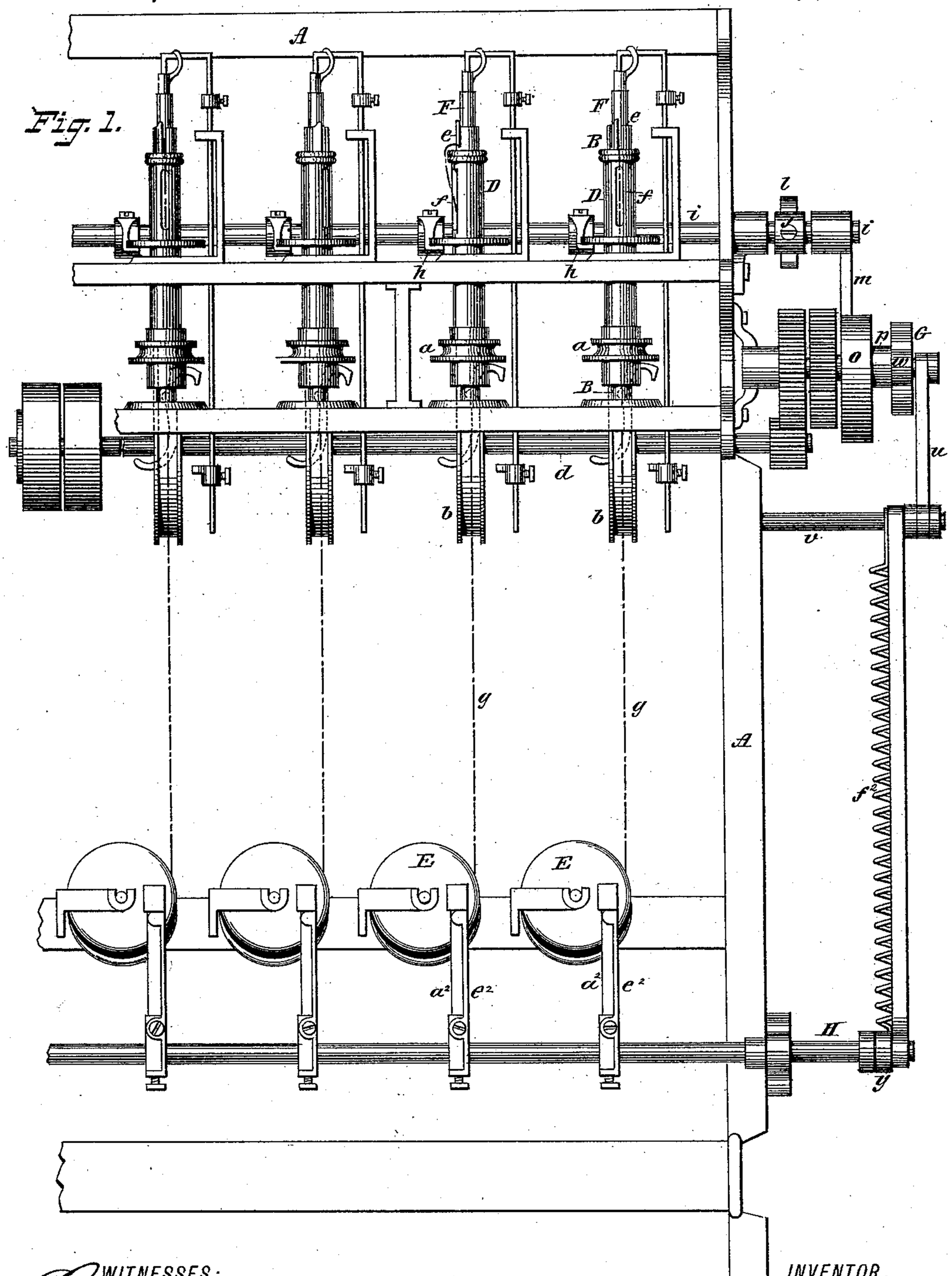
(No Model.) 2 Sheets—Sheet 1.

J. COUCHE.

TENSION REGULATING DEVICE FOR COP WINDING MACHINES.

No. 393,887. Patented Dec. 4, 1888.

Fig. 1.



WITNESSES:

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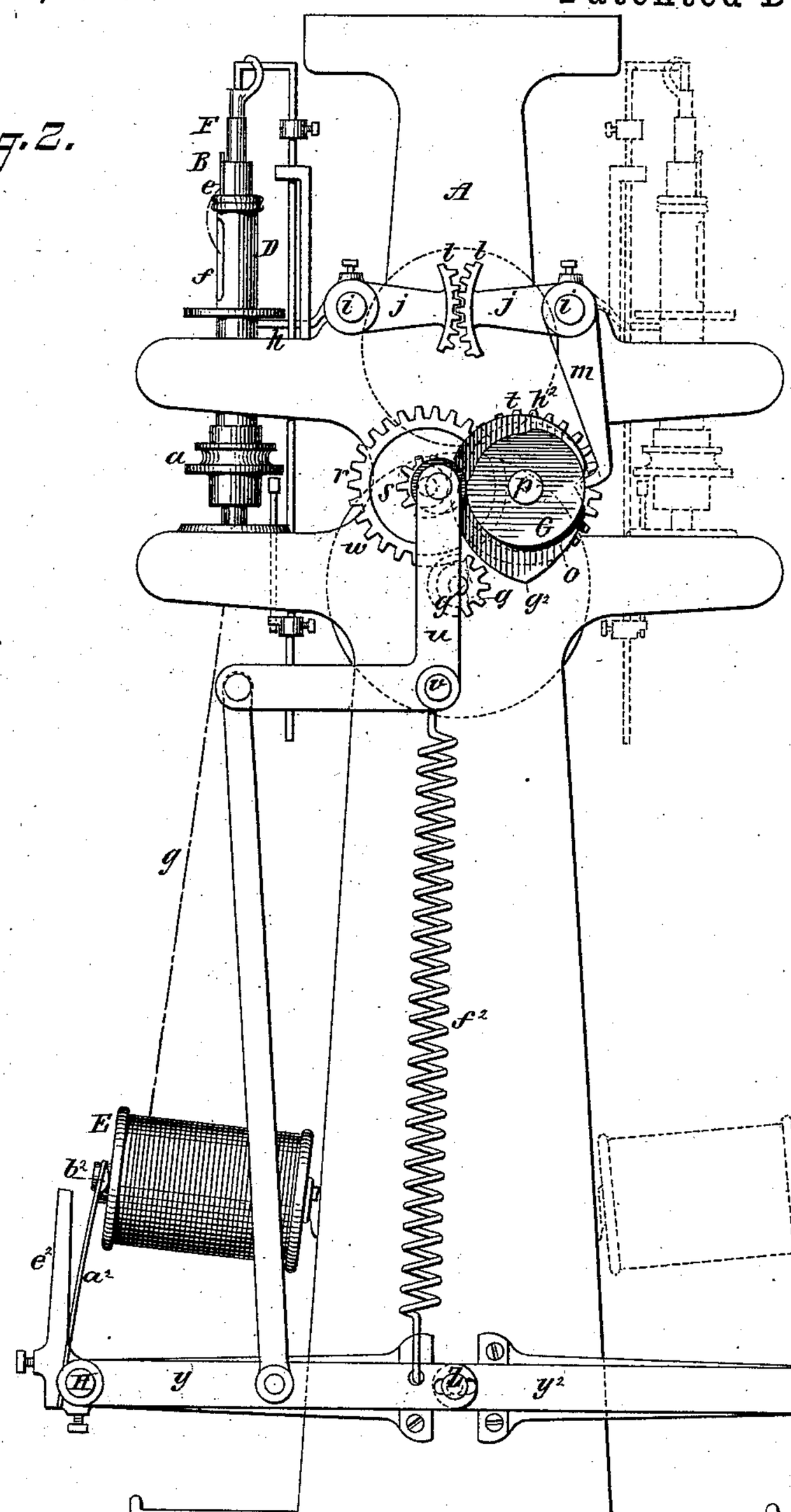
Fig. 2.



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UNITED STATES PATENT OFFICE.

JULES COUCHE, OF UNION HILL, NEW JERSEY, ASSIGNOR TO R. & H. SIMON, OF SAME PLACE.

TENSION-REGULATING DEVICE FOR COP-WINDING MACHINES.

SPECIFICATION forming part of Letters Patent No. 393,887, dated December 4, 1888.

Application filed May 5, 1888. Serial No. 272,956. (No model.)

To all whom it may concern:

Be it known that I, JULES COUCHE, a resident of Union Hill, Hudson county, New Jersey, have invented an Improved Tension-Regulating Device for Cop-Winding Machines, of which the following is a specification.

The object of my invention is to provide a device for regulating the tension of the threads as they are being wound upon cops to be used in shuttles, &c.

The invention consists in the details of improvement and the combinations of parts that will be more fully hereinafter set forth.

Reference is to be had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a portion of a cop-winding machine provided with my improvements, and Fig. 2 is an end elevation thereof.

The letter A in the accompanying drawings represents the frame of the cop-winding machine.

B is a series of hollow spindles that are journaled in the frame A and that carry pulleys *a*. These spindles B may be on both sides of the machine, as in Fig. 2, or only on one side, as desired. These spindles are rotated by belts that pass over the pulleys *a* from pulleys *b* on the driving-shaft *d*, which shaft receives motion from a suitable source; or said spindles may be rotated in other suitable manner.

The spindles B are slit longitudinally from their upper ends downward for a distance, as at *e*, and are tapered internally at their upper ends in the ordinary manner.

D are outer sleeves or thread-guides that surround the spindles B and are adapted to be rotated by and with said spindles, and also to have reciprocating motion on said spindles, all as is usual. The sleeves or guides D are also slotted, as at *f*, which slots in operation will register with the slots *e* in the spindles B. The threads *g* from spools or bobbins E, that are suitably journaled on the frame A, pass through the spindles B and out of said spindles through the slits *e* therein, and thence through the slots *f* in the sleeves or guides D. The threads *g* next pass over the tops of the guides D, thence through the slots *e* in the spindles B, and are wound on the cops or quills F, that are passed into the hollow spindles B, as shown, all as in ordinary machines now in use.

The guides D are reciprocated along the spindles B by means of fingers *h*, that engage said guides, which fingers are secured to a rock-shaft, *i*, that is suitably journaled in the frame A. When the spindles B and connected parts are arranged along both sides of the machine, as in Fig. 2, there will be two rock-shafts *i*, carrying fingers *h*. These shafts will then be connected together by cranks *j j*, one for each shaft, which cranks carry segmental racks *l l*, that mesh with each other. In this manner one shaft *i* imparts its rocking motion to the other shaft *i*; but said shafts may be otherwise arranged to have rocking motion in unison. One of the shafts *i* carries an arm or crank, *m*, that bears at its free end upon a cam, *o*, that is mounted on a shaft, *p*, suitably journaled on the frame A. The driving-shaft *d* carries a pinion, *q*, and by means of intermediate gearing, *r s t*, connecting said pinion and the shaft *p*, said shaft *p* will be driven by the shaft *d*.

The machine above described is old and not my invention, being described herein to show the application of my invention for regulating the tension on the threads *g* when being wound on the cops F. This machine may therefore be altered and varied in any desired particulars so long as my invention is applicable thereto.

I will now show my improved thread-tension-regulating device and how it operates in connection with the above-described machine.

Upon the shaft *p*, with the cam *o*, or upon any other suitable shaft, is secured a cam, G, that rotates with the cam *o*.

u is an angle-lever that is hung on a support, *v*, carried by the frame A. The lever *u* carries on one of its arms a roller or contact-piece, *w*, that bears upon the cam G. The opposite arm of the lever *u* is jointed to a rod, *x*, that at its opposite end is jointed to a lever, *y*. The lever *y* is secured at one end to a rock-shaft, H, that is journaled in suitable bearings

in the frame A near the bobbins E. The lever y at its free end has a slot through which a pin, Z, from another lever, y^2, passes, which lever y^2 is secured to a rock-shaft, H^2, journaled on the frame A parallel with the shaft H; but the levers y y^2 could be otherwise suitably connected.

The shafts H H^2 carry a series of fingers or brakes, a^2, that are preferably springy, and the free ends of which fingers are adapted to bear upon the bobbins E. The free ends of these fingers a^2 preferably carry contact or wearing pieces b^2, that bear upon the bobbins E and take up the wear thereon.

In order to prevent the brake-fingers a^2 from being broken by being drawn outward too far when the bobbins E are inserted in their bearings, cranks-arms e^2 are secured to the rock-shafts H H^2, that come in the path of said brake-fingers a^2 when so drawn outward and limit the outward movement thereof.

f^2 is a spring that is secured at one end to the lever y or y^2 and at its opposite end to the projection c or the frame A. The spring f^2 acts to raise the levers y y^2, and thereby move the fingers a^2 outward from the spools E, also to keep the upper end of the lever u in contact with the cam G.

If the spindles B and cops F are only arranged on one side of the frame A, one of the shafts, H or H^2, and their parts and one of the levers y y^2 may be dispensed with.

As the threads g in ordinary machines are being wound on the quill F from the smaller part toward the larger part, the spools E will naturally increase their speed of rotation as an increased quantity of thread is being taken from them to cover the larger part of the quill. If this accelerated speed of the spools E is not stopped when the larger part of the quill has received the thread, the threads while being next laid on the smaller part of the quill will be delivered from the spools (on account of their previously-acquired momentum) faster than they are wound on the quills, and thereby the threads on the quills at this (smaller) part will be loose and uneven. By my invention I increase the tension on the threads g when they are being wound on the quill from the larger toward the smaller part. This is done by causing the fingers a^2 to press upon the spools E while the threads g are being thus wound on the quills. Then as the threads are being wound on the quills F from the smaller part toward the larger part the tension on the threads is reduced by relieving the pressure of the fingers a^2 upon the spools E.

My improvements operate to produce the above effects as follows: Suppose the quills F to be in position in the spindles B and the parts in the position for winding the threads upon the quills from the smaller toward the larger part. This position of the parts is represented in Fig. 2—that is, the sleeves D are at the lowest point, the crank m is on the narrow part of the cam o, and the lever u resting on the wide part of the cam G close to the narrow part thereof, the fingers a^2 being thereby pressed upon the spools E. The machine is now started, when the cams o G will be turned in the direction of the arrow in Fig. 2 and the spindles B and guides D will be rotated to wind the threads g upon the quills F. The first effect of the cam o will be to slowly move the crank m outward, thereby rocking the shafts i, so as to raise the fingers h and elevate the guides D. At the same time the narrow part of the cam G is presented to the lever u, which enters said narrow part of the cam and acts to raise the levers y y^2, and thereby decrease the pressure of the fingers a^2 on the spools E by moving them outward. As the guides D are moving upward, as above shown, the thread is being wound upon the quills F from their smaller to their larger part, thereby increasing the quantity of thread drawn from the spools E, and consequently increasing the speed of said spools; but this speed is not now interfered with by the fingers a^2. By the time the widest point, g^2, of the cam o has reached the crank m the guides D will have reached their highest position, while the point h^2 of the cam G will have about reached the lever u. As the cams o G continue to rotate, the guides D will, through the action of the crank m and fingers h, begin to gradually descend, thereby winding the threads upon the quills from the larger toward the smaller part of their diameter. The moment the guides begin to descend, as above stated, the point h^2 of the cam G will strike the lever u, thereby moving the upper end of said lever outward and depressing the levers y y^2, thereby also rocking the shafts H H^2 and throwing the fingers a^2 against the spools E, in this manner checking the accelerated speed of said spools and placing a brake upon said spools, so that as the quantity of thread wound upon the quills decreases as the diameter of the quills decreases the spools will be permitted to rotate with only the speed required to deliver the necessary amount of thread. During the time the guides descend, as above, the wide part of the cam G will continue to press upon the lever u, thereby holding the fingers a^2 in contact with the spools E. When the guides D have reached their lowest position—that is, when the crank m is again in the narrow part of the cam o and said guides begin to ascend—the pressure of the fingers upon the spools E will be reduced by the narrow part of the cam G again coming opposite the lever, as above described, when the movements will be repeated.

From the above it will be seen that as the guides D ascend to wind the thread from the smaller to the larger part of the quills the spools E are free to rotate and deliver the required amount of threads, and that immediately the guides begin to descend to wind the threads toward the smaller part of the quills the brake-fingers a^2 are thrown against the spools E to check their speed and to put tension upon the threads, so that they will wind

evenly and properly upon the quills during the decrease in the diameter thereof.

Having now described my invention, what I claim is—

1. In a cop-winding machine, the combination of the brake-finger a^2, that is adapted to bear upon a delivery-spool with a reciprocating thread-guide, means, substantially as described, for reciprocating said guide, and with mechanism, substantially as described, intermediate the finger and the means for reciprocating the thread-guide for pressing said finger upon the spool as the thread is being drawn therefrom and as the thread-guide is moving in one direction and for releasing said pressure as the thread-guide moves in the reverse direction, as specified.

2. In a cop-winding machine, the spindle B and reciprocating thread-guide D, combined with the brake-finger a^2, that is adapted to bear upon the delivery-spool and cam G, and mechanism intermediate the cam and finger, said cam being arranged to alter the pressure of said finger upon the delivery-spool when the direction of motion of the guide D changes, substantially as specified.

3. In a cop-winding machine, the spindle B and thread-guide D, combined with the brake-finger a^2, adapted to bear upon the delivery-spool, cam G, and mechanism, substantially as described, connecting said cam and said guide D and finger a^2, whereby as the thread is being wound toward the narrow part of the quill the tension on the thread g will be increased, and whereby as the thread is being wound toward the larger part of the quill the tension on the thread will be decreased, substantially as herein shown and described.

4. In a cop-winding machine, the cam G, and lever u, engaging said cam, combined with the lever y, shaft H, rod x, connecting the lever y and shaft H, and finger a^2 on said shaft, said finger being adapted to bear upon the delivery-spool, substantially as described.

5. The guide D, rock-shaft i, having finger h, that engages said guide, crank m, and cam o, for rocking said shaft, in combination with the cam G, lever u, engaging said cam, lever y, connected to said lever u, rock-shaft H, carrying said lever y, and finger a^2, said finger being adapted to bear upon the delivery-spool, substantially as described.

6. The thread-guide D, rock-shaft i, finger h on said shaft and engaging the guide D, crank m, and cam o, for rocking said shaft, in combination with the cam G, lever u, engaging said cam, lever y, connected to said lever u, shaft H, carrying said lever y, and finger a^2, said finger being adapted to bear upon the delivery-spool, and with the crank e^2, said crank acting to limit the outward movement of the finger a^2, all arranged and operating substantially as described.

7. The cam G, lever u, engaging said cam, lever y, connected to said lever u, shaft H, carrying said lever y, finger a^2, and crank e^2, said crank acting to limit the outward movement of the finger a^2, substantially as described.

JULES COUCHE.

Witnesses:
JOHN CATON,
E. WHILLDIN.