

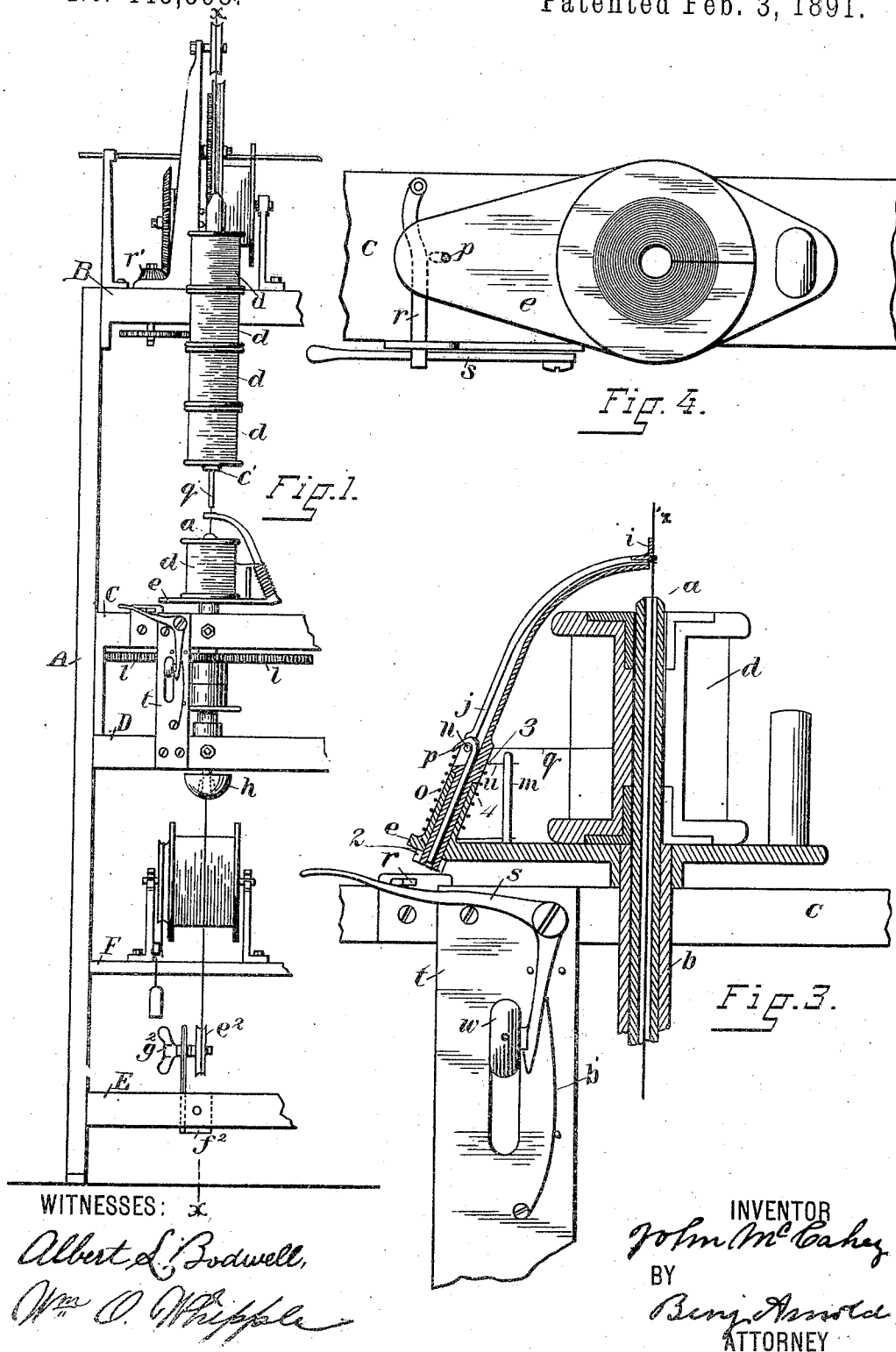
(No Model.)

5 Sheets—Sheet 1.

J. McCAHEY.
WIRE COVERING MACHINE.

No. 445,598.

Patented Feb. 3, 1891.



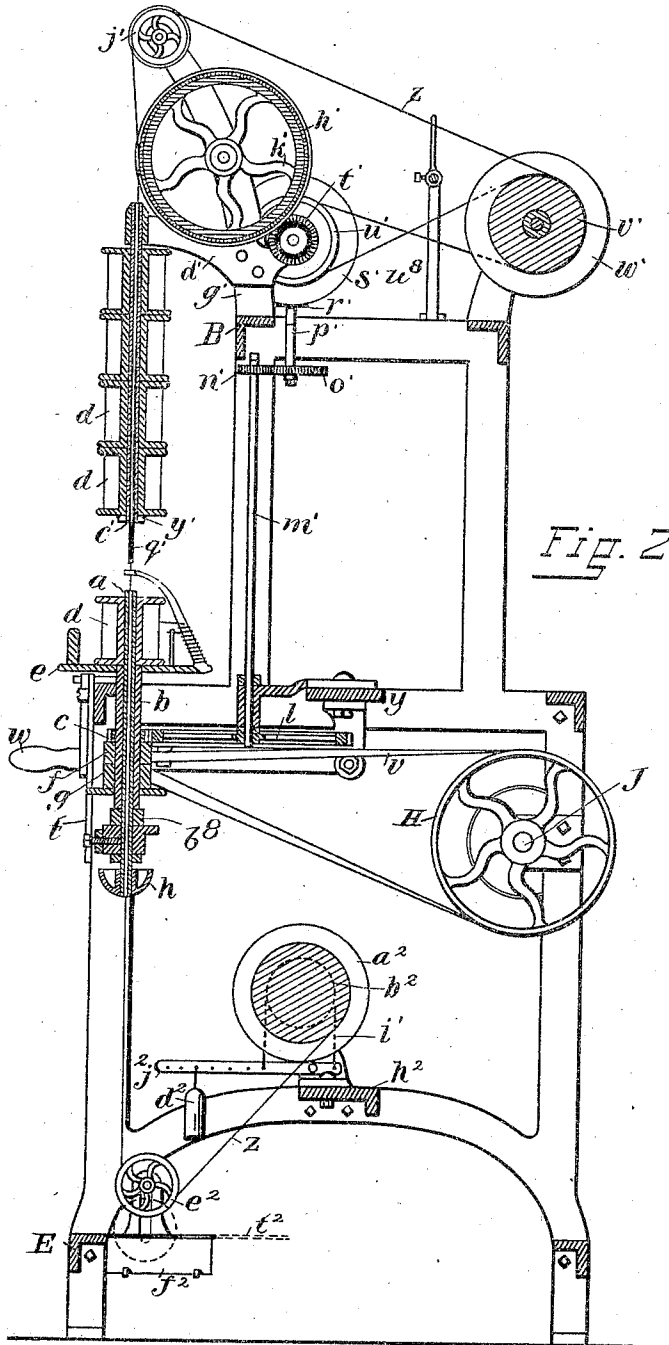
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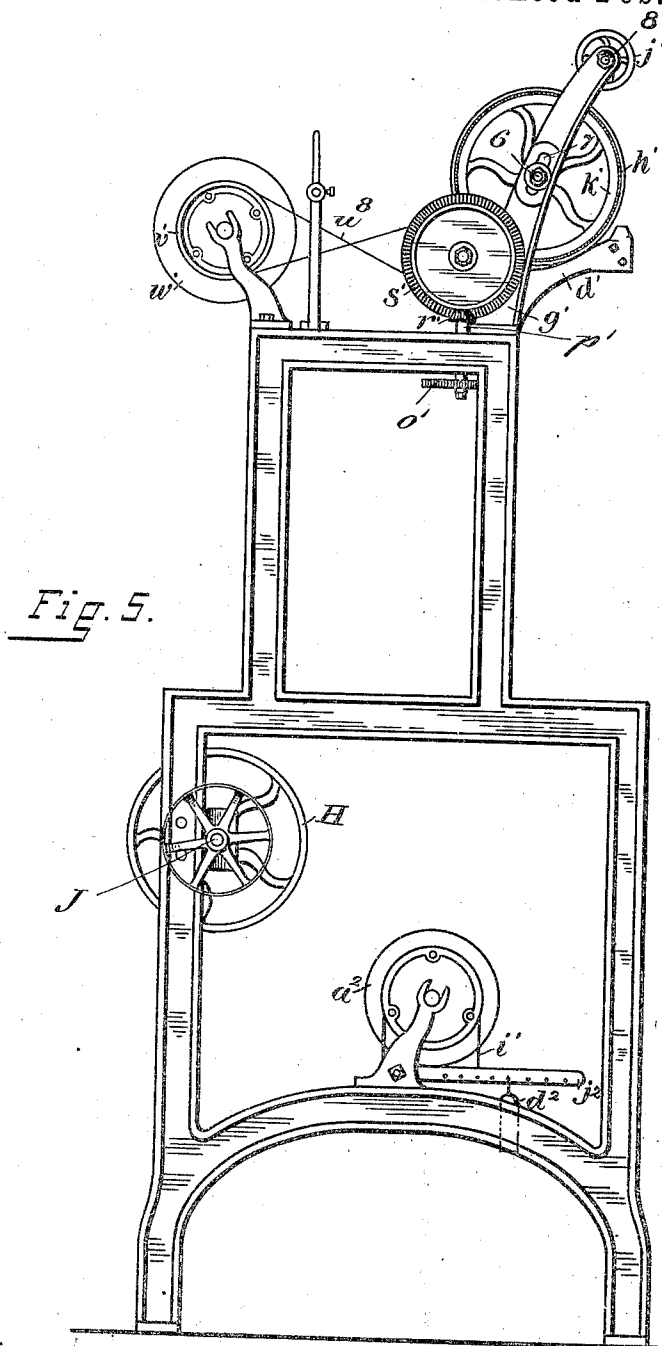
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Fig. 6.

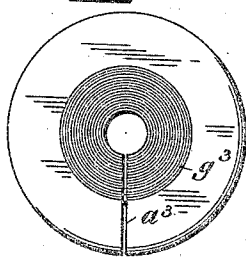


Fig. 7.

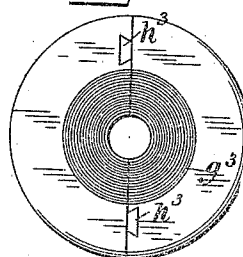


Fig. 8.

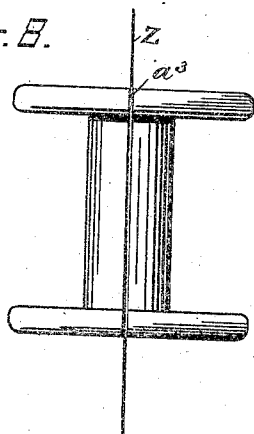


Fig. 9.

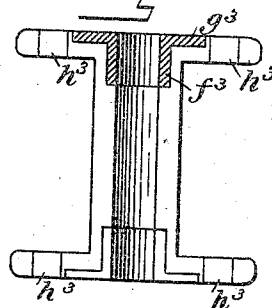
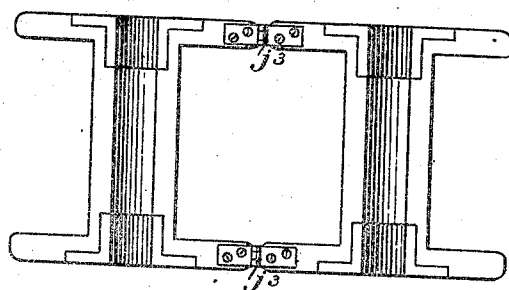


Fig. 10.



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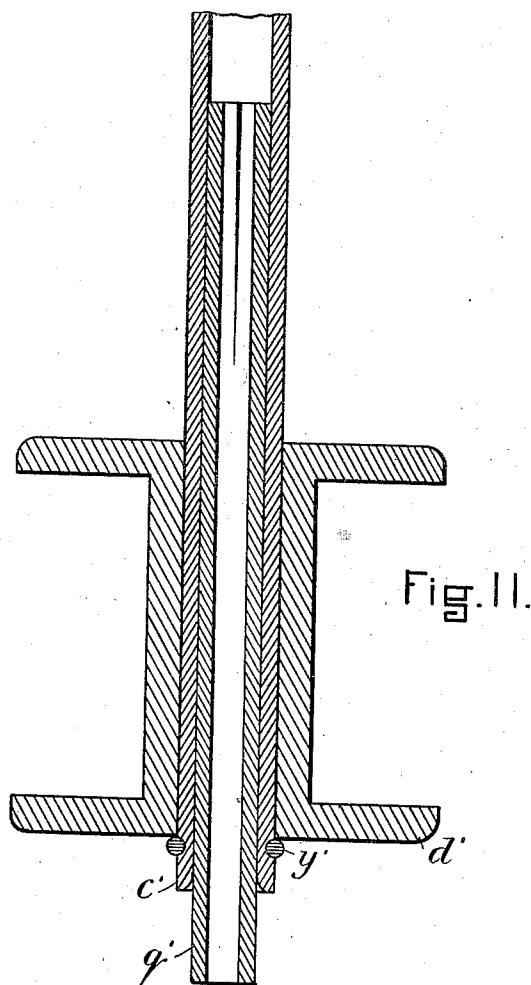


Fig. 11.

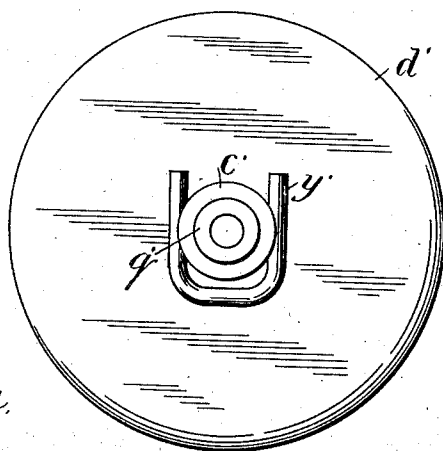


Fig. 12.

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UNITED STATES PATENT OFFICE.

JOHN MCCAHEY, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE NEW ENGLAND BUTT COMPANY, OF SAME PLACE.

WIRE-COVERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 445,598, dated February 3, 1891.

Application filed April 15, 1890. Serial No. 347,950. (No model.)

To all whom it may concern:

Be it known that I, JOHN MCCAHEY, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Wire-Covering Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention is an improvement in that class of winding-machines using a central spool of covering material and passing the wire to be covered through the center of the spool in covering it. The plan of winding with a central spool has very great advantage in regard to the speed that can be attained over the gig system, in which the spool revolves wholly outside of the wire, because in the former plan all the revolving parts are concentric and perfectly balanced, which are indispensable conditions for high speed.

My invention includes an improvement in the stop-motion, which becomes necessary because of the great increase of speed and in the construction of the spools for holding the covering material.

My invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of a set of winding mechanism and a part of the frame in which it is held, which is supposed to contain several such sets, each set being independent in its operations. Fig. 2 shows a vertical section of the winding devices and the frame, taken through the center of the winding-spindle on line *xx* in Fig. 1. Fig. 3 is an enlarged view of the spool, plate, and flier in section and the stop-motion in front elevation. Fig. 4 is an enlarged top view of the rail C and plate under the spool and levers of the stop-motion. Fig. 5 is an end view taken to the left of Fig. 1. Figs. 6 to 10 show constructions of the spools to be used in winding a continuous wire. Figs. 11 and 12 show a vertical section of the lower part of the tube that supports the spools in detail enlarged.

In the drawings, A denotes the end frame; B, the top front rail; C, the upper middle rail;

D, the lower middle rail, and E the bottom girt. The winding mechanism proper is held on the upper and lower middle rails C D. The feeding or take-up motion is held on the front and back top rails, and the wire reel on an intermediate plate F.

The winding mechanism consists of a tubular spindle *a*, held fast in the lower front middle rail D and extending up through the rail C and spool *d*. Upon this spindle *a* is fitted a sleeve *b*, made free to revolve upon the spindle. (See Figs. 2 and 3.) A plate *c* is made fast on the upper end of the sleeve *b* above the rail C, and a gear-wheel *e* is secured to the sleeve just below the rail. A driving-pulley *f* is fastened to the sleeve below the gear-wheel *e*, and a flanged pulley *g* is put loosely on the sleeve below the pulley *f*, the sleeve being supported on a bushing *b'*, held in the lower rail D. A drip-cup *h* is screwed on the lower end of the spindle *a* to catch the oil from the bearings above and keep it off the wire *w*. The spool of thread for covering the wire sits on the plate *c* and turns freely on the spindle *a*. A flier-arm *j* (see Fig. 3) is placed on one end of the plate *c*, the lower end of the arm passing through the plate and having a nut 2 screwed on the end below. A shoulder 3 on the flier-arm above, resting on a hub 4 on the plate, supports the arm, which is free to turn in the plate *c*, that the top of the arm may be swung away from over the spool *d* to allow the spool to be taken off the spindle *a*. The flier-arm is held up to place when winding by a spiral spring *o*, which is placed around it and has one of its ends made fast to the arm *j* and the other to the spindle *m*, fast in the plate *c*. A wire *u*, fast in the arm *j*, brings up against the spindle *m* and prevents the arm from going too far. The flier-arm *j* is made tubular from the lower end nearly up to the thread-opening *n* in its side, and is slotted in its upper side from a little below the opening *n* nearly to the upper end of the arm, which is tubular for a short distance from that end, with a short bar *i* projecting out over the opening in the end of the arm and having a notch in its end to receive the wire and assist in holding it against the drag of the thread in winding.

A drop-wire *p* is fitted to slide freely in the hole in the lower part of the flier-arm *j*, and has a hook at its upper end to catch over the thread after it enters the slot through the opening *n* on its way to the upper end of the arm. When the hook on the upper end of the drop-wire is held up just above the opening *n* by the thread, its lower end will be just flush with the bottom of the nut on the lower end of the flier, which is the case when the thread is intact and taut; but if the thread breaks or runs out or becomes loose from any cause the drop-wire *p* will be free to fall, so that its lower end will project below the nut and strike the lever *r*, that operates the belt-shipper, as will be explained hereinafter.

It will be seen that the flier-arm *j* is set in the plate *e* at an angle and not vertically, the reason of this being that in a vertical arm running at high speed the drop-wire *p* will not fall when free of the thread, because the centrifugal force throws it against the outer side of the hole in the arm in which it slides; but when inclined at the proper angle, which is found by experiment to be at about five degrees from the vertical for a speed of three thousand turns per minute, the centrifugal force assists it in falling as much as it prevents it by pressure against the tube, as before stated, and the wire will drop as freely as in a stationary vertical tube.

In considering the stop-motion a reference to Fig. 4 will show a lever *r*, pivoted on the top of the rail C, in position to be struck by the lower end of the drop-wire *p*. This lever *r* extends out front over a knee-lever *s*, swinging on a pivot fast in a plate *t*, that extends from the rail C down to the rail D. By reference to Fig. 2 it will be seen that the belt *v*, that drives the pulley *f*, is controlled by a shipper-arm *w*, which is pivoted at its inner end to a stand fast on the plate *y* and its outer end extends out through an opening in the plate *t*, and has a handle shape at the end. The lower arm of the knee-lever *s* has a hook at its lower end that will be thrown under a projection on the side of the shipper-arm *w* by a spring *b'* when the arm is up, and hold the belt *v* on the fast pulley *f*; but when the thread breaks or runs out the wire *p* will drop, so that its lower end will strike the lever *r*, the outer end of which will press on the upper arm of the knee-lever *s* and throw the lower arm, with its hook, out from the catch on the shipper-arm *w*, and it will fall and move the belt *v* down onto the loose pulley *g* and let the machine stop.

An arrangement for holding reserve spools of thread is shown in Figs. 1 and 2. A tube *c'* is held in the arm *d'*, fastened to a stand on the top rail B, directly over and in line with the tube or spindle *a*, before mentioned. This tube *c'* is made long enough to hold as many spools of thread as may be required to cover the length of wire in one piece. The spools of thread *d* are put upon this tube *c'*, a

space being left between the lower end of tube *c'* and the upper end of the tube or spindle *a* to admit of a spool being put on or taken off of either tube. The spools *d* are held upon the tube *c'* by means of a wire staple *y'*, the legs of which fit into a groove around the lower end of the tube *c'*. An inner tube *q'* is fitted to slide up and down in the lower end of the tube *c'*, and is split and spread at its upper end, so as to be held where it is put by the friction in the tube *c'*. The tube *q'* is for the purpose of bringing a support to the wire down close where it is wound, and is slid up out of the way when a spool is to be put off or on either tube.

The feed or take-up motion is shown in Figs. 2 and 5. A stand *g'*, secured to the top rail B, has a stud 6 fastened to it, carrying a large grooved wheel *h'*, so placed that the groove in its front side will come directly over the hole in the tube *c'*. The stud in the wheel is held in a slot 7 in the stand, that it may be let up or down, as may be wanted. A smaller grooved wheel *j'* is held on a stud 8 in the top of the stand *g'*, and is placed a little farther out in front than the front of the wheel *h'*, so that it shall lift the covered wire from that wheel at a spot a little lower on the wheel than that where the latter receives the wire from the tube *c'*, to prevent any loose threads on the wire coming off of the large wheel from being wound over and bound down by the wire winding on the wheel, which would cause serious trouble.

The bar *i* on the flier *j*, besides supporting the wire against the drag of the thread as it is wound on it, also serves an important purpose in preventing the thread when it breaks or runs out from slacking up or partially unwinding above the end of the flier and making loose places or "holidays," as they are called, which are likely to open and expose the wire.

The wheel *h'*, that draws the wire off of the reel *a*² and through the winding mechanism, receives motion from the gear-wheel *c* on the sleeve *b* through the gear-wheel *l* on the lower end of the shaft *m'*, which extends up to the top rail B and has a gear-wheel *n'* on its upper end that engages with a gear-wheel *o'*, which is fast on the lower end of a short vertical shaft *p'*, held in bearings in the rail B, which shaft has a small bevel gear-wheel *r'* on its upper end above the rail, which engages with a vertical bevel gear-wheel *s'*, held on a stud fast in the stand *g'*. A gear-wheel *t'*, attached to the bevel-gear *s'*, engages with the gear-wheel *k'* on the wheel *h'*, and thus a positive motion is conveyed to that wheel from the gear *c*, which is necessary to make the covering of the wire perfect. A grooved pulley *u'* on the bevel-gear *s'* carries motion, by means of a belt *u*², to a grooved pulley *v'* on the reel *w'*, which is held in stands on the back top rail. The reel *a*², from which the wire is taken to be covered, is held in stands on the plate *h*². A grooved pulley *b*² on the head of this reel has a belt or

cord z' passing over it, one end being made fast to the stand and the other to a lever j^3 , pivoted at its inner end to the stand and having a weight d^2 hung on it to produce the necessary friction to control the reel. From the reel a^2 the wire passes down under a grooved pulley e^2 , held on a stand attached to the side of a box or trough f^2 , fastened to the inner side of the bottom girt E. The stand that holds the wheel e^2 has a slot in it to receive the stud on which the wheel turns, and a thumb-nut g^2 on the outer end of the stud holds the wheel up. By loosening the nut the wheel e^2 can be set down so as to turn in the box and carry the wire through any substance in the box with which it is desired to coat the wire before it is covered. From this wheel e^2 the wire passes up through the tube a , at the upper end of which it has the thread wound on it, and it continues up through the tube c' and around the wheel h' as many times as may be found necessary to give the wheel sufficient hold on it to feed it through the winding mechanism. From the wheel h' the wire goes over the wheel j' and down onto the reel w' . Before passing the wire up through the tube c' as many spools of thread d may be put on that tube as it will hold, and one spool on the tube a , the thread q , from which passes from the spool d through the opening n in the side of the flier-arm j and the hook of the drop-wire p , then up in the groove, and through the end of the flier-arm to the wire. By raising the shipper w the driving-belt r from the pulley II on the driving-shaft J at the back of the machine will be moved onto the fast pulley f , and the sleeve b and all its connections will be set in motion, causing the flier-arm j to wind the thread around the wire. If the thread breaks, the drop-wire will fall and cause the winding to stop, as before explained. When the thread on the spool d runs out, the machine is stopped by the falling of the wire p , and the flier-arm is turned to one side, the empty spool raised off of the tube a and taken off of the wire z by letting the wire pass out of a slot made in the side of the spool for that purpose, as hereinafter described. The staple y' is then drawn off and a full spool slid down over the wire onto the tube a to take the place of the one removed. The thread of the full spool is then threaded through the flier, as before described, and the machine started up again. In this way all of the spools held on the tube c' can be used to cover with without cutting the wire z , and it is considered that the supply of reserved spools that can be held in this way is fully equal to covering any length of wire that can be drawn in one piece.

The construction of the spools is shown, first, in Fig. 6, in which a slot a^3 is made through the heads and body from the outside to the hole in the center for the passage of the wire in removing them. As a spool made in this way will be liable to be

closed up by the winding of the thread on it, I make a heavy metallic flanged bushing g^3 , to go in the ends of the spool, as seen in section in Fig. 9. This bushing consists of a tube f^3 and a flange g^3 , and it is let into the end of the spool flush with the outer side of the head, this bushing by its stiffness preventing the spool from closing, as mentioned.

Other forms in which the spool may be made to be used on my winder are shown. In Fig. 7 the spool is made in two parts, each part having a short dovetail h^3 on each end, fitting into notches of the same shape in the other side, so that the parts of the spool can be put on the wire and then slid endwise to lock the dovetails. The bushings in the bobbins shown in Figs. 7, 9, and 10 simply serve the same purpose of the bushings usually inserted in spools—that is, to confine the bearing of the spool on the tube or spindle to the ends of the spools to avoid the bad effects of their warping out of shape.

Fig. 8 shows a side view of the spool of Fig. 6.

Fig. 9 shows the inner side of one-half of the spool in Fig. 7.

Fig. 10 shows the two halves of the spool hinged together at the heads, so that they can be opened and taken off of the wire when empty.

The trough f^2 is provided with a sliding cover l^2 , so that when the machine is not running the wheel e^2 can be raised up out of the trough and the cover l^2 slid over it to keep the contents of the trough from drying up.

Having thus described my improvements, what I claim as my invention is—

1. The combination of the tube a , plate e , and the guide-arm j , pivoted to the said plate e and capable of being turned away from over the tube a and the spool surrounding said tube, substantially as and for the purpose set forth.

2. The tube a , through which passes the wire to be covered and upon which is to be placed a spool holding the covering material, plate e , and a flier or guide arm set in said plate at an angle to the center line of the tube a , as described, and containing a drop-wire, in combination with means for driving the plate and flier, substantially as described.

3. The combination of the tube a , plate e , inclined flier arm, and drop-wire with the lever r , knee-lever s , and shipper-lever w , substantially as and for the purpose specified.

4. The stand g' , wheel j' , and adjustable wheel h' , having means for driving it, and the tube c' , having a sliding tube in it, in combination with a wire-covering mechanism, substantially as set forth, and for the purpose specified.

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Witnesses:

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