

B. SAUNDERS.  
Spinning-Machine.  
No. 220,946. Patented Oct. 28, 1879.

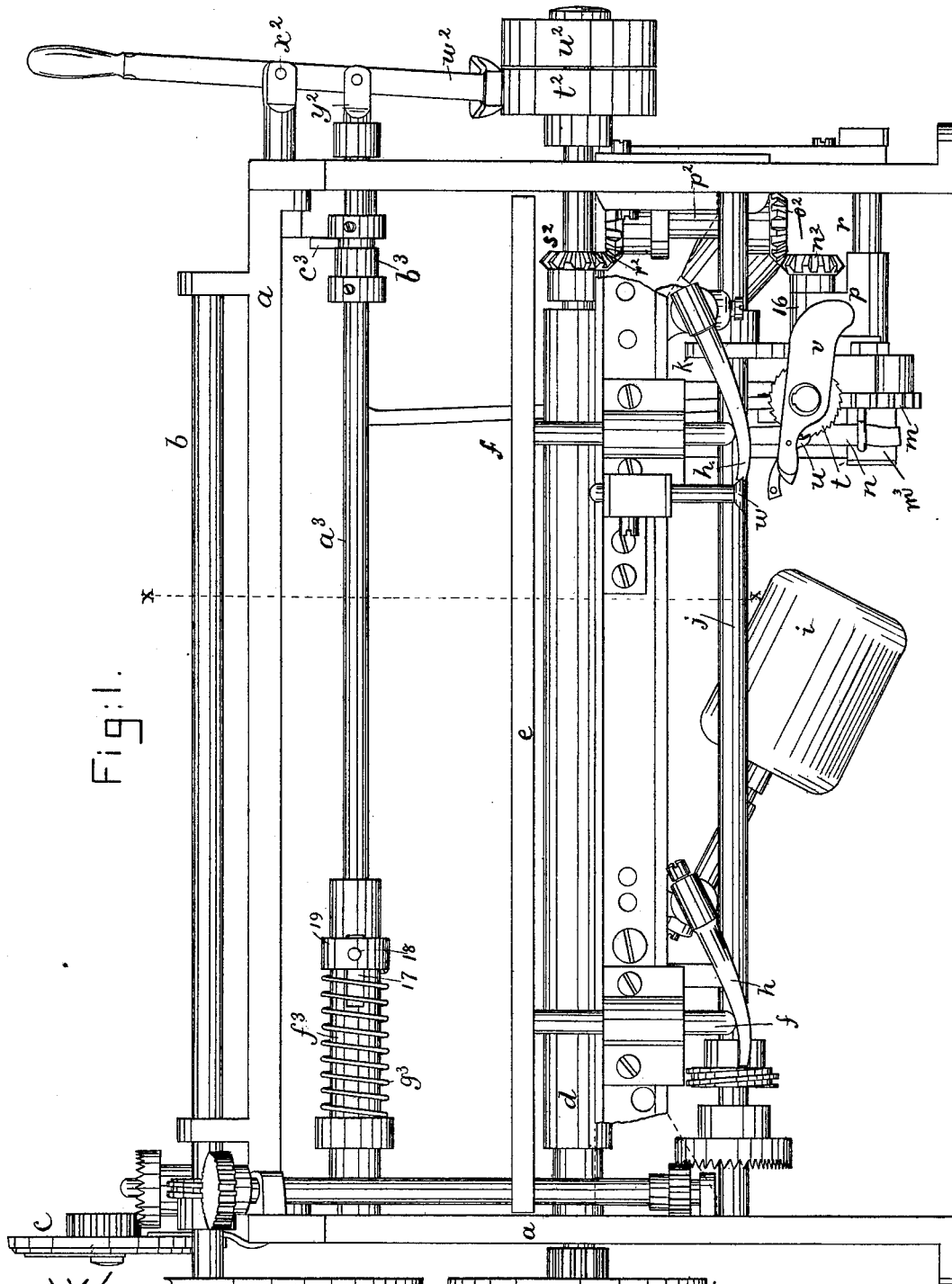


Fig: 1.

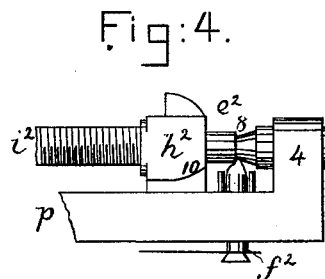
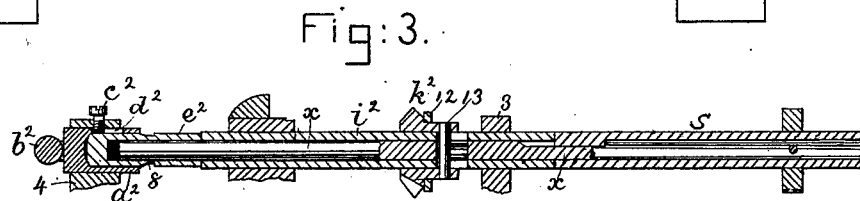
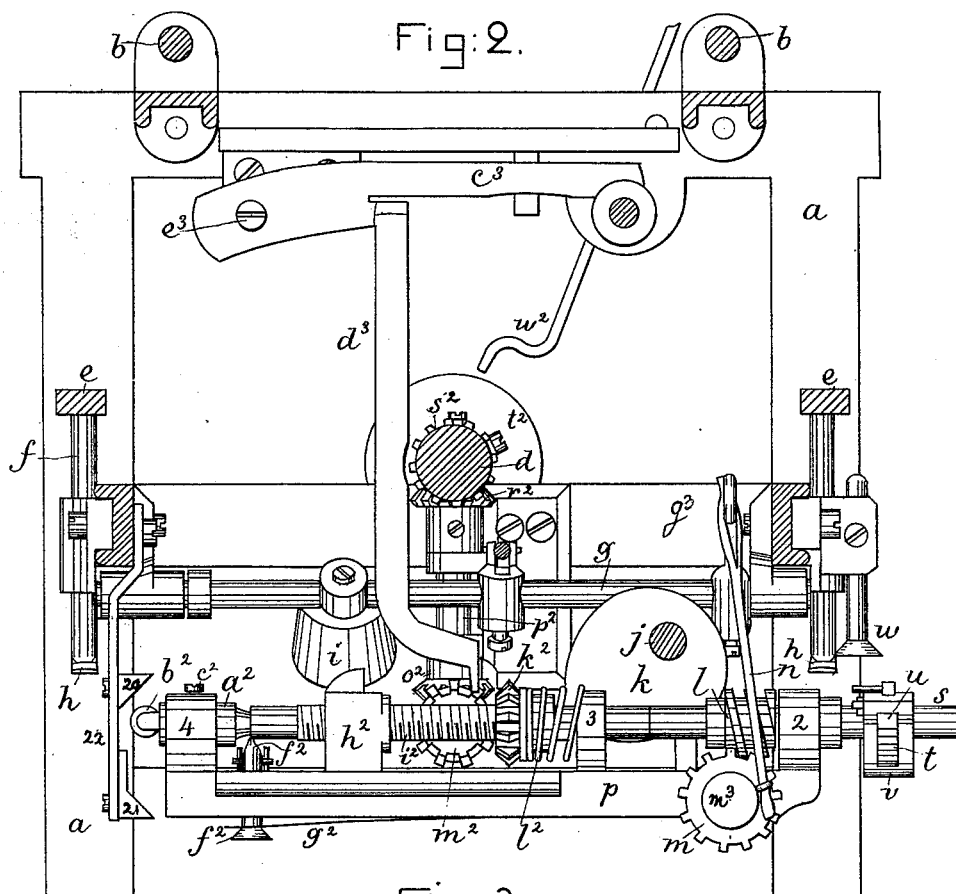
Witnesses.

Jos. P. Livermore  
L. F. Connor

Inventor.

Benjamin Saunders  
by Crosby & Gregory, Attys

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# UNITED STATES PATENT OFFICE.

BENJAMIN SAUNDERS, OF NASHUA, NEW HAMPSHIRE.

## IMPROVEMENT IN SPINNING-MACHINES.

Specification forming part of Letters Patent No. **220,946**, dated October 28, 1879; application filed July 21, 1879.

*To all whom it may concern:*

Be it known that I, BENJAMIN SAUNDERS, of Nashua, county of Hillsborough, and State of New Hampshire, have invented an Improvement in Spinning-Machines, of which the following description, in connection with the accompanying drawings, is a specification.

The object of this invention is to automatically move the traverse-rail to wind the yarn down from the top of the bobbin in proper position for doffing the bobbins when the latter shall have been filled to the proper degree.

In ordinary ring-spinning frames the operator alone determines when the doffing shall take place, and moves down the rail by hand.

In this my invention the screw of the traverse or winding-on motion, made as a sleeve and provided with a nut, is, as herein shown, made to move away from the usual devices which turn the said screw at each descent of the traverse or ring rail during winding on. This screw-sleeve is mounted on a longitudinally-movable shaft held in position by a locking device, and the nut thereon, the bobbins being filled to the proper degree, strikes the locking device and releases the said shaft, permitting it to be moved longitudinally by means of a suitable spring, so as to engage a bevel-gear connected with the said sleeve and shaft, with a system of gearing deriving motion from the driven shaft or other quick-moving part of the machine, which quickly reverses the said screw-sleeve, thus winding down the traverse or ring rail, and at the end of the descent of the traverse-rail the said nut strikes a stopping-lever and stops the frame through the shipping mechanism.

Figure 1 represents one side of part of a spinning-frame, a portion of the frame-work being broken away to show the moving parts; Fig. 2, a section on the line  $x x$ , Fig. 1; Fig. 3, a longitudinal section through the screw-sleeve of the traverse-lever and the movable shaft, and the parts directly connected therewith; and Fig. 4, a detail.

The frame  $a$  of the machine, the front roller,  $b$ , the clock  $c$ , the drum-shaft  $d$ , the traverse or ring rails  $e$ , their lifting or guide rods  $f$ , the rocking shafts  $g$ , their arms  $h$ , the weight  $i$ , the shaft  $j$ , the cam  $k$ , for moving the traverse mechanism, the worm  $l$ , the worm-gear  $m$ ,

its attached drum  $m^3$ , upon which is wound the connecting strap or chain  $n$ , attached at one end to the said drum and at its other end to an arm,  $g^3$ , of the rocker-shaft  $g$ , so that as the said strap is wound upon the said drum the points to which the traverse-rail descends and rises are automatically varied, are all as usual, and their operation need not, therefore, be herein specifically described.

The traverse-lever  $p$  has its fulcrum on a stud,  $r$ , and, as herein shown, has three bearings, 2 3 4. Bearing 2 holds the short shaft  $s$ , which has fixed to it the worm  $l$  and the ratchet-wheel  $t$ , which is acted upon by the pawl  $u$ , connected with the weighted pawl-carrier  $v$ .

The pawl is moved by the foot  $w$  at each rise of the traverse-lever, the worm turning the pinion  $m$  and winding the strap  $n$  on the hub of the pinion, as usual. This short shaft  $s$  is made hollow or otherwise suitably shaped and connected with the end of shaft  $x$ , so as to permit the latter shaft to move longitudinally with relation to shaft  $s$  during its rotation, and yet rotate in unison with the said shaft.

The shaft  $x$  has its opposite end fitted loosely into a socket-piece,  $a^2$ , provided at its rear end with a roller,  $b^2$ , and so held by a screw,  $c^2$ , and slot  $d^2$  as to move a short distance in the bearing 4. The shaft  $x$ , near its end which enters this socket-piece, has a fixed collar,  $e^2$ , provided with an annular groove, 8, to be entered by the locking device  $f^2$ , held up by a spring,  $g^2$ , which locking device is adapted to be pushed down at the proper time and release the said shaft  $x$  by an incline, 10, on the traveling nut  $h^2$ , which is mounted upon the screw-sleeve  $i^2$ . This screw-sleeve is extended through the bearing 3, and serves as a bearing for the shaft  $x$ . This sleeve  $i^2$  has about it a bevel-gear,  $k^2$ , connected with it, and also with the shaft  $x$  loosely, by a pin in the hub of the gear, which pin extends through slots in the sleeve and shaft, this connection permitting the gear to be moved longitudinally with relation to the sleeve and the shaft  $x$ .

The gear  $k^2$  has a collar, 12, acted upon by one end of a spiral spring,  $l^2$ , the opposite end of the spring being connected with the bearing 3, (see Fig. 2,) the tendency of the said spring being always to force the said gear  $k^2$  toward, and so as to engage, the continuously-

rotating bevel-gear  $m^2$ ; but this gear  $k^2$  is held back against the pressure of this spring so long as the locking device  $f^2$  engages the groove in the collar on the shaft  $x$ , the end of the sleeve  $i^2$  then abutting against the pin 13, which holds the gear  $k^2$  on the sleeve.

The bevel-gear  $m^2$  is at one end of a short shaft supported in a bearing, 16, forming part of the traverse-lever, and the said shaft has at its other end a bevel-gear,  $n^2$ , which engages a bevel-gear,  $o^2$ , on a shaft,  $p^2$ , having at its upper end a bevel-gear,  $r^2$ , that, in turn, is engaged and driven by a bevel-gear,  $s^2$ , on the drum or other main shaft  $d$  of the machine moving at the proper speed. This shaft  $d$  is the main driven shaft, and it has a fast and loose pulley,  $t^2$   $u^2$ , and the belt for driving the said fast pulley is controlled by a belt-shipper,  $w^2$ , pivoted at  $x^2$ , and connected with a shipping-rod,  $a^3$ , having a grooved collar,  $b^3$ , into the groove of which drops or enters a finger,  $c^3$ , forming part of a stopping-lever,  $d^3$ , pivoted at  $e^3$ , the lower end of the said lever being extended downward within the path of movement of the nut  $h^2$ .

The shipper-rod  $a^3$ , as herein shown, has its opposite end fitted into a socket-piece,  $f^3$ , slotted at one side, as at 17, to receive a pin, 18, by which to connect the collar 19 with the shipper-rod  $a^3$ , so that the spring  $g^3$  about the said sleeve, with one of its ends against the said collar 19, will move it and the rod  $a^3$  longitudinally whenever the finger  $c^3$  is lifted from its engagement with the grooved collar  $b^3$ , so as to move the shipper to the loose pulley  $u^2$  and stop the machine.

When the machine is to be started to wind yarn upon the bobbins the nut  $h^2$  is in its most forward position, the locking device  $f^2$  is in engagement with the grooved hub  $e^2$  of the shaft  $x$ , and the spring-pressed gear  $k^2$  is held back out of engagement with the gear  $m^2$  by the sleeve, or it may be by the shaft  $x$  itself acting on the pin 13 of the gear  $k^2$ . While the bobbins are being filled with yarn the nut  $h^2$  is gradually forced backward by the rotation of the screw-sleeve  $i^2$ , set in motion by shaft  $x$ , driven as before described, and at that stage of the winding-on operation when the bobbins shall have received upon them the proper amount of yarn the beveled part of the nut strikes the locking device, depresses it, and releases the shaft  $x$  and sleeve, and then the spring  $i^2$  (before compressed and held compressed) expands and forces the gear  $k^2$  into engagement with the positively-driven gear  $m^2$ , and causes it to turn the gear  $k^2$  in a direction to reverse the movement of the screw-sleeve and move the nut rapidly in the opposite direction or toward the stopping-lever,

the traverse-rail by this operation being wound down to its lowest point, and as soon as the nut meets the stopping-lever it acts upon and lifts the finger  $c^3$  and releases the shipping-rod  $a^3$ .

The last movement of the traverse-lever before the machine stops is in the proper direction to lay the yarn down upon the bobbin in proper position for doffing, and the machine is stopped automatically, and the bobbins may be doffed.

The shaft  $x$  is moved longitudinally forward to move the gear  $k^2$  back against its spring and permit the locking device to engage the grooved hub by means of the action of the roller  $b^2$  upon one of the inclines, 20 or 21, connected with a bracket, 22, attached to the frame, any full movement of the traverse prior to or at the commencement of the winding-on movement causing the roller  $b^2$  to strike the said inclines. These inclines are shown as made adjustable in order to operate the rod  $x$  at the proper time with reference to winding down the rail.

I claim—

1. In a spinning-frame, the traverse-lever, its threaded sleeve and traveling nut, and means to operate it, combined with a longitudinally-moving shaft, a locking device operated by the nut, a spring-pressed pinion, and a gear and mechanism to rotate it to actuate the said pinion and the sleeve, to reverse the motion of the nut quickly, and a stopping-lever, to operate substantially as described.

2. The combination, in a spinning-machine, of a belt-shipper and its rod, a stopping-lever and finger to hold the shipping-rod, a traveling nut, a screw to move it slowly in one direction to release the locking device, and means to automatically move the said screw and then reverse it and the nut quickly at the completion of the winding of the bobbin to stop the frame, substantially as described.

3. The traverse-lever rod  $x$ , its collar, and the locking device, combined with the nut and threaded sleeve, and means to move them, substantially as described.

4. The traverse-lever and mechanism for operating it, the longitudinally-movable shaft  $x$ , and the socket, combined with the wedge-blocks or inclines to operate the rod, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BENJ. SAUNDERS.

Witnesses:

A. H. SAUNDERS,  
LULU A. BEMIS.