2 Sheets--Sheet 1.

H. A. CHAPIN.

Machines for Doubling and Twisting Silk.

No. 135,522. Patented Feb. 4, 1873.

Fig. 2.

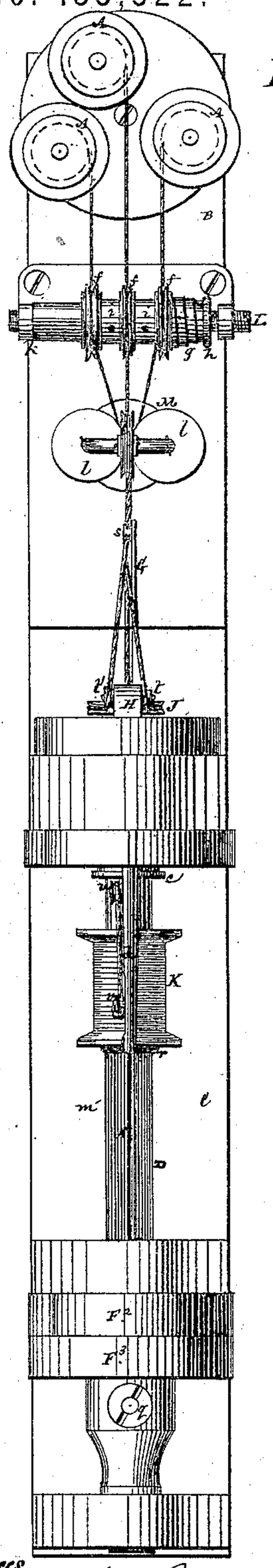
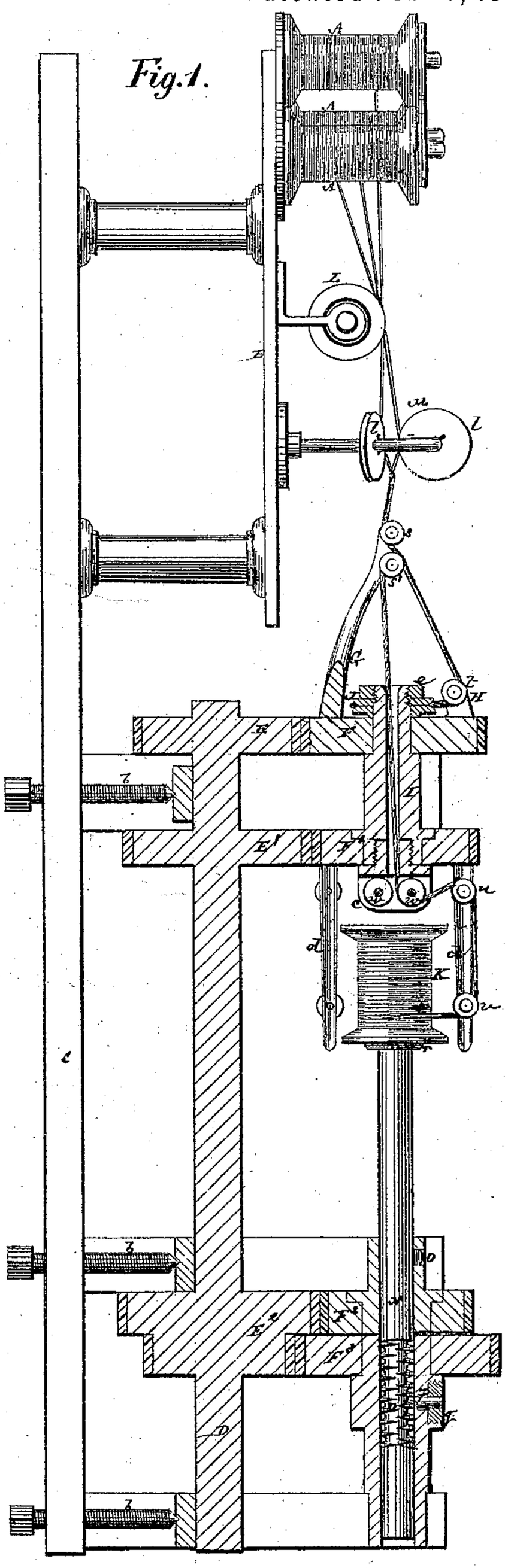


Fig. 1.



Witnesses.

Henry T. Rowe

Fred. Haynes

Henry A. Chapin.

2 Sheets--Sheet 2.

H. A. CHAPIN.

Machines for Doubling and Twisting Silk.

No. 135,522. Patented Feb. 4, 1873.

Fig. 4.

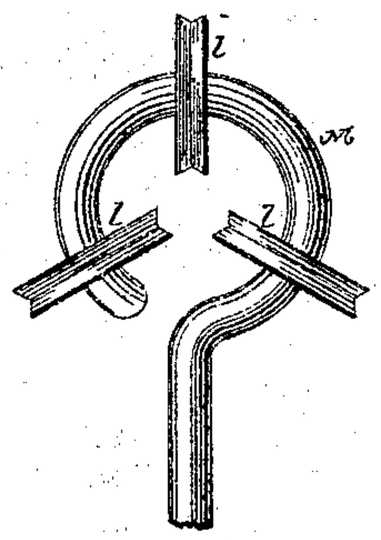


Fig. 3.

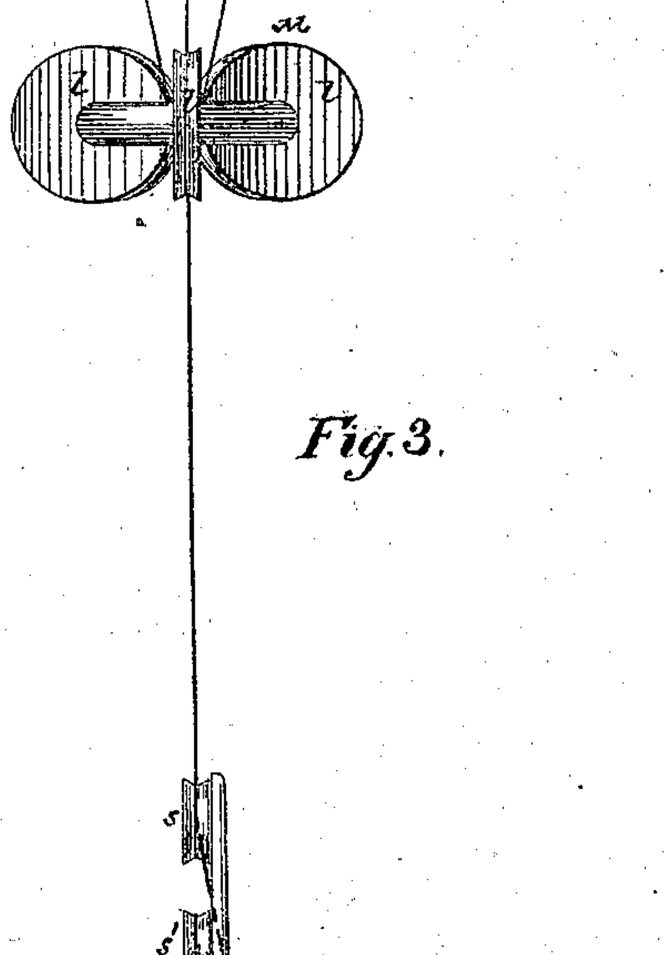


Fig. 5.

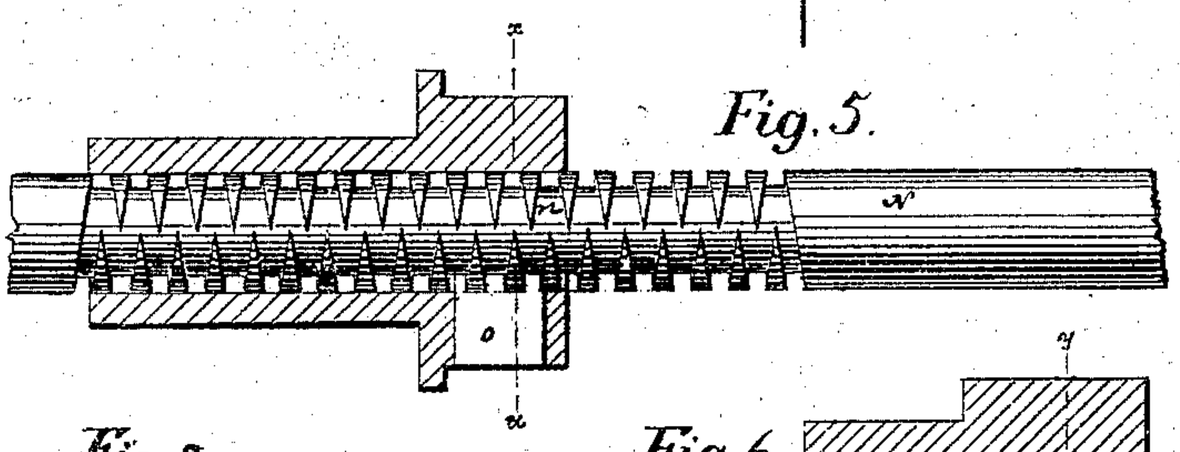


Fig. 7.

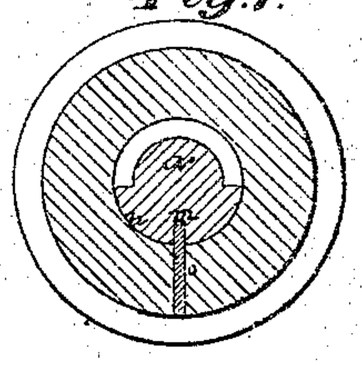


Fig. 8.

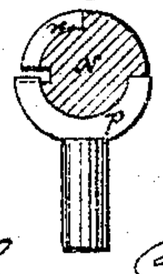
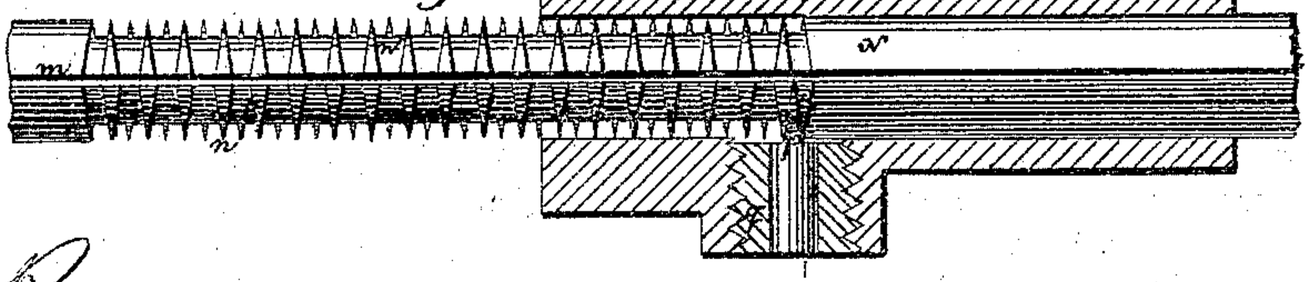


Fig. 6.



Witnesses.

Henry T. Brown

Fred Haynes

Henry A. Chapin

UNITED STATES PATENT OFFICE.

HENRY A. CHAPIN, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR DOUBLING AND TWISTING SILKS.

Specification forming part of Letters Patent No. **135,522**, dated February 4, 1873.

To all whom it may concern:

Be it known that I, HENRY A. CHAPIN, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Doubling and Spinning Machinery; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a sectional side elevation of part of a spinning and doubling machine with my improvements applied; Fig. 2, a front elevation of the same; Fig. 3, an elevation, upon a larger scale, of a cable-lay governor, yarn-carrier, and drawing-pulley, used in my improved machinery, and as in operation upon three strands or filaments; Fig. 4, a plan of the cable-lay governor detached. Figs. 5 and 6 are longitudinal views of a separate traverse motion applied to each spindle in a frame of spindles, and Figs. 7 and 8 transverse sections of the same at the lines *x x* and *y y* respectively.

Similar letters of reference indicate corresponding parts throughout the several figures of the drawing.

My invention relates to doubling and spinning machinery applicable among other purposes to the manufacture of sewing-silks. The improvements consist, first, in a tension device; and second, in a cable-lay governor and yarn-carrier, whereby the doubling and twisting may be performed simultaneously, as it were, thereby obviating the necessity of winding the several threads separately onto one bobbin, to be subsequently twisted; third, in a combination of the cable-lay governor, the yarn-carrier and the drawing-pulley; fourth, in a combination of the tension device, cable-lay governor, yarn-carrier, and drawing-pulley; and, fifth, in a novel construction of yarn-carrier, whereby convenience is afforded for adjusting the delicate thread around the drawing-pulley, and at the same time supports for the guide-pulleys are afforded.

Referring to the accompanying drawing, A A represent the supply-bobbins, of which there may be two or more, three here being shown, and from which the threads to be doubled and twisted are drawn, the same being arranged upon pins carried by the bobbin-board B. C is the frame of the machine, and D a vertical driving-shaft carrying friction driving-pulleys E E^1 E^2, and which may be started and stopped by fast and loose pulleys, not shown in the drawing. The pulleys E E^1 E^2 upon the shaft D impart motion respectively by friction to pulleys F F^1 F^2 F^3, adjusting-screws *b b* serving to regulate the amount of friction. If desired, spur-gear or belt-wheels may be substituted for these friction-pulleys. The pulley F, which is driven by the pulley E, has attached to its upper surface the yarn-carrier G and yarn-guide H, and runs loosely upon the upright hollow shaft I. The pulley F′ is fast on said hollow shaft, which latter passes up through a box in the frame C and pulley F. This shaft carries upon its upper end the drawing-pulley J. A nut, *c*, serves to secure the pulley F′ to such hollow shaft, and has a transverse slot on its under side, in which are two small grooved pulleys, over which the yarn passes to prevent abrasion on its way to the flier-arms *d*, and from thence to the bobbin K, on which the doubled and twisted threads are built. The drawing-pulley J is attached firmly to the hollow shaft I by a nut, *e*. This drawing-pulley is constructed to grip and draw the yarn, as it comes from the carrier G, at a variable rate of action, substantially as described in Letters Patent No. 106,466, issued to William Sparks Thomson, as assignee of myself, August 16, 1870. The flier-arms *d d* are firmly attached to the pulley F′, and said arms, pulley F′, hollow shaft I, nut *e*, and drawing-pulley J are driven by the pulley E′ on the shaft D. The pulleys F and F′ have a differential motion imparted to them by the pulleys E E′ on the shaft D, which causes the yarn to be drawn downward by the drawing-pulley J. L is the tension device located between the supply-bobbins A A and the cable lay-governor M. This tension device is secured to the bobbin-board B, and consists of two or more V-shaped pulleys, *f*, arranged upon a common shaft, and having their free revolutions upon said shaft retarded and regulated by a spring, *g*, and thumb-screw *h*. These V-shaped pulleys are held in suitable relative positions upon their shaft by collars *i*, which are prevented from revolving by pins that enter a spline-way cut in the shaft. On each side of said pulleys is placed a thin wash-

er of felt or other suitable material. By this construction of the tension device L it will be seen that, upon turning the thumb-screw *h*, to produce or regulate compression of the spring *g*, each and every pulley *f* will be subjected to an equal pressure against a tension-support, K. The cable-lay governor M is constructed of two or more grooved pulleys, *l*, of suitable diameter, and arranged to revolve freely and independently of each other upon their axes, and held in position by any suitable device. The axes of these pulleys should be so arranged that the peripheries of the pulleys shall be equidistant from a common center, no matter what the number of pulleys employed. N is the bobbin-spindle, carrying the bobbin K, and arranged to extend down through the pulleys F^2 F^3. Said spindle has cut upon it a spline-way, *m*, and a cross or traverse thread, *n*. The pulley F^2 has a long hollow hub that passes up through a box in the frame C, and is provided on the interior of its hub with a spline, *o*, which, being properly adjusted to the spline-way *m*, causes the pulley F^2 to impart revolving motion to the bobbin-spindle N. The pulley F^2 is driven by the upper half of the pulley E^2, and travels perceptibly faster than the pulley F and its attachments. The pulley F^3 has a long hollow hub, which extends down through a box in the frame C. Arranged within the hub of this pulley is a crescent-shaped traversing-finger, *p*, provided with a stem. This finger is adjusted to fit in and follow the traverse-thread *n* upon the spindle N, and is held in its place and up to the spindle by a hollow screw, *g*, into which the stem of the finger is fitted. The pulley F^3 is controlled by the lower half of the pulley E^2, and has a different speed from the pulley F^2, such difference of speed determining the relative vertical movement of the spindle N. The bobbin K sits freely upon the spindle N resting upon a flange, *r*, and is revolved by the spindle N by means of any suitable friction device.

The operation of doubling and twisting or spinning with the machine and its combinations, as described, is as follows: The ends of the yarns from the supply-bobbins A A are passed each once around one of the grooved pulleys of the tension device L; from thence downward, and each yarn passed once around one of the grooved pulleys of the cable-lay governor, and thereby the twist first given to each strand is retained in it, and so delivered at the point where the strands are united under the cable-lay governor. At a central point immediately under the cable-lay governor or the yarns are united into a single thread at an angle determined by the relative positions of the pulleys of the cable-lay governor. From thence the material being twisted passes down over the pulley *s* on the end of the yarn-carrier G; afterward diagonally over one of the pulleys *t* on the yarn-guide H; from thence around the drawing-pulley J and back to opposite pulley *t'* of the yarn-guide; from whence it passes diagonally upward to and over a pulley, *s'*, upon the yarn-carrier, and afterward downward through the hollow shaft; then passing over small pulleys *w w* in the nut *c;* from thence to and and over pulleys *u v* on the flier-arm *d*, from which it is wound around the bobbin.

In a machine constructed as described the separate winding of the several threads onto a common spool prior to twisting is dispensed with, the doubling and twisting being performed at once. Each spindle, too, in a frame of spindles having an independent traverse motion, every facility is afforded for independent adjustment or stoppage of a single spindle without affecting the rest, and for running the spindles on different numbers. Furthermore, the yarn-carrier G being of an open arm-like construction, convenience is afforded for adjusting the thread around the drawing-pulley J.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The tension device L, consisting of the shaft, the pulleys, the sliding collars connected to the shaft so as not to turn, and the device for regulating the tension on several threads simultaneously and equably, the said parts being combined and operating substantially as described.

2. The stationary cable-lay governor M, applied between the tension device L and yarn-carrier G, substantially as and for the purpose set forth.

3. The combination of the cable-lay governor M, a yarn-carrier, G, and a drawing-pulley, J, substantially as described.

4. The combination of the tension device L, cable-lay governor M, yarn-carrier G, and drawing-pulley J, substantially as described.

5. The yarn-carrier G, constructed with pulley-supports and open at one side, as described, and arranged relatively with the drawing-pulley J, substantially as specified.

HENRY A. CHAPIN.

Witnesses:
HENRY T. BROWN,
FRED. HAYNES.