(No Model.) 2 Sheets—Sheet 1.

O. LEVER & W. S. GRUNDY.

COP WINDING MACHINE.

No. 486,257. Patented Nov. 15, 1892.

Fig. 1.

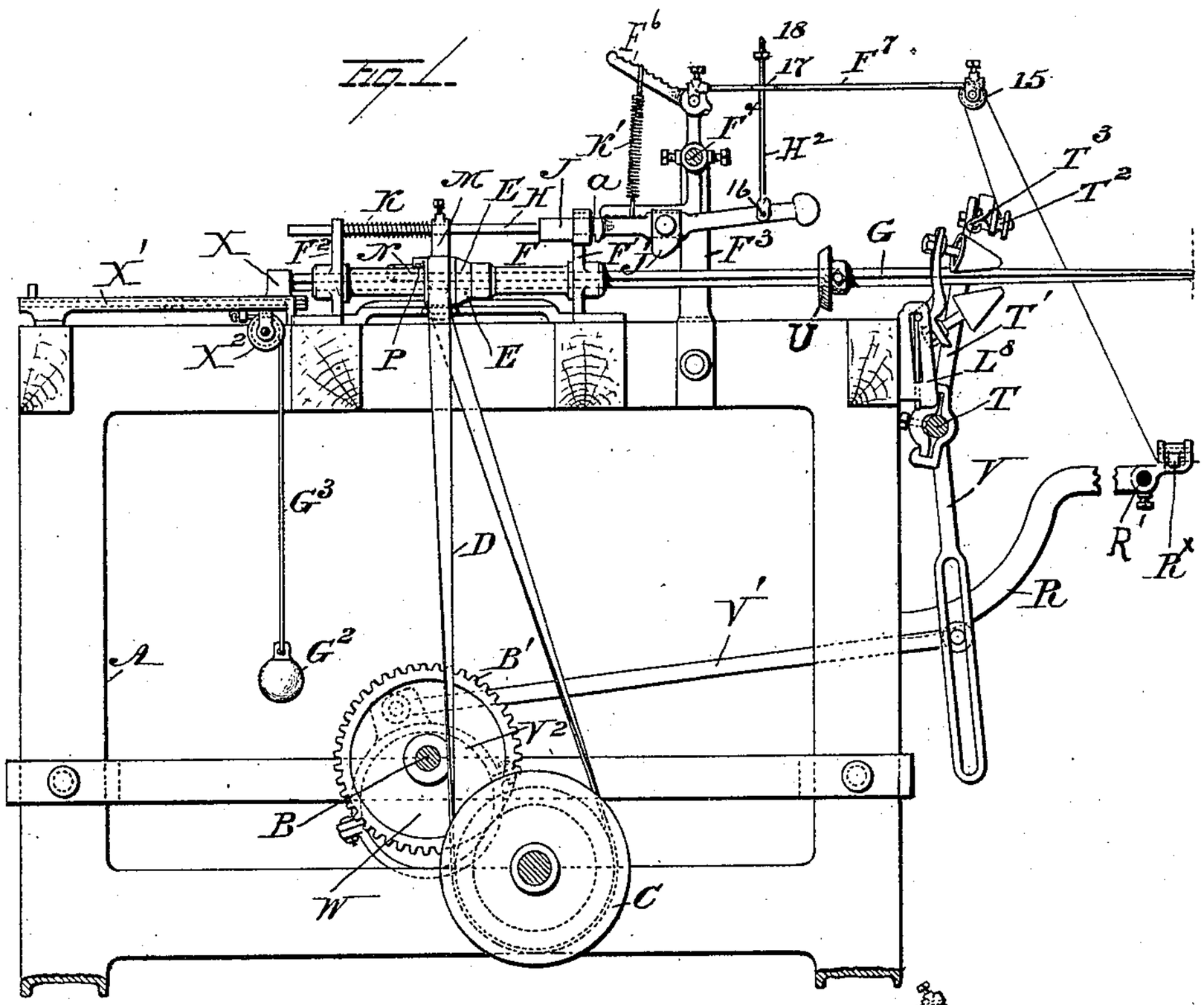
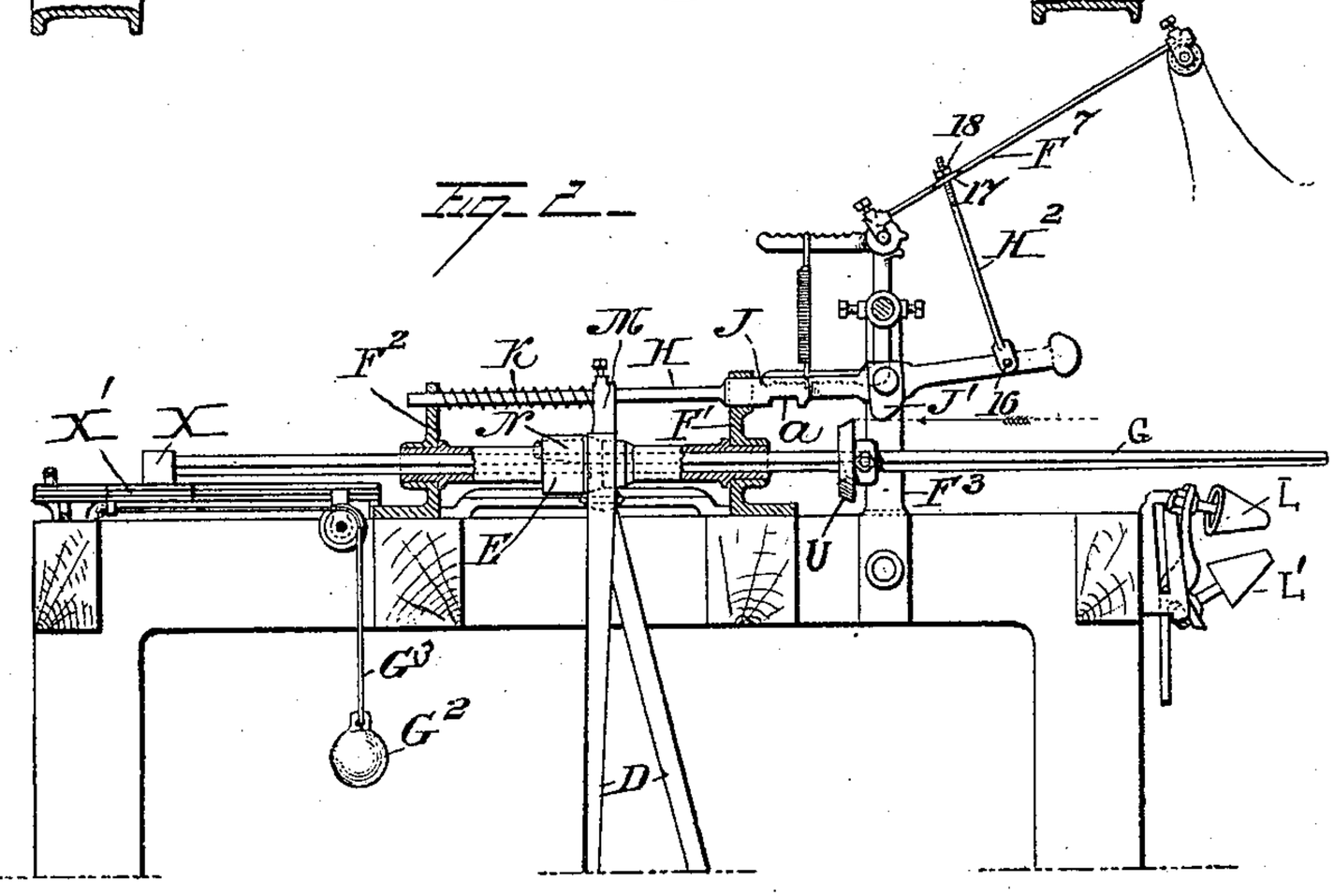


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

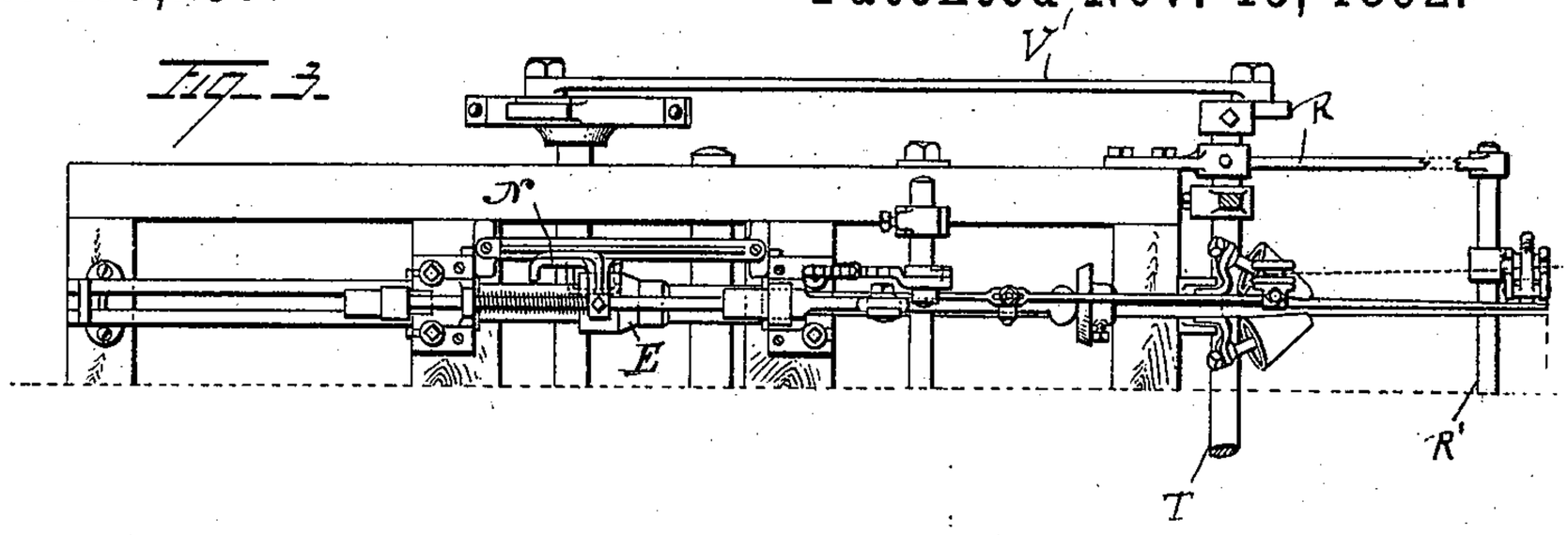


Fig. 6

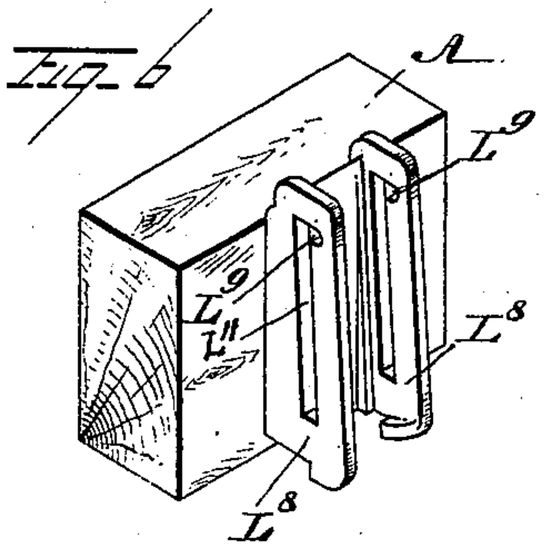


Fig. 4

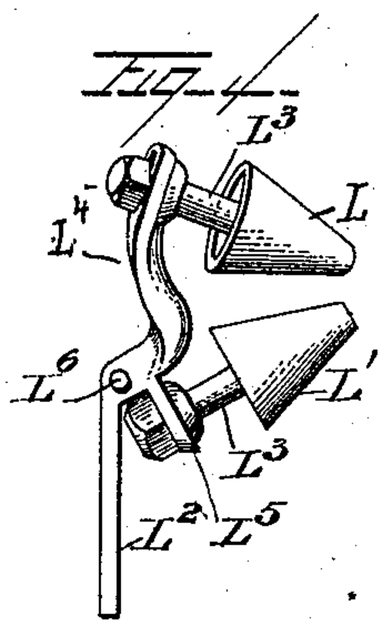


Fig. 5

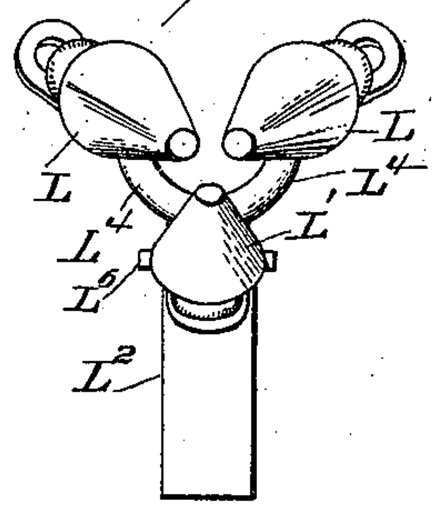


Fig. 7

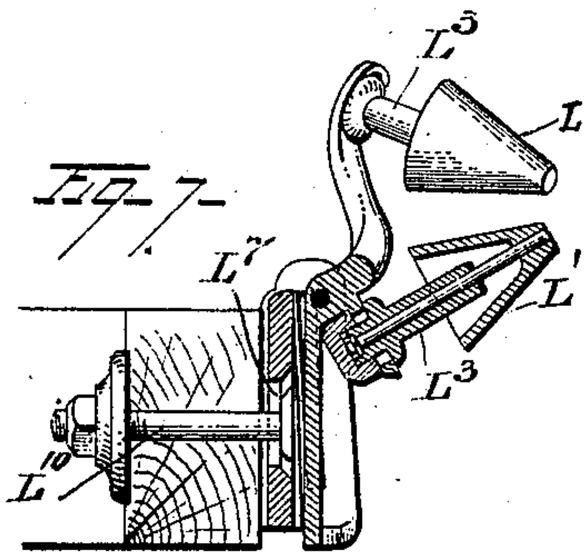


Fig. 8

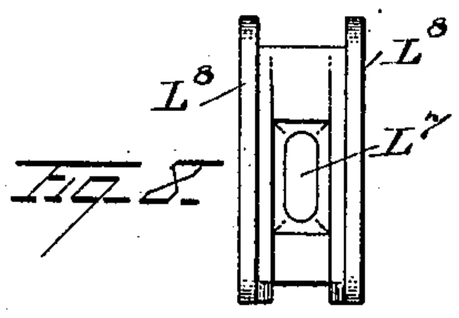
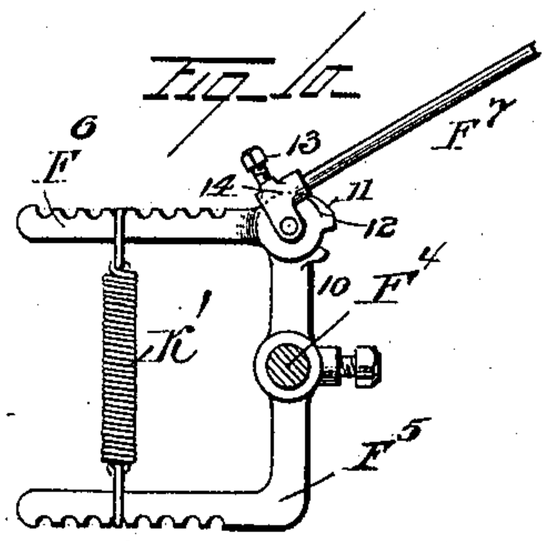


Fig. 10



line of spindle

Fig. 9

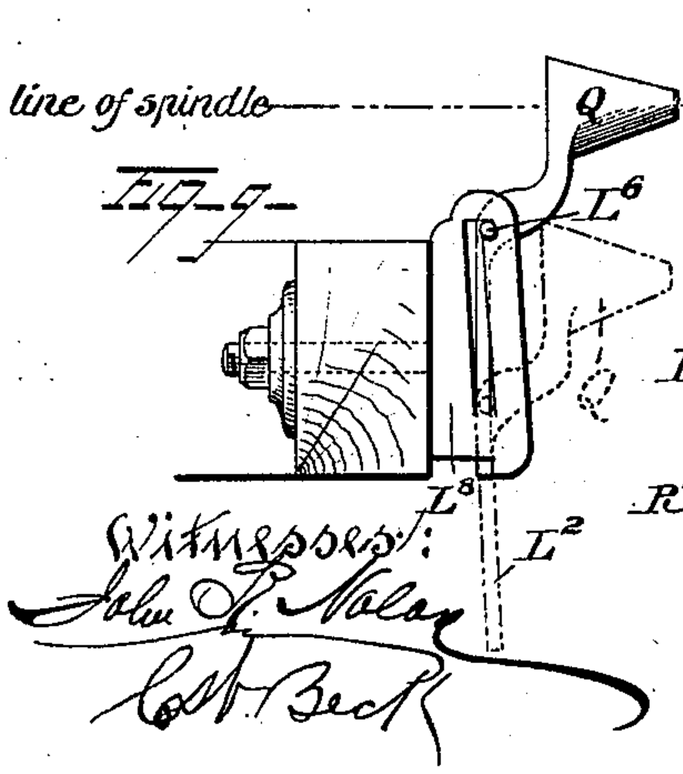


Fig. 11

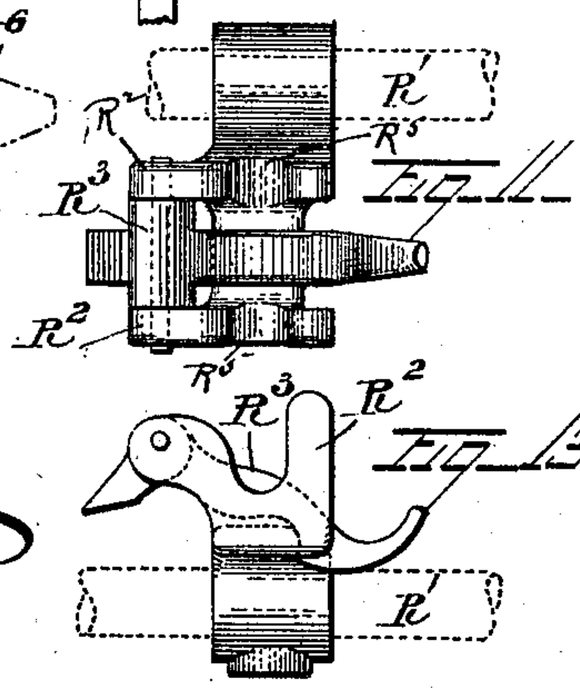
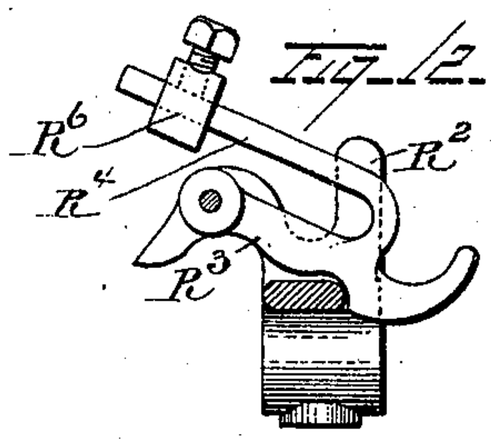


Fig. 12



Witnesses:
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Inventors:
Oswald Lever
William S. Grundy
by their Attys Hutson & Hutson

UNITED STATES PATENT OFFICE.

OSWALD LEVER AND WILLIAM S. GRUNDY, OF PHILADELPHIA, PENNSYLVANIA.

COP-WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 486,257, dated November 15, 1892.

Application filed March 2, 1891. Serial No. 383,499. (No model.)

To all whom it may concern:

Be it known that we, OSWALD LEVER and WILLIAM S. GRUNDY, citizens of the United States, and residents of the city of Philadelphia, State of Pennsylvania, have jointly invented certain new and useful Improvements in Cop-Winding Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to cop-winding machines; and it consists of improvements in the details of the mechanism and the combination and arrangement of the several parts, more particularly in the automatic stop-motion for throwing the spindle-bearing device out of gear with the driving mechanism after each cop is wound; in the mechanism for automatically operating the sliding sleeve which supports the spindle; in the mechanism which controls the form of the cop on the end of the spindle and drops said mechanism below the plane of the spindle when the cop is finished therein, and in the tension device between the thread supplying and guiding devices adjacent to the spindle-point.

In the accompanying drawings, illustrating our invention, in which similar letters and numerals of reference indicate corresponding parts in the several views, Figure 1 is a side elevation of a cop-winding machine embodying our invention. Fig. 2 is a longitudinal vertical sectional view of the upper part thereof. Fig. 3 is a top plan view. Figs. 4 and 5 are the side and front views, respectively, of the mechanism adjacent to the point of the spindle for controlling the form of the cop upon the spindle-point. Fig. 6 is a perspective view of the guiding-frame in which the shaft of the cop-forming mechanism is supported and moved vertically, and Fig. 7 is a sectional view thereof. Fig. 8 is a front view of the base-plate thereof. Fig. 9 is a modification of the cop-forming mechanism, the detached view being an end view of the forming-cup. Fig. 10 is a detached side view of the spring mechanism illustrated in Figs. 1 and 2 which controls the stop-motion; and Figs. 11 and 13 are top and side views, respectively, of the tension mechanism. Fig. 12 is a side view of a modification thereof.

In the drawings, A represents the supporting-frame of the machine, and B the driving-shaft, on which is mounted cog-gearing B′, which operates the pulley C, around which passes a belt or band D, the latter also passing around a pulley E, which is formed with or secured to a horizontally-arranged sleeve F, which is mounted in standards F′ F^2 at the top of the frame A and extends in a transverse direction of the machine, said sleeve being thus rotated by said pulley E. Within the sleeve F is fitted a sliding spindle G, one end of which is tapering or pointed for holding the cop, the main length of the spindle being square. The rear end of the sleeve F in its interior is made square, so that by contact therewith of the angles or corners of the square portion of the spindle the latter is adapted to slide with ease within the sleeve and receive rotary motion therefrom. The standards F′ and F^2 also provide bearings for a sliding rod or bar H, which extends in the direction of and above the spindle G. The opening in the standard F′ is square, so as to allow to pass partly through the same and have a slight vertical play or be recessed and lowered slightly therein an enlarged part J, which is recessed at *a* on its under surface to adapt it to engage with the lower side of the square opening in the standard F. Around the rod H is a spring K, which bears at one end against the collar of the belt-shipper M on said rod and the other end against the standard F^2, whereby when the end of the rod H is raised so as to disengage the recess *a* from the base of the standard F′ the spring K forces the rod forward. The rod H is thus slightly raised vertically, so as to disengage the recess *a* from its engagement with the base of the bearing in the standard F′ on the breaking of the thread during the formation of a cop by means of the following mechanism: A standard F^3 rises upright from the frame of the machine and supports at its top a fixed shaft F^4, extending laterally over the rod H′ and the spindle G. Upon this fixed shaft F^4 is supported adjustably by means of a set-screw an angle-arm F^5. (See Fig. 10.) A longitudinally-extending arm F^6 is pivoted upon a bolt passing through the upper end of the angle-arm F^5. Secured adjustably by a set-screw 13 in a recess 14 of the arm F^6 is an arm F^7, which extends over the spindle and carries on its end a guide-wheel 15, over which the yarn passes on its way to the spindle-point

to form the cop. Between the arm F^6 and the longitudinal portion of the angle-arm F^5 is provided a spring K′, and said arm F^6 has a projection 12, which plays between the shoulders 10 and 11 at the top of the upright portion of the angle-arm F^5. The belt-shipping rod H is secured to the arm F^7 by any appropriate means—such as the screw-rod H^2, pivoted at 16 and passing through a slot 17 in the arm F^7—and its operating length controlled by a nut 18. (See Figs. 1 and 2.) In order to raise the recessed portion *a* of the rod H out of engagement with the bearing in the standard F′ when the cop is finished on the spindle, there is secured to the spindle G a nose or cam-shaped piece U, which is so disposed that when said spindle is run back said piece U, rotating with the spindle, strikes the projecting portion J′ of the rod H and so raises the recess *a* out of engagement with the standard F′, whereby the spring K of the rod H is permitted to become operative and throw the latter forward, as described. Connected with the rod H is a belt-shipper M, which is adapted to engage with a belt or band D, the same being formed with a longitudinally-projecting arm N, which is so disposed that when the rod H is moved, the shipper following the same, the arm N strikes a projection P, formed on the pulley E, and thus the rotation of said pulley is stopped. The pulley E has a portion of its length or a connected part of reduced diameter, (see Figs. 1, 2, and 3,) to which portion the belt or band D may be moved by the shipper M, whereby said belt or band becomes inoperative and the pulley is relieved of power. The cop is formed on the end of the spindle G by means of the conical rollers shown in Figs. 4, 5, and 7 or by means of the cup shown in Fig. 9. The normal position of the spindle G at the beginning of the operation in forming the cop thereon is shown in Fig. 1, the spindle passing through the space between the pointed ends of the three conical rollers L L L′. These rollers are mounted loosely on shafts L^3 to permit them to revolve freely thereon. The lower one L′, however, (see Fig. 7,) should have an additional play outwardly upon its shaft. The shafts L^3, upon which these rollers are mounted, are supported as respects the upper rollers L L in slotted arms L^4, proceeding from the upright plate L^2, the lower roller L′ being supported upon a plate L^5, also proceeding from said upright plate L^2. On the front of the frame of the machine is a plate. (Shown in perspective in Fig. 6, in section in Fig. 7, and in front view in Fig. 8.) This plate is secured to the frame through a slot L^7 by means of a bolt L^{10}. It has sides L^8, projecting at right angles, which are slotted vertically and provided with recesses L^9 at the upper end of said slots. The plate L^2, supporting the cop-forming rollers, (see Fig. 4,) is adapted to be moved vertically in the supporting devices shown in Fig. 6 by means of the projecting pins L^6, passing through the slots L^{11} and supported in the recesses L^9 of said slots at the top thereof. In lieu of the said conical rollers a cop-shaping cup (shown in Fig. 9) may be employed, said cup, as shown in end view, being open at its top and the spindle projecting through the same. In such construction, however, the arms L^4 of the plate L^2 are dispensed with and the cup supported stationary and in the same plane with the spindle, as shown in Fig. 9. An arm R, proceeding from the frame of the machine in front thereof, supports a tension device $R^\times$, the position of which relatively to the machine is shown in Fig. 1 and the detailed construction of which is shown in Figs. 11 to 13, as follows: A shaft R′, proceeding from the arm R, supports a frame R^2, in which a latch R^3 has its pivotal bearings. This bracket-frame has a pair of vertical arms R^2 R^2 parallel to each other, at the forward opposite ends of which are provided journal-bearings for the head of the pivoted latch R^3, and between these parallel arms the outward end of the latch rests upon the yarn passing beneath it. Said arms R^2 R^2 are recessed at R^5 R^5 to form a thread-guide, which keeps the yarn in position under the pivoted latch. The thread leading from the spool to the spindle passes beneath this latch R^3, which is so pivoted that its weight is greater at one end than the other and by gravity bears upon and restrains the too-free movement of the thread beneath it. A modification thereof is shown in Fig. 12, in which the latch R^3 is provided with a counterbalancing device R^4, extending backward over the pivot-bearing, which arm is provided with a sliding counterbalancing-weight R^6, so that thereby the weight of the latch R^3 upon the thread may be adjusted.

Secured in the frame of the machine at right angles with the line of the spindle and below the roller-supporting plate L^8 is a horizontal rock-shaft T, upon which is fixedly mounted an upright arm T′, which supports at its upper end a guide-wheel T^2 and a finger T^3, by which latter the thread is guided in the operation of being formed into a cop. This upright arm T′ has a vibratory movement in the direction of the length of the spindle and over the portion thereof upon which the cop is formed, this action being produced by the rock-shaft T, which is in turn vibrated by being fixed to a lever V, the lower end of which is pivotally attached to a pitman V′, which is connected with an eccentric-strap V^2, which encircles an eccentric W, keyed or otherwise secured to the driving-shaft B. The normal position of the spindle is forward, as shown in Fig. 1—that is to say, with its rear end almost flush with the end of the sleeve F. It is retained adjustably in that position by means of a buffer X, to which is attached a cord G^3, suspending from its other end a weight or bob G^2, and the buffer X travels in a railway X′.

The operation of the device is as follows: Power being applied to the driving-shaft B,

the pulley C and eccentric W are rotated. The driving-belt D imparts rotary motion to the pulley E, and consequently to the spindle G. Vibrating motion is imparted from the eccentric W to the lever V through the pitman V′, whereby a rocking motion is imparted to the shaft T and a vibratory motion to the arm T′, which carries the thread-guiding finger T^3, the thread being previously led from the thread-supplying mechanism under the tension device R^x, thence over the guiding-wheel 15 of the stop mechanism, and thence over the guide-wheel T^2 of the vibrating arm T′, thence to the finger T^3 thereof, and thence to that part of the spindle between the conical rollers L L L′ and the cam projection U, fixed upon the spindle. As the thread or yarn winds on the spindle the cop is formed, and as the same increases in size it bears against the inner face of the cup Q (if that form of cop-shaping device is used) or against the sides of the rotary conical rollers L L L′, (if that form is used,) and owing to its conical form produced thereby it forces the spindle rearward in the direction toward the rod H, so that when the nose or cam U reaches the projection J′ the cop is about finished, and the nose L, striking this projection, lifts the recessed part *a* of the rod H out of engagement with the slotted base of the standard F′, with which it is interlocked, as in Fig. 1, and the spring K at once becomes operative to move the rod H forward, and thus the parts assume the position shown in Fig. 2. As in normal position (see Fig. 1) the belt D passes around the larger diameter of the pulley E, the movement as last described of the rod H, which carries the shipper M, operates to shift the belt D to the smaller portion of the pulley E, thus slacking the said belt and relieving the pulley of the power of the same, whereupon the projection P on the pulley strikes the arm N of the shipper and the pulley is immediately stopped and the spindle G ceases its rotation. The same action of the parts occurs pending the formation of the cop if the thread breaks, whereby the arm F^7 is released, thereby drawing up the rod H and lifting its recess *a* out of engagement with the base of the standard F′. When the cop is finished, a manual movement backward of the plate L^2, which supports the conical rollers or cop-shaping cup, releases its projections L^6 from the recesses L^9 in the vertical slots of the plate L^8 and permits said plate L^2 to drop downward in the slots, carrying with it the conical rollers or cop-shaping cup to a point below the line of the spindle, and thereby enables the finished cop to be removed from the spindle. To form the second cop, the yarn is strung upon the machine, as before stated, and the operation proceeds to form a second cop similarly as described with relation to the first.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A cop-holding spindle and a rotating sleeve-bearing therefor whereby said spindle may also have an endwise motion, in combination with cop-shaping mechanism consisting of three conical friction-rollers mounted upon shafts set at an angle to each other, the lower one of said rollers being loose upon its shaft and capable of longitudinal reciprocation thereon, and a vertically-adjustable supporting-plate for said roller-shafts, consisting of the supporting-plate L^2, provided with slotted arms L^4 L^4, substantially as and for the purpose described.

2. A cop-holding spindle, a sleeve-bearing therefor, a belt-shipping mechanism, and connected spring-controlled sliding rod H, mounted over the same, having an enlargement J thereon recessed on its under surface, and a bearing F′ therefor and having an enlarged opening, in combination with mechanism adapted to free the said rod on the breaking of a thread, consisting of an angle-arm F^5, its supporting-post F^8, connected arms F^6 and F^7, pivotally mounted on said angle-arm, a tension-spring K′ between said angle-arm and the arm F^6 on one side of the pivotal bearing, and mechanism on the other side of said pivotal bearing connecting the arm F^7 with rod H, controlling the belt-shipping device, substantially as described.

3. The combination, with yarn-winding mechanism, of tension devices consisting of the bracket R, having journal-bearing arms R^2, recessed at R^5 to form thread-guides, and a latch R^3, journaled at one end therein and adapted to rest by gravity upon the yarn passing under the same and through said recess in the bracket-arms, substantially as described.

4. The combination, with yarn-winding mechanism, of tension devices consisting of the bracket R, having journal-bearing arms R^2, recessed at R^5 to form thread-guides, a latch R^3, journaled at one end therein and adapted to rest by gravity upon the yarn passing under the same and through said recess in the bracket-arms, and a counterbalancing device R^4R^6 on and extending over the pivoted latch, whereby the weight of the latter upon the yarn may be adjusted, substantially as described.

5. A cop-shaping mechanism and its vertical supporting-plate L^2, provided with projecting pin 6, in combination with a vertically-slotted plate L^8 and having recesses L^9, adapted to engage with the laterally-projecting pins L^6 of the supporting-plate, substantially as described.

In testimony whereof we have hereunto affixed our signatures this 28th day of January, A. D. 1891.

OSWALD LEVER.
WILLIAM S. GRUNDY.

Witnesses:
JOHN R. NOLAN,
H. T. FENTON.