(No Model.) 3 Sheets—Sheet 1.

C. L. STACY.

ADJUSTABLE WINDING MACHINE.

No. 592,454. Patented Oct. 26, 1897.

Fig. 1.

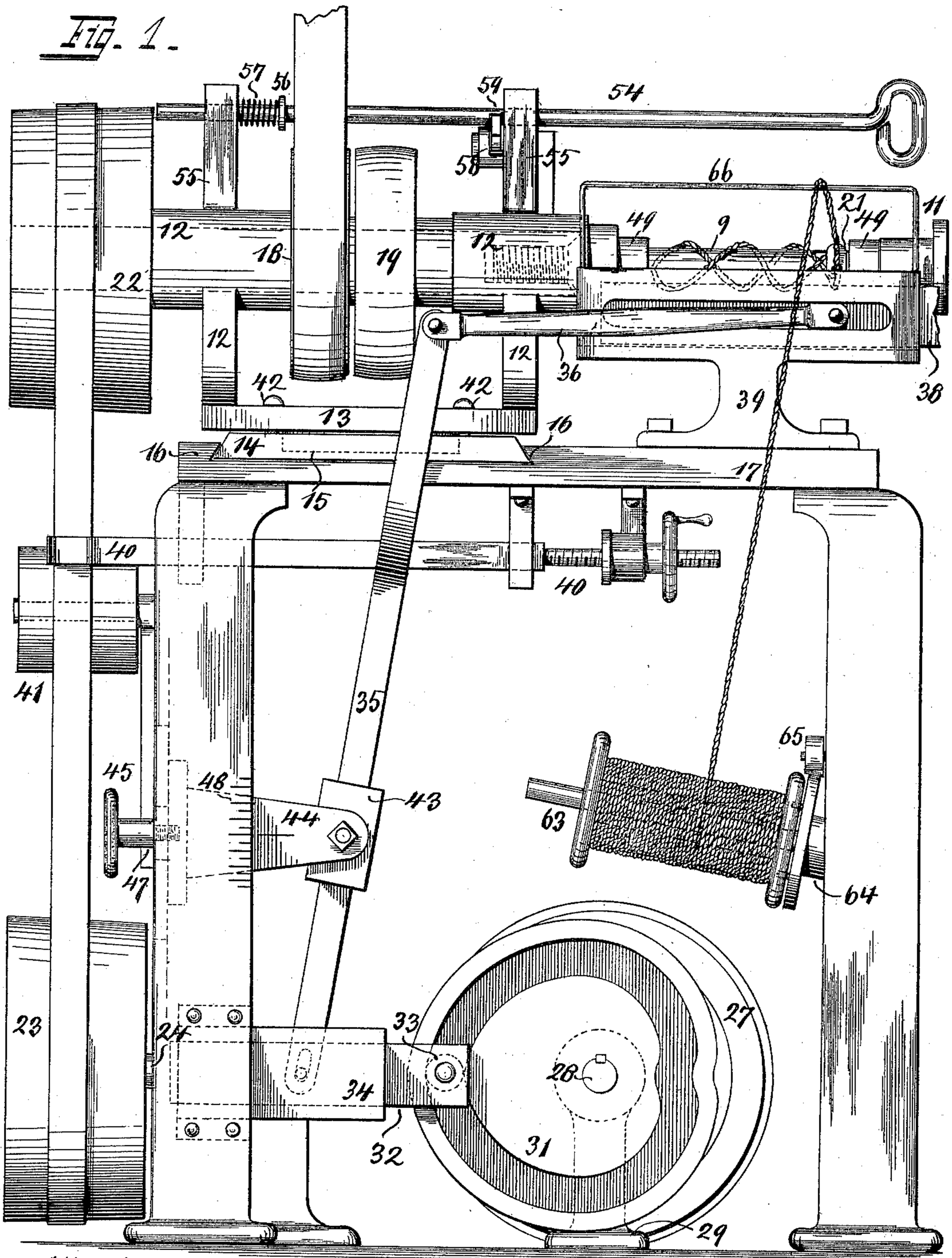

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Fig. 2.

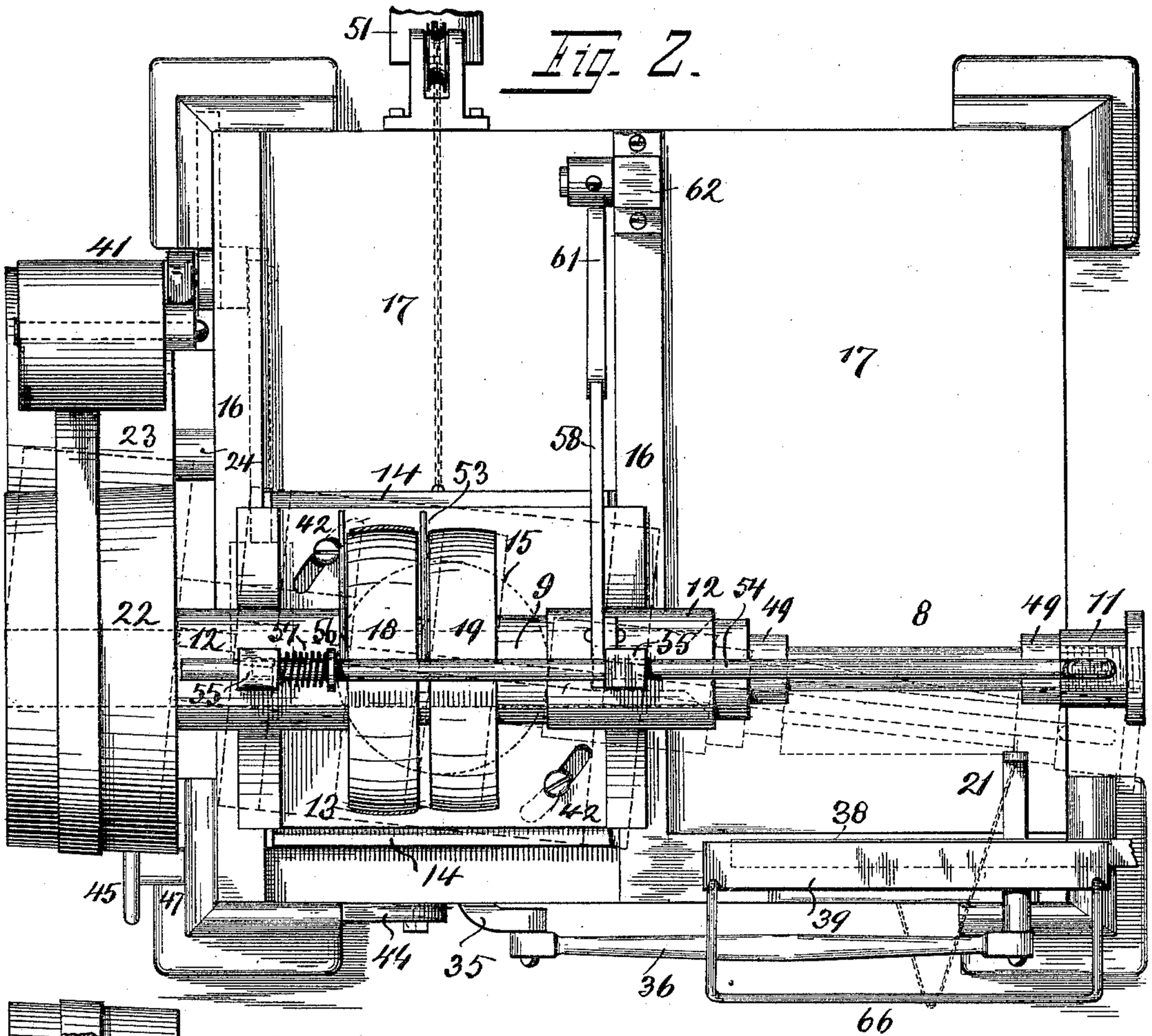


Fig. 4.

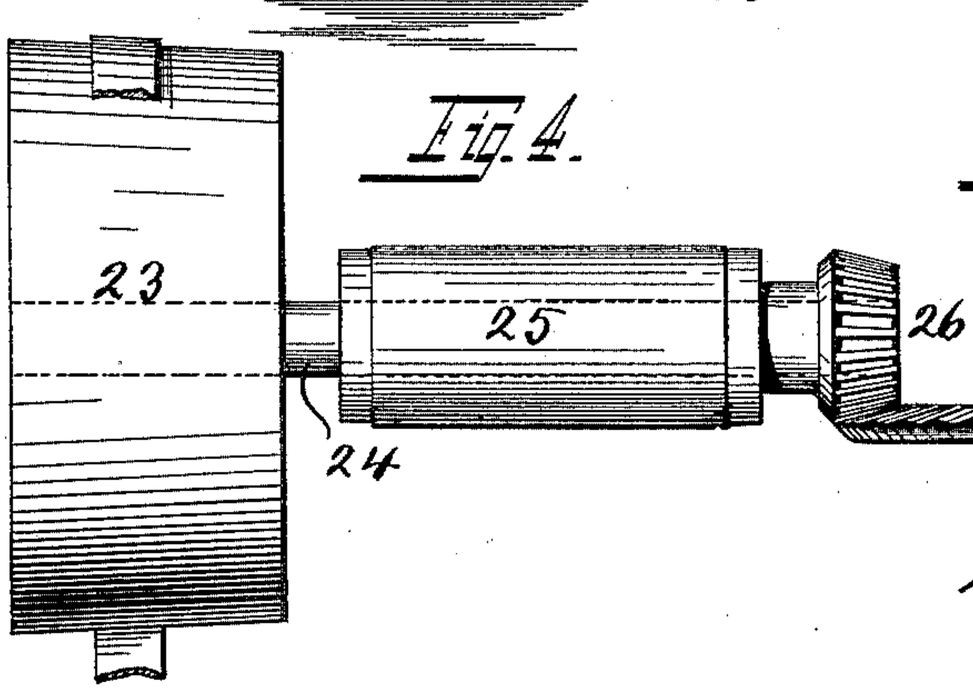
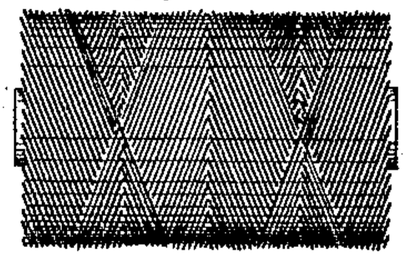


Fig. 1.



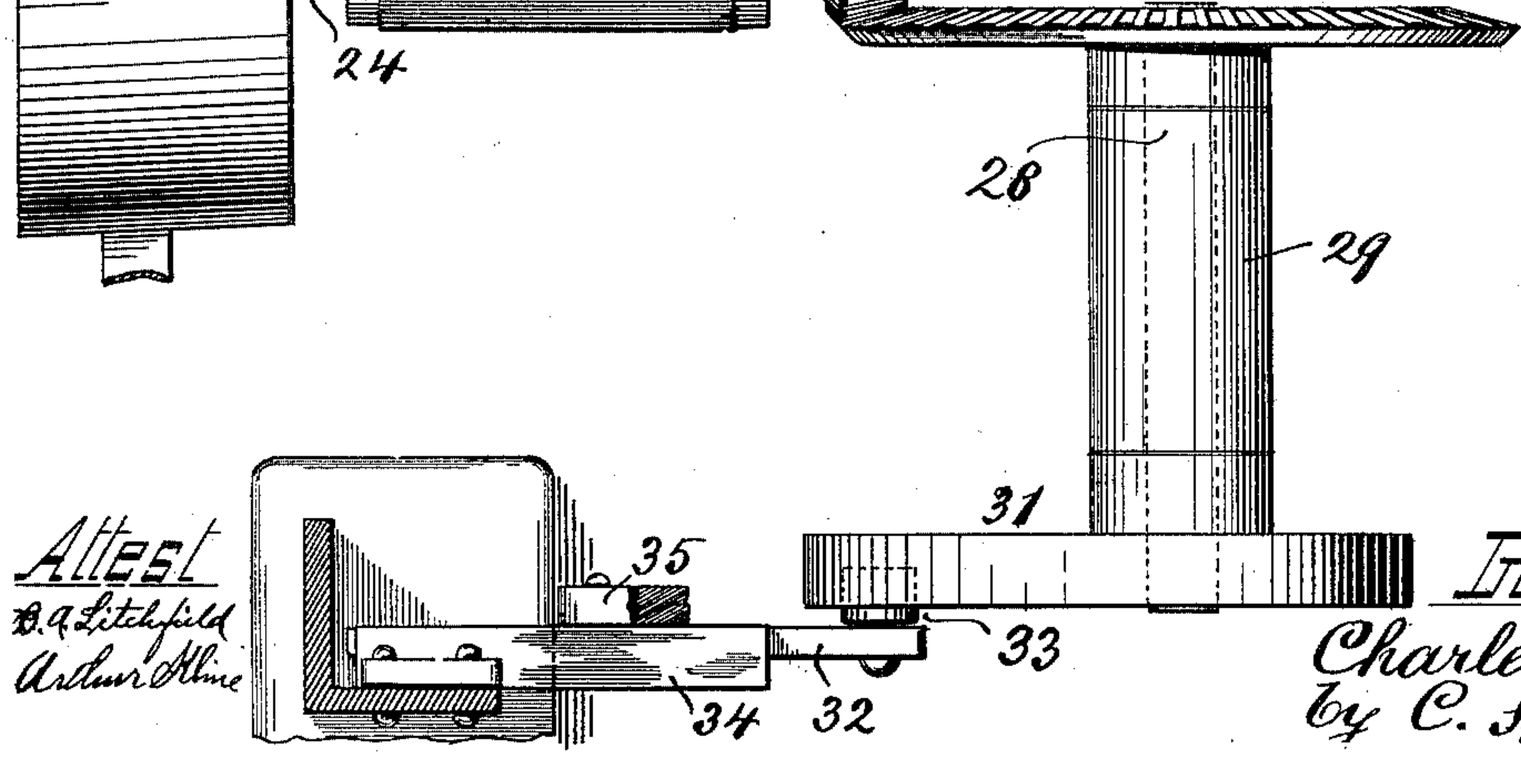


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Fig. 3.

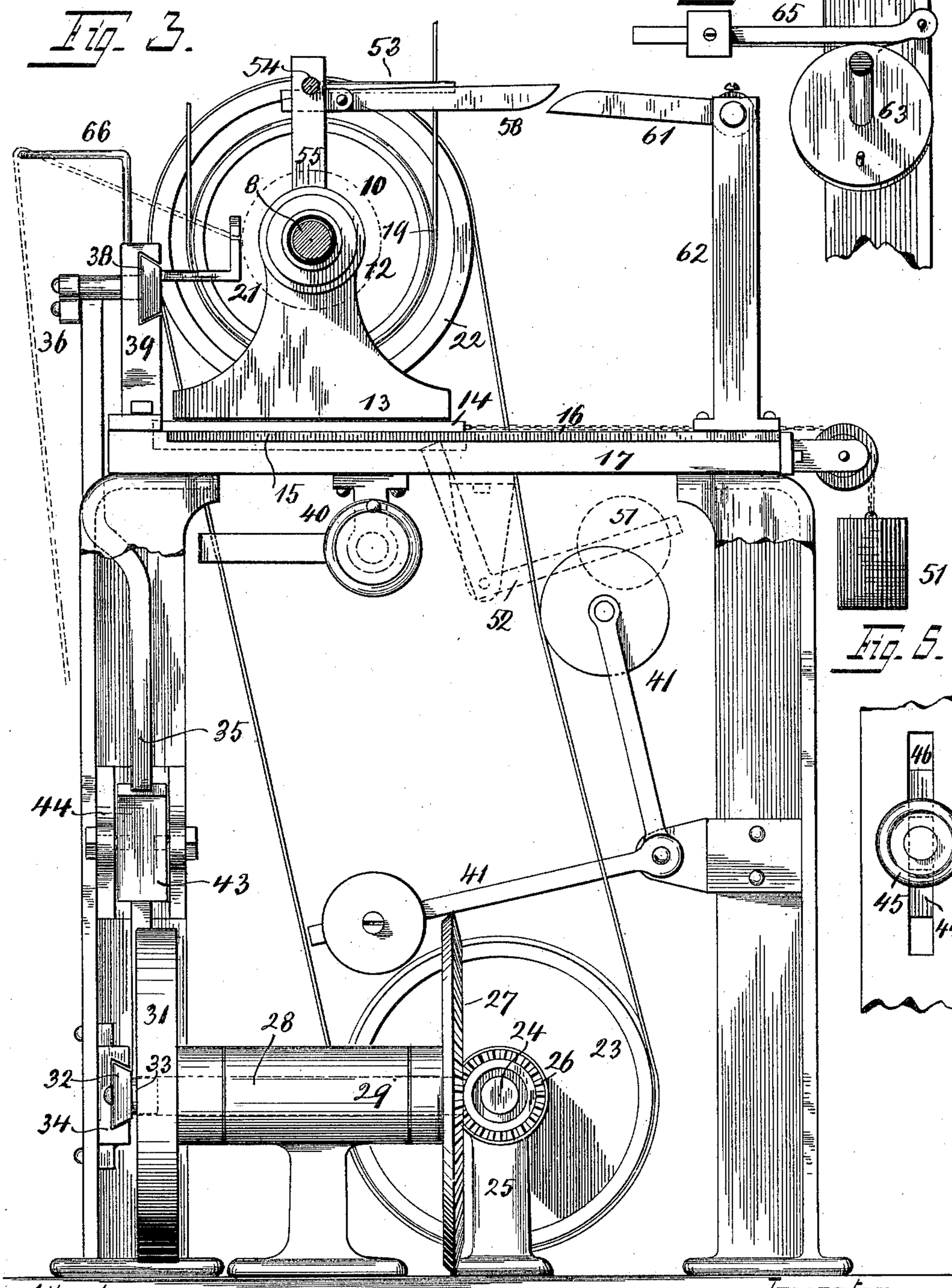

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

CHARLES L. STACY, OF COVINGTON, KENTUCKY.

ADJUSTABLE WINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 592,454, dated October 26, 1897.

Application filed January 20, 1897. Serial No. 619,977. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. STACY, a citizen of the United States, and a resident of Covington, Kenton county, State of Kentucky, have invented certain new and useful Improvements in Adjustable Winding-Machines; and I do declare the following to be a clear, full, 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, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form a part of this specification.

This invention relates to machines for winding twine, warp, twist, yarn, woof, thread, &c. The winding here referred to is the one which occurs after the manufacture of these goods, and has for its object to put them in convenient shape for commercial purposes—that is, shipping and handling by the trade and users.

Most of the goods above enumerated are for spinning and weaving as it occurs in the manufacture of carpets, hosiery, cloth, and textile fabrics in general. In these manufactures the threads forming the warp and woof are put up in so-called "cops," which are usually carried on spindles, from which they are unwound as they are worked up by the looms. It is essential that the threads unwind freely and evenly to prevent any of them from pulling on the woven goods and against the action of the loom, which would cause imperfections and inequalities in the texture of the completed fabric. All possibilities of entanglement must also be avoided which would cause stretching and tearing of the threads and disarrangement of the work. Therefore the threads used for such purposes are wound in form of cylindrical bodies or rolls upon mandrels or tubes usually of paper or pasteboard and without end flanges to facilitate ready unwinding, the central openings formed by the tubes permitting them to be conveniently placed upon the spindles of the looms, upon which they rotate while unwinding therefrom as they are consumed in the progress of weaving. The absence of any flanges at the ends of the tube-mandrels, which would support and confine the layers of thread, makes it necessary that the winding be of a nature which forms rolls of superposed layers which are self-supporting at the ends of the roll to prevent collapse and entanglement while being handled before use, and which layers should also be closely packed to obviate unnecessary bulk.

The features of my invention on this class of machines which do such winding relate to improvements in the general construction and comprehend and affect more or less all parts of the machine. A special feature is a construction and adjustment whereby in the same machine the thread may be wound upon a cone-shaped mandrel, forming then a cone-shaped roll or cop.

In the following specification is found a full description of the invention, its operation, parts, and construction, which latter is also illustrated in the accompanying three sheets of drawings, in which—

Figure 1 shows a front elevation of the machine complete and ready for operation. Fig. 2 is a top view of the same, showing also in dotted lines the position of the spindle adjusted for cone-winding. Fig. 3 is a side elevation with parts broken away and partly in section. Fig. 4 is a top view of certain parts located below the table of the machine. Fig. 5 is a detached detail view. Fig. 6 is a detail view of a brake operating in connection with the delivery-spindle, and Fig. 7 shows appearance of a roll wound by this machine.

To facilitate the free unwinding without entangling, as and for the purposes mentioned, the rolls or cops are wound in a manner which prevents those coils of the thread which during unwinding loosen in advance—that is, before taken up by the loom—from sliding and falling in and onto each other. Therefore instead of having the thread coiled around the tubes in parallel bights close to each other—as, for instance, in a spool of sewing-thread—it is wound in form of a spiral passing from one end of the roll to the other, the pitch of the spiral being about one complete turn of thread around the tube for every one and one-half inches of length of the latter, which proportion is of course optional and may be varied. In returning to the other end the succeeding coils cover and cross the previously-deposited coils at an angle caused by the reversed spiral pitch-line, thereby

holding these latter down and in position particularly at the ends of the cops. This mode of winding is obtained by proportioning accordingly the motions of the tube upon which the thread is wound and of the feeding member which supplies the thread thereto and which passes in front of and parallel with such tube alternately from one end to the other thereof. Thus, for instance, if a tube three and one-half inches long would rotate twice while the feeding member passes once from one end to the other thereof two complete turns of coils of thread would only be deposited throughout the entire length of the tube.

The fact that the accumulating thread increases the diameter of the roll, whereby each succeeding layer of thread becomes larger, does in no way disturb this proportion, since the proportion of the two speeds—that is, of the rotating tube and the reciprocating depositing member—remains constant. It affects, however, the quantity of thread which is deposited at each rotation of the tube and which quantity increases slowly, as does also the speed of the passing thread.

In the drawings, 8 indicates the spindle, which is detachably connected to its driving-shaft 9 by being screwed into one end of the latter to permit substitution of different-sized spindles to meet the size of the tubes 10, upon which the thread is wound. These latter are slipped upon the spindle and held thereon by suitable means, preferably by a knob 11, which is locked to the free end of the spindle. For so locking a screw connection or any other suitable means may be used—as, for instance, a bayonet-joint.

The spindle-shaft is supported in bearings 12, which rise from a platform 13, which rests on another platform 14, the support being in a manner to permit for the former a rotary movement on the latter in a horizontal plane. For such purpose a circular projecting base 15 is provided on one platform, which fits into a corresponding socket in the other. The object of this rotary adjustment will be more particularly referred to in another place.

The sides of platform 14 are fitted between ways 16 on the upper surface of table 17, whereby the former, with platform 13, becomes capable of a sliding movement at right angles to the spindle-shaft. This latter is driven by means of belt-pulleys 18 and 19, one of which is loose to permit stoppage of the shaft. The thread is delivered to the tube on spindle 8 by means of a carrier 21, through a hole in the upper end of which it passes, and which carrier reciprocates in front of said tube and parallel therewith.

To facilitate further explanation, a specific condition of matters will be assumed, and therefore it may be considered that while the carrier travels once from one end of the tube to the other the spindle makes two rotations, so that if the tube were, for instance, three and one-half inches long the thread, while winding from one end toward the other, would pass twice around the tube and again twice while winding back toward the other end, during which time it crosses the previously-delivered layer at three points. Since perfect uniformity of winding is only possible by a strict maintenance of the adopted proportion of speeds between the rotating winding-spindle and the reciprocatory thread-carrier, it is preferable that the operation of one is made dependent on the other. Therefore the mechanism which reciprocates this thread-carrier is in this case driven from the spindle-shaft. The transmission of motion is by two even-sized belt-pulleys 22 and 23, the latter on a shaft 24, supported in a bearing 25 below the table of the machine. A pair of bevel-wheels 26 27 carries the motion over to another shaft 28, supported in a bearing 29 and at right angles to shaft 24. This latter transfer is at a reduced speed for shaft 28, the proportion being in this case one rotation of it to four rotations of shaft 24. By a grooved cam 31 the rotary motion of shaft 28 is converted into a rectilinear reciprocating one and transferred onto a slide 32, a roller 33 on which fits into the groove of the cam. This slide is fitted into a bracket 34, on which it is supported while reciprocating therein. One end of a pivotally-supported lever 35 is secured to this slide 32, while its other end, by means of an intervening connecting-rod 36, connects to a slide 38, to which the thread-carrier 21 is secured and thus receives its reciprocatory motion, as will be readily understood. Slide 38 is fitted into a bracket 39, supported on the top of the table of the machine, and in which bracket said slide moves, being with carrier 21 held by it to a rectilinear motion parallel with the spindle-shaft. A perfect and close adjustment of the proportionate speed between spindle 8 and carrier 21 is made possible by belt-pulleys 22 and 23, one or the two of which are cone-pulleys tapering in opposite directions and with faces considerably broader than the belt, so that the latter may be shifted either way, increasing or decreasing the speed of the driven pulley accordingly. This adjustment is accomplished and maintained by a screw-operated belt-shifter 40, and is particularly useful and necessary to allow for changes of speed when the thickness of the thread to be wound changes. A suitable belt-tightening device 41 is provided to maintain the belt always properly stretched. It is evident that this condition and relation of shafts 9 and 24 might be reversed, and instead of shaft 24 being driven from shaft 9 the former might drive the latter, being in such case longer and provided with the necessary driving-pulleys. For some purposes—as, for instance, in the spinning of hosiery—the yarn is taken from vertically-supported spools or spindles, wound in form of a cone-shaped cop, which is obtained by winding it upon a cone-shaped mandrel. The object of winding them in such shape is to pre-

vent entangling of the thread while being unwound and at which time a few of the outer coils always loosen up immediately in advance before being taken up. Therefore when said conical cops are supported upon their broader ends their upper coils, which decrease in diameter toward the upper end, are prevented from sliding down upon the lower ones by reason of the increasing diameter of the cop toward its lower end. A cone-shaped mandrel or winding-tube is used in this case, for which purpose a cone-shaped spindle is substituted for the straight one. The upper platform 13, which carries the spindle and its shaft, is then partly swung on the sliding platform 14 below and to an angle which brings the side of the cone to a line parallel with the path of thread-carrier 21. (See dotted lines in Fig. 2.) By means of set-screws 42, tapped in platform 14 and passing through slots in platform 13, the latter is then locked to platform 14 in its adjusted position. In all other respects the operation remains the same as for straight winding. Where this provision for cone-winding is not required, the turning platform may be omitted, in which case bearings 12 would be directly secured to platform 14, which then would carry the spindle-shaft.

For winding cops of different lengths the stroke of the carrier is adjusted accordingly by changing the pivotal support on which lever 35 swings, since the throw of the cam acting on the lower end thereof is of fixed length and cannot be adjusted. For such purpose the pivotal center of lever 35 is supported on a hollow block 43, within which it is fitted with a sliding fit. This block is pivotally carried by a bracket 44, which latter is connected to the machine-frame in a manner to be capable of being raised or lowered thereon. A connecting-screw 45, passing through a slot 46 and taking into the back of bracket 44, is provided, whereby the latter after adjustment is held in the desired position, a shoulder 47 clamping it against the frame. When so moved, block 43 simply slides on lever 35, but changes at the same time the fulcrum of it. If moved lower down, the stroke of the thread-carrier 21 is lengthened, and, if raised, it is shortened.

A graduated scale may be provided at the machine-frame, as shown at 48, which facilitates adjustment and indicates the position required for the lever-fulcrum in order to wind a cop of a certain length. The tube-mandrels are of course fitted to the length of the stroke of the thread-carrier, and in order to retain them centrally lengthwise on the spindle when shorter than the latter intervening collars 49 are provided at each end, which make up the space.

At the beginning of winding the sliding carriage or platform 14 is moved sufficiently out to bring tube 10 against the thread-carrier 21. As the winding proceeds the thread accumulating on the tube commences to bear against the thread-carrier, whereby this latter, since it is unable to yield in that direction, reacts through the tube and spindle against the sliding platform 14, thereby forcing this latter, with all its appendages, gradually back. This movement may be assisted, if desirable or necessary, by a counterweight 51, which pulls on platform 14 and is secured thereto either by a chain or by a lever 52, engaging it from underneath through a slot in table 17.

When the desired quantity of thread has been wound upon the tube, the operation of the machine is stopped, the filled tube taken off the spindle, another one substituted, the carriage moved to the front, and operations resumed. For starting and stopping a belt-shifter 53 is provided, which is operated accordingly by the attendant. For stopping an automatic device is provided which, when the roll has assumed a predetermined diameter, moves the belt-shifter automatically, and is constructed as follows:

The belt-shifter rod 54 is supported in standards 55 and provided with a collar 56 and encircled by a spring 57, confined between the collar and one of the standards 55. When the shifter is moved by hand to bring the belt onto the tight pulley 18 for starting, this spring is compressed and acquires, then, a tendency to shift the belt back onto the loose pulley, which tendency is, however, restrained by a lever 58, pivoted to one of the standards 55 and engaging with a notch 59 in shifter-rod 54, thus holding the latter against the action of the spring. As will be remembered, the increasing roll on the winding-spindle moves the carriage-platform, with all its parts, gradually back, which parts include also lever 58, which in due time comes in contact with a tripping device, disengaging it from notch 59, thereby releasing the belt-shifter, which now slides over at once and moves the belt onto the loose pulley, thus stopping operation of the machine. This tripping device consists of a lever 61, adjustably supported upon a standard 62, and according to whether its free end is moved down or up it is encountered by the end of lever 58 sooner or later, whereby the winding is stopped correspondingly sooner or later and a gaging of the quantity of thread wound upon a cop and the diameter of the latter permitted.

The thread is usually taken from the spools, upon which it is wound on the spinning-machine and which are suitably mounted for unwinding, preferably on a spindle 63, supported in a socket 64. To obtain the necessary tension, a brake, acting by its weight against the flange of spindle 63, is used. It consists of a lever pivoted so as to lie over said flange and held down by an adjustable weight. Before being taken up by the thread-carrier 21 the thread passes over a guard 66, which prevents it from becoming entangled with other parts of the machine.

Having described my invention, I claim as new—

1. In a winding-machine for the purpose

here intended, the combination of the rotating winding-spindle adapted to support a receiving-mandrel, a thread-carrier which delivers the thread thereonto and has a reciprocatory movement in front of the receiving-mandrel, parallel with it and from one end thereof to the other, a sliding carriage and a track therefor on which said winding-spindle is supported and which enables it to yield to the pressure of the accumulating thread as it bears against the thread-carrier, means to rotate the spindle and an oscillating lever for reciprocating the thread-carrier.

2. In a winding-machine for the purpose here intended, the combination of the rotating winding-spindle adapted to support a receiving-mandrel, a thread-carrier which delivers the thread thereonto and has a reciprocatory movement in front of the receiving-mandrel, parallel with it and from one end thereof to the other, a carriage and track therefor on which the winding-spindle is supported in a manner to have a sliding movement enabling it to recede from the thread-carrier, a lever to reciprocate the thread-carrier, means to rotate the spindle and means to oscillate the aforesaid lever, the motion for one of these means being derived from the means for operating the other.

3. In a winding-machine for the purpose described, the combination of a thread-carrier, a cam-operated lever for reciprocating it, a spindle 8, a shaft 9 upon which it is mounted, means to rotate shaft 9, all these parts being supported on a sliding carriage whereby the spindle is enabled to recede from the thread-carrier and ways between which the sliding carriage is guided.

4. In a winding-machine, the combination of a reciprocating thread-carrier with a rotating spindle which is supported in a manner to be capable of being adjusted to a position either parallel or at an angle to the path of the thread-carrier.

5. In a winding-machine the combination of a reciprocating thread-carrier, a spindle 8, a shaft 9 whereby it is rotated, a platform 13 upon which shaft 9 is mounted, a sliding platform 14 which carries platform 13, the connection between said platforms being a pivotal one, so that the latter may be turned upon the former and means to guide platform 14.

6. In a winding-machine, the combination of the rotating winding-spindle, the reciprocating thread-carrier, an oscillating lever 35 for actuating the latter, a hollow block 43 within which lever 35 is loosely supported, a bracket 44 on which block 43 is pivotally supported, said bracket being secured to the machine-frame and adjustable thereon in a manner to change the fulcrum of lever 35 and means to secure the bracket in its adjusted position.

7. In a winding-machine, the combination with a reciprocatory thread-carrier, of a winding-spindle, a driving-shaft for rotating the same, tight and loose pulleys on the latter, a spring-actuated belt-shifter adapted to be locked to hold the belt on the tight pulley, a sliding carriage upon which all these last-named parts are supported and with which they move and a trip device adapted to disengage the locked belt-shifter when the same, moving with the sliding carriage engages therewith for the purpose described.

8. In a winding-machine, the combination with a reciprocatory thread-carrier, of a winding-spindle, a driving-shaft for rotating the same tight and loose pulleys on the latter, a belt-shifter 53 having its shifting rod 54 supported in standards 55, a locking-lever 58 adapted to engage with a notch in rod 54 when the belt is on the tight pulley, a sliding carriage upon which all these last-named parts are supported and with which they move, a trip device 61 projecting within the path of the carriage and adapted to disengage lever 58 from rod 54 when the former, projecting ahead of the carriage, engages the device 61 and a spring to shift the belt-shifter to cause it to move the belt onto the loose pulley.

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

CHARLES L. STACY.

Witnesses:
C. SPENGEL,
D. J. HAUSS.