

(No Model.)

2 Sheets—Sheet 1.

W. H. SALTMARSH & C. A. BOGARDUS.
RING SPINNING FRAME.

No. 401,217.

Patented Apr. 9, 1889.

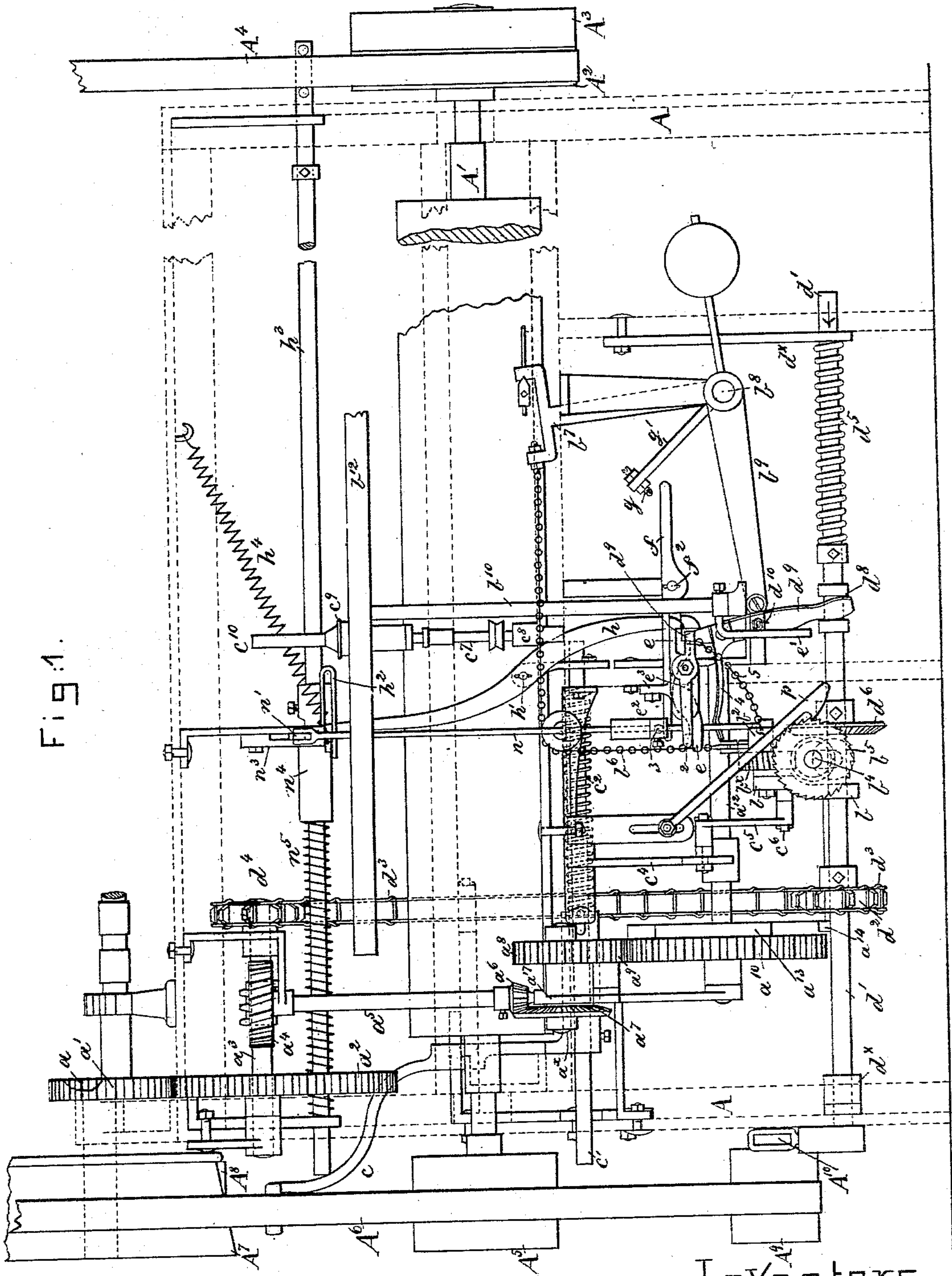


Fig. 1.

Witnesses.

Howard F. Eaton.

John F. C. Printkett

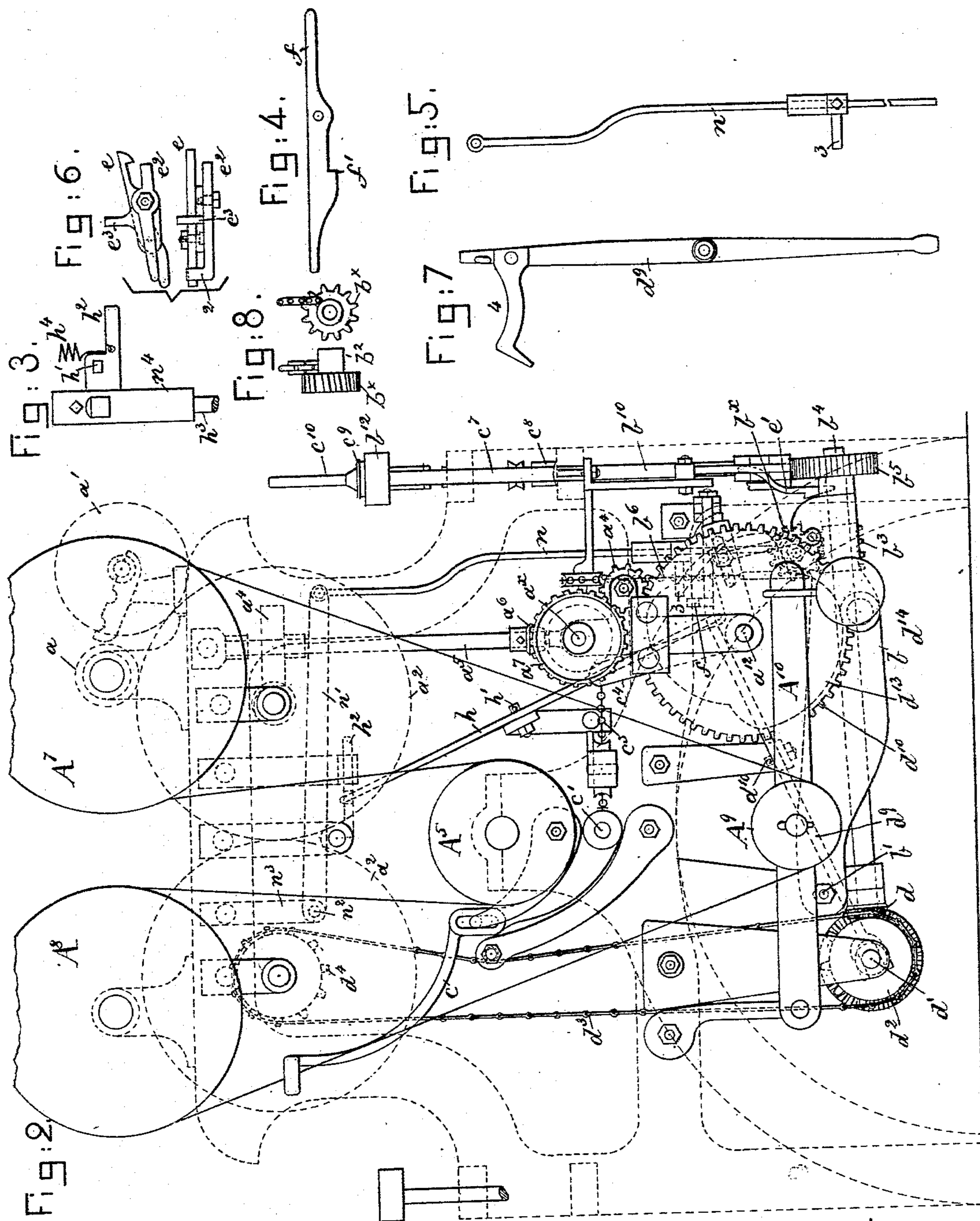
Inventors.

William H. Saltmarsh
Charles A. Bogardus.

by Leroy & Gregory Attys

RING SPINNING FRAME.

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Inventors

William H. Suttmarsh

Charles A. Bogardus,
by Leroy Stegony Attys

UNITED STATES PATENT OFFICE.

WILLIAM H. SALTMARSH AND CHARLES A. BOGARDUS, OF CHICOPEE FALLS,
MASSACHUSETTS.

RING-SPINNING FRAME.

SPECIFICATION forming part of Letters Patent No. 401,217, dated April 9, 1889.

Application filed September 14, 1888. Serial No. 285,415. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. SALT-
MARSH and CHARLES A. BOGARDUS, of Chico-
pee Falls, county of Hampden, State of Mas-
sachusetts, have invented an Improvement in
Ring-Spinning Frames, of which the follow-
ing description, in connection with the ac-
companying drawings, is a specification, like
letters on the drawings representing like parts.

10 This invention has for its object to provide
a ring spinning or twisting frame with means
whereby the ring-rail may be automatically
lowered to "wind down" the yarn, as it is
called, when the bobbins have been filled, in
15 order that the ring-rail may be in position to
enable the bobbins to be doffed.

Prior to our invention this winding down
of the ring-rail prior to doffing has been done
by a hand operation requiring considerable
20 power, and being further objectionable be-
cause in such plan the commencement of the
winding down was determined as to time en-
tirely by the judgment of the operator, and
frequently the operator by carelessness starts
25 the winding down sooner than necessary, or,
on the other hand, neglects to start the wind-
ing-down movement until after the bobbin
has had wound upon it at its nose more than
the desired amount of yarn.

30 In this our invention the winding-down mo-
tion is made automatic, it being commenced
unerringly at the end of that stroke or end of
the ring-rail which is the highest reached by
it, at which time the bobbin receives upon it
35 the last regular layer of yarn which it is de-
sired to lay on the barrel of the bobbin. So,
also, the movement of our improved machine
is stopped as soon as the ring-rail completes
its winding-down stroke. The automatic com-
40 mencement of the winding-down motion and
the automatic stopping of the machine at the
completion of the winding-down movement of
the ring-rail results in a very material sav-
ing in labor, relieves the operator from the
45 duty of watching the machine to see when the
bobbins are properly filled, and from the ex-
ertion of winding the rail down by a hand op-
eration; and, further, our invention results in
a great saving of yarn, for in practice when
50 the operator by carelessness, which is of fre-

quent occurrence, neglects to start the wind-
ing down of the yarn at the proper time many
extra turns of yarn are laid upon the bobbin,
which have to be wound off when the bobbin
is placed in a loom-shuttle, for at such time 55
all the yarn added or wound down on the out-
side of the yarn load has to be removed, and
with it all the unnecessary turns of yarn, as
described, so as to leave the yarn leading di-
rectly from the last regular layer of yarn 60
wound upon the bobbin, and this has to be
done before the shuttle is started.

In accordance with our invention we have
added to an ordinary ring spinning or twist-
ing frame certain mechanism or devices which 65
we will hereinafter describe.

Our invention consists, essentially, in the
combination, with the building-lever, chain-
hub, and pick-shaft, of a reversing-shaft, con-
necting-gearing between the reversing-shaft 70
and pick-shaft and between the pick-shaft
and chain-hub, and with means to actuate the
said reversing-shaft to operate the pick-shaft,
substantially as will be described.

Other features will be described in the speci- 75
fication, and pointed out in the claims.

Figure 1 is a partial front elevation of a
sufficient portion of a ring-spinning frame
containing our improvements to enable the
same to be understood, part of the frame-work 80
being broken out to shorten the same and part
of it being shown by dotted lines, we having
shown but one spindle, bobbin, and ring, as
all others will be but duplicates of it. Fig.
2 is a partial left-hand end elevation of the 85
frame shown in Fig. 1, the said figure showing
a part of a ring-rail at the rear side of the
frame, it being understood that the devices
at the front and rear sides of the frame are
alike, as usual. Fig. 3 is a detail of part of the 90
shipping mechanism to be referred to. Fig.
4 is a detail showing the latch *f* by itself.
Fig. 5 is a detail of the weighted leg *n*. Fig.
6 shows two views of the latch *e* and finger
e' to move it, and the bracket on which they 95
are pivoted. Fig. 7 is a detail showing the
lever *d*⁹ and its attached finger 4, to be de-
scribed, and Fig. 8 shows the chain-hub *b*² and
worm-gear *b*^x.

The frame-work A, the drum-shaft A', hav- 100

ing at its end usual fast and loose pulleys $A^2 A^3$ with which co-operates the driving-belt A^4 , the pulley A^5 at the opposite end of the drum-shaft, the belt A^6 , driven by it and extended over the usual cone-pulleys $A^7 A^8$, which by intermediate gearing rotate the usual front rolls of the two sets of rolls at the front and rear sides of the machine, the binder-pulley A^9 , carried by the weighted binder-lever A^{10} , the small pinion a on the shaft to which is attached one of the said cone-pulleys, (only one of which pinions is shown, and that on the shaft to which is attached the cone-pulley A^7), the pinion a' on the front roll-shaft, the gear a^2 , driven by it, the worm-shaft a^3 , to which the gear a^2 is secured, the worm-gear a^4 , driven by the worm on the worm-shaft a^3 , the vertical shaft a^5 , its beveled gear a^6 , engaging the beveled gear a^7 , fast to a short shaft, a^x , in a bearing, a^{17} , the pinion a^8 , fast on the said short shaft a^x , the intermediate gear a^9 , the gear a^{10} , the latter fast on the cam-shaft a^{12} , having the builder-cam a^{13} (shown by dotted lines in Fig. 2 and full lines, Fig. 1) just inside the gear a^{10} , the said builder-cam in practice acting during its rotation on a roller at the end of a long stud, a^{14} , extended from one side of the builder-lever b , pivoted at b' , the chain hub b^2 , (see Figs. 1 and 8,) carried by the said builder-lever and having a worm-gear, as b^x , the worm b^3 , engaging the said worm-gear and fast on the pick-shaft b^4 , carried by the lever b , the ratchet-wheel b^5 , secured to the said pick-shaft, the builder-chain b^6 , connected to the hub b^2 at one end and to the arm b^7 of the rock-shaft, b^8 , having an arm, b^9 , the lifting-rod b^{10} , the ring rail b^{12} , the belt-shipper arm c , the slide-rod c' , to which it is attached, the spring c^2 , surrounding the slide-rod c' , the chain c^3 , (see Fig. 2,) connected to it and to the elbow-lever c^4 , loosely mounted on the cam-shaft a^{12} and connected at its front end by a link, c^5 , with a stud, c^6 , extended from the builder-lever b , and the spindle c^7 , step or bearing c^8 , ring c^9 , and bobbin c^{10} are and may be all as usual in ring spinning or twisting frames, the particular devices so far referred to being those common to ring-frames in common use.

We will now describe the parts which we have added to the usual spinning-frame.

To the pick-shaft b^4 we have added a beveled gear, d , (see Fig. 2,) and have supplied the frame with a reversing-shaft, as d' , having fast on it, as shown, a chain-wheel, d^2 , driven by a chain, d^3 , which derives its motion from a chain-wheel, d^4 , secured to the shaft a^3 of the gear a^2 . This shaft d' , besides its movement of rotation, has a sliding movement in its bearings d^x , and is surrounded by a spiral spring, as d^5 , which normally acts to move the said shaft in the direction of the arrow thereon in Fig. 1 to engage the beveled gear d^6 , fast upon it, with the beveled pinion d on the pick-shaft when it is desired to reverse the rotation of the pick-shaft to wind up the chain b^6 on the chain-hub b^2 and let

the ring-rail b^{12} descend quickly to wind down the yarn upon the bobbin.

The shaft d' has a grooved hub, d^8 , which is engaged by the forked lower end of a lever, d^9 , having its fulcrum at d^{10} , the outer end of the said lever being engaged and held by a latch, e , from the commencement of the winding motion until the ring-rail makes that ascent which is to be the highest during the operation of winding the yarn upon the bobbin, or at that ascent which is to lay the last layer of yarn on the barrel of the bobbin c^{10} . At this ascent of the ring-rail b^{12} a tripping device or finger, e' , secured to the lower end of the lifting-rod b^{10} , acts to lift a releasing device, e^2 , shown as a short lever pivoted on a stand, e^3 , which stand also serves to hold the pivot, as herein shown, for the latch e .

The releasing device e^2 (see Figs. 1 and 6) has at one end a projection, 2, which, as the finger e' meets the said releasing device e^2 , acts upon the rearend of and lifts the hooked end of the latch e from and so as to release the lever b^9 , so that the spring d^5 , surrounding the shaft d' , acts to move the said shaft and effect the engagement of the beveled gear d^6 with the pinion d . As the lever d^9 is moved, as described, by the spring d^5 , the upper end of the said lever is carried to the right, viewing Fig. 1, past the hook f' of a locking device, f , shown as a weighted latch pivoted at f^2 , so that the said latch previously held up by the hook f' , resting on the top of the lever d^9 , drops and engages the said lever d^9 and holds it until the beveled gears $d^6 d$, acting through the shaft d' , winds up the chain b^6 on the chain-hub b^2 , which is effected by the time that the ring-rail b^{12} reaches its lowest position. As the ring-rail arrives in its lowest position after having wound the yarn down about the yarn load on the bobbin in usual manner, a screw or projection, g , of an arm, g' , which we have added to the usual rock-shaft, b^8 , acts upon the end of the locking device f , opposite that which engages and holds the lever d^9 , and turns the locking device so that its hook f' is lifted from engagement with the lever d^9 , permitting it to be moved by the action against it of the lower end of a lever, h , pivoted at h' , and having its upper end extended through or made to engage with an arm or projection, as h^2 , extended from the shipper-rod h^3 , the latter rod being common to ring-spinning frames of the kind referred to.

The upper end of the lever h has connected to it a strong spring, as h^4 , which normally acts upon the said lever h to throw the front end of the lever d^9 to the left, viewing Fig. 1, away from the hooked part of the locking device f .

In the movement of the lever d^9 , derived from the lever h and spring h^4 , the said lever d^9 passes with its edge the hook of the releasing latch e , which rested on the top of the lever d^9 when the said lever was held by the locking device f , and the said latch drops

down over and again catches and holds the said lever in the position it is to occupy when the machine is again started, which is done by the operator in the usual manner after the winding-down motion has been effected, the bobbins doffed, and new bobbins applied to the spindles, as commonly practiced.

At the time that the projection g acts to lift the locking device f to release the lever d^9 the said locking device acts upon a projection, 3, connected to a weighted pendulum or leg, n , pivoted at its upper end to a shipper-rod holding lever n' in turn pivoted at n^2 on a stand, n^3 , the said lever n' when down engaging a shoulder of a collar, n^4 , fast on the shipper-rod h^3 , the said lever in its depressed condition normally acting to hold the shipper-rod with its spring n^5 compressed, so that as soon as the lever n' is lifted by movement of the locking device f said shipper-rod is released and permitted to act in usual manner to effect the movement of the belt A^4 from the fast upon the loose pulley A^3 .

The leg-lever n is so weighted that it will normally swing when loosened, as hereinafter described, toward the drum-shaft A' far enough to place its projection 3 above the locking device f , so that as the latter rises the frame is automatically stopped, the rising of the latch f being just as the winding-down operation is completed. This leg-lever n is held back while the bobbin is being filled in usual manner by a finger, 4, (see Figs. 1 and 7,) extended laterally from the lever d^9 , the said finger permitting the said leg-lever to move toward the locking device f as the latch e is released from the lever d^9 or just as the ring-rail completes its highest ascent.

The lever d^9 has connected to it a chain, 5, (see Fig. 1,) which is jointed to the usual pawl, p , which engages the ratchet-wheel b^5 on and moves the pick-shaft b^4 during each descent of the builder-lever b to gradually unwind the chain.

It is obvious that the pawl p must be kept from engagement with the said ratchet-wheel when the builder-lever b is being moved down and the pick-shaft is being reversed to wind up the chain, as described, during the winding-down movement, and to do this at and in unison with the winding-down movement we have connected the said chain to the lever d^9 , which is chiefly depended upon to determine the starting and completion of the winding-down movement.

Having described our invention, we desire to state that we do not intend to limit our invention to the exact form and shape of the devices added by us to the usual spinning-frame to enable the winding down to be commenced automatically at a particular or the highest ascent of the ring-rail, and the chain to be automatically wound up at a certain descent of the ring-rail, and the stopping devices to be set in motion to stop the machine, for it will be obvious to a skilled mechanic that the shape of the devices $f e e^2 h d^9 g g'$

might be variously modified and other well-known equivalent devices for any one of them be substituted for one or more of the said devices without departing from our invention. Nor do we desire to limit the application of our improvements to their employment in connection with any particular form of building mechanism, but may readily adapt our improvements to co-operate with the building mechanism commonly found in any usual spinning or twisting frame.

It will be noticed that the distance from the hooked part of the latch e to the hooked part f' of the locking device f is less than the width of the lever d^9 .

We claim—

1. In a ring-frame, the combination, with the building-lever, chain-hub, and pick-shaft, of the reversing-shaft, connecting gearing between the reversing-shaft and pick-shaft and between the pick-shaft and chain-hub, and with means to actuate the said reversing-shaft to operate the pick-shaft, substantially as described.

2. The builder-lever, the pick-shaft, its attached ratchet and pawl p , combined with the lever d^9 , and the connection between the said lever and pawl, substantially as described.

3. The belt-shipper rod, the lever to engage and hold the said rod, the leg-lever n , connected thereto and having a projection, 3, and the lever d^9 , having the finger or projection 4, combined with the locking-lever f , and with means to move it to release the lever d^9 , and means to actuate said lever at the completion of the winding-down motion, substantially as described.

4. The builder-lever, the pick-shaft, the reversing-shaft, the gearing between it and the pick-shaft, means to rotate the reversing-shaft, the lever d^9 , a spring to effect the engagement of the said gearing, a latch to hold the said lever d^9 , and a tripping device, as e' , for the said latch, combined with the ring-rail, lifting-rod, and with means between the builder-lever and lifting-rod to lift the lifting-rod, whereby as the lifting-rod makes its greatest upstroke the said latch is actuated to release the said lever and cause the reversing-shaft to rotate the pick-shaft, substantially as described.

5. The builder-lever, the pick-shaft, the sliding reversing-shaft, its actuating-spring, the gear between the said shafts, and means to rotate the said reversing-shaft, combined with the lever d^9 and the latch e to hold the said lever in position to disengage the gears between the reversing and pick shafts, substantially as described.

6. The builder-lever, the pick-shaft, the sliding reversing-shaft, its engaging spring, the gear between the said shafts, and means to rotate the said reversing-shaft, combined with the lever d^9 and with the locking device f to engage the said lever and lock it in position to keep the gears between the reversing

and pick shafts in engagement while the reversing-shaft actuates the pick-shaft, substantially as described.

7. The builder-lever, means to move it, the
5 pick-shaft having the worm and the beveled gear, the chain-hub having the worm-gear, the chain, the rock-shaft to which it is connected, and the lifting-rod and ring-rail, and the ratchet-wheel and pawl to move the pick-
10 shaft intermittingly, combined with the reversing-shaft, its gear d^6 , and means to rotate the said shaft, and means to automatically stop the rotation of the spindles as soon as

the ring-rail reaches its lowest position after starting to wind the yarn down over the yarn 15 load preparatory to doffing the bobbins, substantially as described.

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

WM. H. SALTMARSH.
CHAS. A. BOGARDUS.

Witnesses:

DANIEL DUM,
J. WILSON LYMAN.