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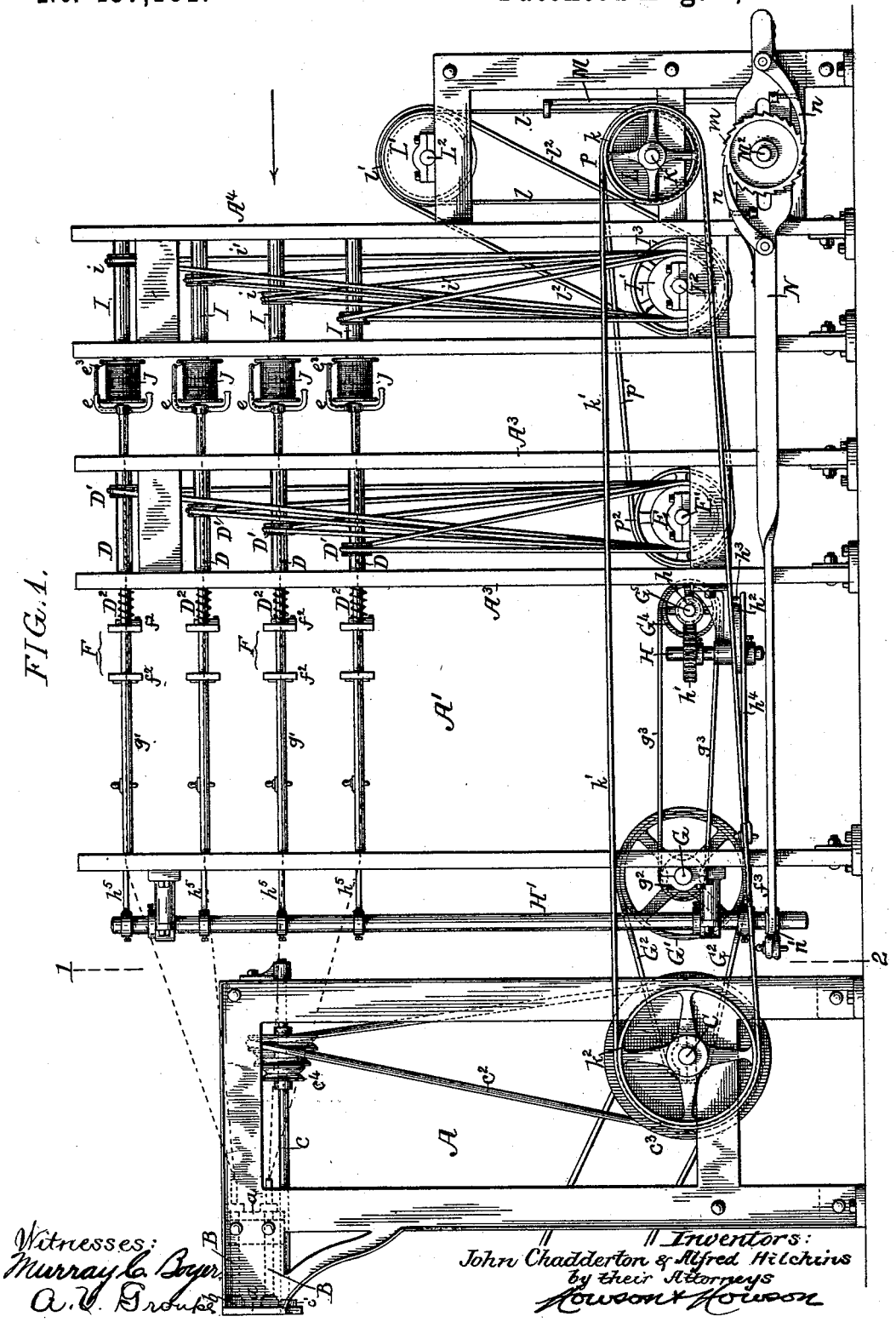
J. CHADDERTON & A. HITCHINS.

TWISTING MACHINE.

No. 457,181. Patented Aug. 4, 1891.

FIG. 1.



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TWISTING MACHINE.

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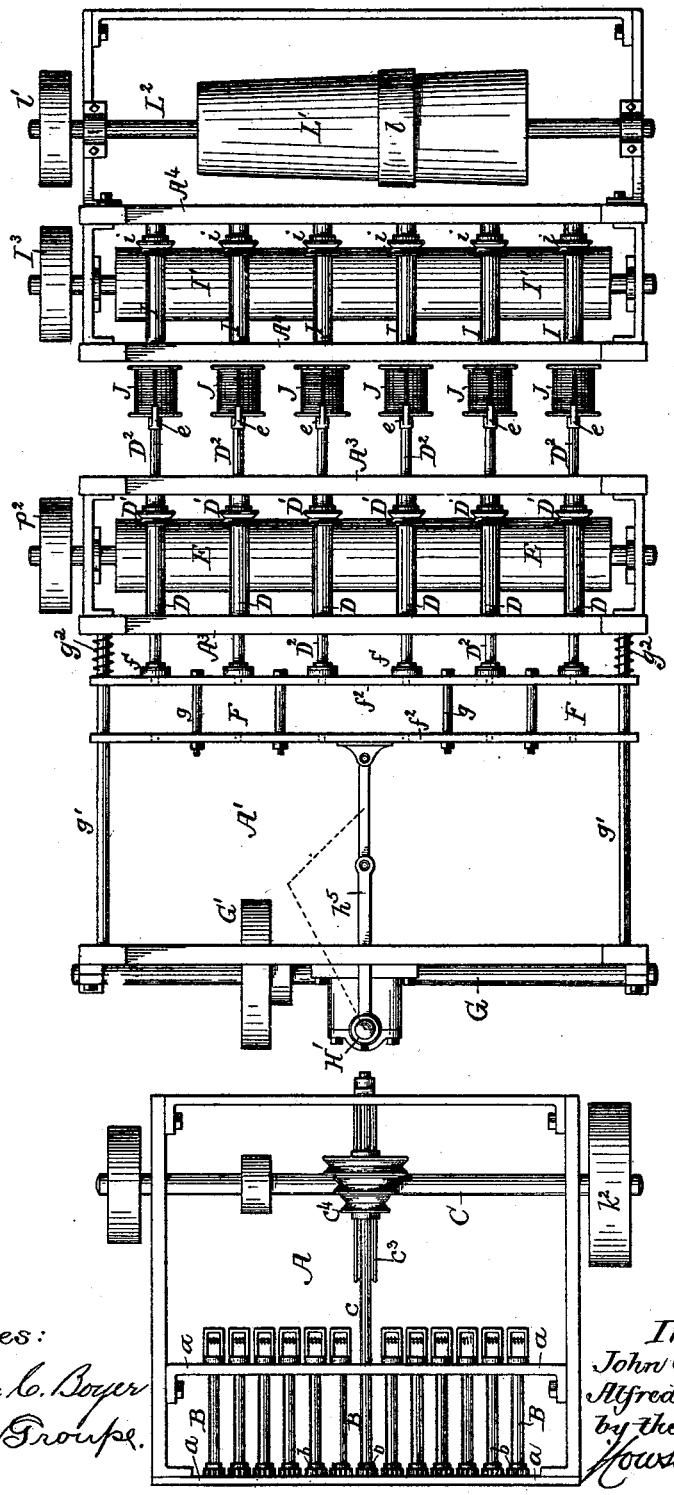
FIG. 2.



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J. CHADDERTON & A. HITCHINS.

TWISTING MACHINE.

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FIG. 4.

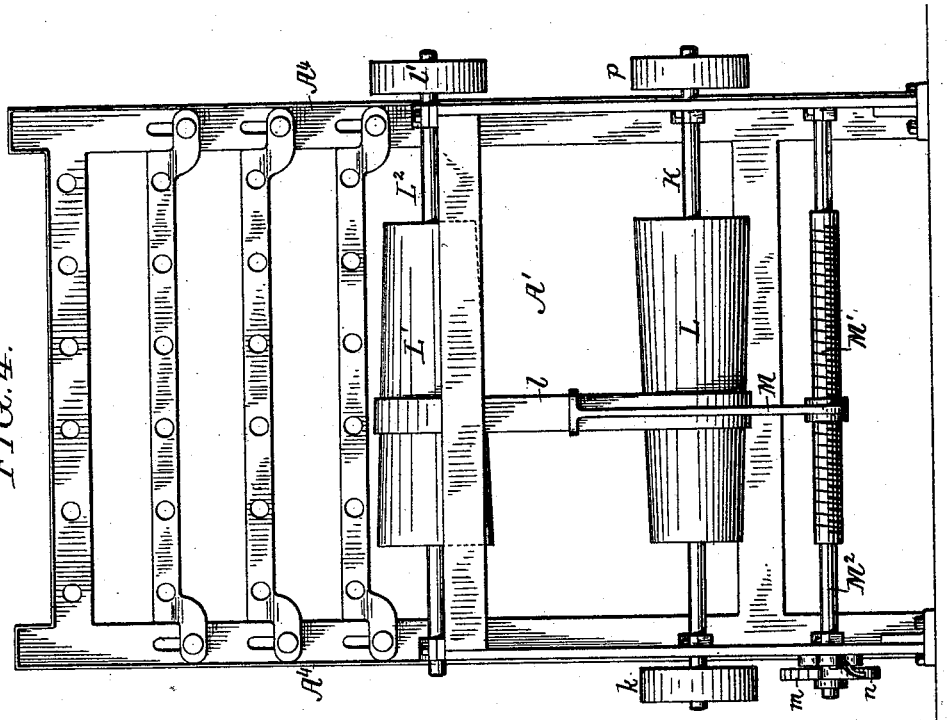
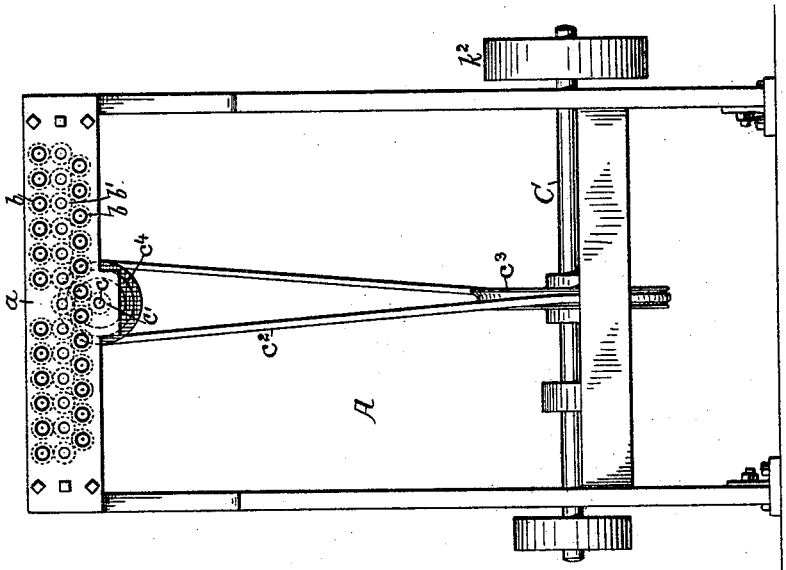


FIG. 3.



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(No Model.) 4 Sheets—Sheet 4.

J. CHADDERTON & A. HITCHINS.

TWISTING MACHINE.

No. 457,181. Patented Aug. 4, 1891.

FIG. 5.

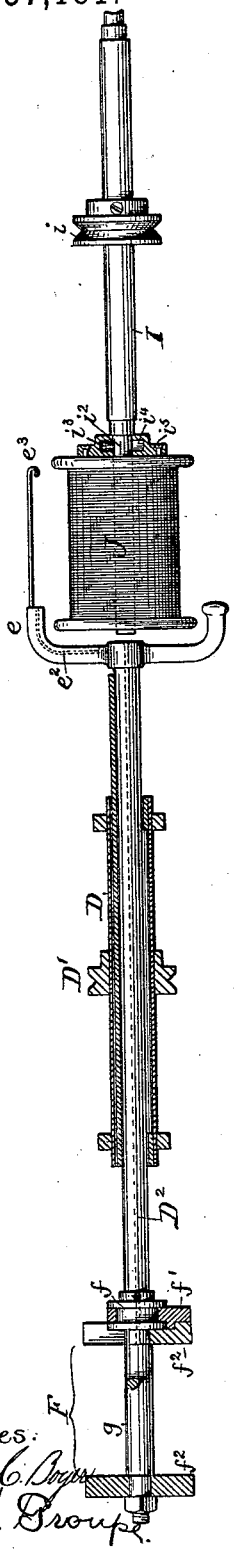


FIG. 9.

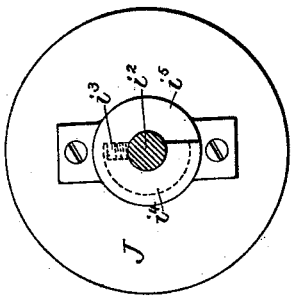


FIG. 8.

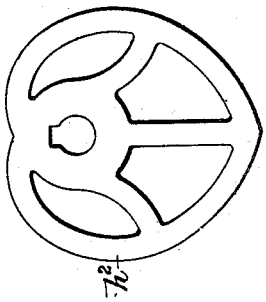


FIG. 10.

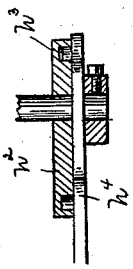


FIG. 6.

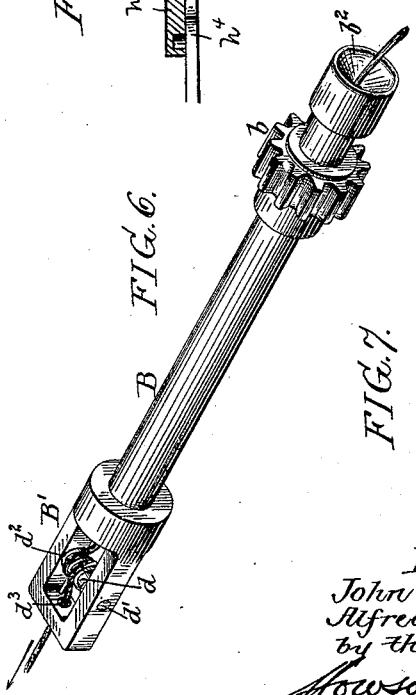
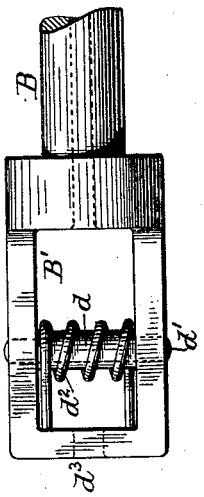


FIG. 7.



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UNITED STATES PATENT OFFICE.

JOHN CHADDERTON AND ALFRED HITCHINS, OF PHILADELPHIA, PENNSYLVANIA.

TWISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 457,181, dated August 4, 1891.

Application filed December 8, 1890. Serial No. 373,859. (No model.)

To all whom it may concern:

Be it known that we, JOHN CHADDERTON and ALFRED HITCHINS, both citizens of the United States, and residents of Philadelphia, Pennsylvania, have invented certain Improvements in Twisting-Machines, of which the following is a specification.

Our invention relates to the construction of machines for twisting and winding yarn, its principal object being to construct a machine applicable to the twisting of a form of chenille, although it may of course be employed for yarns or strands of any character.

In the accompanying drawings, Figure 1 is a side view of a twisting and winding machine constructed in accordance with our invention. Fig. 2 is a plan view of the same. Fig. 3 is a transverse section on the line 1 2, Fig. 1. Fig. 4 is an end elevation looking in the direction of the arrow, Fig. 1. Fig. 5 is a longitudinal sectional view of one of the spooling mechanisms detached from the machine. Fig. 6 is a perspective view of one of the twisting-spindles. Fig. 7 is an enlarged view of the head of one of the twisting-spindles. Figs. 8 and 9 are views of details, and Fig. 10 is a view of a modification.

The machine, as shown in Fig. 1, is divided practically in two parts, the portion A carrying the twisting mechanism and the portion A′ carrying the spooling mechanism, but both portions are driven from the common driving-shaft C.

We will first describe the twisting mechanism. The machine shown in the drawings is designed to twist twenty-four ends of yarn, although more or less than this number may be twisted by multiplying or decreasing the number of twisters and spoolers. Mounted on the frame A are a series of hollow twisting-spindles B. (Shown in detail in Figs. 6 and 7.) These spindles are adapted to bearings $a\ a$ on the frame, and each spindle is provided with a gear-wheel b, which engages with intermediate gear-wheels b', as shown by dotted lines in Fig. 3, so that all the gears of the spindles are in train. Motion is imparted to the train by a pinion c', mounted on the shaft c, which is driven from the main shaft C by a belt c^2, passing around a wheel c^3 on the main shaft and around a wheel c^4 on the shaft c. As the twisting-spindles are all of the same construction, a detailed description of but one of them is given. The spindle B is in the form of a tube, on which is secured the pinion b, and is provided at one end with a flaring mouth b^2 for the entrance of the yarn, and at its opposite end with an open head B′, on which is mounted a roller d, revolving freely on a pin d'. Passing around this roller in a helical form and having its opposite ends secured in the head B′ is a wire d^2, the coils of which, however, are of such size as to permit the free rotation of the roller d. In the outer end of the head B′ is an eye d^3, through which the twisted yarn is delivered to the winding-frames. The yarn enters at the mouth b^2, passing through the spindle, is coiled once around the roller d in the spaces between the coils of the wire d^2, and from thence passes out through the eye d^3, so that as the spindle is revolved the yarn is twisted.

Mounted in the standards A^3 of the frame A′ are a series of sleeves D, to each of which is secured a pulley D′, rotated by a belt passing over the pulley and over a drum E, each spindle being driven from said drum by an independent belt, and the wheels or pulleys on the spindles are so staggered that their belts will clear each other, as will be understood on reference to the accompanying drawings.

Passing through the sleeve D and rotating therewith is a spindle D^2, having a central passage for the yarn delivered from the twisters and carrying at one end a flier e, constructed in any suitable manner, the radial arm of the flier in the present instance having a passage e^2, through which the yarn passes and is delivered to an eye e^3 at the end of the flier. The outer end of the spindle is provided with a grooved collar f, rotating freely in a bearing f' on one of the transverse bars of a reciprocated frame F, so that as the flier is rotated with the sleeve D it may be moved to and fro by the frame F to effect an even wind on the spool or bobbin. This frame F comprises two transverse bars $f^2\ f^2$, secured together by bolts g and sliding on guide-bars g' on the frame-work.

Mounted on the frame of the machine is a transverse shaft G, carrying a pulley G′, over which passes a belt G^2 from a small pulley on the main driving-shaft C, and on said shaft G is a belt-pulley g^2, over which passes a belt

g^3 to a belt-wheel G^4 on a transverse shaft G'. On the shaft G^5 is a worm h, gearing with a worm-wheel h' on a vertical shaft H, adapted to bearings on the frame A^3. Secured to this shaft H is a cam h^2, of the character shown in Fig. 8, which acts on a pin h^3 of the bar h^4, connected to a lever f^3 on the rock-shaft H', said rock-shaft being mounted vertically in bearings projecting from the frame A' and provided with a series of arms h^5, connected to the series of frames F.

To provide for the return of the frames after being moved in one direction by the cam h^2, I place springs g^2 on the guide-bars g' between the fixed frame of the machine and the frames F, or, if desired, the cam h^2 may be made in the form of a grooved cam, so as to move the frames positively in both directions.

Thus it will be seen that as the shaft H revolves the cam h^2 acts to vibrate the rock-shaft H', moving the eye e^3 of the flier over the face of the spool J, on which is wound the chenille or other yarn.

On the section A^4 of the frame A' are mounted small shafts I, carrying spools J, on which the yarn is wound by the flier. On each shaft is a belt-wheel i, driven by a belt i' from a drum or pulley I' on a transverse shaft I^2, this driving mechanism being similar to that employed for rotating the sleeves D, as already described. The spool J is slipped over an extension i^2 of this shaft I, and is coupled to said shaft by a pin i^3, adapted to a cam-groove i^4 in the plate i^5 on the end of the spool, as clearly shown in Figs. 5 and 9, so that as the shaft I revolves it will carry the spool on this shaft at the same speed; but to remove the spool from this shaft all that is necessary is to turn the spool in the opposite direction, the spool freeing itself from the pin by its cam-slot. As the diameter of the spool varies with the amount of yarn wound upon it, the speed of rotation of such spool is gradually lessened as the winding proceeds, a description of the mechanism for effecting such gradual change being as follows:

Referring to Figs. 1 and 4, K is a shaft having a belt-wheel k, around which passes a belt k' from a belt-pulley k^2 on the driving-shaft C. On the shaft K is a cone-pulley L, the belt l from which passes up and over a cone-pulley L', tapered in a direction opposite to that of the cone-pulley L, as clearly shown in Fig. 4. On the shaft L^2 of the cone-pulley L' is a belt-pulley l', around which passes a belt l^2 to a belt-wheel I^3 on the shaft I^2. The belt l on the two cone-drums is moved along gradually by a shifter M, one end of which engages the belt l, the other end engaging a screw M' on the shaft M^2. Mounted on the end of this shaft is a ratchet-wheel m, and engaging with this ratchet are spring-pawls n, pivoted to a reciprocating bar N, guided at one end by the shaft M^2 and connected at its other end to an arm n' on the rock-shaft H', so that as the rock-shaft vibrates it will reciprocate the bar N, the pawls of which engaging with the ratchet will turn the screw-shaft and feed the belt along the cone-drums, gradually increasing or diminishing the speed of the spools, as may be desired. The shaft E' is driven from a belt-wheel p by a belt p', which passes around a belt-pulley p^2 on the shaft E', so that the spindles D^2 are driven at a regular speed.

We claim as our invention—

1. The combination, in a twisting-machine, of the hollow twisting-spindle, a hollow spooling-spindle with mechanism for reciprocating the same, a driving-sleeve mounted upon and adapted to rotate said spooling-spindle, a flier at one end of said spooling-spindle, yarn-guides on said flier, a spool-shaft having its axis on a line with the axis of the spooling-spindle, and mechanism for revolving said spool-shaft, substantially as specified.

2. The combination of the spindle hollow throughout its length for the passage of the yarn, having at one end a transverse roller, with a spirally-twisted wire surrounding said roller and forming a spiral guide for the thread, substantially as set forth.

3. The combination of the twister, the spool-shaft, and mechanism for rotating the same, the driving-sleeve for the spooling-spindle, the hollow spooling-spindle, a flier at one end thereof, said spooling-spindle sliding longitudinally in but turning with its driving-sleeve, a reciprocated frame carrying said spooling-spindle, a vertical rock-shaft connected to said frame, and means for operating said rock-shaft, substantially as described.

4. The combination of the driving-sleeve for the spooling-spindle, the spooling-spindle, its flier, means for reciprocating the same, a spool-shaft with the belt-drums E and I, a belt extending from the drum E to the pulley D' on the spool-driving sleeve, and a belt extending from the drum I' to the spool-shaft I, with mechanism, substantially as described, for changing the speed of the spool-shaft-driving belt, substantially as and for the purpose set forth.

5. The combination of the driving-sleeve D, the spooling-spindle adapted to slide therein but turn therewith, a frame connected to said spooling-spindle, a vertical rock-shaft connected to said frame, worm and worm-gearing driven from the main shaft, a cam on the shaft of the worm-wheel, and a rod connected to said shaft and adapted to be acted upon by the cam, whereby the flier-spindle is reciprocated, substantially as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN CHADDERTON.
ALFRED HITCHINS.

Witnesses:
WILLIAM D. CONNER,
HARRY SMITH.