

(No Model.)

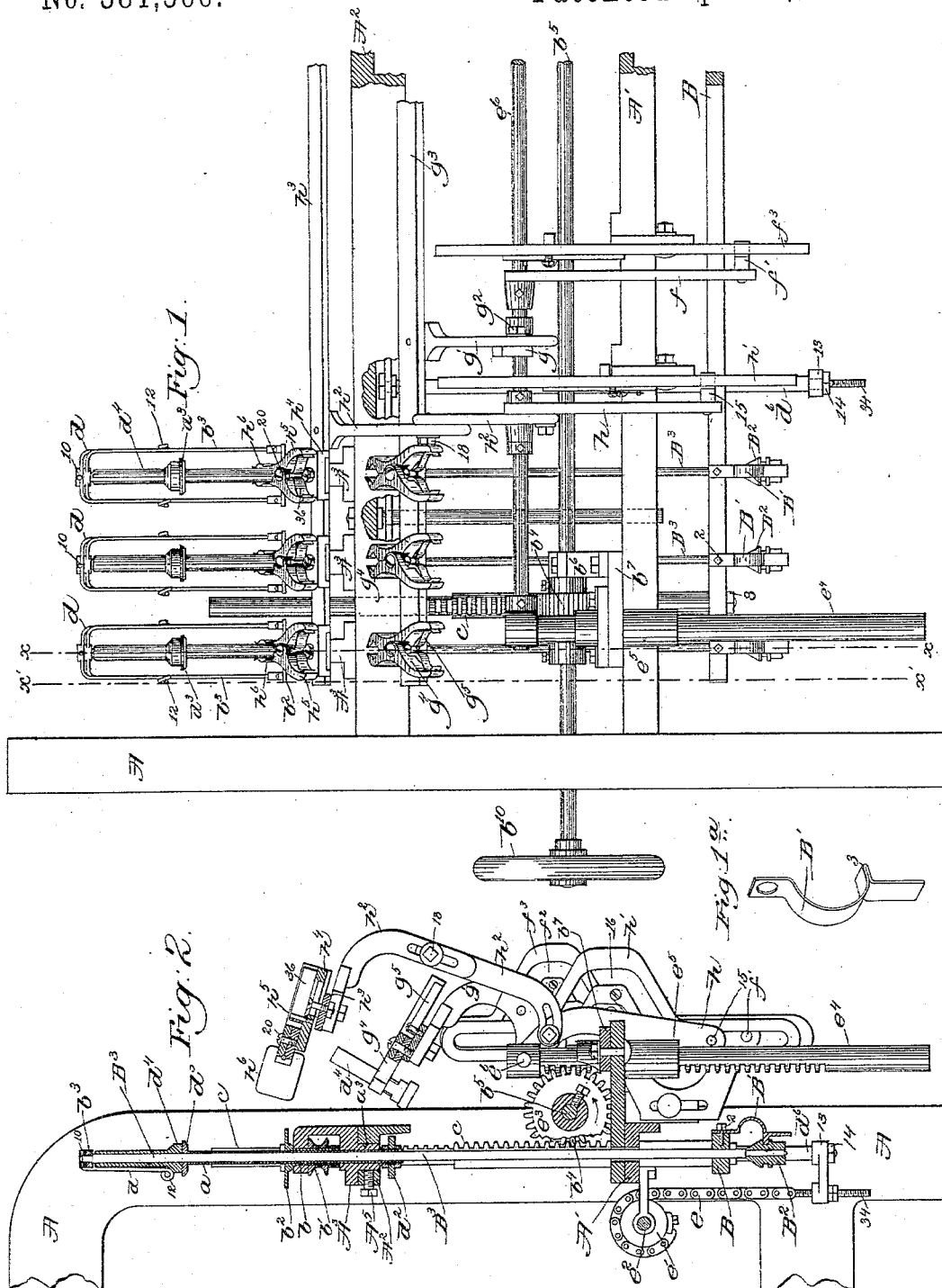
J. MARJERISON.

3 Sheets—Sheet 1.

SPINNING MACHINE.

No. 381,566.

Patented Apr. 24, 1888.



Witnesses
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John F. C. Brinkman

Inventor.
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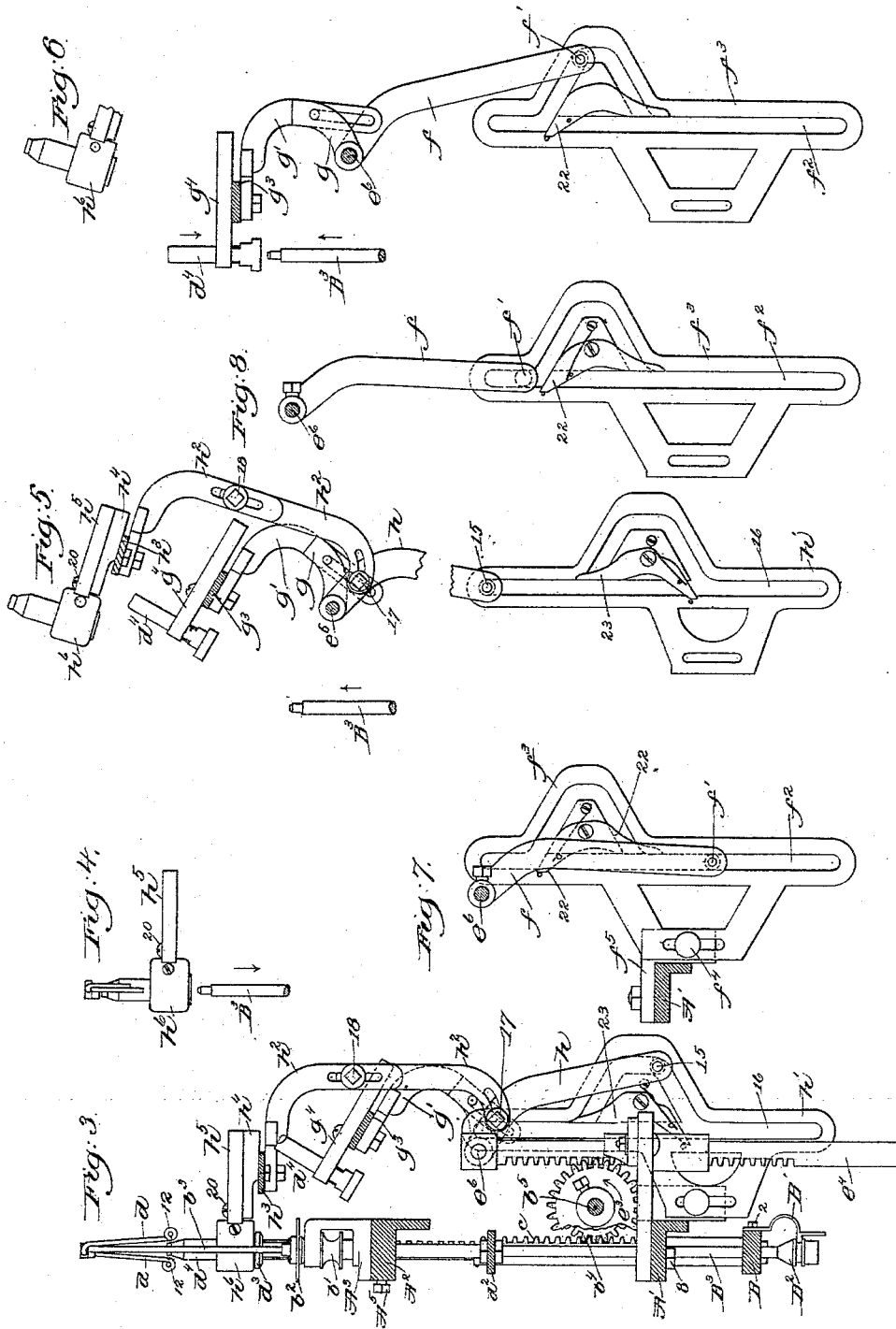
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3 Sheets—Sheet 2.

No. 381,566.

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(No Model.)

3 Sheets—Sheet 3.

J. MARJERISON.
SPINNING MACHINE.

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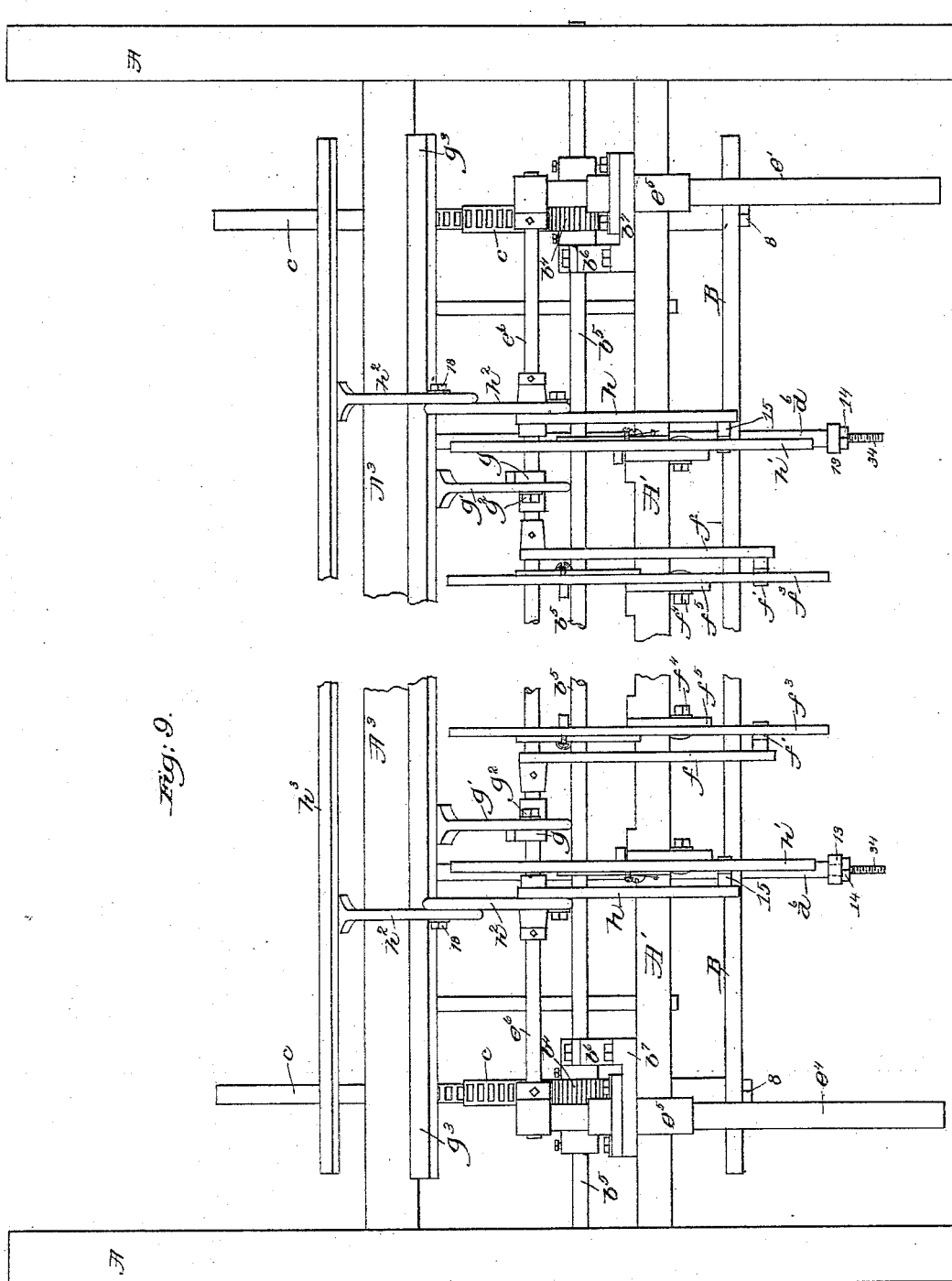


Fig. 9.

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UNITED STATES PATENT OFFICE.

JAMES MARJERISON, OF LAWRENCE, MASSACHUSETTS.

SPINNING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 381,566, dated April 24, 1888.

Application filed February 15, 1886. Serial No. 192,057. (No model.)

To all whom it may concern:

Be it known that I, JAMES MARJERISON, of Lawrence, county of Essex, and State of Massachusetts, have invented an Improvement in Spinning-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object, chiefly, to provide an apparatus whereby two or more bobbins may be automatically applied to or be removed from their carrying-spindles, to thereby facilitate the operation in spinning, called "doffing."

My invention is herein shown as applied to a spinning-machine having a series of dead-spindles surrounded by tubes attached to a builder-rail, the said tubes carrying the bobbins, the dead-spindles having co-operating with them yokes provided with attached whirls which surround the said tubes, the said yokes having attached to them the fliers. The foot-step rail, which supports the bearings for the lower ends of the dead-spindles, has attached to it near its ends toothed rods, which are engaged by toothed gears on a doffing-shaft parallel to the said foot-step rail, the said shaft having its bearings in boxes on a stationary cross-beam. The shaft referred to has other larger toothed gears, which engage toothed rods placed in vertical guides attached to the said bearings, and the said toothed rods at their upper ends sustain a rock-shaft having an attached arm provided with a stud, which is acted upon by a stationary cam to rock the said shaft, the said shaft having secured to it hubs, on which are adjustably attached arms that support a bar, on which is pivoted the clamps that receive the empty bobbins and apply them to the spindles. The rock-shaft referred to serves as the fulcrum for other arms or levers having pins that are acted upon by other stationary cams, the said arms or levers having at their upper ends adjustable portions, which hold the bar to which are pivoted the clamps that engage and remove the full bobbins from the spindles.

Figure 1 in front elevation, represents a sufficient portion of a spinning-machine to illustrate one practical embodiment of my invention; Fig. 1^a, a detail showing the step-

support; Fig. 2, a section of Fig. 1 in the dotted line *xx*. Fig. 3 is a like section in the dotted line *x'x'*, the parts being, however, in a different position, the full bobbin on the spindle having been grasped by the jaws. Fig. 4 is a detail showing the bobbin-receiving jaws as grasping the full bobbin and removing it from the top of the spindle. Fig. 5 represents yet another position occupied by the clamps with relation to the spindle, one clamp having taken away the full bobbin, the other clamp approaching the spindle with the empty bobbin. Fig. 6 is a broken detail showing yet another position of the said parts. Figs. 7 and 8 are details chiefly to show the cams instrumental in moving the carriers for the jaws or clamps; and Fig. 9 is a partial front view of a spinning-frame embodying my improvements, the frame being broken out centrally, the spindles, fliers, tubes, bobbins, and clamps being omitted.

The frame-work A, of suitable or usual shape, to support the working parts, has a fixed cross-beam, A', and a fixed collar-rail, A², which is provided with a series of holes to receive the collars *a*³ of the tube-bearings A³, the said tube-bearings being secured in place by suitable screws, A⁵, engaging the said collars.

The step rail B, as herein shown, has attached to it by screws 2 a series of supporting-pieces, B', (shown separately in Fig. 1^a), which are shaped at their lower ends, as at 3, to enter an annular groove in and thereby support the foot-steps or lower bearing, B², for the dead spindles B³, the said supporting-pieces being so shaped and composed of spring-steel to thereby enable any bearing B² to be readily detached from the step-rail to permit a dead-spindle to be removed from the machine.

The dead-spindles are extended upward through holes made in the cross-rail A' and through the tubes *a*, and the upper ends of the said dead-spindles are extended above the collar-rail far enough to provide for the traverse of the tube and bobbin thereon as the yarn from the flier is wound upon the bobbin in usual manner. Each tube *a*, connected at its lower end by suitable nuts to the builder-rail *d*, receives about it a sleeve, *b*, to which is attached not only a whirl, *b'*, but also a disk or plate, *b*², having attached to it

in suitable manner a yoke, b^3 , the upper portion of which is provided with a bearing to receive loosely the upper end of a dead-spindle, the upper ends of all the dead-spindles being held pressed up into the said bearings at all times, except when the full bobbins are to be doffed and empty bobbins are to be applied, at which time and preparatory for doffing the step-rail B will be lowered by the gear b^4 , fast on the doffer-shaft b^5 , supported in bearings b^6 , erected upon a plate, b^7 , attached to the stationary cross-rail A', the said gears, one at each end of the said shaft, engaging the toothed rods c , one at each end of the machine, the said toothed rods being connected to the said step-rail by nuts 8.

The doffing-shaft b^5 is herein shown as provided with a hand-wheel, b^{10} , by which to turn it when the spindles are to be lowered or raised.

The yoke b^3 , referred to, serves as a support for and prevents vibration of the upper end of the dead-spindle. Each yoke b^3 has at its upper end a suitable projection, to which is pinned or otherwise attached by a pin, 10, a flier, d , the arms of which are bent downward nearly parallel to the sides of the yoke, and are provided with eyes 12, the legs of the fliers being sufficiently separated from the arms of the yoke to permit the yarn to be wound around the leg of the flier one or more times before entering the eye of the flier, the number of times the yarn is so wound about the flier-leg depending upon the amount of friction desired on the yarn and the hardness of the yarn wound upon the bobbin. The yoke or flier will be rotated in unison by bands passed about the whirls b' , as usual in flier-frames.

The tubes a at their upper ends are provided with plates or washers d^2 , on which rest the bottoms of the bobbins d^1 . The builder-rail d' is connected to a builder-rod, d^3 , provided at its lower end with a lug or ear, 13, connected thereto by a nut, 14, the said lug being threaded to enable the connection to it of the screw 34 of the chain e , attached to the usual drum, e' , of the builder-shaft e^2 , common to flier and cap frames, the builder rail being moved in usual manner.

The doffing-shaft b^5 has fast upon it near each end a gear, e^3 , which is made to engage a toothed rod or rack, e^4 , placed in a guide, e^5 , attached to one of the plates b^7 . These two toothed rods or racks at their upper ends have bearings for the reception of a rock-shaft, e^6 . This rock-shaft has fast on it arms f , provided with studs f' , that enter slots f^2 of cam-plates f^3 , attached each by a bolt, f^4 , to a bracket, f^5 , secured to the cross-rail A'. The rock-shaft e^6 also has fixed to it hubs g , to which the arms g' are adjustably attached by the bolts g^2 , the upper ends of the said arms having attached to them the bar g^3 , upon which is mounted opposite each dead-spindle a pair of clamps or jaws, g^4 , normally held closed somewhat together by a spring, g^5 , the said clamps

or jaws being adapted to have inserted in them by hand the empty bobbins d^1 , as shown in Figs. 3 and 5, the said bobbins being supplied to the said jaws or clamps preparatory to lifting the rock-shaft e^6 and doffing the full bobbins. The rock-shaft e^6 also serves as a pivot for the arms h , each arm having a pin, 15, to enter a cam-groove, 16, (see Figs. 3 and 5,) of a cam-plate h' , supported as described, of the cam-plate f^3 by a bracket on the cross-rail A'. Each arm h has attached to it by a bolt, 17, an arm h^2 h^2 , herein shown as made in two pieces and united by a bolt, 18.

The upper ends of the arms h^2 have attached to them the bar h^3 , which opposite each dead-spindle has bolted to it a base-block, h^4 , slotted, as shown in Fig. 2, for adjustment on the said bar, each of the said blocks having pivoted upon it by a screw or bolt, 20, the arms of a clamp or pair of jaws, h^5 , having broad ends h^6 , made of rather thin sheet steel, concaved to embrace the full bobbins, the front ends of the said clamps or jaws being so shaped as to spread apart and pass about the said full bobbins, as in Fig. 3, when the clamps or jaws are moved from the position Fig. 2 to that shown in Fig. 3, springs 36 keeping the said jaws normally closed.

Supposing the parts to be as in Fig. 1, but with the bobbins full of yarn, then the operation of doffing will be performed, as follows: The jaws or clamps g^4 will be provided with bobbins, as shown in Fig. 2, and the shaft b^5 will be turned in the direction of the arrow, Figs. 2 and 3, which will effect the depression of the step-rail, drawing the dead-spindles down into the tubes far enough to permit the full bobbins to be removed from the spindles, and this may be done whatever may be the position of the builder-rail and the tube a ; but when the builder-rail is actuated, in usual manner, to wind the bobbins for filling, the builder-rail will usually be down when doffing takes place. As the step-rail is lowered, the rock-shaft e^6 is correspondingly raised, and the pin 15 in the cam-slot 16 will cause the arms h h^2 and the attached bar h^3 and jaws or clamps h^5 h^6 to pass forward about the full bobbins, as in Fig. 3, and as the rock-shaft e^6 continues to rise from the position Fig. 3 to the position Fig. 5, the said jaws or clamps pull or lift the full bobbins from the upper ends of the spindles, the latter descending gradually as the said clamps or jaws ascend, the jaws or clamps grasping the full bobbins a little after the spindles commence to descend. The shape of the cam grooves 16 is such as to cause the clamps or jaws (they having grasped the full bobbins) to retire from the spindles and fliers to remove the said full bobbins, as in Fig. 5. During the time that the full bobbins are being removed the jaws containing the empty bobbins will be raised with the rock-shaft e^6 until the bottoms of the said empty bobbins are a little higher than the tops of the spindles, when the rock-shaft e^6 will be lowered, and at such time the pin f' of the arm f , at-

tached to the said rock shaft (see Fig. 8) and in the upper end of the cam-groove f^3 , will strike the switch 22 and will pass to the right, (viewing Fig. 8,) which will cause the rock-shaft to be partially rotated, so that the bar g^3 , having attached to it the jaws or clamps g^4 , will cause the said clamps, holding in them the empty bobbins, to be placed in position on or with relation to the rising dead-spindles, so that the said spindles as they rise enter the bobbins, and the spindles having entered the bobbins partially the jaws or clamps are pulled away laterally as the pins f' pass into the lower straight parts of the cam slots f^2 , leaving the empty bobbins on the spindles.

The operation may be repeated as often as desired.

When the rock-shaft e^6 is being lifted, the studs f' travel upward in the straight or vertical parts of the slots f^2 ; but the pin 15 is made to travel first in a straight part of the slot 16 until it reaches the spring-switch 23, when the said stud 15 travels into the cam part of the said slot 16; but when the rock-shaft descends the studs f' , meeting the switches 22, are caused to travel down in the cam parts of the slots f^2 ; but the stud 15 when it descends passes down in the straight part of the slot 16.

Fig. 5 shows the upper end of the dead-spindle in the position it will occupy vertically with relation to the jaws holding the full and empty bobbins when the rock-shaft e^6 has just commenced to descend, and Fig. 6 shows the position that the said parts will occupy as the empty bobbin is to be entered by the upper end of the dead spindle, the latter being moved in the direction of the arrow on it.

Viewing Fig. 4, the spindle is supposed to be descending and the jaws h^5 to be rising, the descent of the spindles continuing until the clamps g^4 and h^5 arrive nearly in the position Fig. 5.

Figs. 2, 3, 4, 5, and 6 show consecutive different positions of the operative parts.

I prefer to employ the independent fliers d ; but I may omit them and provide the legs of the yoke with eyes to receive the yarn, the said yoke then serving the purpose of a flier.

My invention with but slight alteration may be used in connection with ring-spinning spindles or in twisting-machines.

In another application, Serial No. 247,930, filed August 26, 1887, I have shown means, substantially as herein shown, for removing full bobbins and applying empty ones to the spindles; but with the said means I have also combined other means for removing and applying the caps of cap-spinning machines, and in the said application I have made claims for some of the devices herein shown when adapted for use in a cap spinning frame.

I claim—

1. The spindle-rail B, the dead-spindles, and the foot-steps B' , combined with the spring-holders B' , upon or by which the steps are detachably supported, substantially as described.

2. The spindle-rail B, the dead-spindles, the steps to support them, the builder-rail d^2 , and the tubes a , connected therewith, and thus adapted to be moved vertically thereby, combined with the rack-bars e^4 , the rock-shaft e^6 , supported by the said bars, and thus adapted to be moved vertically, the clamps g^4 , operatively connected with said rock-shaft, the racks or toothed rods c , the doffing-shaft b^5 , and the gears thereon, to operate substantially as set forth.

3. The rock-shaft e^6 , its attached arms f , provided with a pin, the rail g^3 and means to support it from the said shaft, and the clamps g^4 , combined with the cams f^3 , and with means to raise and lower the said rock-shaft, as and for the purpose set forth.

4. The rock-shaft e^6 , its attached arm or arms f , having studs f' , the rail g^3 , supports for connecting the latter with said rock-shaft, the clamps g^4 , and the cam-plates f^3 , combined with the arms h h^2 , the rail h^3 , the clamps h^5 , the pins or projections 15 on the arms h , the cam-plates h' , the rack-bars e^4 , the doffing-shaft b^5 , and gears on the latter engaging said rack-bars, substantially as set forth.

5. A series of dead-spindles, steps to support them, a step rail, a collar-rail, a series of collars, a builder-rail, means to move it, a series of tubes, a , attached to the said builder-rail and provided with supports, as plates d^2 , for the bobbins, a series of sleeves provided with whirls and yokes or fliers, combined with a series of clamps to receive the empty bobbins, a series of clamps to remove the full bobbins, and means for supporting and operating said clamps, substantially as set forth.

6. The rock-shaft e^6 , its arm f , provided with pins f' and its attached arm g' , the rail g^3 , carried by the arms g' , the clamps g^4 thereon, and the cam plates f^3 , combined with cam-plates h' , arms h , having pins or projections 15, arms h^2 , bar h^3 , and clamps h^5 , and with means to raise and lower the said rock-shaft, the cam-plates during such movements causing the oscillation of the rails h^3 and g^3 and their attached clamps to operate substantially as described.

7. The combination, with a vertically-movable spindle-rail and a series of steps and spindles supported thereby, of a set of vibratory and vertically-movable clamps to receive empty bobbins, a set of vibratory and vertically-movable clamps to remove full bobbins, and supports and operating mechanism for the said clamps, substantially as set forth.

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

JAMES MARJERISON.

Witnesses:

G. W. GREGORY,
F. CUTTER.