arranged to direct the yarn through the said compound onto the core, in combination with mechanism for drawing the covered wire through the hollow spindle and winding the same upon a reel, substantially as and for the purpose specified.

4. In a machine for covering a core with insulating material, having one or more arms carrying bobbins of yarn or similar material, in combination with a revolving spindle through which the core to be covered is carried, a dish containing a suitable insulating compound and fixed to the revolving spindle, rollers arranged to direct the yarn through the said compound onto the wire, a series of bobbins and fliers, each bobbin pivoted on an independent flier, the yarn from the various bobbins being each directed through a hole in the center of the flier to be twisted and then to the center of the hollow spindle where the twisted yarns thus conducted are wound upon the wire, substantially as and for the purpose specified.

5. In a machine for covering a core with insulating material, the combination of separate sections of a spindle through which the core to be covered is carried with mechanism for revolving said sections in opposite directions, each of said spindles provided with one or more arms carrying bobbins of yarn or similar material, and a dish on each spindle containing a suitable insulating compound and through which the strands to be covered are carried, whereby additional layers of insulated material are wound in opposite directions on said core, substantially as described.

6. In a machine for covering a core with insulating material, in combination with mechanism for drawing the core through the machine, of one or more arms carrying bobbins of yarn or similar material, a revolving spindle to which said arms are attached, a dish containing a suitable insulating compound fixed to the revolving spindle and through which the strands to be covered are carried disks attached to said spindle and a series of fliers carried by said disks, bobbins provided with yarn or similar material carried by said fliers, and each of said fliers provided with a tube through which the yarn from the bobbin to the core is conveyed, whereby the said yarn from the bobbins is wound upon the core of insulating material, substantially as described.

7. In a machine for covering a core with insulating material, a bobbin from which the covering material is taken, in combination with a dish holding the insulating material, said dish having a central sleeve adapting it to be fitted on a spindle, tubes extending through the dish and through which the covering is conveyed from the bobbin, a cover for the dish having rollers mounted thereon over which the covering is carried, rollers within the dish immersed in the insulating material, spring pressed rollers also within the dish and projections on said sleeve, between which rollers and projections the surplus insulating material is pressed off, and drawing mechanism for drawing the covering out of said dish, substantially as described.

8. In a core covering machine, the combination with a revolving hollow spindle, of a core carried through the same, drawing mechanism for drawing the core, a dish adapted to hold liquid covering material attached to said spindle and means therein to receive the material to be covered, a grooved top above said dish and also secured to said spindle, for carrying the material to be covered to and onto said core, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER HERBERT AVIS.

Witnesses:

C. W. NASH,

ALEX. MCKENZIE.