E. H. RYON.

COP WINDING MACHINE.

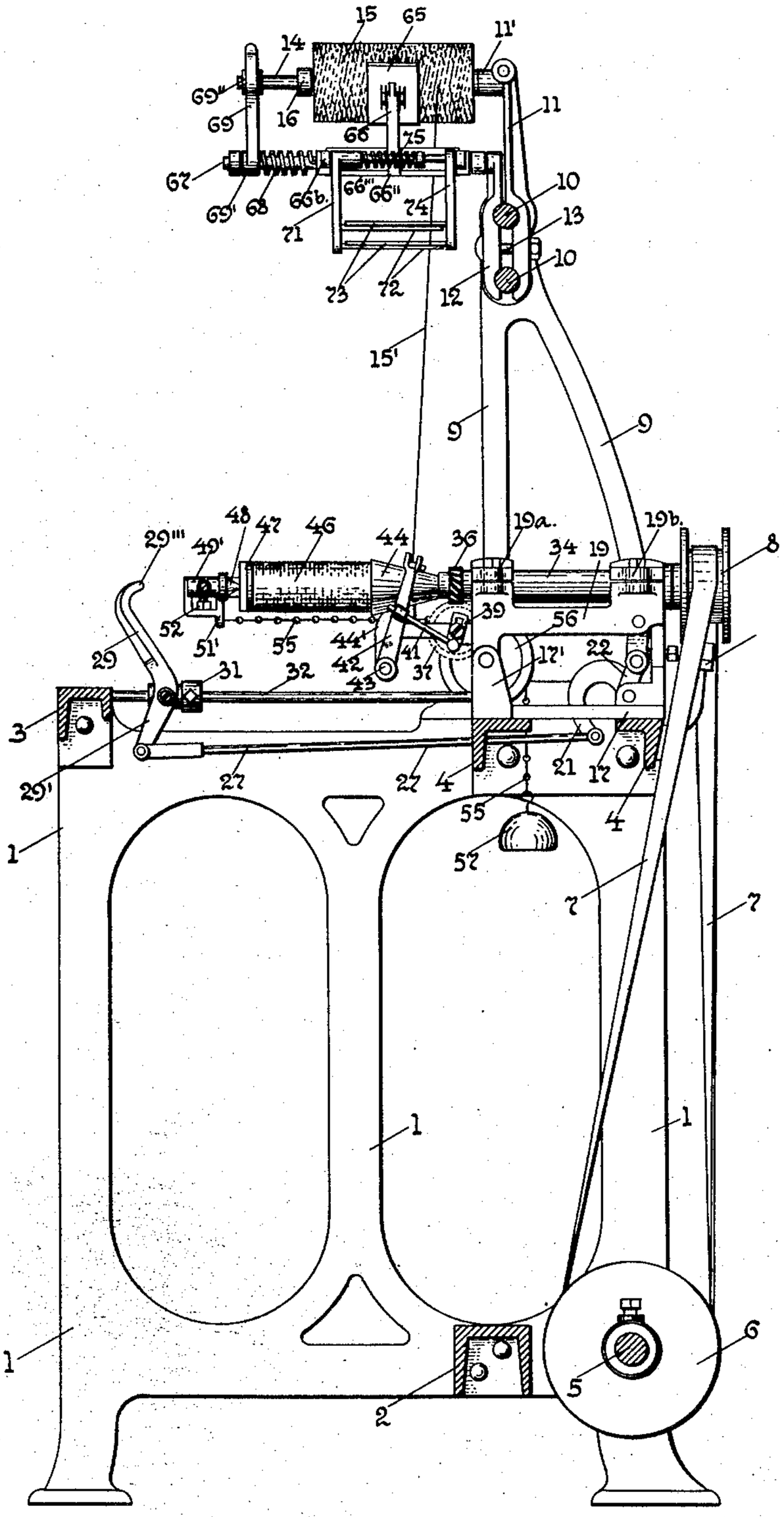
APPLICATION FILED JUNE 16, 1909.

**976,698.**

**Patented Nov. 22, 1910.**

4 SHEETS—SHEET 1.

Fig. 1.




Witnesses

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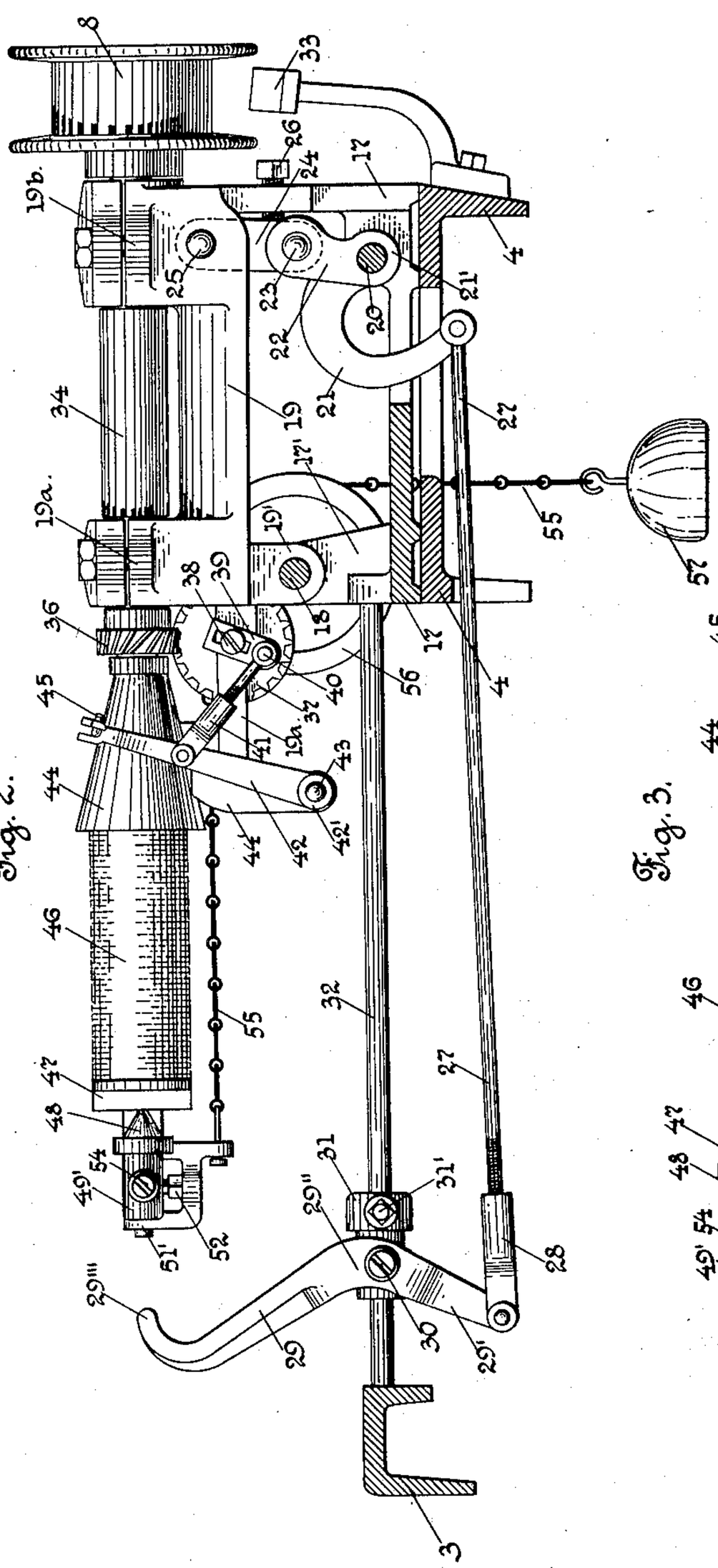

Fig. 2.

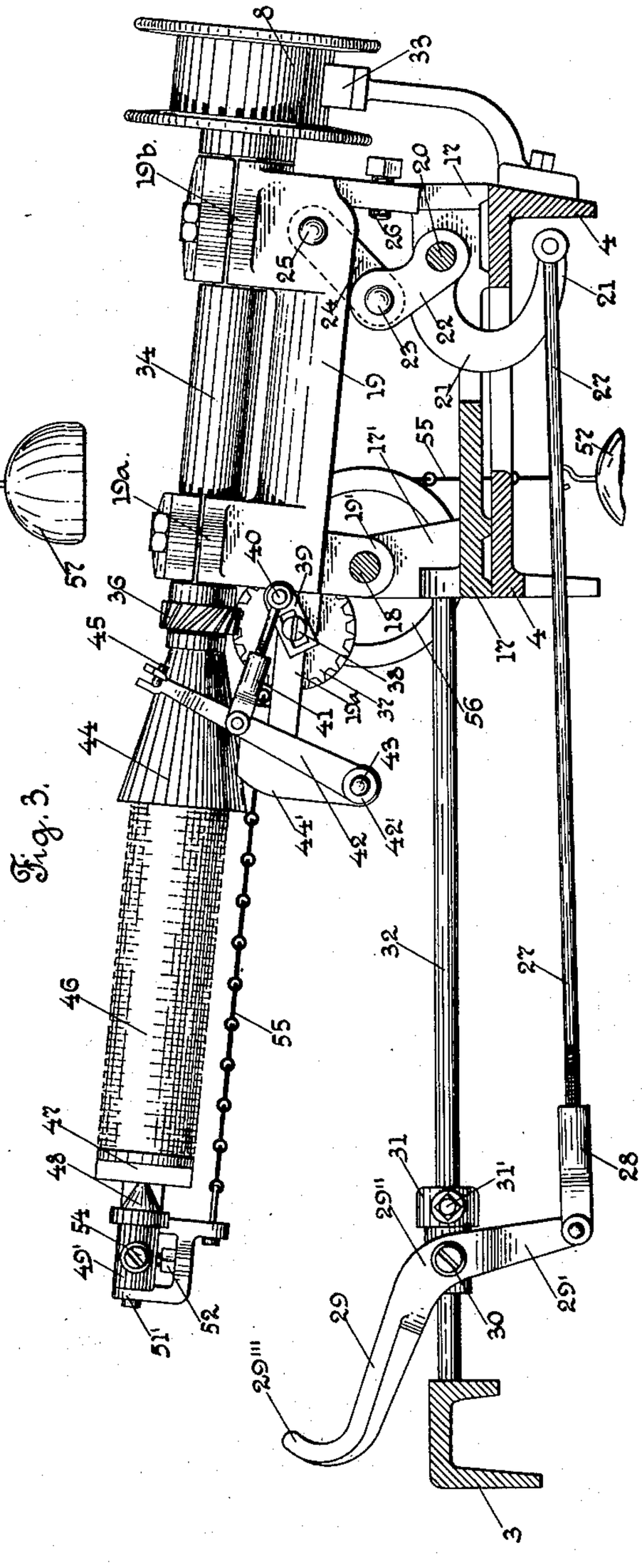

Fig. 3.

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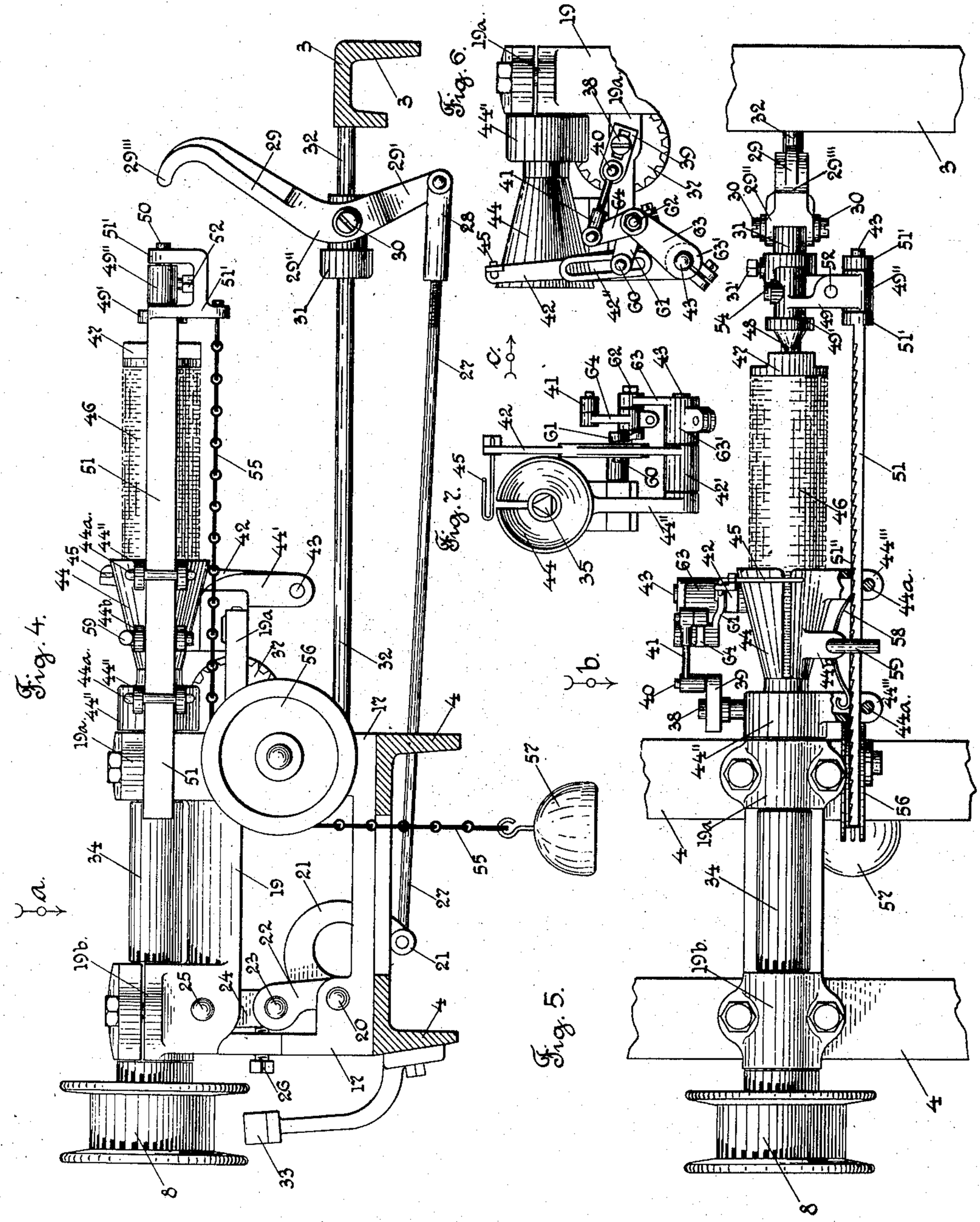
4 SHEETS—SHEET 3.

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4 SHEETS—SHEET 4.

Fig. 9.

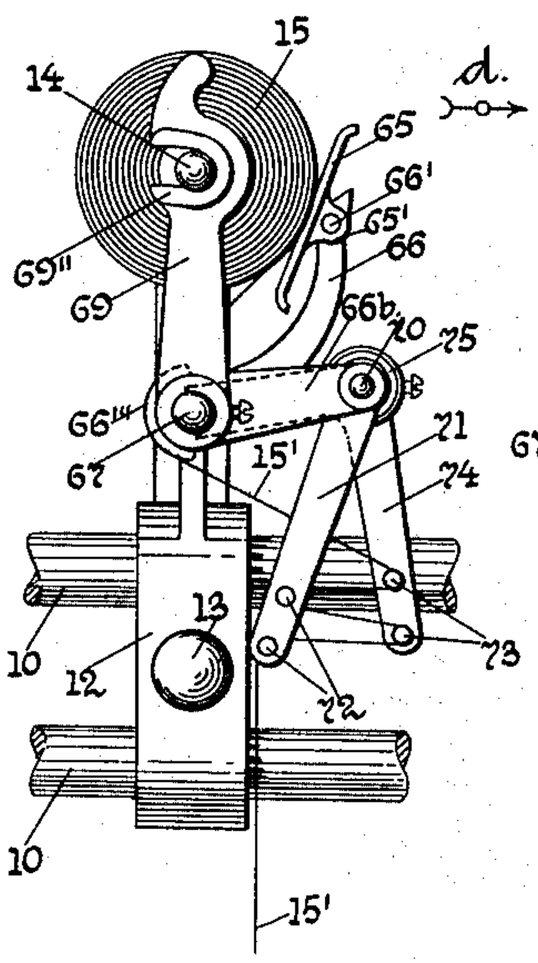



Fig. 8.

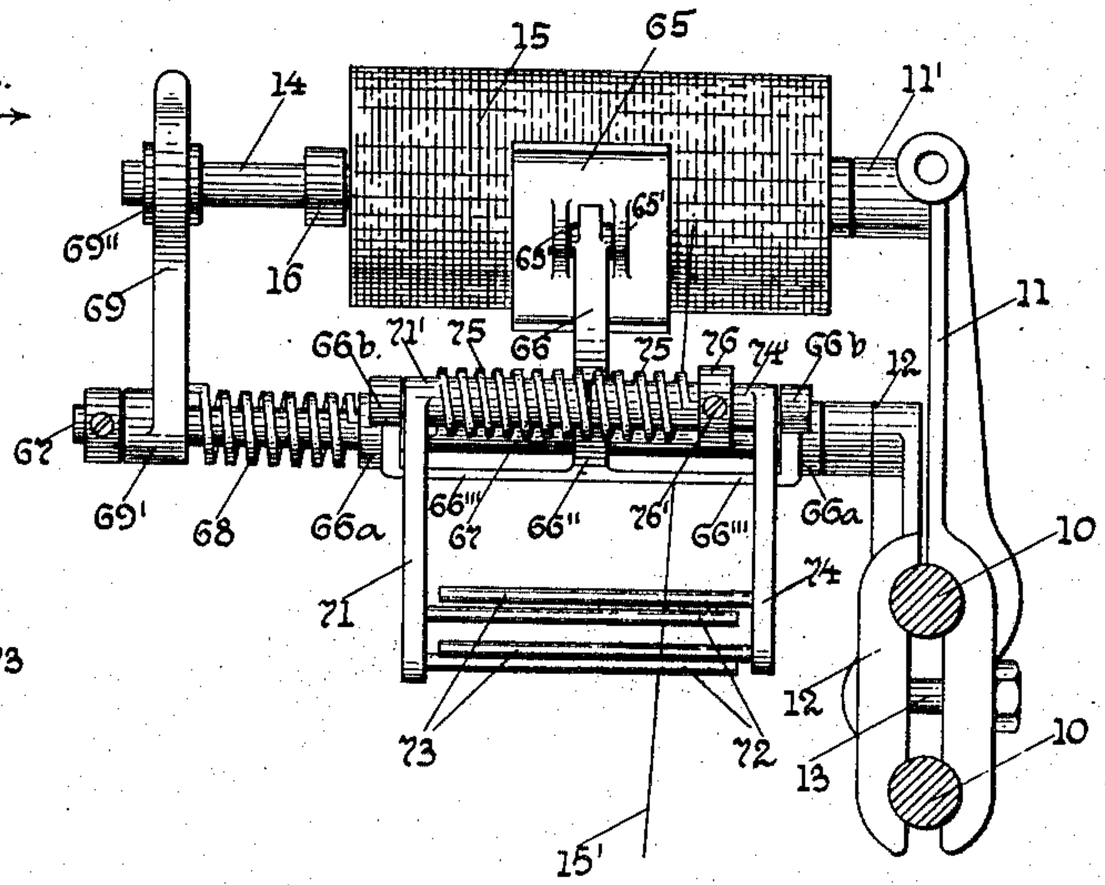
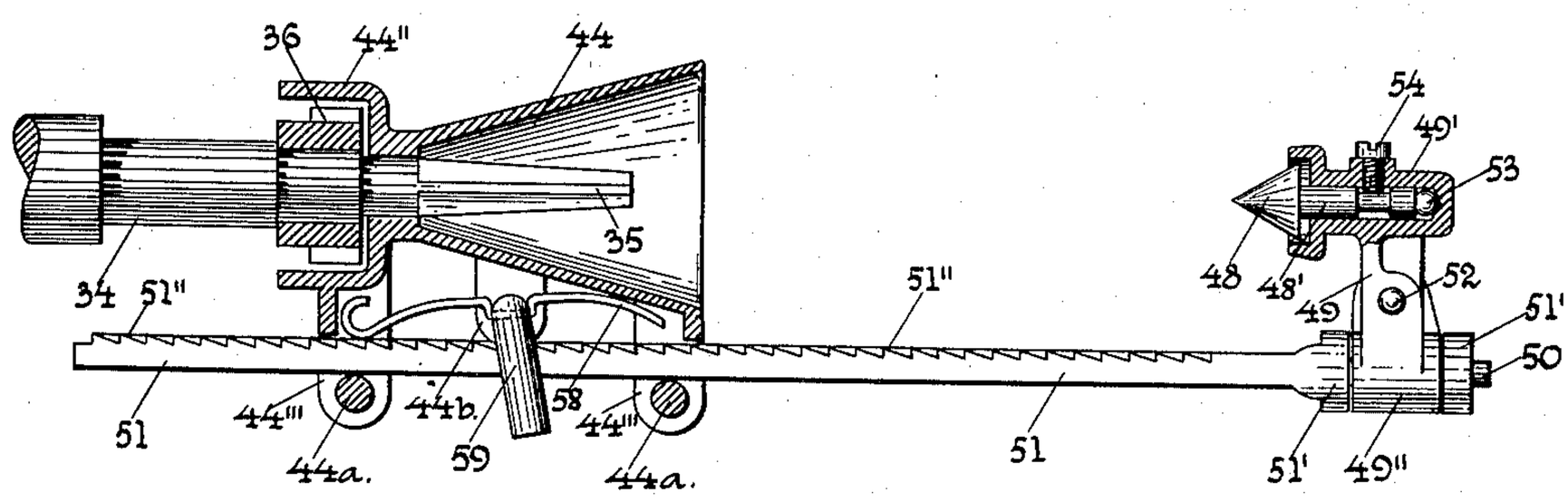



Fig. 10

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# UNITED STATES PATENT OFFICE.

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## COP-WINDING MACHINE.

976,698. Specification of Letters Patent. **Patented Nov. 22, 1910.**

Application filed June 16, 1909. Serial No. 502,451.

*To all whom it may concern:*

Be it known that I, EPPA H. RYON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Cop-Winding Machines, of which the following is a specification.

My invention relates to a cop winding machine, or an automatic machine for winding cops, spools, or similar devices, and the object of my invention is to improve upon the construction of a cop winding machine as ordinarily made.

My improvements particularly relate to mechanism for stopping the spindle driving mechanism, after the cop or spool is fully wound, and to the individual traverse motion for each spindle, and to the cop holding device.

My invention consists in certain novel features of construction of my improvements as will be hereinafter fully described.

I have only shown in the drawings detached portions of a cop winding machine with my improvements applied thereto, sufficient to enable those skilled in the art to understand the construction and operation of the same.

Referring to the drawings:—Figure 1 is a vertical cross section of a cop winding machine, with my improvements applied thereto. Fig. 2 shows, on an enlarged scale, the spindle drive mechanism shown in Fig. 1, detached; the lower portion is shown in section. Fig. 3 corresponds to Fig. 2, but shows some of the parts in a different position. Fig. 4 shows the spindle drive mechanism shown in Fig. 2, looking from the opposite side. Fig. 5 is a plan view of the spindle drive mechanism shown in Fig. 4, looking in the direction of arrow *a*, same figure, and also shows a modified construction of the traverse motion. Fig. 6 is a side view of the modified construction of the traverse motion shown in Fig. 5, looking in the direction of arrow *b*, same figure. Fig. 7 is a front view of the traverse motion shown in Fig. 6, looking in the direction of arrow *c*, same figure. Fig. 8 shows, on an enlarged scale, the thread tension device shown in the upper part of Fig. 1. Fig. 9 is a front end view of the thread tension device shown in Fig. 8, looking in the direction of arrow *d*, same figure, and, Fig. 10 shows, on an enlarged scale, a section of the spindle end, and spindle rack, detached, with the butt spindle holder in section.

In the accompanying drawings, 1 is the side or end frame of the machine, 2 is the lower cross girt, 3 the front girt, and 4 the back girt of the machine. A driving shaft 5 is, in this instance located near the bottom of the machine, and suitably mounted in bearings, not shown. On the driving shaft 5 is secured the driving pulley 6. There is in this instance a driving pulley for each spindle; only one pulley and spindle is shown in the drawings. A belt 7, with a half turn, passes around the pulley 6, and over a pulley 8, located above the pulley 6, to revolve the cop spindle, to be hereinafter described.

Secured on the end frame 1, and extending upwardly therefrom, preferably on each side, is a stand 9, which is adapted to carry on its upper end two traverse rods or shafts 10, 10, see Fig. 1. The shafts 10 have clamped thereon, the upwardly extending spool arm 11, in this instance by means of a cap 12 and bolt 13. Extending forward from the upper end of the spool arm 11, and suitably secured to the boss 11′ on said arm, is a rod 14, to loosely receive the yarn spool 15, which is held in position by a collar 16 on the rod 14.

All of the above-mentioned parts may be of the usual and well known construction in cop winding machines.

I will now describe my improvements.

On the back girt 4, see Fig. 2, is a stand 17, having the upwardly extending ears 17′ carrying a bolt 18, on which bolt is pivotally mounted the downwardly extending lug 19′ rigidly attached to the spindle bed 19. The other end of the stand 17 is provided with a bolt or stud 20, which has loosely mounted thereon the hub 21′ of a lever 21. Extending upwardly from the hub 21′ is a fork lever 22, carrying a stud 23, on which stud is pivotally mounted one end of a link 24. The other end of said link 24 is pivotally connected with a bolt 25 on the rear part of the spindle bed 19, see Figs. 2, and 3. When the lever 21 is in the position shown in Fig. 2, the link 24 bears against the end of a screw bolt 26, which is adjustably screwed into the downwardly extending projection 19″ on the spindle bed 19, and the rear portion of the spindle bed 19 is raised

to cause the driving belt 7 to be tightened on the pulley 8, to rotate the spindle.

The lever 21 extends downwardly, and has pivotally connected to its end one end of a connector rod 27; the other end of said rod 27 is provided with a rod-head 28, to which is pivotally connected the end of a downwardly extending arm 29′ on a lever 29, which has its hub 29″ preferably yoked, and pivotally mounted on bolts 30, secured on a collar 31, which is adjustably secured upon the horizontally extending rod 32 by a set screw 31′. The upwardly extending arm of the lever 29 has in this instance the engaging end 29‴, adapted to extend in the path of and be engaged by the spindle holder, after the cop is wound to a predetermined extent, to move the lever 29 from the position shown in Fig. 2, to the position shown in Fig. 3, and through the arm 29′ and link 27, rock the lever 21 and cause the spindle bed 19 at its outer end to be lowered, to loosen the belt 7, and cause the pulley 8 to rest on the friction stand 33, secured at its lower end to the cross girt 4 and stop the rotation of the spindle.

The spindle drive mechanism consists in this instance of the spindle 34, see Fig. 2, adapted to rotate loosely in bearings 19ª and 19ᵇ on the bed 19. The outer end of the spindle 34 has secured thereon the pulley 8, and the inner end of the spindle 34 is provided with a tapered tip 35, see Fig. 10. The tip 35 is in this instance made of triangular shape in cross section, as shown in Fig. 7, and acts to hold firmly the cop to be wound thereon.

On the reduced end of the spindle 34, in front of the bearing 19ª, see Fig. 2, is mounted in this instance the hub of a spiral pinion 36, which pinion meshes with and drives a spiral gear 37, fast on a shaft which preferably revolves in suitable bearings on the extension 19ª of the spindle bed 19. One end of said shaft has adjustably secured thereon, by a screw 38, the crank slide 39 carrying a crank pin 40, which pin is pivotally connected with one end of a connector 41; the other end of said connector 41 is pivotally connected to the upwardly extending traverse lever 42, which lever has the hub 42′ on its lower end loosely mounted on a stud 43 on the downwardly extending arm 44′ on a trumpet 44, see Fig. 2. The trumpet 44 for forming the shape of the cop is secured on the extension 19ª, and is adapted to loosely extend over the end of the spindle 34 and the tapered tip 35, see Fig. 10. The trumpet 44 is preferably provided with a cylindrical portion 44″, to cover the spiral gear 36, see Fig. 10. The traverse lever 42 is provided with a thread-hook 45, which is suitably held on the end of the traverse lever 42, and is adapted to guide the thread in the usual way, to form the cop 46, to be wound on the butt 47, in the usual way.

The butt 47 of the cop 46 is centrally located, in this instance on the butt spindle 48, see Fig. 3. The butt spindle 48, see Fig. 10, is of conical shape and may have its exterior surface corrugated, if desired. The shaft 48′ of the butt spindle 48, loosely revolves in the head 49′ of the spindle lever 49, which has its hub 49″ pivotally mounted on a stud 50 on the head 51′ on the weight bar 51. A set screw 52 on the head 51′, see Figs. 2 and 3, limits the downward movement of the butt spindle lever 49. The butt spindle 48 bears at its outer end, in this instance, against a ball 53 within the head 49′. A set screw 54 turns through a threaded opening in the head 49′, and its inner end extends into an annular groove in the spindle 48, and acts to hold the spindle in the head 49′.

The weight bar 51 is supported in a horizontal plane, in this instance on pins 44ª, in extensions 44‴ on the trumpet 44, see Fig. 10. A chain 55, see Fig. 4, is secured at one end to the head 51′ on the bar 51, and passes over a guide-sheave 56, and has in this instance secured to its other end a weight 57, which weight acts to yieldingly move the cop 46 toward the trumpet 44. The weight bar 51 is preferably provided with teeth 51″ on its inner edge. The teeth 51″ are adapted to be engaged by the end of a spring blade 58, see Fig. 5. The blade 58 is secured on an arm or lever 59, which has a rocking motion in an extension 44ᵇ on the trumpet 44. The engagement of the end of the spring blade 58 with the teeth 51′ on the bar 51, as shown in Fig. 5, holds said bar in its outward position, during the removal of the cop from the spindle after it is wound a sufficient length. The turning of the arm or lever 59 to the right in Fig. 10, after the cop has been taken from the spindle, will release the engaging end of the spring blade 58 from the teeth 51″ on the bar 51, and allow the weight 57 to act to return the bar 51 and the butt spindle 48 to their starting position.

I have shown in Figs. 6, and 7, a modified construction of the traverse motion. In these figures, the traverse lever 42 has its hub 42′ pivotally mounted on the stud 43, and has an elongated slot 42″, into which loosely extends and is adapted to move a pin or stud 60 on a lever 61. The lever 61 has its hub 61′ pivotally mounted upon the stud 62 on the end of an upwardly extending arm 63, which has its hub 63′ adjustably secured upon the stud 43. Extending out from the hub 61′ of the lever 61, and adjustably secured thereon, is a lever 64, which has pivotally connected to its end one end

of the connector 41, the other end of which is connected to the crank slide 39, above referred to, to operate the traverse lever 42.

In the modified construction of the mechanism for moving the traverse lever 42, I obtain more or less dwell on one end of the stroke of said traverse lever. By the mechanism, as shown in Fig. 6, the position of the arm 63 causes a dwell motion at the left of the stroke, and if the arm 63 is turned and adjusted to the left, the dwell for the traverse lever 42 will occur at the right of the stroke of the traverse lever 42.

I will now describe my improvements in thread tension mechanism, which are shown in Figs. 8, and 9. A friction pad 65 bears against the thread on the spool 15, and has in this instance ears 65′ thereon to loosely receive the pin 66′ carried on the upper end of an arm 66, which has its hub 66″ loosely mounted on a rod 67, see Fig. 9, which rod extends out from the cap 12 of the spool holder. Preferably made integral with the hub 66″ and extending out therefrom on each side, is the rounded part 66‴, over which the thread 15′ from the spool 15 passes. Each end of the rounded portion 66‴ has a hub 66ª, which is loosely mounted on the rod 67. A helically coiled torsion spring 68 encircles the rod 67, and is attached at one end to the hub 66ª, and at its other end to the hub 69′ on an arm 69, see Fig. 8, which arm extends upwardly and has an open end slotted portion 69″ to hold the end of the spool shaft 14. Through the action of the torsion spring 68, the arm 66, with the friction pad 65 thereon, will be moved toward the spool surface to press against the spool 15. Each of the end hubs 66ª is provided with an arm 66ᵇ which extends out therefrom, and they carry at their outer ends a rod 70, see Fig. 9, on which is loosely mounted the hub 71′ of a downwardly extending arm 71. Said arm 71 carries a pair of thread tension wires 72 extending out at right angles therefrom. A second pair of thread tension wires 73 are attached to a second arm 74, which has its hub 74′ loosely pivoted on the rod 70, which hub has an arm extending inwardly therefrom toward the rod 67, to be held thereby, see broken lines in Fig. 9, and rigidly hold the arm 74 in its position relative to the arm 66. A torsion spring 75 is connected at one end to a collar 76, secured by a screw 76′ on the hub 74′, and at its other end to the arm 71, and acts to yieldingly hold said arm 71 away from the arm 74, as shown in Fig. 9. The thread 15′ on the spool 15 passes around the thread wires 72 and 73, as shown in Fig. 9, and the increase of the friction on said thread causes the thread wire 72 to move toward the wire 73, on the arm 74, and when the tension is sufficient, the pull on the thread 15 will cause the wires 72 and 73 to be drawn toward each other, and move the arms 71 and 74 toward each other, to move the arm 66 and release the friction of the pad 65 on the spool 15, to diminish the friction of said spool.

It will be understood that the details of construction of my improvements may be varied if desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a cop winding machine, a pivotally mounted spindle bed, a spindle mounted on said bed, means to drive said spindle, a traverse device connected with and driven by said spindle, and a device for shaping the cop, all attached to and movable with said spindle bed.

2. In a cop winding machine, a pivotally mounted spindle bed, a spindle mounted thereon, a trumpet attached to said bed, a traverse arm, means to operate the same, and means connected with said spindle bed to move the same on its pivotal support, said means including a toggle joint, and devices to operate the same.

3. In a cop winding machine, a spindle having a tapered end on which the yarn is wound, a trumpet surrounding said end, means to revolve said end within said trumpet, a sliding member having ratchet teeth thereon, and a pivoted arm on one end of said sliding member, the free end of said arm carrying a device to bear against the butt end of the cop, and a pawl to coöperate with the teeth of said sliding member.

4. In a cop winding machine, a pivoted spindle bed, a spindle having its bearings on said bed, means to revolve said spindle, devices connected with said spindle bed to control it on its pivotal support, a revoluble member to bear against the but of the cop, means to hold said member in yielding contact with said cop, a second member mounted in the path of said revoluble member, as the latter is moved by the increase in the length of the cop as the yarn is wound thereon, and connections from said second member to said devices connected with the spindle bed, to cause the stoppage of the spindle when the cop has been wound to a predetermined length.

5. In a cop winding machine, a pivotally mounted spindle bed, a revoluble spindle mounted on said bed, and having a pulley on one end, and a tapered portion of triangular shape in cross section, at its other end, the trumpet surrounding said last mentioned end to form the shape of the cop, a traverse guide for the yarn adjacent said trumpet, and means to operate said guide, a belt connected with said pulley, and means to rock said spindle bed, to tighten and loosen said belt on the pulley, and a brake device adjustably secured adjacent said pulley, to

stop the motion of said pulley when the belt is slack.

6. In a traverse motion for winding machines, a pivotally mounted traverse arm having a slot therein, a guide for the yarn attached to said arm, two pivotally supported arms, adjustably connected, and adapted to move together, a fourth arm having a stud for a bearing for said adjustably connected arms, a stud in one of said adjustably connected arms to coöperate with the slot in said traverse arm, a connector from the other of said adjustable arms to a crank, and said crank, and means for operating said crank.

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