(No Model.) 5 Sheets—Sheet 1.

C. FRIEDERICH.

COP WINDING MACHINE.

No. 493,356. Patented Mar. 14, 1893.

Fig. 1.

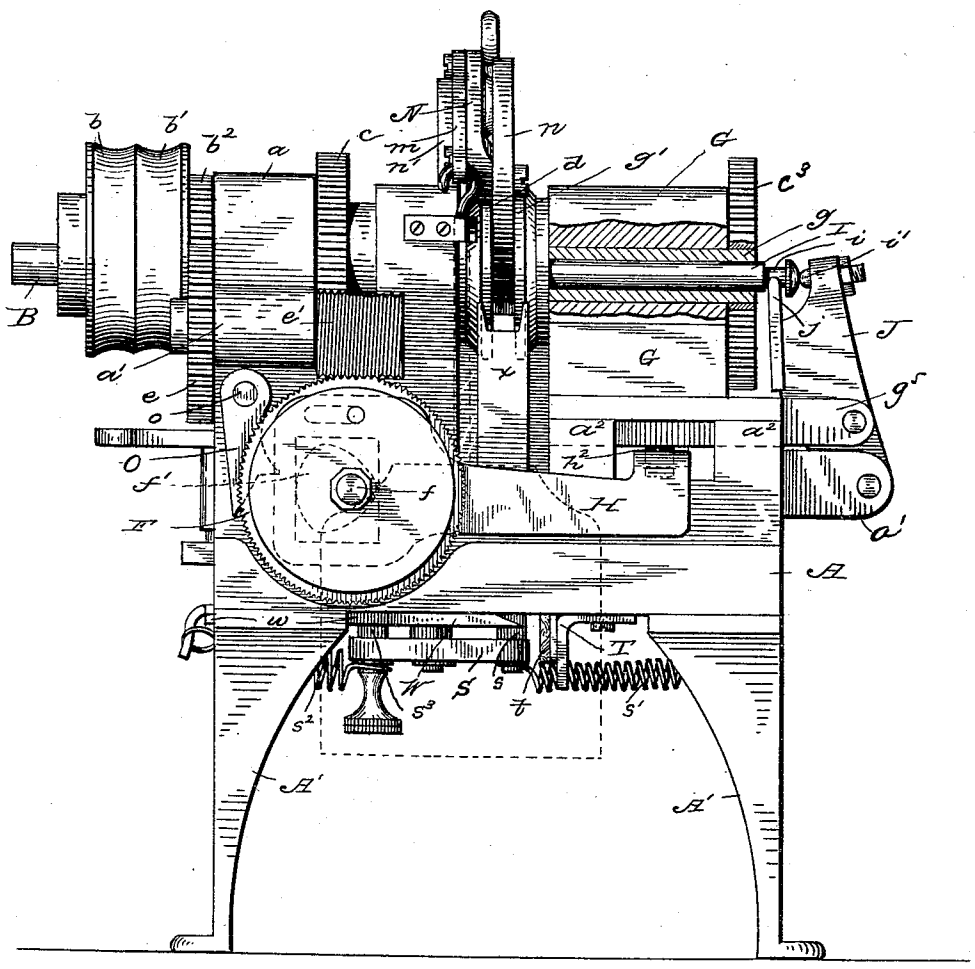

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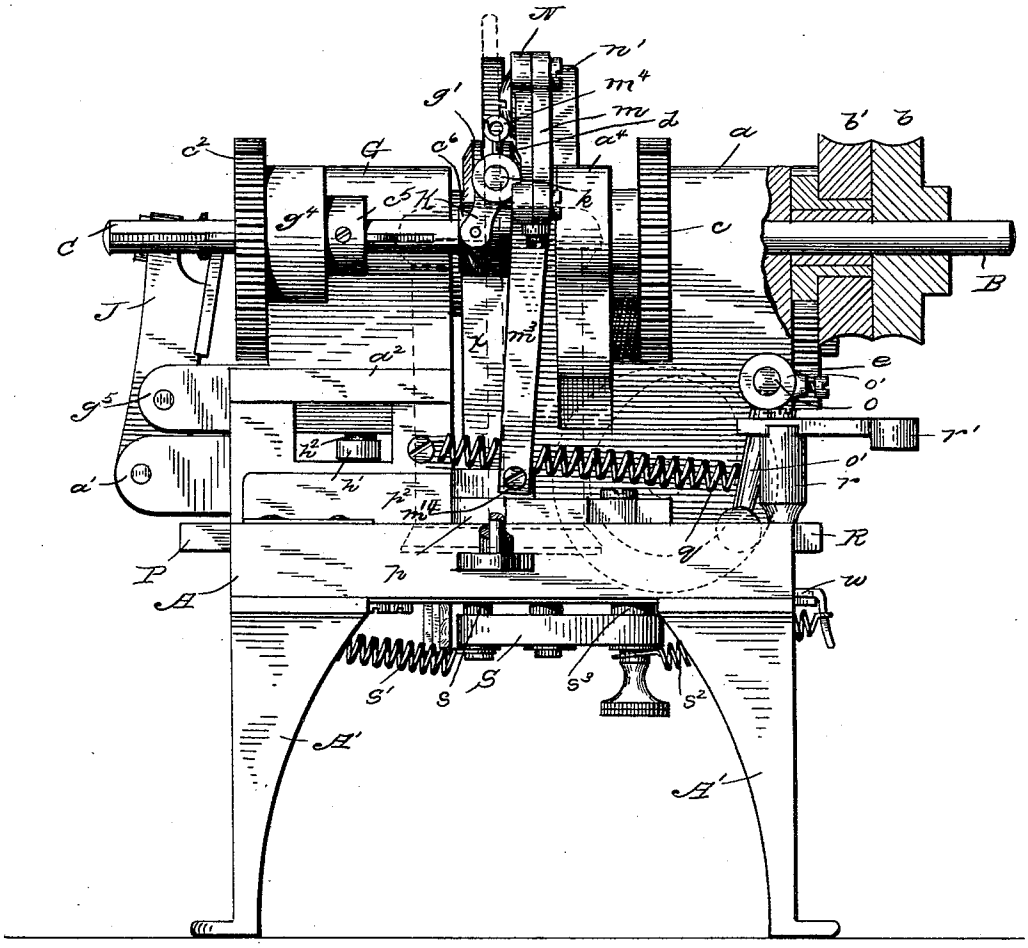
Fig. 2.



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(No Model.) 5 Sheets—Sheet 3.

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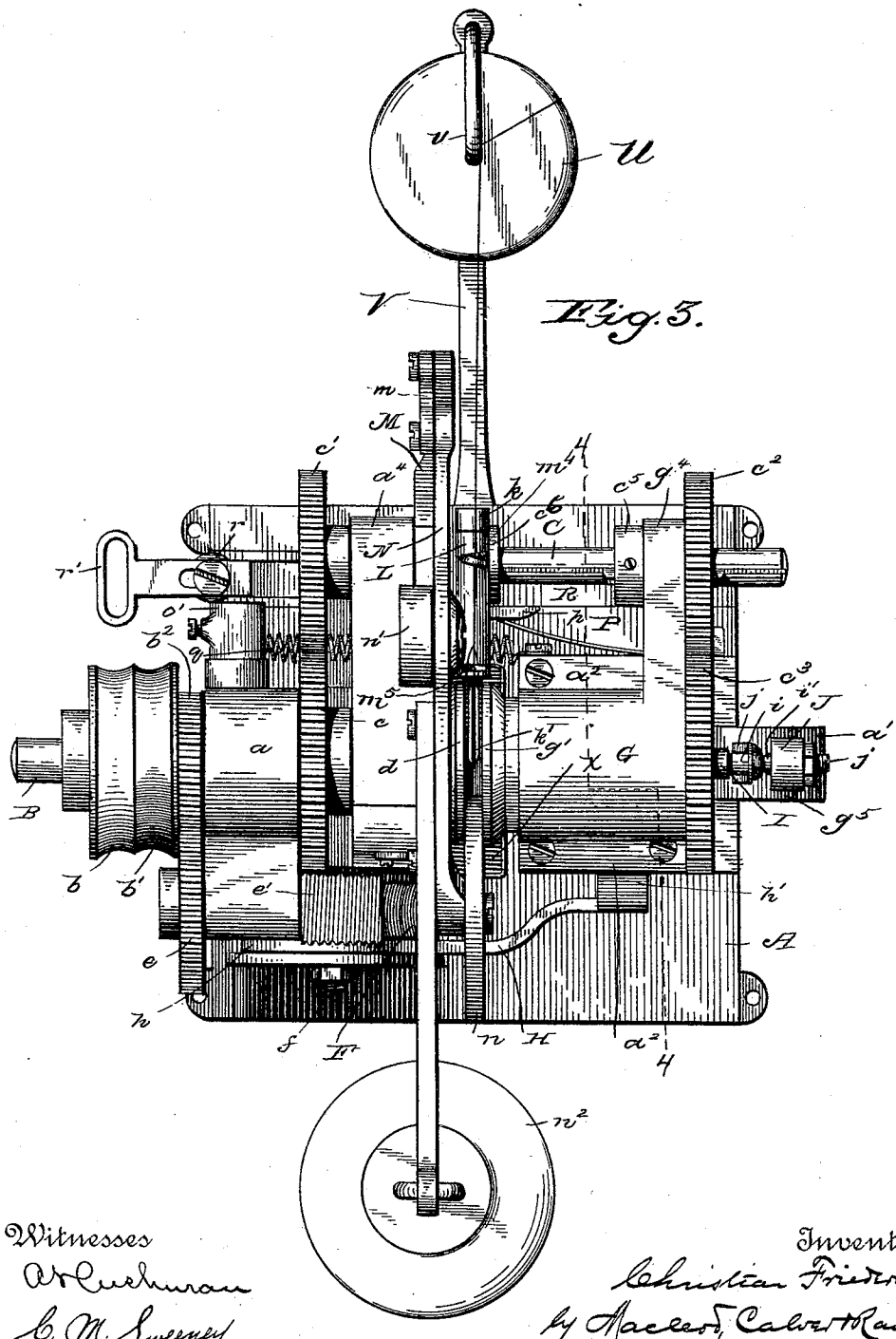

Fig. 3.

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(No Model.) 5 Sheets—Sheet 4.

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COP WINDING MACHINE.

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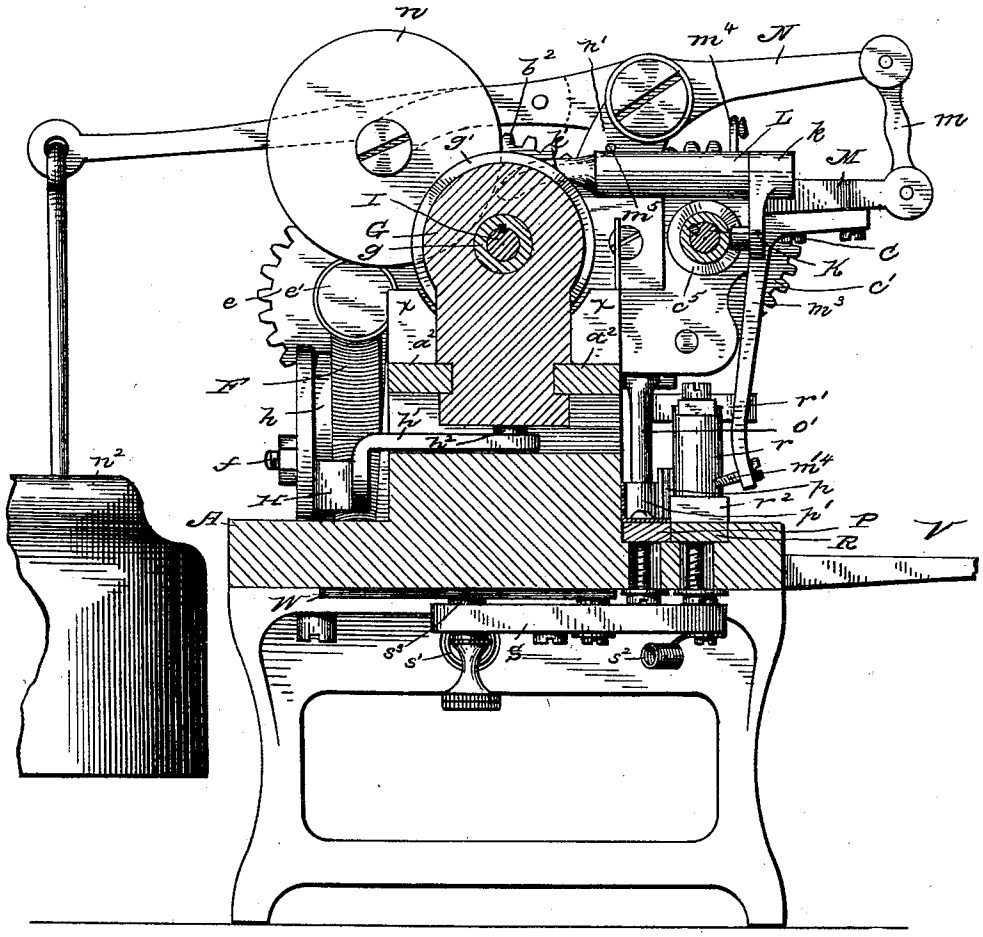
Fig. 4.



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COP WINDING MACHINE.

No. 493,356. Patented Mar. 14, 1893.

Fig. 5.

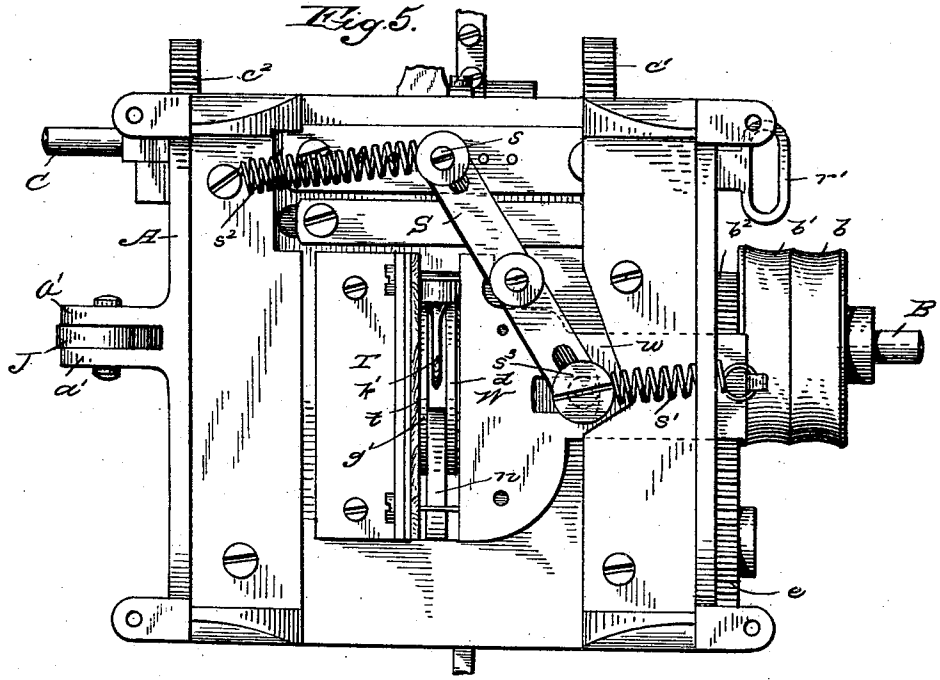


Fig. 6.

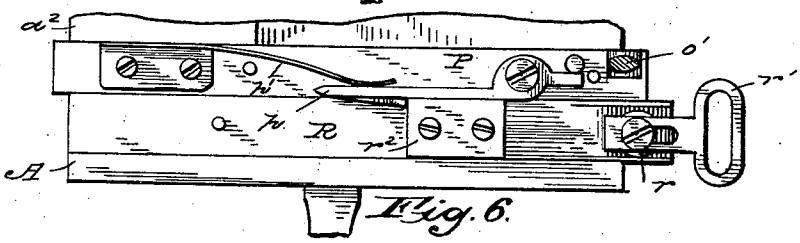


Fig. 7.

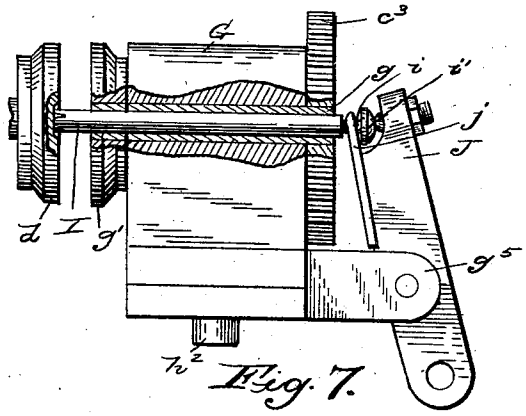
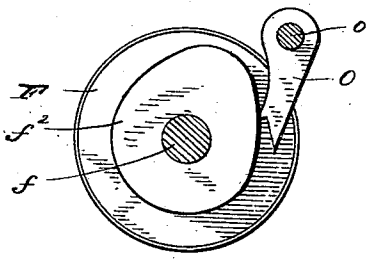


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHRISTIAN FRIEDERICH, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY OF NEW JERSEY.

COP-WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 493,356, dated March 14, 1893.

Application filed June 2, 1892. Serial No. 435,301. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN FRIEDERICH, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Cop-Winding Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object to provide a machine of simple construction by which flat or disk-formed cops of thread, more especially adapted for use in sewing machine shuttles, may be continuously and automatically wound on a machine which, upon the completion of a cop, will be automatically operated to discharge the same and will recommence the winding of a new cop without any attention on the part of the operator.

In the accompanying drawings Figures 1 and 2 are views, from opposite sides, of my improved cop winding machine, a portion of Fig. 2 being represented in section. Fig. 3 is a plan view of my machine, and Fig. 4 a cross section of the same on line 4—4 of Fig. 3. Fig. 5 is a bottom view of the table of the machine to show the mechanism underneath, and Figs. 6, 7 and 8 are detail views.

A denotes a metal bench or table mounted upon legs A′ and provided with a suitable standard *a* in which is mounted the driving shaft B provided with fast and loose pulleys *b* and *b′*, the gear wheel *c* and the head or disk *d*. The loose pulley *b′* is provided with a gear wheel b^2 meshing with a second gear wheel *e* on a short shaft journaled in the arm *a′* of the standard *a*, and provided with the worm *e′* meshing with a worm wheel F mounted on a transverse stud *f* attached to the standard *a*, and rigid with which are the cams *f′* f^2. The table A is also provided with a short standard a^2 having a suitable guide-way in which is mounted the sliding bracket G journaled in which is a sleeve or hollow shaft *g* provided with a head or disk *g′*. The gear wheel *c* on the shaft B meshes with a gear wheel *c′* on a shaft C which is journaled in an arm a^4 of the standard *a* and which has splined thereto a second gear wheel c^2 meshing with a gear wheel c^3 on the shaft *g*. The gear wheel c^2 is rigidly mounted on a sleeve to which is attached a collar c^5 between which and the said gear wheel c^2 extends an arm g^4 of the sliding bracket G so that as the said bracket moves to the right or left the said gear wheel will move therewith so as to keep it in constant mesh with the gear wheel c^3 on the shaft *g*. The cam *f′* is embraced by a yoke *h* on a bar H which has a right-angular arm *h′* which is connected by a pin h^2 with the base of the sliding bracket G so that as the said cam is rotated with the worm wheel F the said bracket will be moved to the right or left, as will presently appear. The rotary disks or heads *d* and *g′* are separated from each other, as more clearly shown in Figs. 1 and 3, and serve as walls to form a recess or chamber in which the disk-shaped cop is to be wound. Passing through the sleeve or hollow shaft *g* is a pin I which serves as a spindle upon which the cop is wound and which, when the sliding bracket G is moved to the right (Figs. 1 and 2), will be withdrawn from the cop which latter, upon being released by the movement to the right of the head or disk *g′* with the sliding bracket G, will be free to fall into a chute or receptacle *x* below.

The pin I is provided at its outer end with a groove *i* which is engaged by a lug or arm *j* of a lever J pivoted at its lower end between horizontally extending lugs or projections *a′* on the standard a^2, said lever being also pivotally connected with lugs or projections g^5 on the sliding bracket G. The upper end of the lever J has an abutment, herein shown as a screw *j′*, which engages the head *i′* of the pin I so that the said abutment and the arm *j* will move the said pin out and in with the said sliding bracket, and the said pin will thus, at the proper time, be withdrawn from the head or disk *g′* to disengage the cop and will then be returned for the winding operation. As the yoke *h* is moved inward, or to the left in Figs. 1 and 3, the pin I will be projected through the head or disk *g′* and by engaging the thread (which latter will be drawn across its end) will take hold of the same and force it into contact with the rotary head or disk *d* so that when the said head or disk *d*

is set in rotation the thread will immediately begin to wind upon the inner end of the said pin.

Mounted on the shaft C is a small cam c^6 which engages an arm K on a small rock-shaft k journaled in a sleeve L formed integral with or rigidly secured to a lever M pivoted on the shaft C; the said rock-shaft being provided at its forward or inner end with a thread distributer k' which extends between the rotary heads or disks d and g' and which serves to traverse or distribute the thread between the said disks. The lever M is connected at its upper end by a link m with the rear end of a lever N pivoted on a post n' attached to the bracket a or an arm thereof, said lever N carrying at its outer or forward end a presser wheel n which comes between the rotary heads or disks d and g' and thus rides upon the thread being wound and serves to compress it and make it wind compactly. The forward end of the lever N is drawn downward, to keep the presser wheel n against the thread, in any suitable manner; a weight n^2 suspended from the forward end of said lever being herein shown as the means which I prefer to employ for this purpose.

The cam f^2 is engaged by an arm or tappet O secured to a small shaft o extending transversely through the bracket a and provided at its opposite end with a depending arm o' which engages a slide P provided with a spring-pressed catch p. A spring q, connected with the arm o and the standard a^2, serves to retract the said slide and to hold the arm or tappet against the cam f^2. The slide P moves longitudinally in a suitable groove formed in the table A, and, contiguous to the said slide in the said groove, is a second slide R provided with a pin or standard r carrying a loop r' through which the belt passes and which loop serves as a belt shipper to transfer the driving belt from the fast to the loose pulley, and vice versa, as may be required. The said slide R is provided with a block r^2 which, at times, is connected by the spring catch p to the slide P (said catch being pressed against by a plate spring p') so that as the said slide P is moved toward the left in Fig. 3, or to the right in Fig. 2, the belt may be transferred from the loose pulley b' to the fast pulley b, or said belt may be reversely transferred on the inward movement of the said slide R. Beneath the table A is a lever S which is provided with a pin s extending upward through a slot in the said table and engaging the slide R; springs s' and s^2 attached to the opposite ends of the said lever S serve to move the said lever in such a manner as to retract said slide R, or to move it to the right in Figs. 1 and 3.

To the underside of the bed A is attached a small L-shaped plate or bracket T the base of which is provided with a cutting block t of vulcanized fiber or other suitable material; and in a suitable guideway beneath the said bed is arranged a thread severing knife W, which is engaged by a pin s^3 on the lever S, so that when the slide R carrying the belt shipper is moved outward to transfer the belt from the fast to the loose pulley the said knife will be forced against the said cutting block to sever the thread; or if the thread be not severed, it will be held tight by said knife so that when the thread again begins to wind it will immediately be broken. The spring s' connected with the said pin s^3 and with a tail-piece w of the knife W, serves as a yielding connection between said knife and pin so that the latter is free to continue its movement with the lever S after the knife is in contact with the block t.

The lever M is provided with a depending arm m^3 having a toe or projection m^{14}, herein shown as a screw tapped in the lower part of said arm, the said toe or projection being arranged to engage the catch p on the slide P, and owing to the fact that the said lever M is connected by the link m with the lever N it will be seen that as the forward end of the last named lever is forced upward by the accumulating thread beneath the presser wheel n the said toe or projection will be caused to engage the said spring catch when the lever N is lifted far enough; and when sufficient thread has been wound to make a cop of any desired size the said toe or projection will force the said catch inward and release it from the block r^2 on the slide R, and the latter, which in the mean time has been held outward by the said spring catch, will then be retracted by the springs s' and s^2 operating on said slide through the lever S and will thus transfer the belt from the fast pulley b to the loose pulley b' and thereby arrest the rotary movement of the shaft B and the rotary heads or disks d and g' receiving motion therefrom; the last named head or disk, it will be understood, being rotated through the trains of gears c, c', c^2, c^3.

The operation of my improved cop winding machine is as follows: In first starting the machine the end of the thread is caught between the inner end of the pin I and the rotary head or disk d and the machine is then started by running the driving belt on to the fast pulley b, thereby imparting rotary movements to the heads or disks d and g' and causing the thread to accumulate on the pin or spindle I which rotates with the sleeve or shaft g through which it passes. As the thread is wound between the said heads or disks on the said pin I it is continuously distributed back and forth by the thread distributer k' and is solidly compressed by the presser wheel n borne down by the weight attached to the lever N. When sufficient thread has accumulated between the rotary heads or disks to raise the presser wheel n and the lever N by which it is carried far enough to cause the toe or projection m^{14} at the lower end of the arm m^3 to engage the spring catch p on the slide P and release the said catch from the block r^2

on the slide R, the springs s' and s^2, acting on the said slide R through the lever S, as hereinbefore described, will retract the said slide and transfer the driving belt from the fast pulley b to the loose pulley b', thereby stopping the rotary movements of the winding mechanism. The gear wheel b^3, rotating with the loose pulley b', now imparts movement to the gear wheel e with which it meshes and which in turn sets the worm e' in motion thereby causing the worm wheel F and the cams f' and f^2 moving therewith to rotate. The rotary movements of the cam f' imparts movement to the yoke h of the bar H and shifts the said bar to the right (Figs. 1 and 3) thereby moving the sliding bracket G to the right and releasing the rotary head or disk g' from the cop which, when the pin I is moved far enough outward, is free to fall by the action of gravity into the receptacle beneath. During this operation the cam f^2 which, through the arm or tappet O, shaft o, and arm o', governs the movements of the slide P, has caused the said slide to move backward or to the left in Fig. 2 so as to engage the spring catch p with the block r^2 on the slide R and the said slide P is again moved outward, or to the left in Figs. 3 and 6; by the time the cam f has performed its revolution and has thus returned the sliding bracket G, the rotary head g' and pin I carried thereby to their first positions; so that the belt shipper carried by the slide R is now again moved to the left (Figs. 1 and 3) and has transferred the driving belt from the loose pulley b' to the fast pulley b, thereby arresting the movements of the worm wheel F and the cams connected therewith and setting the winding mechanism again in operation. The spool U from which the thread for the cops is drawn is herein shown as being supported by an arm V attached to the table A, the thread being led upward from the spool through a guide v attached to said arm V and thence through suitable thread guides or eyes m^4 m^5 on the sleeve L to the rocking thread distributer k' extending between the rotary heads or disks d and g'. Instead of using the cams f' and f^2 for operating the pin I and the movable head or disk and for governing the movements of the belt shipping mechanism, these devices may be operated from other equivalent rotating parts (as eccentrics or cranks) moving with the worm-wheel F, as will be readily understood.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a cop winding machine, the combination with a rotary head or disk and a second rotary head or disk movable toward and from the first disk or head, of an endwise movable pin arranged centrally of the said disks or heads and extending across the space between them, a thread distributer also arranged between the said disks or heads, and means for rotating the said heads or disks, for vibrating or reciprocating the said thread distributer and for moving the said pin and the said movable head or disk outward and inward at times.

2. In a cop winding machine, the combination of a driving shaft provided with fast and loose pulleys, a rotary head or disk on the said driving shaft, and a second rotary head or disk normally separated from the first-named head or disk, a shaft by which the last-named head or disk is carried, a train of gearing connecting the last-named shaft with the driving shaft, a movable bracket in which the shaft carrying the movable head or disk is mounted, an endwise movable pin extending through the shaft carrying the said movable head or disk and crossing the space between them, a thread distributing mechanism, a worm, a worm wheel, a gearing connection between the said worm wheel and the said loose pulley, means operated from said worm wheel for moving the said sliding bracket and the said pin, a belt shipping mechanism, and means, also operated from said worm wheel, for controlling the operation of the said belt shipping mechanism in transferring the belt from the loose to the fast pulley.

3. In a cop winding machine the combination with two rotary heads or disks which in their normal positions are separated from each other a distance equal to the thickness of the cop to be wound, and one of which disks or heads is movable toward and from the other, a driving shaft carrying one of the said rotary heads or disks and which driving shaft is provided with fast and loose pulleys, a train of gearing connecting the said driving shaft with the other of said rotary heads or disks to operate the latter, a thread compressing wheel or device to bear upon the cop being formed and compress the latter, a belt shipping mechanism for transferring the driving belt from the fast pulley to the loose pulley and vice versa, a cutting mechanism connected with the said belt shipping mechanism, and a mechanism for governing the action of the said belt shipper by the accumulating thread of the cop; whereby when a cop of any desired size has been formed the said governing mechanism may be operated to release the belt shipper and transfer the driving belt from the fast to the loose pulley and thus suspend the winding operation.

4. In a cop winding machine, the combination with two rotary heads or disks normally separated from each other during the winding operation, and one of which is movable toward and from the other, of a thread distributer and a presser wheel or device bearing upon the accumulating thread, mechanism for rotating the said heads or disks, and a stop motion, for said rotating mechanism, controlled by the said presser wheel or device, the position of the latter being governed by the accumulating thread.

5. In a cop winding machine, the combination with two rotary heads or disks normally separated from each other during the winding operation, and one of which is movable toward and from the other, of a thread distributer and a presser wheel or device bearing upon the accumulating thread, mechanism for rotating the said heads or disks, a stop motion, for said rotating mechanism, controlled by the said presser wheel or device, the position of which latter is governed by the accumulating thread on the cop, and a knife for severing the thread.

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

CHRISTIAN FRIEDERICH.

Witnesses:
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J. G. GREENE.