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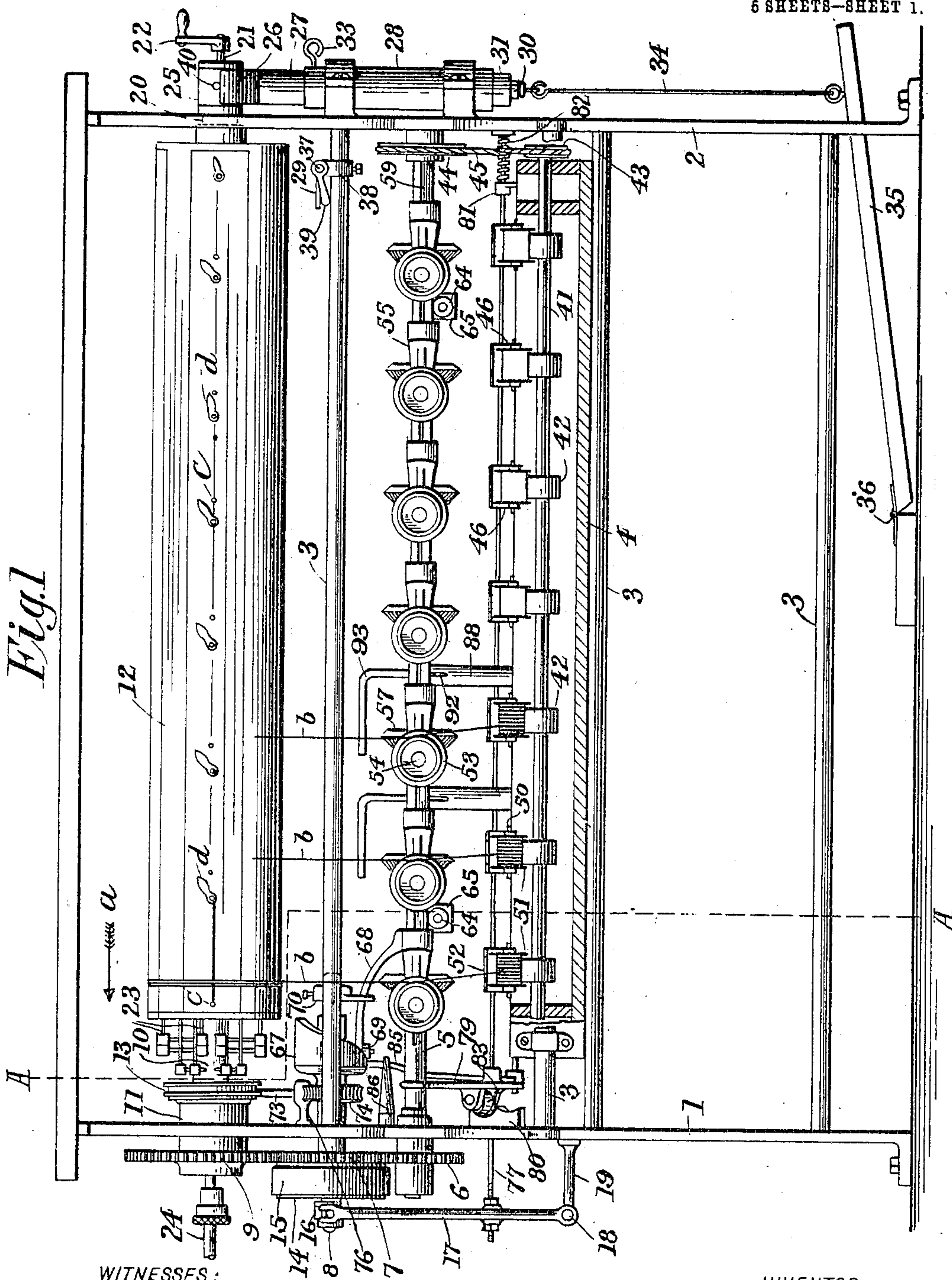
PATENTED SEPT. 5, 1905.

J. H. YOUNG.
SKEINING OR WINDING MACHINE MECHANISM.

APPLICATION FILED AUG. 7, 1903.

5 SHEETS—SHEET 1.

Fig. 1



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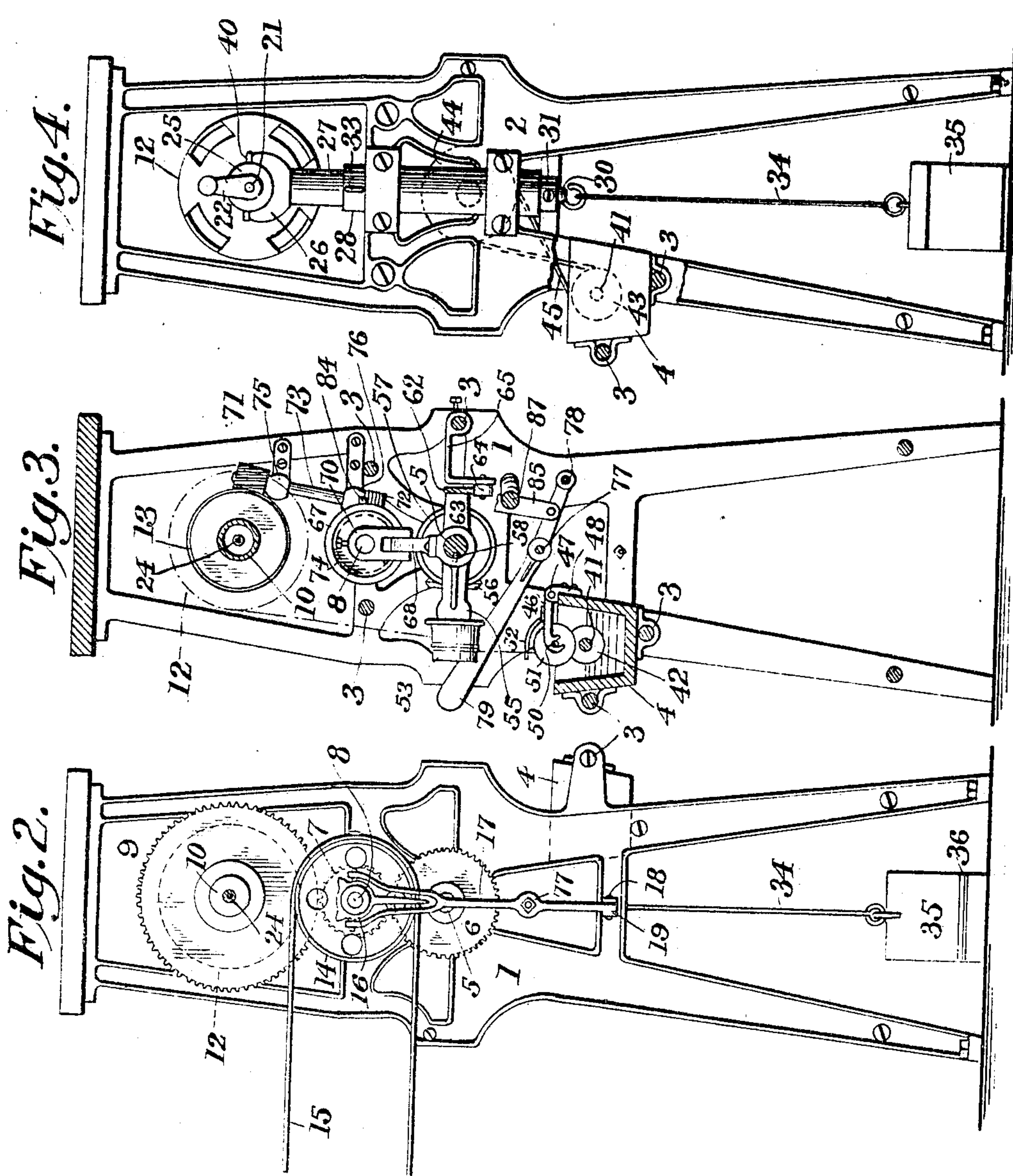
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5 SHEETS--SHEET 2.



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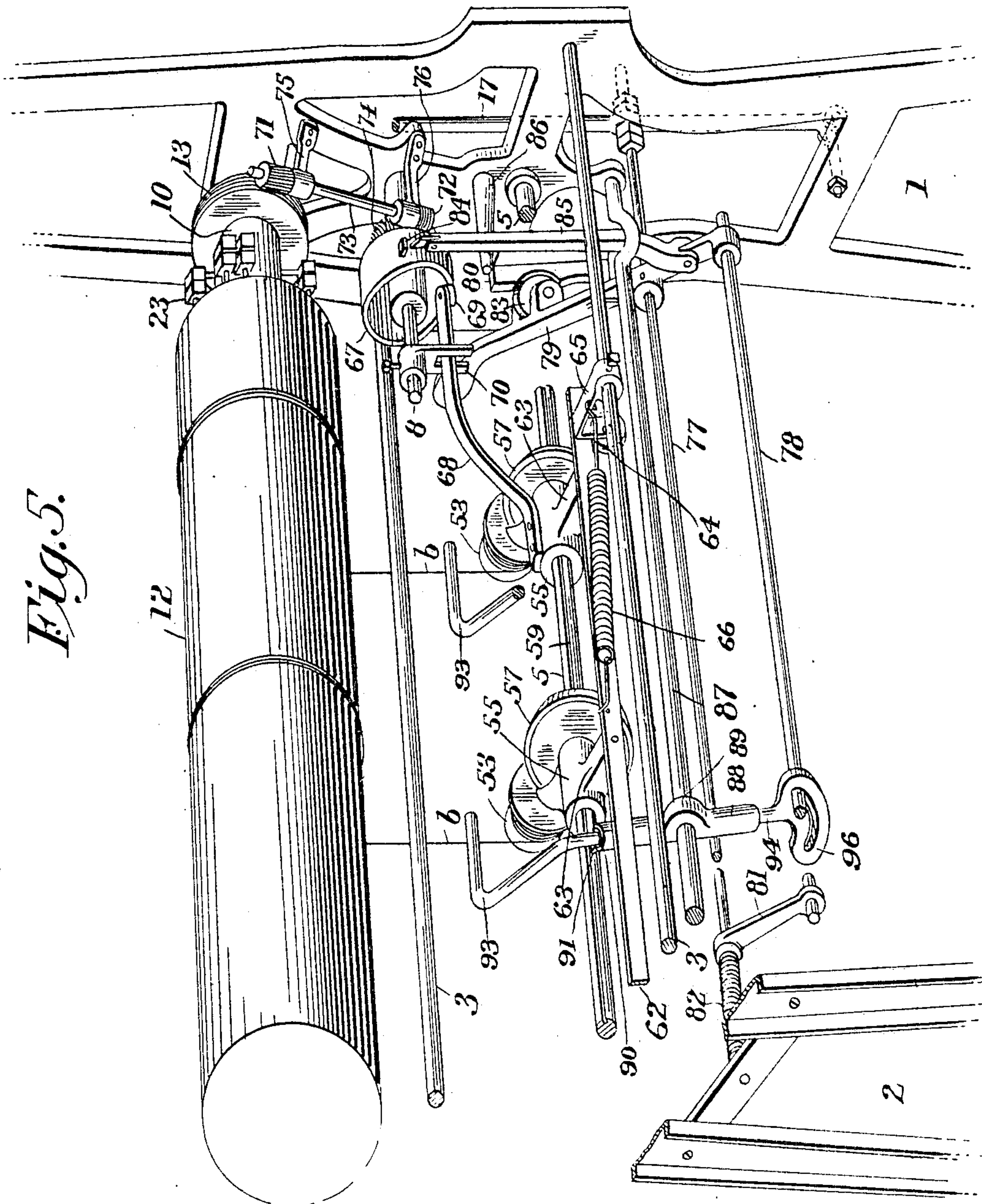
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5 SHEETS—SHEET 3.

Fig. 5.



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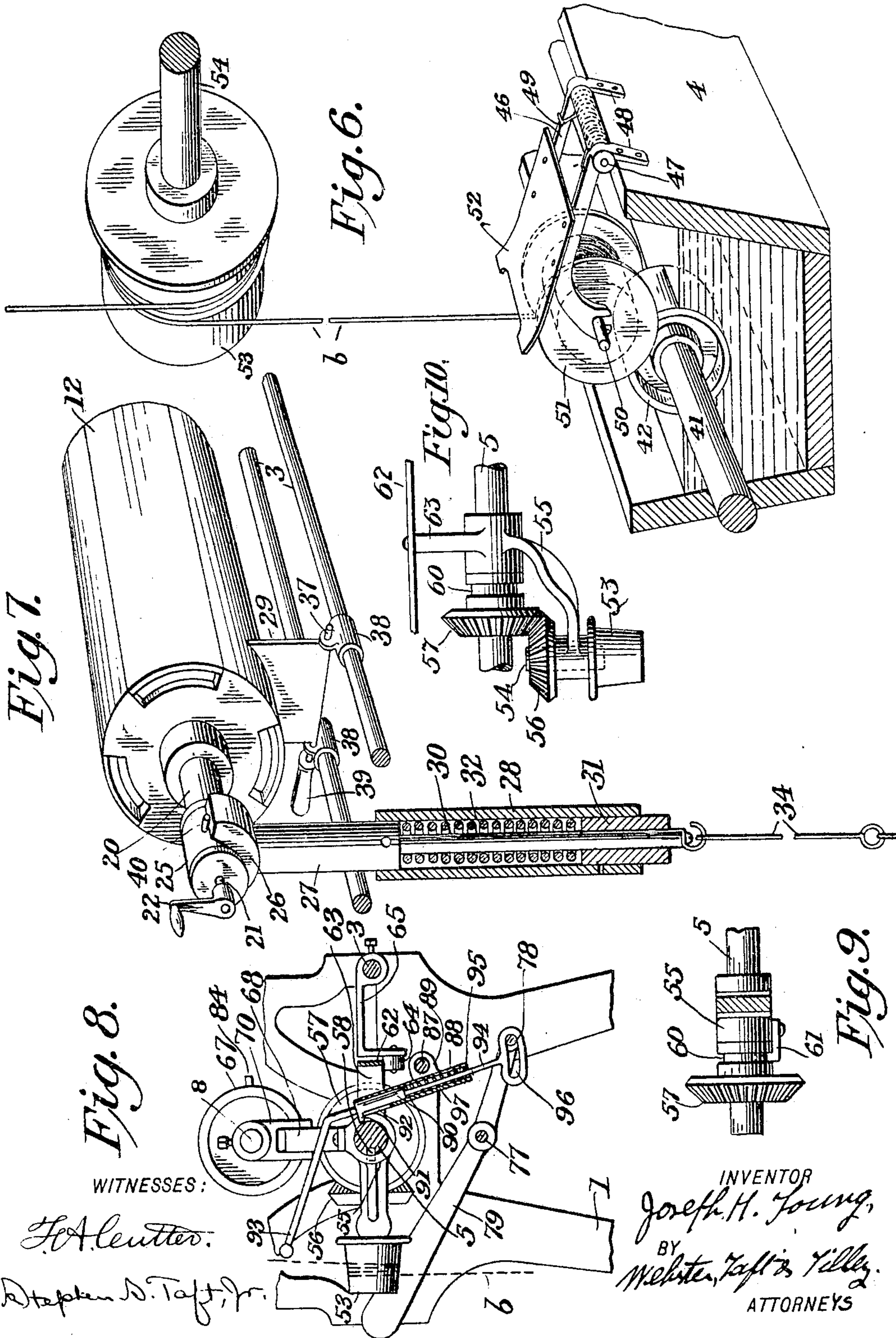
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6 SHEETS-SHEET 4.



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5 SHEETS—SHEET 5.

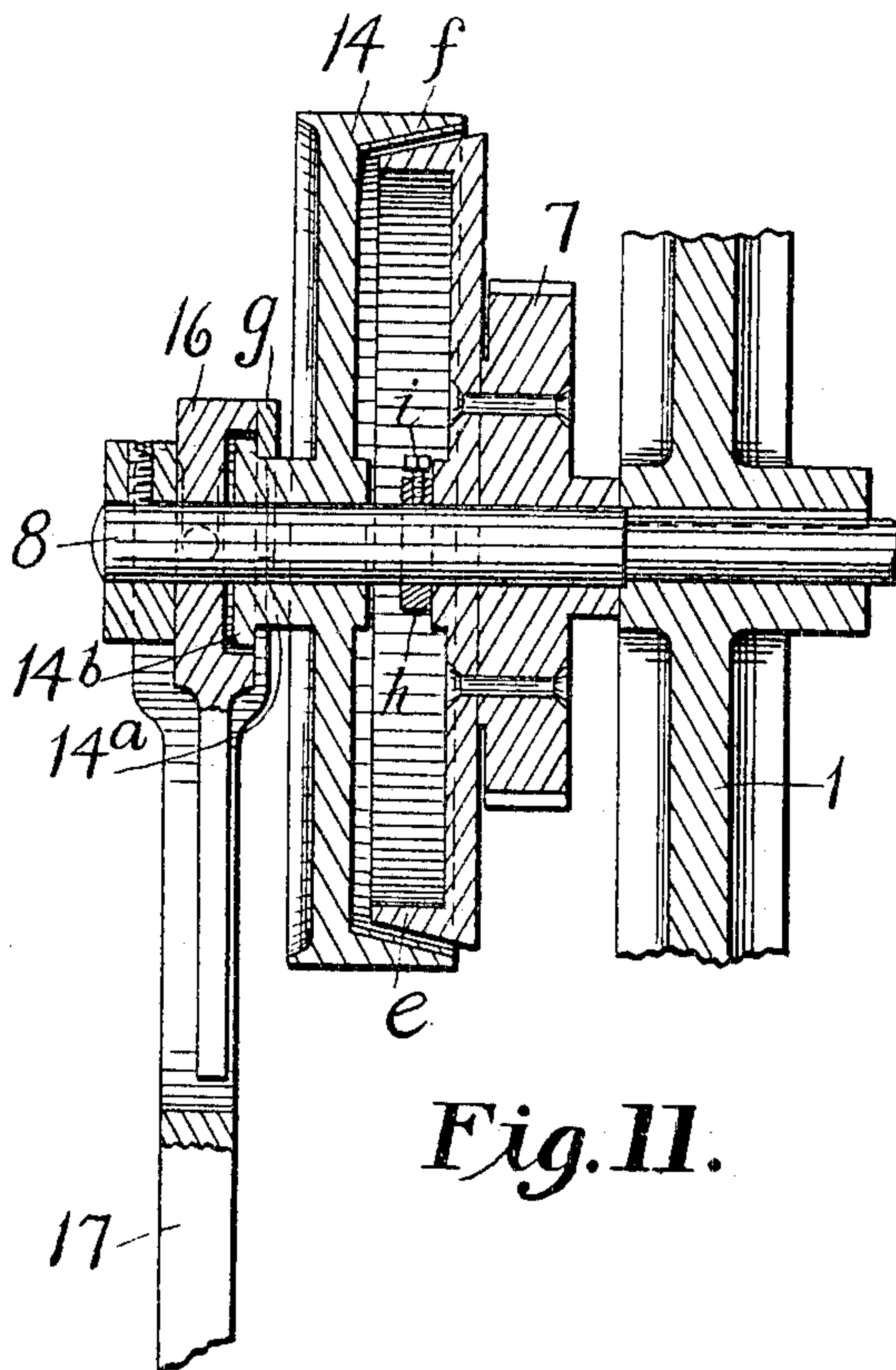


Fig. II.

Witnesses

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UNITED STATES PATENT OFFICE

JOSEPH H. YOUNG, OF NORTHAMPTON, MASSACHUSETTS.

SKEINING OR WINDING MACHINE MECHANISM.

No. 798,989.

Specification of Letters Patent.

Patented Sept. 5, 1905.

Application filed August 7, 1903. Serial No 168,689.

To all whom it may concern:

Be it known that I, JOSEPH H. YOUNG, a citizen of the United States of America, residing at Northampton, in the county of Hampshire and Commonwealth of Massachusetts, have invented new and useful Skeining or Winding Machine Mechanism, of which the following is a specification.

My invention relates to improvements in machines for winding silk, thread, or other material upon a rotary cylinder which have tension and guide devices and means for governing the speed of the rotary members and the amount of silk or other material wound in a given time, also movable bearing appliances, automatic stop devices, and other subsidiary parts and members necessary or desirable in the construction of a complete machine of the kind under consideration, all as hereinafter set forth; and the objects of my improvement are, first, to provide mechanism in a winding-machine whereby silk or other material may be automatically stretched, wound, and formed into skeins and dried at a single operation; second, to afford means for forming the material into skeins of uniform lengths or into skeins each of which consists of a given number of feet or yards; third, to furnish effectual and easily-operated interchangeable bearings for one end of the cylinder; fourth, to provide improved automatic stopping devices for the mechanism; fifth, to furnish means for winding and producing skeins which are quick-acting, positive, and certain, and, sixth, to embody one or all of these features in a practicable and efficient machine, which is comparatively simple in construction and operation. I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a front view of a machine, showing a preferred form of my improved mechanism, the water-box being in section; Fig. 2, an elevation of the left-hand end of the machine; Fig. 3, a vertical section on lines A A looking in the direction of arrow *a*, Fig. 1, some of the parts being omitted; Fig. 4, an elevation of the right-hand end of the machine, one of the legs being broken away to show the end of the water-box and pulley which drives the spools therein; Fig. 5, an enlarged perspective view from the rear looking toward the left-hand end and showing the skeining mechanism with other details; Fig. 6, an enlarged perspective and sectional view of the water-box and certain of

its members and one of the tension and guide rolls; Fig. 7, an enlarged detail in perspective and partial section of the interchangeable bearings for the right-hand end of the cylinder; Fig. 8, an enlarged detail showing one of the stop devices, parts being in section; Fig. 9, an enlarged detail showing the manner in which the large tension and guide roll actuating gears are held to the carriers; Fig. 10, a top view of a carrier and associated gears and roll, and Fig. 11 a sectional view of the clutch mechanism.

Similar reference characters designate similar parts throughout the several views.

In order to properly form material such as silk into skeins during the process of manufacture, it is customary to manipulate the silk while wet in order to properly stretch it and obtain a product which is even, of uniform size, and free from kinks or other imperfections. This is generally done in three separate and distinct operations—that is, the wet silk is unwound from the spools and stretched, formed into skeins, and dried by the use of separate machines or mechanisms—processes which require considerable time and result in an inferior product. With my improved mechanism I am able to practically and expeditiously combine these three operations in one at a great saving of time and expense and with a resultant product which is superior to that obtained in the old way.

A collapsible cylinder such as that shown in Letters Patent of the United States, No. 688,917, issued to me December 17, 1901, or one of a similar character should be preferably used with my improved mechanism, parts of which mechanism constitute improvements in devices having somewhat similar objects in view set forth in the aforesaid Letters Patent; but I do not wish to be confined to any particular form or construction of cylinder or of other parts or members except such as fall within the scope of the present invention, and it may be here noted that various changes, such as the substitution of mechanical equivalents for parts or members shown and described, may be made without departing from the nature of my invention. It is obvious, too, that it is not always necessary to employ all of the devices which enter into the ensemble of my machine, provided it is desired to use only such parts as may be required to bring about results which do not contemplate or include the complete operation, as herein set forth, of the machine

as a whole. For instance, a different interchangeable bearing may be provided for what may be termed the "free end" of the cylinder, different stop devices may be substituted or such devices omitted altogether, and other changes or omissions such as will readily occur to one skilled in the art may be resorted to.

The most important and essential feature of the mechanism is the means employed for forming the silk into skeins and incidentally stretching it, and I desire to cover, broadly, the means for so doing with such other means as may be closely associated therewith.

A simple frame is first provided, which should consist generally of end standards 12, which may be bolted to the floor, a number of tie-rods 3, connecting said standards, and a top piece or shelf fastened to the upper ends of the standards. A water-box 4 is firmly mounted between the standards 1 and 2 on two of the tie-rods 3. A main shaft 5 has its ends journaled in the aforesaid standards and projects through the standard 1. A gear 6 is rigidly mounted on the shaft 5 at the left of the standard 1. The gear 6 meshes with a pinion 7, loosely mounted on a stud 8, which is firmly set into and projects both sides of the standard 1. The pinion 7 also meshes with a large gear 9, tight on a hollow trunnion 10, which has a bearing 11 in the standard 1, and said gear drives the winding drum or cylinder 12. Inside of the standard 1 is a spiral gear 13, tight on the trunnion 10. A pulley 14, driven by a belt 15 from any suitable source of power, is loosely mounted on the stud 8 at the left of the pinion 7.

A clutch is provided to connect and disconnect the pulley 14 with and from the pinion 7, and such clutch may be of the ordinary friction variety. The clutch herein shown consists of a friction member *e*, fastened to one face of the pinion 7, a friction member *f* on the inside of the pulley 14, the member *e* extending into said pulley to be engaged by the member *f* when the pulley is actuated toward the standard 1, and a part 16, mounted to reciprocate on the stud 8 and connected with the pulley through the medium of the pulley-hub 14^a, flanged at 14^b and projecting into said part 16, and a plate *g*, rigidly attached to the part 16 and extending down over the flange 14^b. A lever 17, forked at its upper end and there pivotally attached to the part 16, is pivoted at 18 to a bracket 19, extending outward from the face of the standard 1. This lever is the medium for actuating the part 16 and the connected pulley 14, so as to cause the friction members to become engaged or disengaged, according to the direction in which said lever is thrown. While the part 16 and the pulley 14 are held outward by the lever 17 the pinion 7 remains motionless; but as soon as said part and pulley are thrust inward by said lever said pin-

ion is caused to revolve. A collar *h*, held in place on the stud 8 by a set-screw *i*, prevents the member *e* and pinion 7 from following the member *f* and pulley 14 at the time the member *f* is actuated away from the member *e*.

In practice the cylinder 12 is some ten feet long, more or less, and the length of the machine proportionately increased, so that provision is made for forming twenty skeins, perhaps, upon said cylinder, instead of seven, as shown; but this is not material.

The cylinder 12 comprises peripheral fixed and movable or collapsible segments and is supported at one end by the trunnion 10, to which latter a hollow shaft 20 is attached and extends through and beyond the cylinder to furnish a bearing for the other end thereof. A shaft 21, operated by means of a crank 22 on the right-hand end thereof, extends into the aforesaid hollow shaft and is the medium by which the collapsible segments are manipulated. Steam-pipes 23 enter the cylinder 12 from the left-hand end for the purpose of heating the same, steam being supplied to these pipes by a main supply-pipe 24, between which and the pipes 23 communication is had through the hollow trunnion 10. All of the parts just mentioned are fully described in the Letters Patent hereinbefore referred to. A bearing-collar 25 on the end of the shaft 20, which projects beyond the standard 2, is normally received into a saddle 26, which forms a part of the interchangeable bearing explained below. Interchangeable bearings suitable for the desired purpose comprise an upwardly-spring-pressed plunger 27, to the top of which is affixed the saddle 26, operating in a sleeve 28, and a movable rest 29. The sleeve 28 is securely bracketed to the outside face of the standard 2. A spindle 30 passes downward from the base of the plunger 27 through a bushing 31, fixed tightly in the bottom of the sleeve 28, and a spring 32 is interposed between said base of the plunger and the top of said bushing, thereby tending to elevate the plunger. The plunger is held at the proper elevation by means of a pin 33 passing through openings in said plunger and opposite sides of the fixed sleeve 28 to lock the former to the latter. Any other suitable and equivalent locking means may be employed. A link or rod 34 is connected at its upper end with the bottom of the spindle 30 and at its lower end with a treadle 35, having one end pivoted at 36 to a fixed support on the floor. If it is desired to prevent the collar 25 from turning in the saddle 26, pins 40 may be employed, said pins projecting from opposite sides of said collar and resting upon the upper edges of said saddle when elevated. The rest 29 is simply a plate having one edge cut to conform more or less closely to the under surface of the cylinder 12 and provided with trunnions 37, journaled in bearings 38-38 on two of the tie-rods 3, and with

a handle 39 for convenience in manipulating the rest. This rest is adapted to lie down parallel with the tie-rods upon which it is mounted, but may be turned up to support the cylinder 12, as shown in Fig. 7.

The box 4, which is intended to contain water, has a shaft 41 extending longitudinally through the same, upon which are mounted friction-rolls 42. The shaft 41 and the rolls 42 are driven by means of a pulley 43, tight on one end of said shaft, a pulley 44, tight on the main shaft 5, and a belt 45, connecting said pulleys. Associated with each of the rolls 42 above the same is a downwardly-tensioned spool-holder 46. Each holder 46 is pivoted at 47 to lugs 48 on the back of the box 4 and is pressed downward by means of a spring 49. The holder is provided with downwardly-turned front feet notched to fit over the spindle 50 of a spool 51, upon which the silk, thread, or other material to be stretched, skeined, and dried is wound. A plate 52 on the top of the holder 46 serves to prevent undue spattering of water from the revolving spool. The strand of silk or other material, hereinafter generally termed the "thread" *b*, passes upward from the spool 51 to a tension and guide roll 53, around which it is wound once or twice before being carried to the cylinder 12. Said cylinder may be provided with a plurality of fasteners for the thread *b*, said fasteners consisting of pins *c* and resilient fasteners *d*, arranged in line on the periphery of the cylinder in the usual and well-known manner.

The driving mechanism is so arranged and the diameters of the rolls 42 and 53 and cylinder 12 are so proportioned relative to each other and to said mechanism that the surface speed of the rolls 42 is one per cent. slower than that of the rolls 53 and the surface speed of the latter ten per cent. slower than that of the cylinder 12. Hence the thread is stretched as it passes from the spools 51 to said cylinder, as will be more fully explained hereinafter. Of course the relative speeds may be changed as desired by using different sizes of gears from those shown at 6, 7, and 9 and different sizes of pulleys 43 and 44.

There will be as many tension-rolls 53 as there are rolls 42 and as many of the latter as the number of skeins which it is proposed to wind on the cylinder. The axes of the rolls 42 and 53 stand at right angles to each other. Under some conditions stationary members can be substituted for the rolls 53.

The automatic skein-forming mechanism, of which the rolls 53 constitute a part, will next be described, such mechanism being in reality a thread-guide of peculiar construction and arrangement.

Each roll 53 is tight on the front end of a spindle 54, mounted loosely in a carrier 55 and having a bevel-gear 56 tight on its rear end. The bevel-gear 56 meshes with a larger

bevel-gear 57, which is revolubly connected with the shaft 5 by means of a key 58, extending into a slot or keyway 59 in said shaft. The carriers 55 are loosely mounted on the shaft 5, and the gears 57 are connected with said carriers, both carriers and gears being arranged to reciprocate on said shaft, the key 58 sliding in the slot 59. As a convenient method of holding the gear 57, which revolves with and moves longitudinally on the shaft 5 to the carrier 55, which does not revolve, but reciprocates upon said shaft, an annular groove 60 is formed in the hub of the gear and a lug 61 provided, which is screwed or otherwise attached to the carrier, said lug having an inwardly-turned finger to enter said groove. The carriers 55 are firmly connected by means of a bar 62, to which projections 63 on the rear of said carriers are rigidly fastened. The bar 62 rests and travels upon rolls 64, supported by the downwardly-turned ends of supports 65, rigidly attached to one of the tie-rods near the terminals of said bar. The longitudinal movement permitted the bar 62 and attached parts is sufficient for the purpose of forming the thread into skeins, as hereinafter explained. More than two supports 65 and rolls 64 may be provided, if desired. The normal motion or direction of rotation of the shaft 5 tends to force the bar 62 downward onto its supporting-rolls, and a spring 66, having one end attached to said bar and the other to the support 65, which is adjacent the head of the machine or that end where the driving mechanism is located, also tends to keep the bar in contact with said rolls and to draw the same, with attached members, toward the left or the head of the machine. The parts which are under the influence of the spring 66 may be actuated against the resiliency of said spring toward the foot of the machine through the medium of a cam 67, loosely mounted on the spindle 8 inside of the standard 1, and an arm 68, rising from the top of the left-hand carrier 55 and having its left-hand or free end provided with a roller 69, which bears against the working face of said cam. A forked guide 70 for the arm 68 is mounted on the stud 8. The design of the cam 67 is such that it will move the parts tensioned toward it by the spring 66 to the right for a distance equal to the width of a skein and then allow them to return for the same distance, thus making up the skein of an inner and outer layer, the movement of the rolls 53 along a horizontal plane being so graduated as to lay the threads upon the cylinder 12 side by side. The parts are also so related that during one revolution of the cam 67 the requisite number of yards to form a skein will have been wound off of each of the spools 51 onto the cylinder. The cam 67 receives its motion from the worm spiral gear 13 through the medium of a spiral gear 71 and worm 72 on a shaft 73 and a gear

74, rigid with said cam. Brackets 75 and 76, extending inward from the standard 1, furnish bearings for the shaft 73, the spiral gear 71 on the upper end of which meshes with the spiral gear 13, and the worm 72 on the lower terminal meshes with the gear 74.

Various formations in skeins may be produced by changing the working face of the cam 67, as will be clearly apparent from the foregoing.

As a means for starting and stopping the mechanism rods 77 and 78 a lever 79 and a block 80 are employed. One end of the rod 77 is attached to the clutch arm or lever 17 above its pivotal point, and the other end is loosely mounted in the standard 2. The lever 79 is very firmly secured intermediate of its ends to the rod 77, and one end of the rod 78 is attached to the rear end of said lever. The other end of the rod 78 is supported by an arm 81, projecting from the rod 77 near the foot of the machine. A spiral spring 82 encircles the rod 77 between its arm 81 and the standard 2 and tends to force both of the rods 77 and 78 to the left and at the same time to turn the rod 77 so as to elevate the front end of the lever 79. A roll 83, mounted in ears on the left side of the lever 79, is so positioned as to operate against the inner edge or cam-face of the block 80. The block 80 is firmly attached to the inside of the standard 1. The aforesaid cam-face has indentations or recesses therein so formed as to normally hold the lever 79 in either one of two positions, the upper indentation being deeper than the lower, so that when the lever is depressed it will be forced to the right against the resiliency of the spring 82 and carry with it the rod 77, which in turn rocks the arm 17 toward the standard 1 and operates the part 16, thereby connecting the mechanism with the pulley 14 and setting the machine in motion. When the lever 79 is elevated, the clutch is thrown outward and the pulley 14 disconnected from the pinion 7.

Instead of using a spring 82 to force the rod 77 against the cam-block 80 the latter may be provided with a cam-slot in the usual and well-known manner, so that the spring can be omitted. The former construction is, however, deemed to be the better of the two for the purposes of my invention.

In order to automatically stop the machine when the cam 67 has described one revolution, I provide said cam with a dog 84 and mount an arm 85 on the lever 79 back of the rod 77, extending said arm upward into the path of said dog. The arm 85 is adapted to fall forward out of the perpendicular and rest against a pin 86, extending inward from the standard 1. Near the end of a revolution of the cam 67 the dog 84 encounters the head of the arm 85 and forces said arm downward, which action at the same time elevates the front end of the lever 79, transferring the roll

83 from the lower to the upper and deeper indentation in the block 80 and through the medium of the spring 82 causes the rod 77 to be carried to the left, and thereby throw off the clutch when the mechanism stops. When the cam comes to rest, its dog 84 has passed beyond the head of the arm 85, so that it will not interfere with the depression of the front end of the lever 79 when it is desired to again start the machine.

The rod 78 forms a part of the device used to automatically stop the machine when a thread breaks and which will next be described.

Loosely mounted on a rod 87, supported by the standards, is a series of automatic stops so arranged that when any one of the threads δ breaks the clutch will be actuated to discontinue further operation of the machine. Each one of these devices consists of a sleeve 88, hung by an ear 89 at the rear to the rod 87, and a spring-pressed plunger 90 in said sleeve, provided with a nose 91, projecting through a slot 92 in the sleeve. The device is located so as to bring the nose 91 adjacent the shaft 5. A bent rod 93 extends from the top of the plunger 90 over said shaft and forward to the vicinity of that portion of a thread δ which passes upward from the roll 53. A spindle 94 extends from the base of the plunger 90 through a bushing 95 in the bottom of the sleeve 88 and terminates in a slotted foot 96, through which the rod 78 passes. A spring 97, interposed between the bottom of the plunger 90 and the top of the bushing 95, tends to force the plunger and attached parts upward. The device is so suspended on the rod 87 that the preponderance of weight above the point of support has a tendency to cause the rod 93 to fall forward by gravity. It is, however, normally held back by a thread δ during the operation of the machine with the nose 91 clear of the periphery of the shaft 5; but if said thread breaks the upper part of the device immediately falls forward and said nose is engaged by one edge of the slot 59 in said shaft, so that the revolution of the shaft forces the plunger 90 downward and carries with it the rod 78, bringing about the same result as is produced when the dog 84 on the cam 67 encounters the arm 85—that is, the machine is stopped. After the broken thread is repaired and the stop device properly rearranged the machine can be started again. The construction of this device is such that the machine can be stopped or started by means of the lever 79 without interfering therewith. Instead of the edge of the slot 59 a projection may be provided on or in connection with the shaft 5 to engage the plunger 90 when the thread breaks.

Assuming that the box 4 is partially filled with water and the spools 51 are in place beneath the holders 46 on the friction-rolls 42 and that the threads δ from said spools have

been carried upward around the tension-rolls
 53 and attached to the fastening devices *c* and
d on the cylinder 12, the general operation
 of the machine is as follows: Grasp the front
 5 end of the lever 79 and depress it until the
 roller 83 rests in the lower and shallower in-
 dentation in the block 80, which being farther
 to the right than the upper indentation in
 said block causes the rod 77, to which said
 10 lever is rigidly attached, to be forced to the
 right against the resiliency of the spring 82,
 thereby operating the part 16 so as to cause
 the pinion 7 to revolve with the pulley 14.
 The pinion 7 revolves the shaft 5 through the
 15 medium of the gear 6 and the cylinder 12
 through the medium of the gear 9, said shaft
 and cylinder revolving in the same direction.
 The belt 45, which connects the pulleys on
 the shafts 5 and 41, being crossed imparts mo-
 20 tion to the shaft 41 from and in the opposite
 direction to the shaft 5. The gears 57, which
 are keyed to the shaft 5, rotate the gears
 56 and cause the rolls 53 to revolve; but the
 difference in size between the two sets of
 25 gears slightly accelerates the surface speed
 of the rolls 53 as compared with that of the
 rolls 42 and spools 51, even though the pulley
 43 is smaller than the pulley 44, so that the
 threads are slightly stretched between said
 30 rolls 53 and the spools, which are held down
 on the rolls 42 in the manner described and
 cannot revolve any faster than they. The
 gearing is arranged so that the surface of the
 cylinder 12 is driven faster than that of the
 35 rolls 53. Hence the threads are stretched again
 between said rolls and cylinder. The opera-
 tion thus far described would cause the
 threads to pile up on the cylinder 12 above
 the rolls 53; but it is desirable, not to say
 40 necessary, that each thread should be laid
 evenly on the cylinder, so as to form skeins,
 and this result is brought about by the guide
 mechanism, a description of the operation of
 which is given below. The spiral gear 13,
 45 which revolves with the cylinder 12, rotates
 the cam 67 through the medium of the spiral
 gear 71 and worm 72, which latter engages
 the worm-gear 74. When the machine is
 started, the roll 69 on the guide-arm 68 bears
 50 against the low part of the cam 67, and as
 said cam revolves it forces the arm, with its
 attached or connected carriers 55, to the right,
 thus laying each turn of each thread on the
 cylinder beside the preceding turn. This
 55 operation is facilitated by the bar 62, which
 is connected with the carriers and rides on
 the rolls 64. The parts are forced to the
 right against the resiliency of the spring 66.
 After the cam 67 has described one-half of
 60 its revolution and the high part thereof has
 passed the roll 69 the spring 66 begins to
 draw the bar 62 and the attached carriers to
 the left, thereby winding a second layer of
 thread on top of the one which has already
 65 been wound on the cylinder 12 and is of the

proper skein width. The gearing between
 the cylinder and cam is such that the latter
 travels much slower than the former, and
 when it has completed its revolution the
 requisite number of yards in each skein has
 70 been wound upon the cylinder. Then the
 dog 84 encounters the arm 85 and stops the
 machine in the manner hereinbefore de-
 scribed. The threads are now broken, the
 skeins all of the proper width are tied and
 75 disconnected from the fasteners, after which
 they are drawn off of the right-hand end of
 the cylinder onto the parts that project be-
 yond the same, the collapsible segments hav-
 ing previously been drawn inward. The rest
 80 29 is next elevated into position to directly
 support the right-hand end of the cylinder,
 the pin 33 is removed, and pressure applied
 to the treadle 35 to depress the plunger 27
 against the resiliency of its spring 32, leaving
 85 the parts which project from said cylinder at
 this end clear and from which the skeins are
 removed. After the skeins have been taken
 away the treadle 35 is released and the plun-
 ger allowed to rise under the influence of its
 90 spring until the saddle 26 is beneath the col-
 lar 25, when the pin 33 is replaced to lock the
 plunger in position and the rest 29 is turned
 down out of the way of the cylinder. The
 machine is now ready for the formation of a
 95 new lot of skeins. In case any one of the
 threads *b* breaks the head of the associated
 plunger 90 and sleeve 88 falls forward, so that
 the nose 91 drops into the slot 59 before the
 shaft 5 has completed another revolution, and
 100 said plunger is thereby depressed to stop the
 machine until the broken thread can be tied
 and the stop device readjusted, when the ma-
 chine is again started.

It will be readily seen from the foregoing
 105 that the silk or thread is stretched, reeled,
 and formed into skeins and dried in one con-
 tinuous and comparatively rapid operation,
 the drying being brought about by the heat
 which is furnished to the cylinder through
 110 the medium of the steam-pipes. In the event
 that it is not desired to dry the material on
 the cylinder the use of the steam-pipes is dis-
 continued or they may be entirely omitted
 from the construction; but in most cases it is
 115 expedient to use this or some other equally
 good means for heating the cylinder and dry-
 ing the material. The skeins are evenly
 formed and of uniform length, such results
 being brought about entirely automatically. 120

What I claim as my invention, and desire to
 secure by Letters Patent, is—

1. The combination with the cylinder and
 reciprocating tension-rolls of a skeining or
 winding machine, of automatic means to stop
 125 the mechanism when a predetermined amount
 of silk or other material has been wound upon
 the cylinder.

2. The combination with the cylinder and
 reciprocating tension and guide rolls of a 130

skeining or winding machine, of automatic means to stop the mechanism when a skein containing a predetermined amount of silk or other material has been wound or formed upon the cylinder.

3. The combination with the cylinder, tension-rolls, and friction-rolls of a skeining or winding machine, of automatic means to stop the mechanism when a predetermined amount of silk or other material has been wound upon the cylinder.

4. The combination with the cylinder, tension-rolls and friction-rolls of a skeining or winding machine, of means to automatically stop the mechanism when a skein containing a predetermined amount of silk or other material has been wound or formed upon the cylinder.

5. The combination, in a skeining or winding machine, with a cylinder, tension and friction rolls, of mechanism adapted to automatically reciprocate said tension-rolls and form the material wound upon the cylinder into skeins.

6. The combination, in a skeining or winding machine, with mechanism comprising tension-rolls and means to reciprocate the same for forming the material wound upon the cylinder of the machine into skeins, of means to automatically stop the machine at the completion of the skein formation.

7. The combination, in mechanism of the class specified, with a rotary shaft, of a tension-roll for thread and a carrier for said roll mounted on said shaft and means independent of said shaft to reciprocate said carrier.

8. The combination, in mechanism of the class specified, with a rotary shaft, of a carrier mounted thereon, and a roll supported by said carrier and adapted to be rotated by said shaft.

9. The combination, in mechanism of the class specified, with a rotary shaft, of a carrier mounted to reciprocate thereon, and a roll supported by said carrier and adapted to be rotated by said shaft.

10. The combination, in mechanism of the class specified, with a rotary shaft, of a carrier mounted thereon, a roll carried by said carrier and adapted to be rotated by said shaft, and means to reciprocate the carrier on said shaft.

11. The combination, in mechanism of the class specified, with a rotary shaft, of a carrier mounted to reciprocate on said shaft, a spindle supported by said carrier, having a roll and attached gear mounted thereon, a second gear meshing with the first and rotatably held to the shaft, and means to cause said second gear to follow the reciprocal movement of the carrier.

12. The combination, in mechanism of the class specified, with a rotary shaft, of a carrier mounted to reciprocate on said shaft, a spindle supported by said carrier, having a roll and

attached gear mounted thereon, a second gear meshing with the first and having its hub provided with an annular groove, and a lug fast on the carrier and extending into said groove.

13. The combination, in mechanism of the class specified, with a rotary shaft having a keyway therein, of a carrier mounted to reciprocate on said shaft, a spindle supported by said carrier, a roll and gear mounted on said spindle, a second gear meshing with the first and provided with a key to slide in said keyway, and means of attachment between the carrier and second gear to secure axial movement of the latter with the carrier.

14. The combination, in mechanism of the class specified, with a rotary shaft, of a plurality of carriers mounted thereon, and means to simultaneously reciprocate said carriers.

15. The combination, in mechanism of the class specified, with a rotary shaft, of a plurality of carriers mounted thereon and provided with rolls, means to simultaneously rotate said rolls from the shaft, and means to simultaneously reciprocate the carriers and rolls.

16. The combination, in mechanism of the class specified, with a rotary shaft, of a plurality of carriers mounted thereon, a reciprocating member attached to said carriers, and means to actuate the carriers so arranged, on the shaft.

17. The combination, in mechanism of the class specified, with a rotary shaft, of a plurality of carriers and associated tension members mounted to reciprocate thereon, a connecting member between said carriers, suitable supports for said member, and means to reciprocate the carriers so arranged, on the shaft.

18. The combination, in mechanism of the class specified, with a rotary shaft, of a plurality of carriers mounted on said shaft, a member attached to said carriers and suitably supported for reciprocal movement, a spring arranged to draw said member and connected to force said carriers in the opposite direction against the resiliency of said spring.

19. The combination, in mechanism of the class specified, with a rotary shaft, of a plurality of carriers having rolls, mounted to reciprocate on said shaft, means to rotate said rolls from the shaft, a connection between all of the carriers spring-actuated in one direction, a cam, and a bearing member or arm between the reciprocating members and said cam.

20. The combination, in mechanism of the class specified, with a rotary shaft and a cam, of a plurality of carriers mounted on said shaft to reciprocate simultaneously, a connection between the carriers and said cam, and means to retain said connection in operative relation with the cam.

21. The combination, in mechanism of the

class specified, with a rotary shaft and a cam, of a plurality of carriers having tension-rolls, mounted on said shaft to reciprocate simultaneously, means to rotate said rolls from the shaft, a connection between the carriers and said cam, and means to retain said connection in operative relation with the cam.

22. The combination, in mechanism of the class specified, with rotary reciprocating tension-rolls and rotary friction-rolls, of means to drive said rolls at different rates of speed.

23. The combination, in mechanism of the class specified, with rotary reciprocating tension-rolls and rotary friction-rolls, said rolls standing at right angles to each other, of means to drive said rolls at different rates of speed.

24. The combination, in mechanism of the class specified, with rotary reciprocating tension-rolls and a cylinder, of means to drive said rolls and cylinder at different rates of speed.

25. The combination, in mechanism of the class specified, with rotary reciprocating tension-rolls and a cylinder, the rolls standing at right angles to the cylinder, of means to drive said rolls and cylinder at different rates of speed.

26. The combination, in mechanism of the class specified, with a clutch, of a longitudinally-movable rod having a lever thereon adapted to operate said clutch, and a cam-block in the path of said lever.

27. The combination, in mechanism of the class specified, with a clutch, of a longitudinally-movable rod spring-pressed in one direction, adapted to operate said clutch, a lever rigidly mounted thereon, and a cam-block in the path of said lever.

28. The combination, in mechanism of the class specified, with a clutch and a cam provided with a dog, of a longitudinally-movable rod having a lever mounted thereon adapted to operate said clutch, and an arm attached to said lever and extending into the path of said dog.

29. The combination, in mechanism of the class specified, with a clutch and a cam provided with a dog, of a longitudinally-movable rod connected with the clutch mechanism and having a lever mounted thereon, a cam-block in the path of said lever, and an arm attached to the lever and extending into the path of said dog.

30. The combination, in mechanism of the class specified, with a clutch, clutch-operating mechanism, and winding mechanism for silk or other material, of a sleeve having a spring-pressed plunger therein, pivotally supported so as to gravitate forward, and members connected with said plunger and respectively arranged and adapted to bear against a thread and to connect with the clutch-operating mechanism.

31. The combination, in mechanism of the class specified, with a clutch and winding mechanism

for silk or other material, of a longitudinally-movable rod adapted to operate said clutch, a sleeve having a spring-pressed plunger therein, pivotally supported so as to gravitate forward, a member connected with said plunger and arranged and adapted to bear against a thread, a second member connected with the plunger, and connecting means between said second member and the aforesaid rod, and means to depress said plunger and operate the clutch mechanism when the device rocks out of a prearranged position.

32. The combination, in mechanism of the class specified, with a clutch and winding mechanism for silk or other material, of a longitudinally-movable rod in operative connection with the clutch and having a lever rigidly mounted thereon, a cam-block in the path of said lever, a second rod connected and standing parallel with the first, a sleeve having a spring-pressed plunger therein, pivotally supported so as to gravitate forward, two members connected with said plunger and respectively arranged and adapted to bear against a thread and to engage the second of the aforesaid rods, and means to depress said plunger and operate the clutch mechanism when the device rocks out of a prearranged position.

33. The combination, in mechanism of the class specified, with a clutch and winding mechanism for silk or other material, of a longitudinally-movable rod adapted to operate said clutch, a slotted sleeve having a spring-pressed plunger therein, pivotally supported so as to gravitate forward, a member connected with said plunger and arranged and adapted to bear against a thread, a second member connected with the plunger, connecting means between said second member and the aforesaid rod, and a rotary member, the plunger being provided with a nose extending through the slot in said sleeve to be engaged by said rotary member when the upper part of the device falls forward out of a prearranged position.

34. The combination, in mechanism of the class specified, with a clutch and winding mechanism for silk or other material, of a longitudinally-movable rod in operative connection with the clutch and having a lever rigidly mounted thereon, a cam-block in the path of said lever, a second rod connected and extending parallel with the first, a slotted sleeve having a spring-pressed plunger therein, pivotally supported so as to gravitate forward, two members connected with said plunger and respectively arranged and adapted to bear against a thread and to engage the second of the aforesaid rods, and a rotary member, the plunger being provided with a nose extending through the slot in said sleeve to be engaged by said rotary member when the upper part of the device falls forward out of a prearranged position.

35. In mechanism of the class specified, the combination with a rotary member, of an au-

automatic stop device normally dependent for operation upon the breaking of a thread, comprising a sleeve and a spring-pressed plunger therein, said plunger being provided with a
5 thread-engaging part at one end and a part at the other end adapted to be connected with the clutch-operating mechanism, the device being adapted to be suspended adjacent to said rotary member and to be held out of engage-
10 ment with the same by a thread.

36. The combination, in mechanism of the class specified, with a cylinder and a movable support therefor at one end, of a rest jour-
naled beneath the cylinder and adapted to be
15 turned up to receive the same when said support is removed.

37. The combination, in mechanism of the class specified, with a cylinder and a tempo-
rary rest therefor, of a fixed sleeve, a plunger
20 operating in said sleeve and adapted to fur-

nish a support or bearing for the cylinder, and means to lock said plunger to the sleeve.

38. The combination, in mechanism of the class specified, with a cylinder and a tempo-
rary rest therefor, of a fixed sleeve, a plunger 25 operating in said sleeve and adapted to furnish a bearing for the cylinder, a bushing in the sleeve, a spindle extending from said plunger through said bushing, a spring inter-
posed between the plunger and bushing, and 30 a removable pin to lock the plunger to the sleeve.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH H. YOUNG.

Witnesses:

F. A. CUTTER,
STEPHEN S. TAFT, Jr.