2 Sheets—Sheet 1.

D. SMITH.

Stop-Motion for Winding and Twisting Machinery.

No. 198,956. **Patented Jan. 8, 1878.**

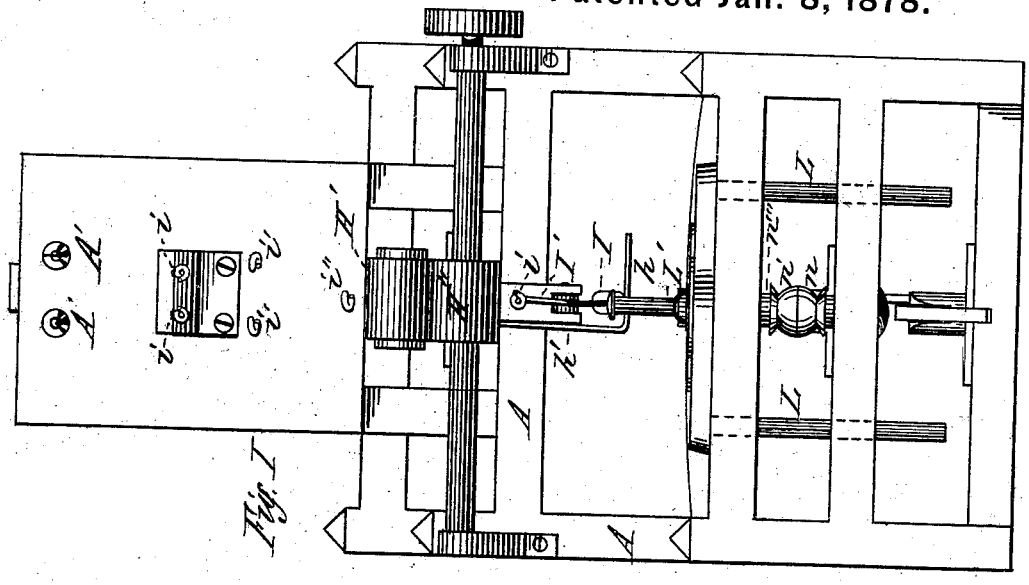

Fig. I.

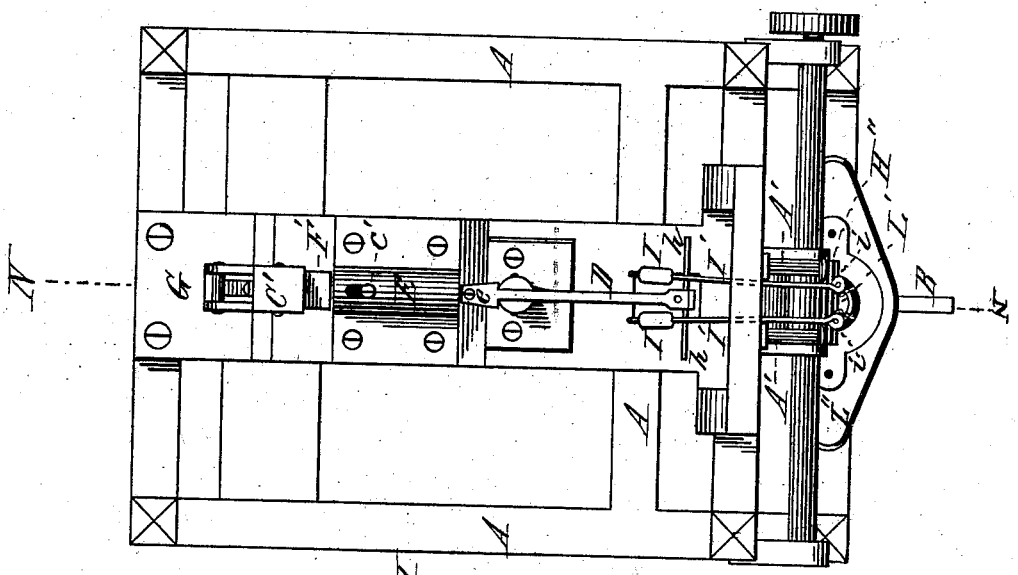

Fig. II.

Witnesses.

T. A. Lewis.

C. E. Buckland

Inventor.

Deples Smith

2 Sheets—Sheet 2.

D. SMITH.

Stop-Motion for Winding and Twisting Machinery.

No. 198,956. **Patented Jan. 8, 1878.**

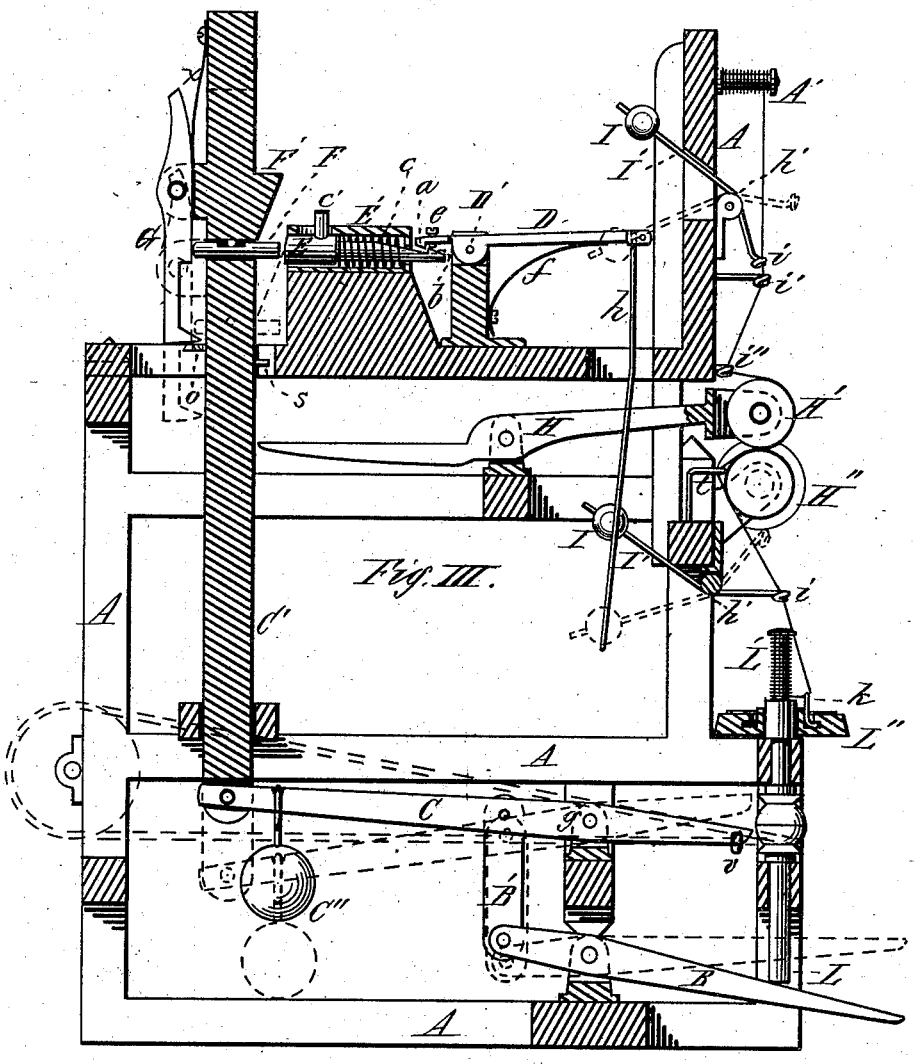

Fig. III.

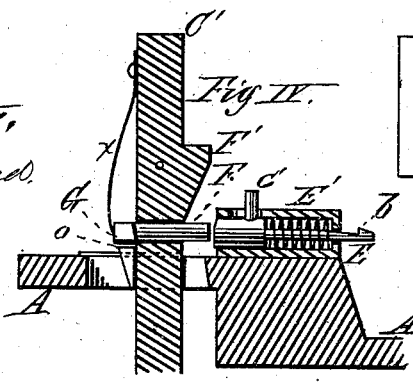

Fig. IV.

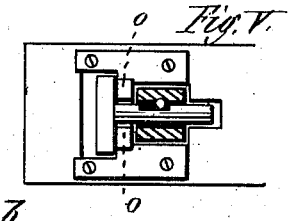

Fig. V.

Witnesses—
T. A. Curtis,
C. E. Buckland.

Inventor
Dexter Smith

UNITED STATES PATENT OFFICE.

DEXTER SMITH, OF SPRINGFIELD, MASSACHUSETTS.

IMPROVEMENT IN STOP-MOTIONS FOR WINDING AND TWISTING MACHINERY.

Specification forming part of Letters Patent No. **198,956**, dated January 8, 1878; application filed September 7, 1877.

To all whom it may concern:

Be it known that I, DEXTER SMITH, of Springfield, in the State of Massachusetts, have invented a new and useful Stop-Motion for Winding and Twisting Machinery; and that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, and to the letters of reference marked thereon.

The object of my invention is to automatically stop the motion of a winding, twisting, or doubling machine by the breaking or loosening of the thread while being wound or twisted.

My invention consists, first, of a movable catch-bolt attached to a support, operating, in connection with a catch-lever, to throw a latch out of position and permit a shipper-rod to drop and move the shipping-lever, which shifts the belt from one pulley to the other, or from the tight pulley to the loose one.

It also consists of a shipper-rod having a pin moving in connection therewith, to throw the latch out of position and cause the rod to drop, and also having a cam made thereon, to set the bolt back into position when the rod drops, so that when the rod is raised again the bolt and catch-lever will have been already automatically set for further action.

It also consists of a rod connected with the catch-lever, upon which weighted levers are arranged to fall to disconnect the catch-lever from the bolt, said weighted levers having an eye at the opposite end from the weight, through which the thread passes from the bobbin to the spool, the weighted end of each lever being held up when the thread is taut and dropped when the thread is broken or loosened, all which will be more fully hereinafter described.

Figure I is a front elevation of my invention. Fig. II is a plan view of the same. Fig. III is a vertical section at line N of Fig. II. Fig. IV is a vertical section upon the same line of the shipping-rod, showing a modification of the latch; and Fig. V is a plan view of the same modification.

In the drawings, A represents the frame of the machine, to which is attached the frame or casing in which slides the bolt E, having a catch, *b*, at one end, and directly in front of which bolt is pivoted, at D′, a lever, D, provided at one end with a catch, *a*, which is located over the bolt E, and just in rear of the catch *b* on said bolt when the latter is thrown in or forward, so that when in this position the two catches *a* and *b* will engage with each other, the catch end of the lever D being thrown down slightly for that purpose by a spring, *f*, or other equivalent means.

The shipping-rod C′ is held by the frame in a vertical position, so as to move freely up or down, and is provided with a pin, F, sliding freely therein, which should, however, have a limited motion secured either by a small pin or other suitable means.

The shipping-rod C′ is also provided with a latch, G, which may be pivoted to the rod, and hang down on its rear side, and held in so as to rest upon a ledge, *o*, by means of a spring, as shown in Fig. III; or the latch may be made in one piece with and upon the rear end of the sliding pin F, as shown clearly in Figs. IV and V.

A cam or inclined projection, F′, is made on the front side of the shipping-rod C′, and the sliding pin F is so located in the rod C′ that when the rod is up the pin F is just in rear of the bolt E and the cam F′ is just above it. The shipping-lever C is connected at one end with the lower end of the shipping-rod, and is pivoted to the frame at *g*, with an eye at the other end, through which runs the belt which passes around the pulley *n* to revolve the spool L′. A treadle-bar, B, is pivoted to the frame, and is connected to the shipping-lever by a bar, B′. If the shipping-rod C′ is not sufficiently heavy to drop quickly of itself, a weight, C″, may be added. To the front end of the lever D is attached a rod, *h*, having a horizontal arm at its upper end, as shown clearly in Fig. II, and this rod may extend downward, with a horizontal arm at its lower end, as shown in Fig. I. To the frame at *h′*, in front of the lever D and upper horizontal bar *h* attached thereto, is pivoted one or more levers, I′, having a weight, I, at the rear end,

and an eye, *i*, at the front end, through which eye the thread passes from the bobbin placed at A′ to the spool below, as will be explained hereinafter. A similar lever, I′, is pivoted to the frame A, in front of the horizontal arm, at the lower end of the rod *h*.

The ring-holder L″ and traveler *k* are made in the usual way, and supported upon and operated by the wave-rods L, in the ordinary manner.

The feed-roll H″ is hung in suitable bearings in the frame, and the presser-roll is hung in the forked end of a lever, H, pivoted in the frame. A pin, *s*, is fixed in the shipping-rod C′ at such height above the lever H that when the shipping-rod drops the pin *s* strikes upon the rear end of the lever, and raises the presser-roll sufficiently to relieve the pressure from the thread passing around the feed-roll H″ beneath.

The operation of my invention is as follows: One or more bobbins of thread are placed upon the spindles at A′, and the thread therefrom passed down through the eyes *i* of the upper levers I′, through the eyes *i′* and *i″*, and partially around the presser-roll H′, thence around the feed-roll H″, and through the eye *t* behind the feed-roll, and thence through the eye *i* of the lower lever I′, and through the traveler *k* to the spool L′. As the machine is set in motion by a belt passing around a pulley on the feed-roll shaft and by the belt on the pulley *n* the thread is unwound from the bobbins at A′ and wound upon the spool L′, any desired number of threads being thus twisted together and wound upon the spool L′, the threads, when drawn taut, drawing down the ends *i* of the levers I′, as shown in black lines in Fig. III, and raising their weighted ends. If, however, the thread, or one of the threads, should break above the feed-roll H″, the eye end of the lever I′, through which the thread passes, is quickly released, and the weighted end of the lever drops and strikes upon the horizontal arm of the rod *h* at its upper end, quickly throwing up the catch *a* on the opposite end of the lever D, and disengaging it from the catch *b* on the bolt E, and the bolt, being actuated by a spring, *c*, or by a weight and pulley, is thrown to the rear against the pin F, driving that also rearward against the latch G, forcing that off the ledge *o*, and allowing the shipping-rod C′ to drop, moving the front end of the shipping-lever upward, and shifting the belt from the fixed pulley *n* to the loose pulley *n′* above, and automatically stopping the machine.

As the shipping-rod C′ drops the inclined projection or cam F′ on the rod comes in contact with the projecting rear end of the bolt E, and forces it forward again, so that the catch *a* thereon engages with the catch *b* on the rear end of the lever D, and the bolt is thereby held in its forward position. When the rod C′ drops, the pin *s* strikes upon the rear end of the lever H, and raises the presser-roll H′ away from the feed-roll H″ and from the thread wound thereon, and the thread is then no longer fed down to the spool L′. The thread then being connected, the rod C′ is raised by placing the foot on the treadle-bar B and pressing it down, and the machine recommences its operation.

Should the traveler *k* fly out of its ring, or the thread break or become loose below the feed-roll H″ from any cause, the eye end of the lower lever I′ quickly flies upward, and the weighted end falls upon the horizontal arm at the lower end of the rod *h*, and the shipper-rod falls, as before, by the immediate disengagement of the catches *a* and *b*, automatically stopping the machine, as before.

To adapt the machine to the winding and twisting of exceedingly fine and delicate threads, as silk, the catches *a* and *b* of the bolt E and lever D may be adjusted to engage with each other to any desired degree. This is accomplished by a set-screw, *e*, turned through the end of the lever and against the bolt E, or against its catch, and vice versa; or this adjustment may be accomplished so that the catch end of the lever D shall have a limited vertical movement, to cause the catches *a* and *b* to engage with each other to a greater or less degree, and the two catches to be disengaged by a heavier or lighter blow of the weighted levers I′, according to the strength of the thread being wound.

When adjusted for a very fine thread, the catches *a* and *b* engage very little, so that a very light stroke of the weighted end of the lever I′ will disengage the catches, and the stroke of the levers I′ upon the horizontal part of the rod *h* may be further regulated by moving the weights I along the lever, either in or out.

In the modification shown in Figs. IV and V the latch G is made upon the end of the pin F, and extends out on each side, so that when the pin is forced back it passes down, when the rod drops, between the ledges *o* on each side of the pin, and in rear of the rod C′, and the rear sides of these ledges are beveled or inclined, as shown clearly in Fig. IV, so that when the rod is moved up again the latch rides up against this incline on the rear side of the ledges, and the pin and latch are forced in to rest upon these ledges again by the spring *x*, or by a weight and pulley, if more convenient.

If desirable, the bolt E may be limited in its backward movement by a pin or projection, *c′*, protruding through a slot in its case E′, or by any other desirable means.

Having thus described my invention, what I claim as new is—

1. In a stop mechanism, the movable catch-bolt E, combined with a catch-lever, D, and the adjusting-screw *e*, substantially as described.

2. In combination with the catch-bolt E and lever D, the latch-pin F, latch G, and ship-

ping-rod C′, substantially as and for the purposes set forth.

3. The tripping or weighted levers I′, in combination with the rod *h*, the lever D, the catch-bolt E, spring *c*, latch-pin F, and shipping mechanism, substantially as and for the purposes set forth.

4. The shipping-rod C′, provided with the cam F, in combination with the catch-bolt E and lever D, whereby, when the said shipping-rod C′ falls, the catch-bolt E is thrown forward and caused to engage with the catch-lever D, substantially as described.

DEXTER SMITH.

Witnesses:
T. A. CURTIS,
C. E. BUCKLAND.