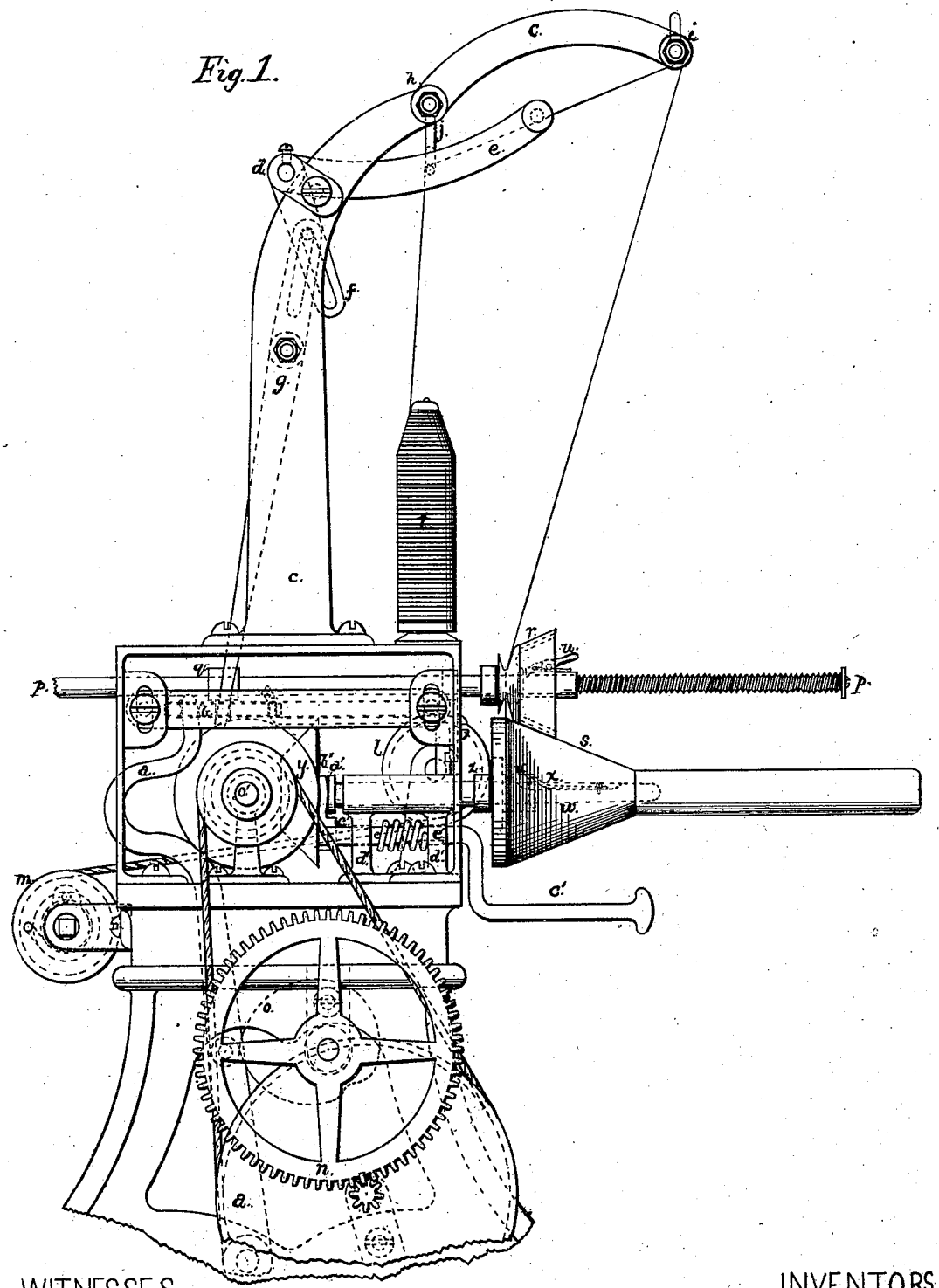
3 Sheets—Sheet 1.

S. T. & W. S. THOMAS.

YARN BOBBIN WINDER.

No. 183,517. Patented Oct. 24, 1876.

Fig. 1.



WITNESSES

Eugene Humphrey

Edwin S. Thomas

INVENTORS

Samuel T. Thomas

Winfield S. Thomas

3 Sheets—Sheet 2.

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Fig. 2.

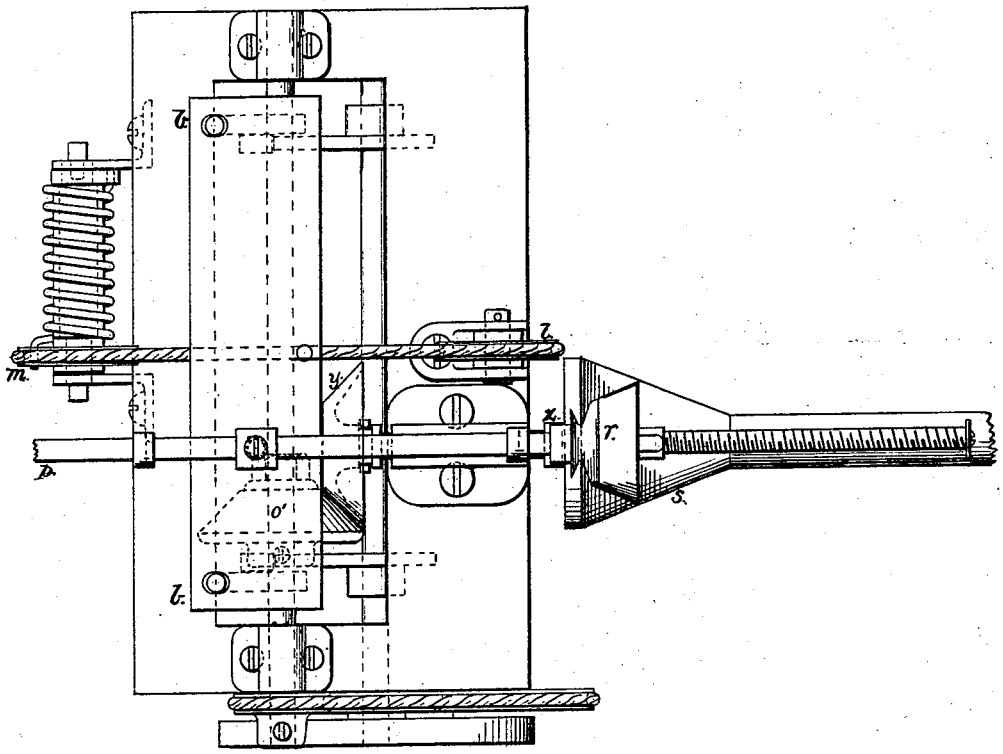
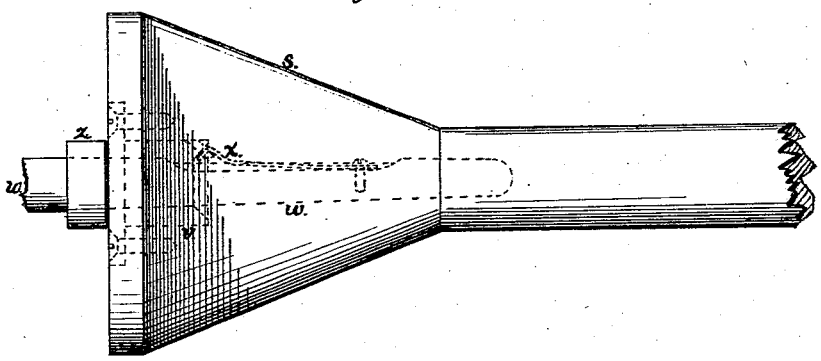


Fig. 3



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Eugene F. Humphrey

Edwin S. Thomas

INVENTORS

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Winfield S. Thomas

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Fig. 4.

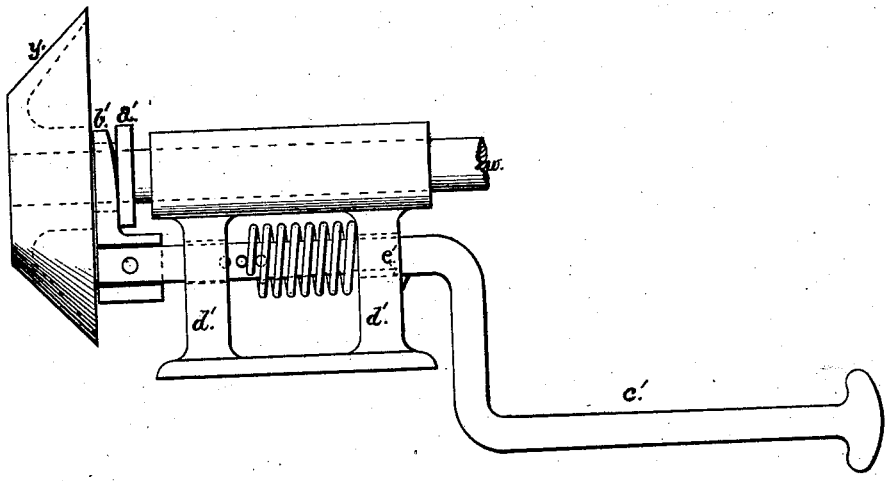
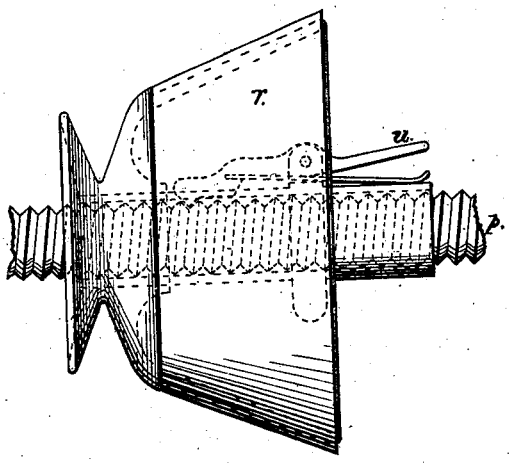


Fig. 5



WITNESSES

Eugene Dumphrey

Edwin G. Thomas

INVENTORS

Samuel T. Thomas

Winfield S. Thomas

UNITED STATES PATENT OFFICE.

SAMUEL T. THOMAS, OF BOSTON, MASSACHUSETTS, AND WINFIELD S. THOMAS, OF LACONIA, NEW HAMPSHIRE.

IMPROVEMENT IN YARN BOBBIN WINDERS.

Specification forming part of Letters Patent No. **183,517**, dated October 24, 1876; application filed September 6, 1876.

To all whom it may concern:

Be it known that we, SAMUEL T. THOMAS, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, and WINFIELD S. THOMAS, of Laconia, in the county of Belknap and State of New Hampshire, have invented certain useful Improvements in Yarn-Winders for Knitting-Machines, of which the following is a specification:

Our invention relates to new devices or new combinations of mechanism for automatically guiding and for varying and graduating the tension upon the yarn as it passes from the cop to the bobbin in the process of winding, in such a manner that, as the yarn ascends the inclination of the conical part of the bobbin in its distribution thereon by the guide, the tension upon the same shall be gradually decreased, and as it descends such inclination the tension shall be gradually increased, according to the variation in the circumference of the cone of the bobbin around and upon which the yarn is being wound, and for the purpose of securing as great or greater compactness of winding on the barrel or small diameter of the bobbin as upon the large diameter of the conical part, the object being to avoid the usual waste, annoyance, and imperfections in knitting resulting from badly-wound bobbins.

Referring to the drawings, Figure 1 is an end elevation of a winder embodying our invention. Fig. 2 is a plan of the lower portion of the same. Fig. 3 is a plan showing the mode of attaching the bobbin to the spindle. Fig. 4 is an elevation, giving a view of the devices for stopping and starting the bobbin-spindle. Fig. 5 is a plan of the self-regulating yarn-guide.

Attached to the lower part of the frame of the machine, Fig. 1, is a lever, *a*, which terminates at its upper end in a hole in a sliding plate, *b*. This plate *b* extends longitudinally through the machine, and its ends are fitted to slide in grooves formed in the frame of the machine. *c c* is an irregular curved arm attached to the top of the machine; and a corresponding arm is attached in like manner to the top of the opposite end of the machine. Upon the arm *c* is a bracket, *d*, from the outer end of which an iron rod extends to a corresponding bracket on the opposite end of the machine. Upon this rod is an arm, *e*, and a slotted arm, *f*, both secured rigidly to the rod, which is free to move in its brackets. Attached to arm *c* is a lever, *g*, whose lower end terminates in a hole in plate *b*, and whose upper end is slotted and connected with arm *f* by a movable stud. From the front end of arm *e* extends an iron rod to a corresponding arm at the opposite end of the machine; also, from arm *c*, at *h* and *i*, iron rods extend to opposite corresponding arms. Pendent from rod *h* is a hook, *j*; and these hooks may be multiplied along said rod at intervals corresponding to the position and number of spindles employed in the machine; and on rod *i* is an upright pin, *k*, and these pins may be multiplied along said rod to correspond to the number of hooks *j*. The sliding plate *b* is attached, by a belt which passes around pulley *l*, to pulley *m*, which last-named pulley is attached to a spiral spring coiled around its shaft, as clearly shown in Fig. 2. On the shaft of the gear-wheel *n* is a cam, *o*, which operates against a roll on lever *a*. Upon guide-rod *p* is a collar, *q*, secured to said rod by a set-screw, and from the collar a pin projects down into a hole in the sliding plate *b*.

Now, the practical operation of the above-described mechanism is as follows: When the winder is put in operation, with the parts in the position shown in Fig. 1, the cam *o* moves away from the roll of lever *a*, which lever is forced to follow said cam by the spiral spring on the shaft of pulley *m*, and to carry in its movement the sliding plate *b*, which carries forward the guide-rod *p*, with its yarn-guide *r*, to the extent of the length of the cone on the bobbin *s*. During this forward movement of plate *b*, it also carries the end of lever *g*, whose opposite end moves in a backward direction the arm *f*, which at the same time depresses gradually the forward end of arm *e*. While this movement is taking place, the yarn from cop *t* is passing over hook *j*, under the rod in the forward end of arm *e*, under rod *i*, up around pin *k*, and thence through the channel in guide *r* to bobbin *s*, as shown, said guide *r* being adapted, by means of its spring-latch *u*, engaged in the threads of the screw on the guide-rod, to change its position along said

rod by contact with the yarn upon the bobbin as the bobbin fills. Simultaneously with the gradual depression of the forward end of arm *e*, as described, the guide *r* moves forward with a proper relative speed, and delivers the yarn onto the bobbin, and distributes it along the cone from the larger to the smaller diameter; and during such distribution the tension upon the yarn is gradually increased by the depression of the end of arm *e*, producing an angle in the yarn where it passes under the rod in arm *e*, and increasing the tension in accordance with the requirements of the variable diameter of the bobbin, and for the purposes hereinbefore mentioned.

Again, when the cam *o* works against the roll of the lever *a*, which cam and lever are also duplicated at the opposite end of the machine, reversing the movements just described, the tension is gradually diminished upon the yarn, to conform to the greater speed in winding caused by the increase in the diameter from the smaller to the larger end of the bobbin, as described.

The degree of the depression of the arm *e* may be regulated by adjusting the movable stud in the slots of the levers *g* and *f*, changing their relative leverage.

The bobbin-spindle *w* is grooved, and into said groove is fixed the spring *x*, as shown, the free end of which is curved. The bobbin *s* has an iron bushing, *v*, inserted into its larger end, and so shaped as to form an internal circular space, into which the free end of the spring *x* fits when the bobbin is placed on the spindle, and secures the bobbin thereto, while a pin across such internal circular space causes the bobbin to rotate with the spindle.

Upon the inner end of the bobbin-spindle is a beveled friction-pulley, *y*, which is driven by contact with a similar pulley upon the driving-shaft *o'*. The hub *a'* of said pulley is grooved, and into this groove projects the two branches of a bifurcated connection, the lower end of which is attached to the bent shipping-rod *c'*. This bent rod has loose bearings in the stands *d d*, and is notched at *e'*. On this rod, between said stands, is a spiral spring, as shown, which keeps the friction-pulleys in contact with each other to drive the spindle. Drawing rod *c* forward until its notch *e* hooks onto the stand *d* separates the driving-pulleys and stops the spindle. Raising the rod again, so as to clear the notch from the stand and allow the spring to act, will carry the pulleys together and start the spindle again.

The self-regulating yarn-guide *r*, the method of attaching the bobbin to the spindle, and the mechanism for stopping and starting the spindle herein described we do not claim as our invention; but

What we do claim is—

1. The cam *o*, lever *a*, sliding plate *b*, lever *g*, arms *f* and *e*, rod *h*, with its hook *j*, and rod *i*, with its pin *k*, the several parts being constructed, combined, and arranged to operate together, as and for the purposes set forth.

2. The sliding plate *b*, lever *g*, arms *f* and *e*, rods *h* and *i*, with their hook *j* and pin *k*, vibrating rod *p*, and adjustable guide *r*, the several parts being constructed, combined, and arranged to operate together, as and for the purposes specified.

SAMUEL T. THOMAS.
WINFIELD S. THOMAS.

Witnesses:
EUGENE HUMPHREY,
EDWIN G. THOMAS.