(No Model.) 4 Sheets—Sheet 1.

J. W. EISENHART.

BOBBIN WINDING MACHINE.

No. 445,765. Patented Feb. 3, 1891.

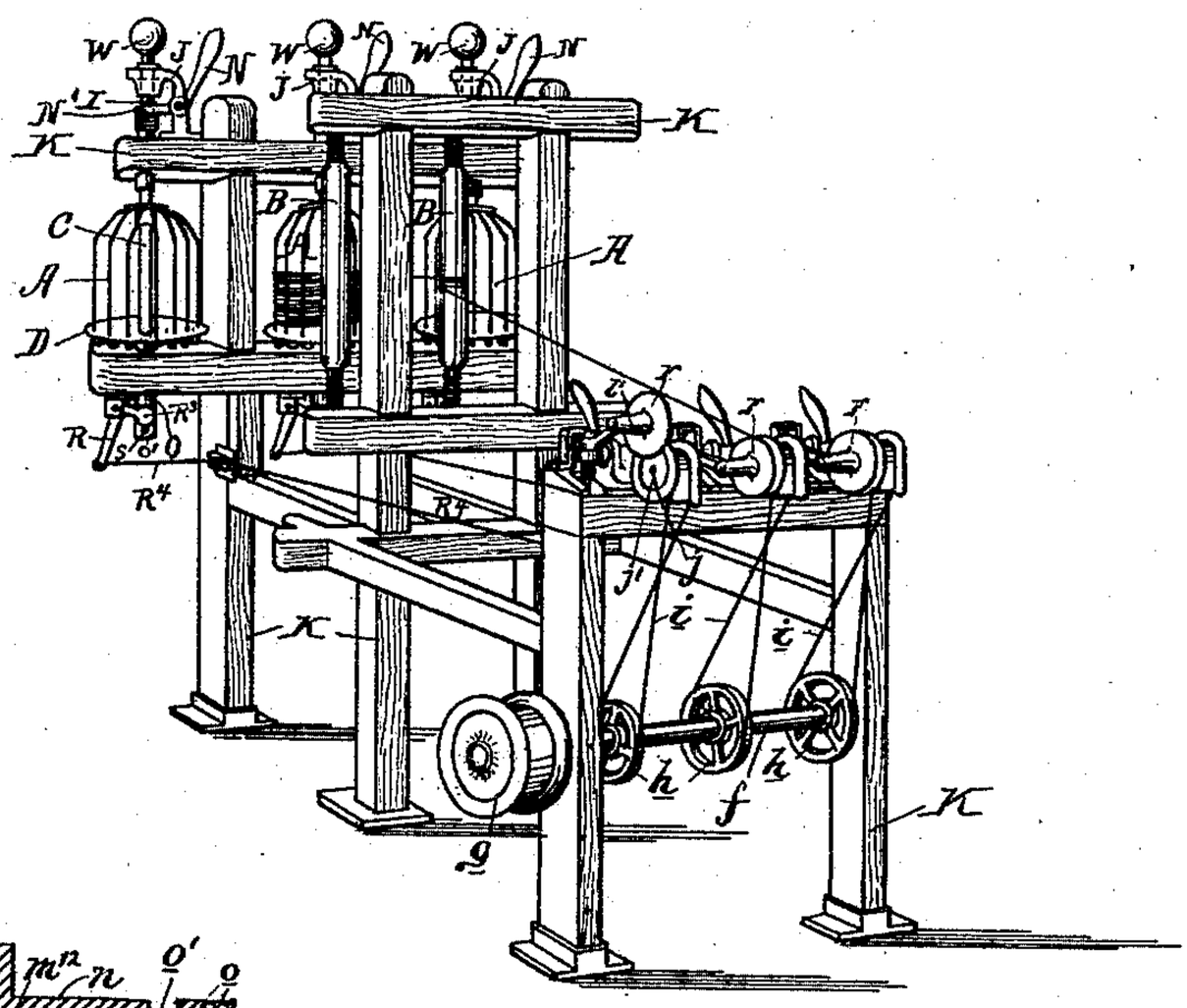

FIG. 1.

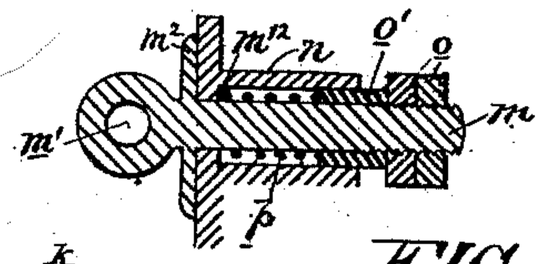

FIG. 3.

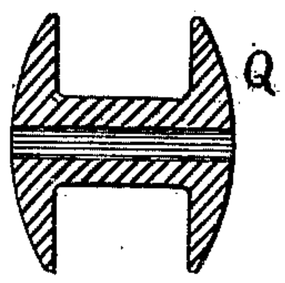

FIG. 2a.

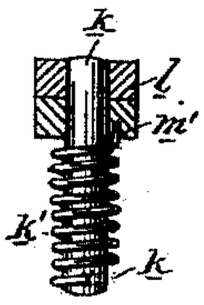

FIG. 4.

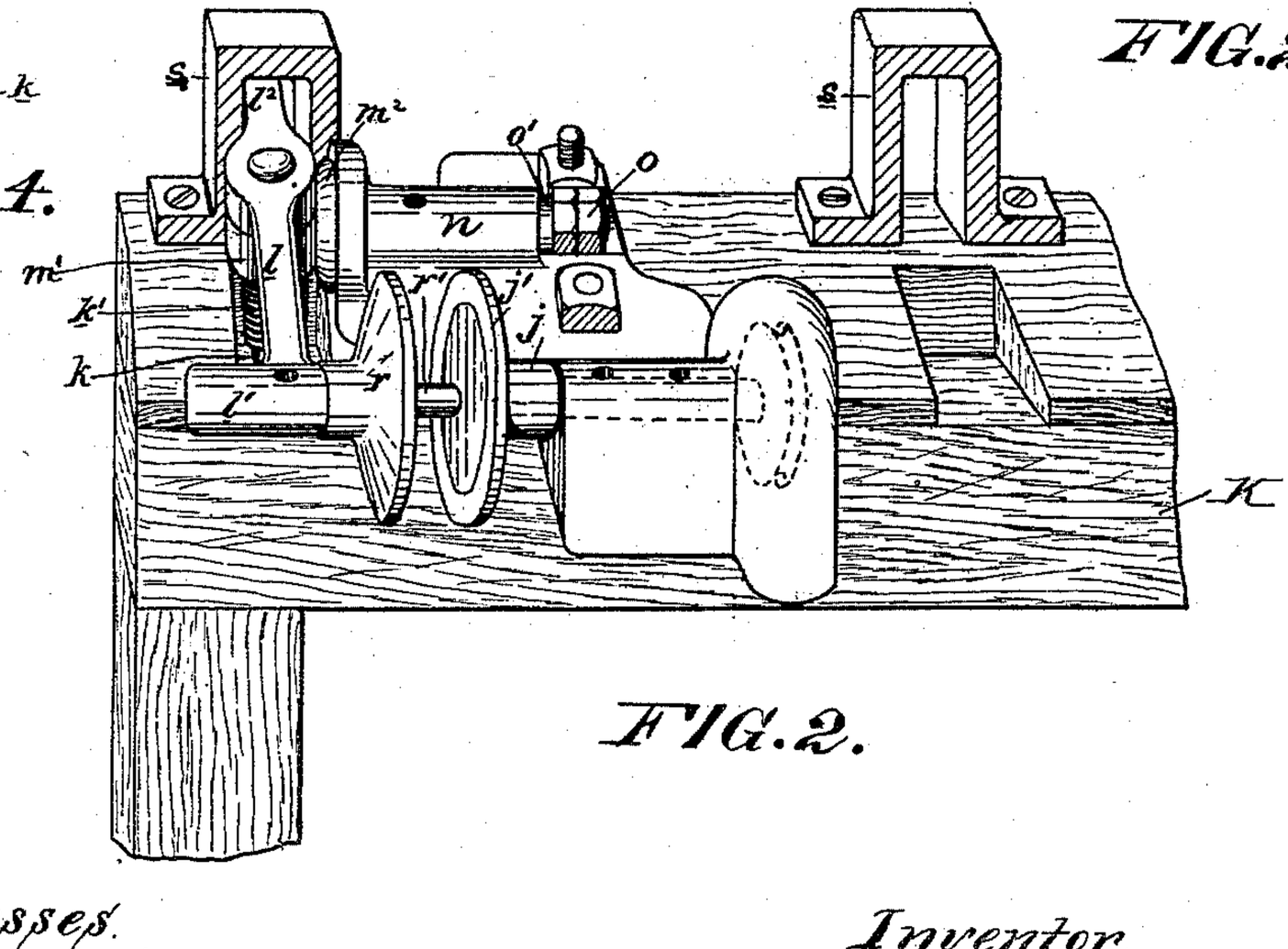

FIG. 2.

Witnesses.
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(No Model.) 4 Sheets—Sheet 2.

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BOBBIN WINDING MACHINE.

No. 445,765. Patented Feb. 3, 1891.

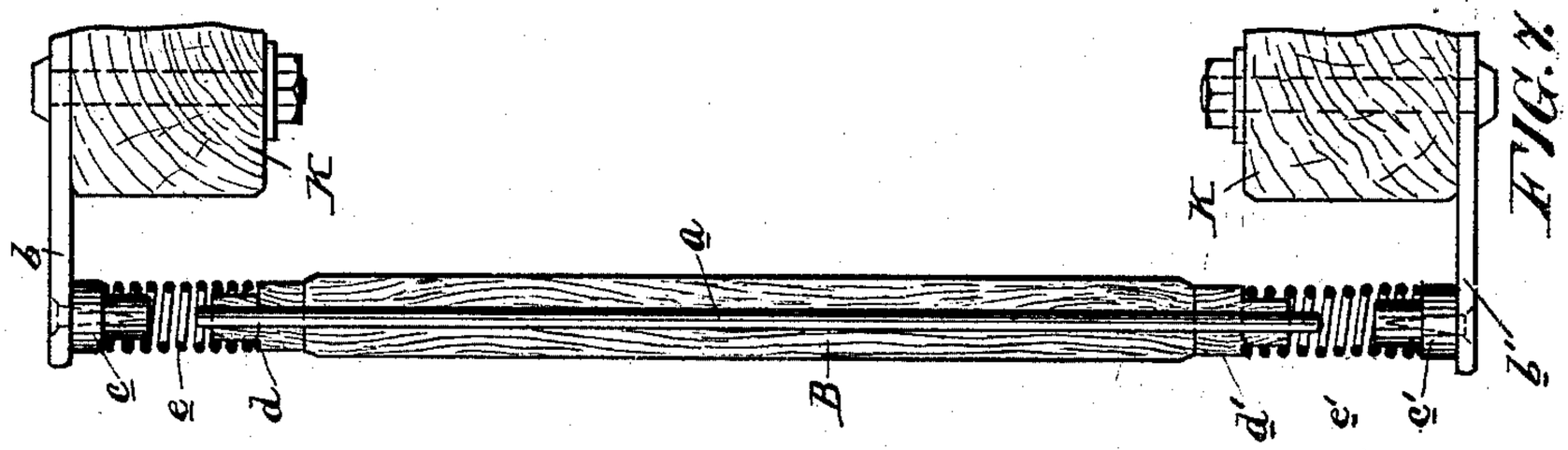

FIG. 4.

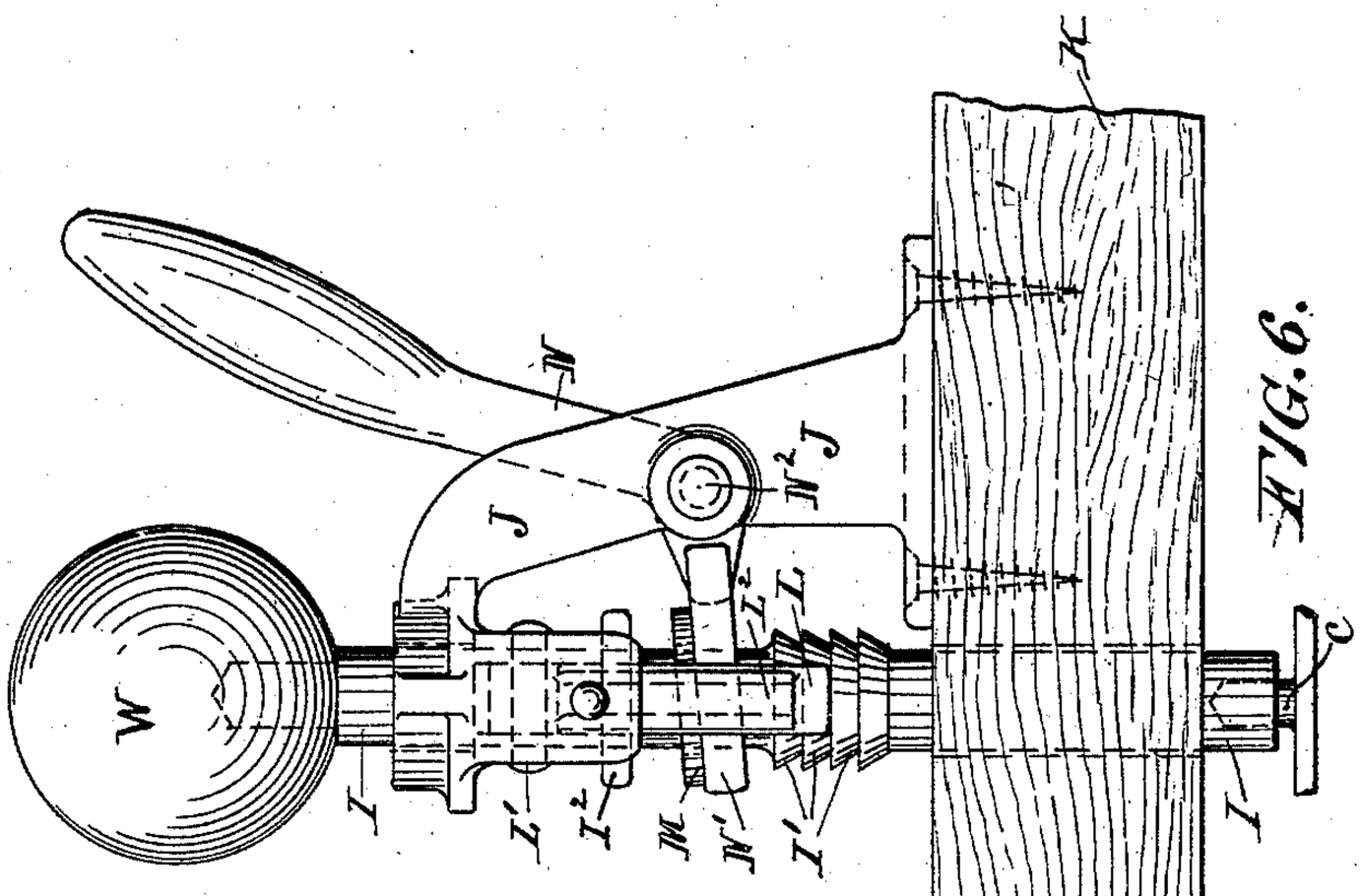

FIG. 6.

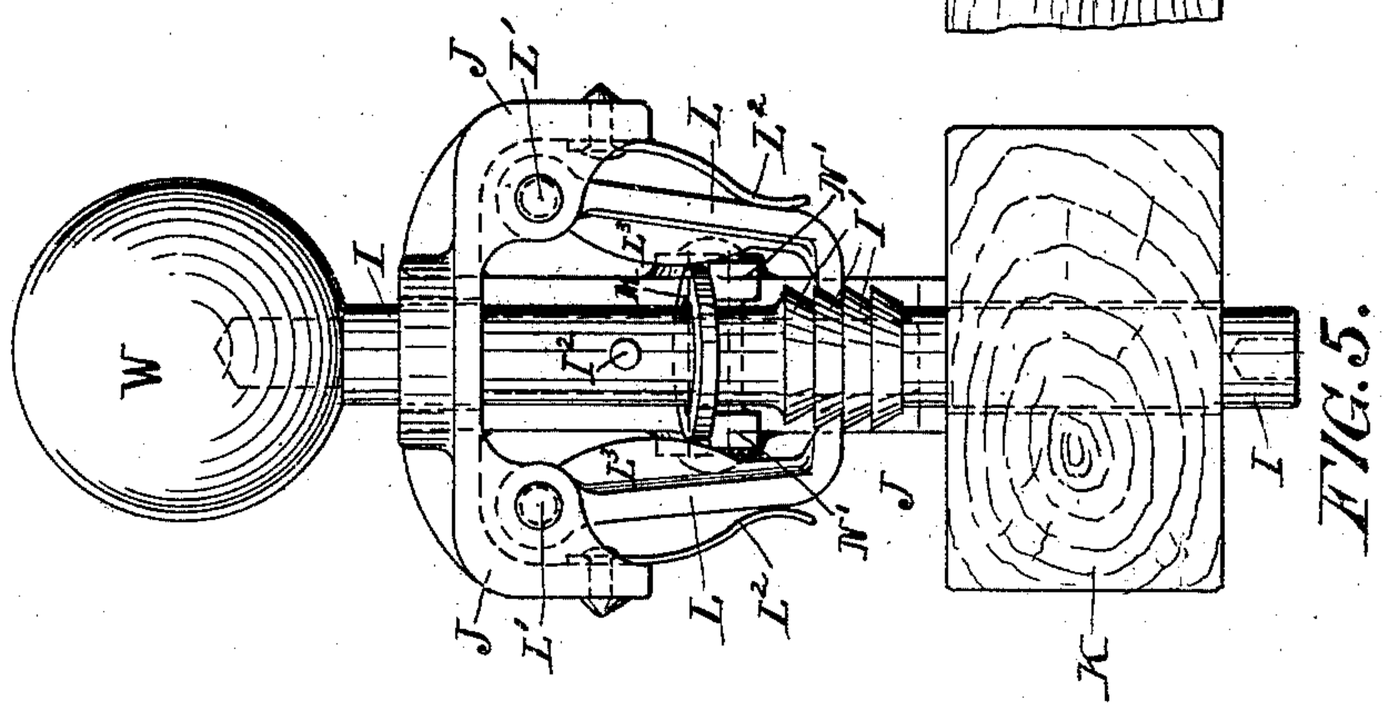

FIG. 5.

Witnesses.
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(No Model.) 4 Sheets—Sheet 3.

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BOBBIN WINDING MACHINE.

No. 445,765. Patented Feb. 3, 1891.

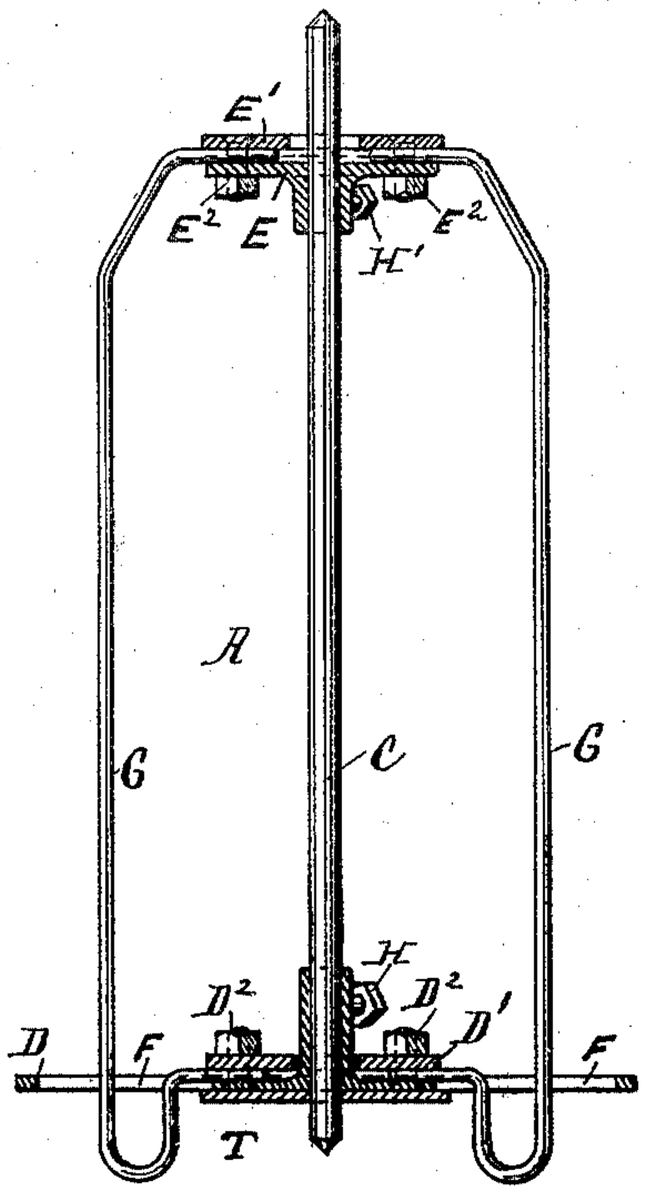

FIG. 8.

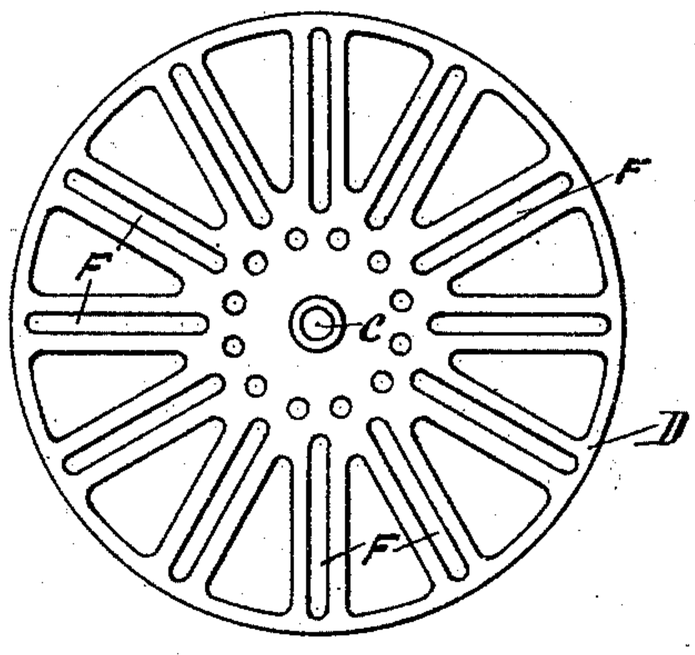

FIG. 9.

Witnesses.
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(No Model.)

4 Sheets—Sheet 4.

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BOBBIN WINDING MACHINE.

No. 445,765. Patented Feb. 3, 1891.

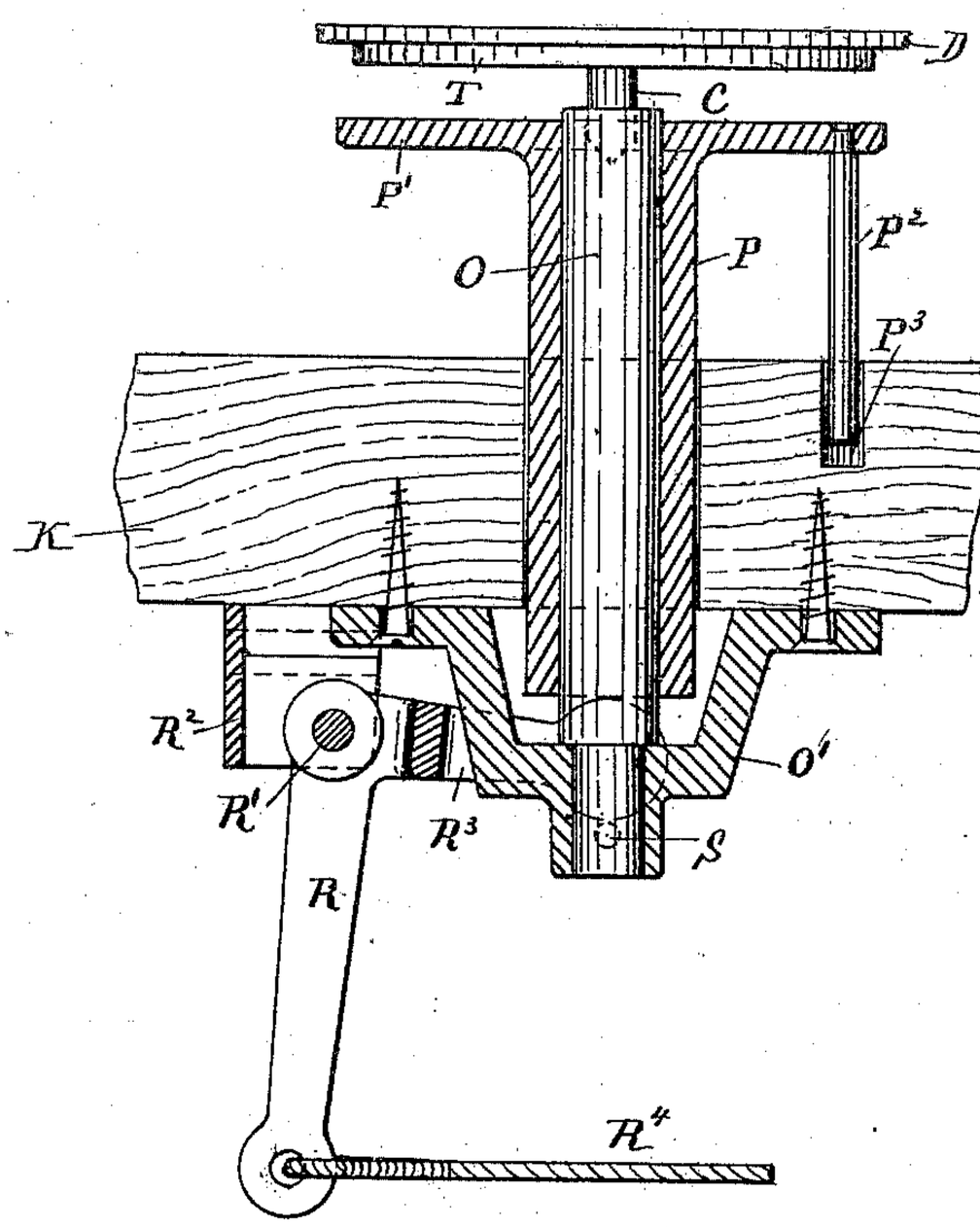

FIG. 10.

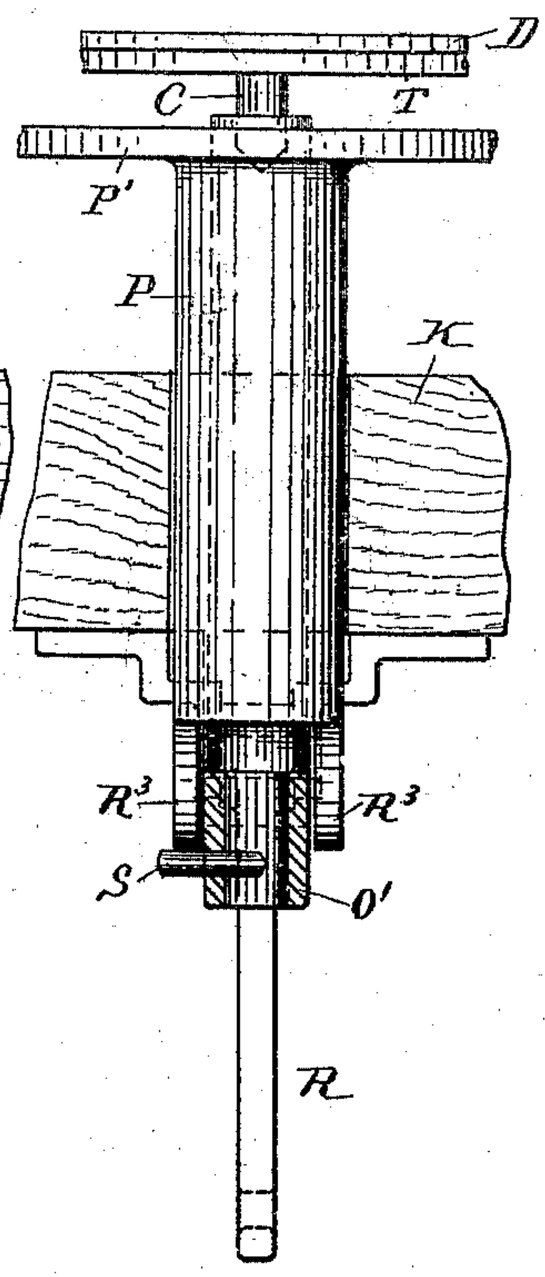

FIG. 11.

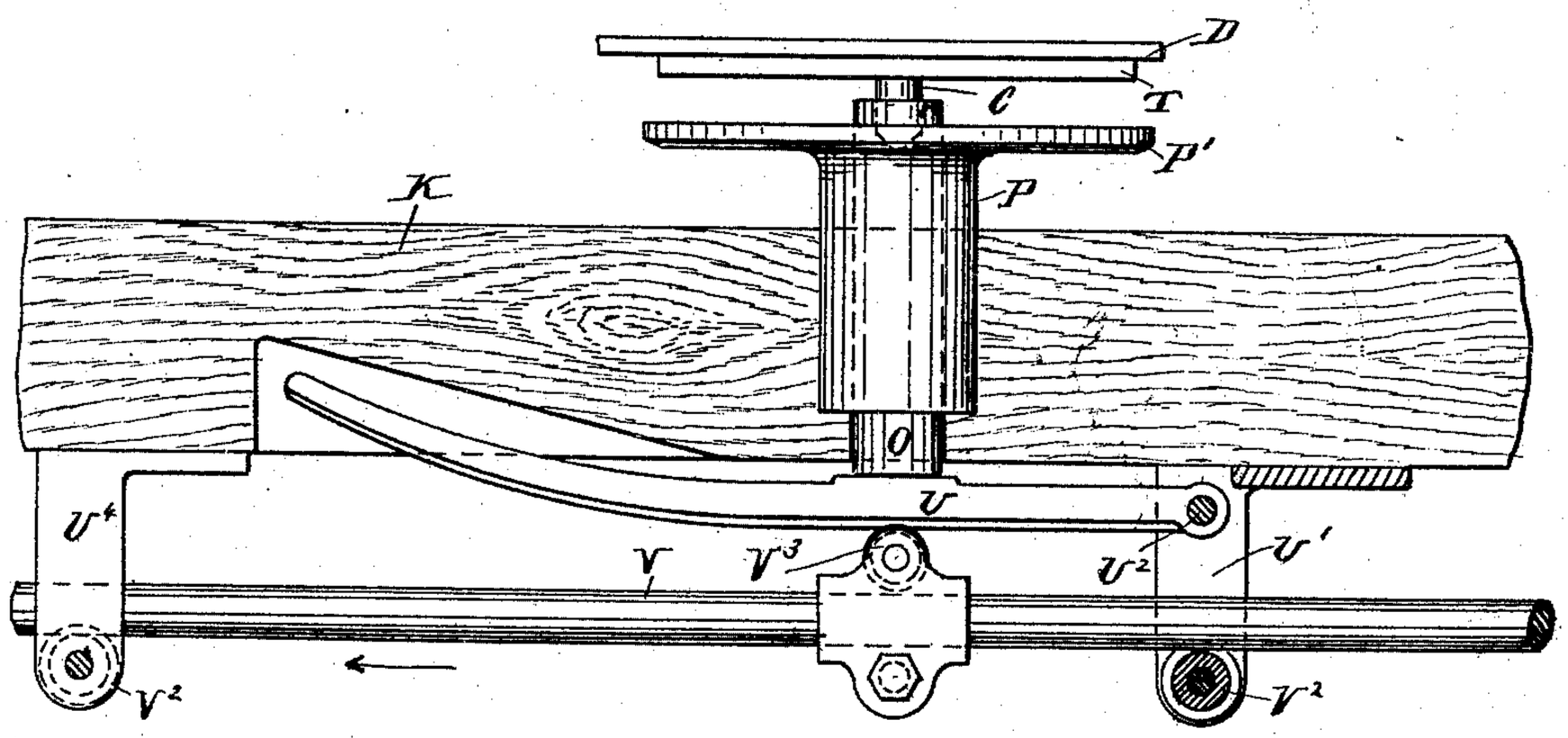

FIG. 12.

Witnesses.
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J. A. Colby

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Chas A. Potter.

UNITED STATES PATENT OFFICE.

JOHN W. EISENHART, OF YORK, PENNSYLVANIA.

BOBBIN-WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 445,765, dated February 3, 1891.

Application filed July 8, 1890. Serial No. 358,086. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. EISENHART, a citizen of the United States, and a resident of York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Bobbin-Winding Machines, of which the following is a specification.

My invention relates to improvements in bobbin or spool winding machines; and it consists, first, in improvements in the construction of the reels upon which the coils of wire are carried while being unwound; second, in an improved brake or device for causing friction upon the bottom of these reels while the wire is being unwound, so as to prevent the drag of the wire and the momentum of the reels from causing the reels to revolve faster than the wire travels to the bobbins upon which it is being wound, and thereby causing the wire to overrun itself; third, in an improved center for holding and releasing the upper end of the reel-spindle; fourth, in an improved tension bar or roller for regulating the tension on the wire as it is being unwound from the reel and delivered to the bobbin; fifth, in improvements in the devices for holding and driving the bobbin or spool while being wound.

In the accompanying drawings, forming part of this specification, and in which similar letters of reference indicate similar parts throughout the several views, Figure 1 is a perspective view of my wire-winding machine; Fig. 2, a perspective view of part of the front part of the machine, showing devices for holding and driving the bobbin or spool to be wound; Fig. 2ª, a central sectional elevation of a bobbin or spool; Fig. 3, a horizontal section through the pivot-shaft which carries the movable arm which carries the bobbin, showing the manner in which this shaft is secured in its bearings; Fig. 4, a vertical view, partly in section, showing the pin for connecting the bobbin-carrying arm and its pivot-shaft. Fig. 5 is an enlarged side, and Fig. 6 a front, elevation of the loaded center and its connected mechanism for holding the upper end of the wire-reel; Fig. 7, an enlarged sectional elevation of the tension-roller; Fig. 8, a sectional elevation of the wire-reel; Fig. 9, a plan of the base of the same; Fig. 10, an enlarged sectional front elevation of the friction or brake apparatus for controlling the revolution of the reel; Fig. 11, a side elevation of the same; Fig. 12, a front elevation, partly in section, of a modification of the same.

The coils of wire which are to be wound upon the spools are placed upon a reel A, Figs. 1 and 8. These reels are then placed upon the machine, as shown in Fig. 1, the wires from them passing two or three times around a tension-roller B, Figs. 1 and 7, and thence to the bobbins, upon which they are wound. The reels A are constructed as shown in Fig. 8.

C is a central shaft, near the bottom of which is a base D, Figs. 8 and 9, upon which the coil of wire rests. This base is furnished with a central hub, as shown, through which the shaft passes.

H is a set-screw for securing the base to the shaft. The base is furnished with radial slots F.

Near the top of spindle C is a collar E, which is furnished with a central hub through which the spindle passes.

H′ is a set-screw passing the through hub of collar E by means of which this collar may be secured to the spindle C.

G are rods, the lower parts of which extend down through radial slots F, then up, and are bent over so as to rest upon the solid central part of the plate D.

D′ is a disk of metal which surrounds the hub of plate D, and which rests upon the ends of rods G, and which by means of nuts and bolts D^2 may be made to bear down upon the ends of the rods, so as to pinch them tightly between itself and plate D.

The upper ends of rods G are bent inward and rest upon the top of collar E.

E′ is a disk of metal surrounding spindle C and resting on top of rods G.

E^2 are nuts and bolts by means of which the disk E′ may be drawn down to pinch the upper ends of the rods between itself and the collar E.

It will be seen from the drawings that the diameter of the reel A may be varied so as to hold coils of wire of different diameters by

simply loosening nuts D^2 E^2 and pushing the wires either in or out, as may be necessary to suit the greater or less diameter of the hole in the coil of wire, after which the nuts are again tightened. The wires G are kept the proper distances apart by passing through the slots F in base-plate D.

The height of reel A may be varied, if desired, by loosening the screws H H′ in the hubs of plates D E, which plates may then be moved toward or away from each other. Such a movement of these plates would of course necessitate a new set of rods G of suitable length.

The coil of wire to be unwound is placed upon reel A, which is then placed upon the machine, the frame of which carries suitable centers for holding the spindle C of the reel and allowing this reel to revolve.

I will first describe the construction and operation of the upper center, which is fully illustrated in Figs. 1, 5, and 6.

I is the center, constructed of a cylindrical or square piece of metal. The upper end thereof may be loaded with a weight W in order to cause it to fall and bear firmly against the spindle C of the reel A. The weight W may be done away with, if desired, for in some cases its own weight would be sufficient to cause the center to fall.

J is a bracket secured to the frame K, through the upper end of which the center I passes. The center also passes through a hole in the frame K, as indicated by dotted lines in Figs. 5 and 6, and by means of the bearings formed by the bracket and the frame is always kept in a perfectly vertical position. Pivoted to the bracket J at L′ are pawls L, and the center I has turned out upon it a number of shoulders I′, with which the pawls L are adapted to engage. L^2 are springs, one end of which is secured to bracket J, and which bear against the pawls L in order to keep them in contact with the shoulders I′ on center I.

L^3 are projections or cams on the inside of pawls L.

M is a collar surrounding the center I and carried upon the bifurcated arm N′ of a bell-crank lever N, which is pivoted to the bracket J at N^2. In order to raise the center I to put the reel A in place, the handle of the bell-crank lever N is grasped and drawn down, raising the bifurcated end N′ of this lever, and with it the collar M. This engages the cams L^3 on the pawls L and as it ascends pushes these pawls clear of the turned-out shoulders I′ on the center I. As the collar is raised farther, it engages a pin I^2, which passes through the center I, and lifts this center so that the reel A may be put in place. When the bell-crank is released, the weight of the center I causes said center to fall until its lower end rests upon the spindle C of reel A, and as the collar M passes the cams L^3 on pawls L the springs L^2 force these pawls in until they engage one of the shoulders I′ on center I and lock this center and the reel in place until they are released by operating the bell-crank again. There are several shoulders turned out on the center I, so that this center will be adapted to hold spindles C of different lengths.

The center for holding the lower end of spindle C is shown in Figs. 10 and 11, and a modification of it in Fig. 12. These figures also show the devices by means of which friction is applied to the reel A in order that the coil of wire on the reel may not overrun itself while being unwound.

Referring to Figs. 10 and 11, O is the lower center, which is supported by a bracket O′, carried by the frame K of the machine. P is a sleeve surrounding this center and passing through the frame of the machine, and P′ is a flange upon the top of this sleeve. R is a bell-crank lever pivoted at R′ to a bracket R^2, carried by frame K, and the upper arm R^3 of which is bifurcated and passes to each side of center O and bracket O′, upon which arm R^3 the lower end of sleeve P rests. S is a pin or stop carried by bracket O′, which prevents arm R^3 of the bell-crank from falling too low. In Fig. 11 the pin S is shown as entering the center O. This construction, in addition to giving a greater bearing for the pin, prevents the center from turning in its bearings. Secured to the flange P′ is a pin P^2, which passes down and enters a hole P^3 in frame K and prevents this flange and sleeve P from turning. R^4 is a rope or rod secured to lower arm of bell-crank R and extending to the front of the machine, as shown in Fig. 1, and by means of which this bell-crank may be operated. Upon the bottom of the reel A and secured to the bottom plate D is a disk of leather T.

After the reel A has been put in place between the centers I and O the bell-crank R is operated by drawing the rope or rod R^4 forward, which causes arm R^3 of the bell-crank to rise and to raise with it the sleeve P and flange P′. The bell-crank is operated until the flange P′ bears firmly against the leather disk or washer T and acts as a brake to keep the wire on the reel from overrunning itself while being unwound.

Instead of the sleeve P and flange P′ being raised to make contact with the washer on the reel, the center O and the reel and washer may be lowered while the sleeve and flange remain stationary. A device for accomplishing this result is shown in Fig. 12. In this device the sleeve P is held immovably in the frame K, and the center O passes through it and rests upon a curved lever U, one end of which is pivoted at U^2 to a bracket U′ and the other end of which is free. V is a rod which rests upon friction-rollers V^2, carried by the brackets U′ U^4, and which carries a roller V^3, upon which the lever U rests. By pushing rod V in the direction indicated by the arrow the center O and the reel A and washer T fall until the latter rests upon the

flange P′ of sleeve P. The weight of the reel and its connected parts causes enough friction between the washer T and the flange P′ to prevent the wire from overrunning itself.

The wire, after being unwound from reel A and before being wound upon the bobbins, passes two or three times around a tension-roller B, Figs. 1 and 7, which not only serves to give a tension to the wire, but also acts to take any bends or kinks out of it. The roller B is constructed, preferably, of wood, with a metallic center *a*, Fig. 7, and is supported as shown in this figure. *b b′* are brackets carried by frame K, and *c c′* are studs carried by these brackets. *d d′* are studs or collars placed at the ends of roller B and through which the rod *a* passes. *e* is a coil-spring, one end of which is secured to stud *c*, and the other end of which is secured to collar *d*. *e′* is a similar spring secured to stud *c′* and collar *d′*. The ends of the rod *a* are free to turn in the collars *d d′*. As the wire is unwound from the reels it revolves the roller B, which, with the rod *a*, is carried by and turns in the collars *d d′*, which are supported by springs *e e′*, as above described, and the springs *e e′* give and allow a certain lateral movement of the roller when any unusual strain is brought upon the wire, in order to regulate and maintain a constant tension upon it. The wire, after leaving the roller B, is wound upon the bobbin Q, a section of which is shown in Fig. 2ª. The apparatus for holding and driving this bobbin is shown in Figs. 1, 2, 3, and 4. In Fig. 1 a shaft *f* is carried by frame K and furnished with a pulley *g*, by means of which it may be driven. Upon this shaft are pulleys *h*, each of which, by means of a belt *i*, drives a shaft *j*, Figs. 1 and 2, which drives a bobbin Q.

The devices for holding the bobbin are shown more clearly in Figs. 2, 3, and 4. An arm or lever *l* is securely attached to a pin *k*, which extends downwardly at right angles from it and passes through a hole in the end *m′* of a shaft *m*. This shaft *m* is carried in a bearing-box *n*. Its forward end is furnished with a flange m^2, and upon its rear end are placed the nuts *o*. A spring *p* surrounds shaft *m*, one end bearing against a shoulder m^{12} of the box *n* and the other against the nuts *o* or against a collar *o′*, which surrounds shaft *m*, and which bears against these nuts. The spring *p* always forces the shaft *m* inward and causes the flange m^2 to bear firmly against the box *n*. Its tension may be regulated by setting the nuts *o* in or out. The purpose of the flange m^2 and reacting spring *p* is simply to form a means for keeping shaft *m*, arm *l*, and connected parts in place during the winding of the bobbin. The outside end of the arm or lever *l* carries a bearing *l′*, in which is mounted a shaft *r′*, carrying a flange *r*. The pin *k* is surrounded by a spring *k′*, one end of which is secured to said pin and the other to the end *m′* of shaft *m*, as shown in Fig. 4. The inside end l^2 of the lever or arm *l* extends into an ⊓-shaped stop *s*, bolted to the frame K, which limits in both directions the lateral movement of this arm. When the bobbin is to be put in place for winding, the arm or lever *l* is lifted, the shaft *m* turning in its bearings to allow this movement, the bobbin is slipped over the end of shaft *r′* on the end of the lever *l*, and this lever is again lowered. The ends of the bobbin are now held between a flange *j′* of the shaft *j* and the flange *r* of the shaft *r′*, the spring *k′* on the pin *k* forcing lever *l* in and securing a good contact between these flanges and the bobbin. As the shaft *j* is revolved by the belting, as described, it, by the friction of flange *j′* against the bobbin, drives the bobbin around which the wire is wound.

Having thus described my invention, I claim—

1. In a wire-winding machine, and in combination, the frame of the machine, an adjustable reel for holding a coil of wire, suitable centers in which this reel revolves, a friction-brake, a tension-roller with a central shaft, said shaft, collars in which the ends of this shaft are free to turn, coil-springs for supporting these collars, brackets and studs for carrying the coil-springs, and devices, substantially as described, for holding and driving the bobbin to be wound with the wire.

2. The herein-described adjustable reel for holding a coil of wire or similar material while it is being unwound, consisting of a spindle adapted to be held between centers, as described, and carrying a base-plate furnished with radial slots and an upper plate, rods the upper ends of which rest upon said upper plate and which pass down through slots in the lower plate and are bent up so as to rest upon said lower plate, plates or washers, and nuts and bolts by means of which said plates or washers may be drawn down, so as to secure the rods in place by pinching them between said washers and said base and top plates.

3. In a wire-winding machine, and in combination with the wire-holding reel, the spindle of the reel, and the upper and lower centers which support the spindle, and in which the spindle turns, a friction-washer secured to the lower side of the base-plate of the reel, a flanged collar surrounding the lower center, a bell-crank lever for raising said flanged collar into contact with said friction-washer, and means for operating said bell-crank lever, all substantially as and for the purposes set forth.

4. The combination of the upper center furnished with shoulders, as described, a bracket through the upper end of which said center passes and which guides said center, pawls pivoted to said bracket and adapted normally to engage with the shoulders on the said center, and devices, as described, for withdrawing said pawls from the shoulders on the center and for raising the latter.

5. The combination, with the upper center furnished with shoulders, as described, of the

bracket, pawls pivoted to said bracket, springs for throwing said pawls in, a bell-crank lever pivoted to said bracket, one arm of which is bifurcated and spans the center, a collar surrounding said center and carried by said bifurcated arm of the bell-crank, and a pin carried by said center, with which said collar is adapted to engage when raised, all substantially as and for the purposes set forth.

6. In combination with frame K, the brackets *b b'*, carried thereby, studs carried by said brackets, the tension-roller, shaft *a*, and the coil-springs and collars for carrying said shaft and tension-roller, all substantially as and for the purposes set forth.

7. In combination with roller B and center *a*, the brackets *b b'*, studs *c c'*, collars *d d'*, and coil-springs *e e'*, secured to said studs and collars, all substantially as and for the purposes set forth.

8. In a wire-winding machine, and as a device for holding and driving the bobbins while being wound, and in combination, an arm the forward end of which is furnished with a bearing, a flanged shaft turning in said bearing, a pin secured at right angles to said arm, a shaft secured in a bearing carried by the frame of the machine and furnished with a head through which said pin passes, a coil-spring surrounding said pin, one end of which is secured to said pin and the other to said shaft, and a spool-driving shaft furnished with a flange and devices for driving the same, all substantially as set forth.

9. In combination with arm *l*, the shaft *m*, adapted to turn in a suitable bearing to allow this arm to be raised to put on or take off a bobbin, a flange upon this shaft, adapted to bear against the bearing, a spring surrounding said shaft and bearing against said bearing and against a collar or nut on said shaft, a pin rigidly connected to said arm *l* and passing down through a head on said shaft, and a spring for throwing the outer end of said arm inward, all substantially as described and set forth.

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