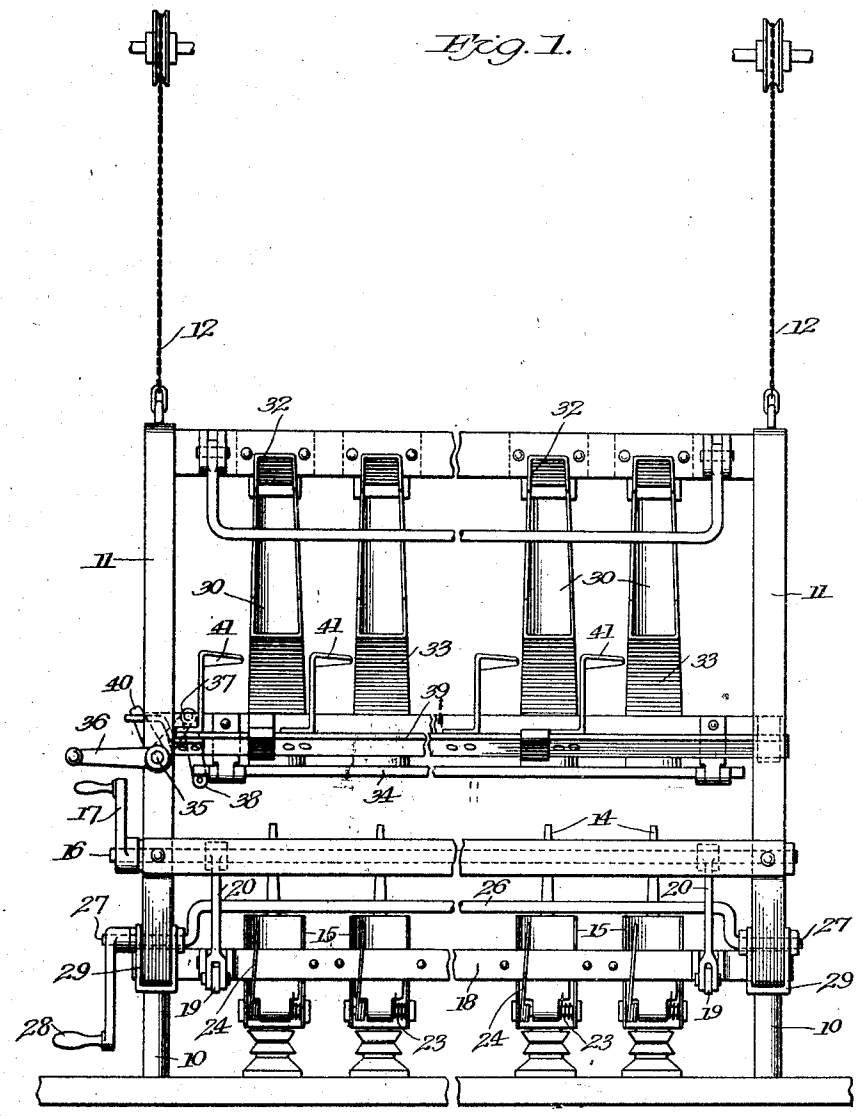
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Fig. 1.



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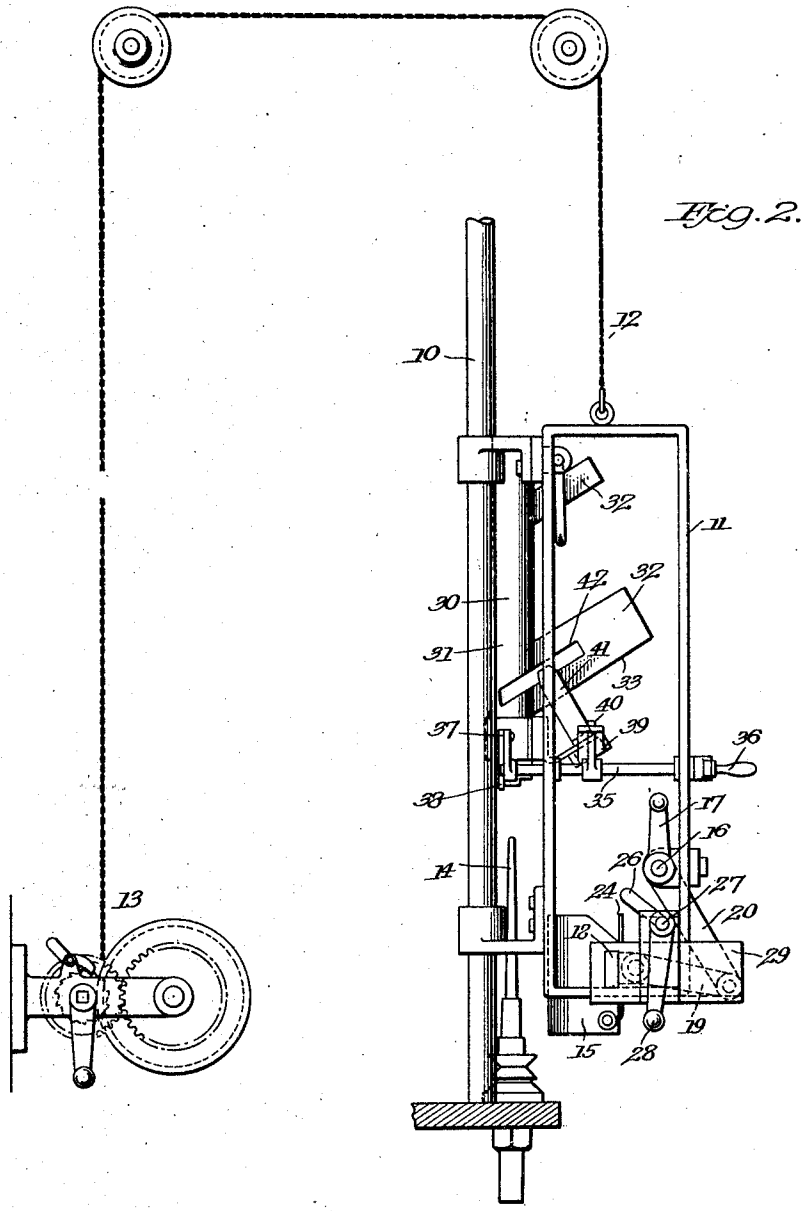
July 20, 1926. 1,593,039

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Fig. 2.



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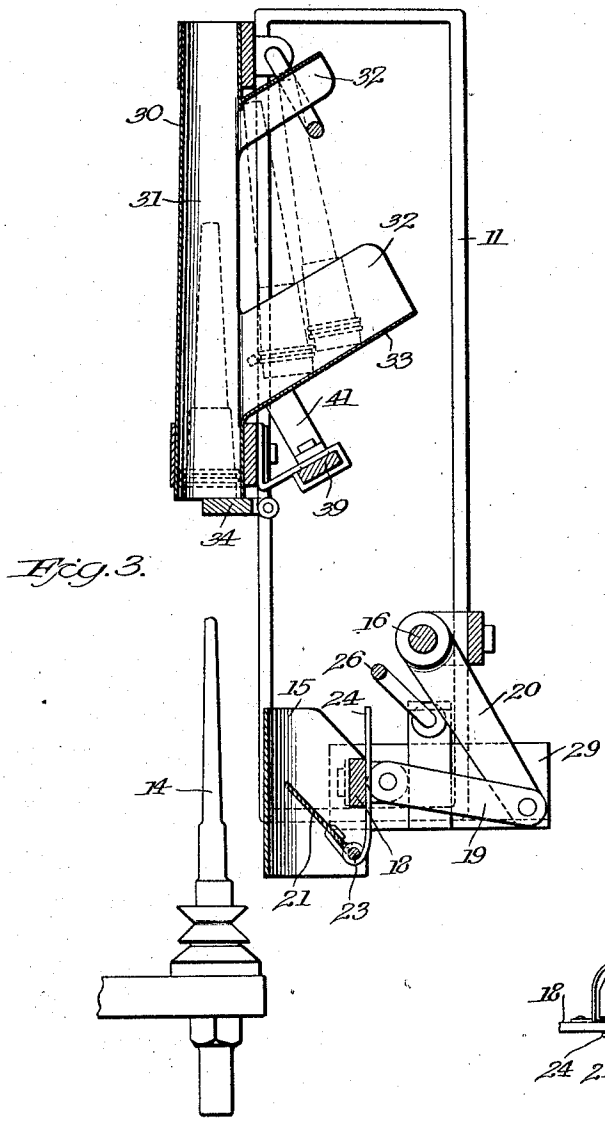


Fig. 3.



Fig. 5.

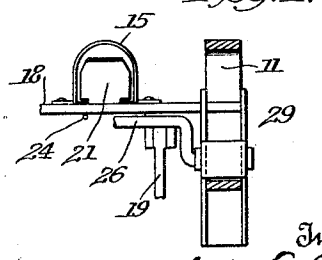


Fig. 4.

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UNITED STATES PATENT OFFICE.

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DOFFER.

Application filed August 25, 1925. Serial No. 52,331.

The object of this invention is to provide a simple mechanism for simultaneously removing all the filled bobbins and discharging them simultaneously into a suitable receptacle alongside the spinning-frame and also to place on the spindles simultaneously a fresh set of empty bobbins, as more fully hereinafter set forth.

In the drawings—

Fig. 1 is a front elevation of our improved apparatus with so much of the spinning machine illustrated as is needed;

Fig. 2 is an end elevation of the same;

Figs. 3, 4 and 5 are detail views hereinafter described.

Referring to the drawings annexed by reference characters, 10 designates vertical rods on which is mounted to slide vertically a frame 11, the means for vertically sliding this frame consisting, in the present instance, of a cable 12 and a hand-driven ratchet gearing and drum arrangement numbered as a whole 13, by which latter mechanism the frame 11 may be raised and lowered at will and held at any point in its vertical travel desired.

When the bobbins are filled and it is desired to remove them from the spindles 14, the frame 11 is lowered to a point where the bobbin-extractors 15 will lie just above the upper ends of the spindles 14; then the bobbin-extractors are shifted as a whole inwardly until they lie just above the top ends of the spindles, the mechanism for doing this consisting of a shaft 16 journaled on frame 11 and provided with an operating handle 17; a bar 18 slidably mounted on the lower bars of the frame 11 and connected to shaft 16 by links 19, and arms 20, the inner ends of links 19 being pivotally connected to said bar 18, and all the extractors 15 being mounted on said bar.

After the extractors 15 are thus shifted into position over the top ends of the spindles 15, the frame 11 is lowered far enough for the extractors 15 to pass down over the filled bobbins, means being provided whereby the filled bobbins are gripped in the extractors 15 so that when the frame 11 is again raised the filled bobbins will be pulled off the spindles and will be held in the extractors. The means for thus gripping the filled bobbins consists of a plate 21 pivotally mounted on a rod 22 extending upwardly and inwardly toward the spindle-frame. A small coil-spring 23 on the rod 22 tends to swing the gripping-plates 21 inwardly and downwardly. Each gripping-plate is provided with an upstanding tripping-finger 24 which normally rests against a stop-bar 18 extending across the outer sides of the extractor-cylinders 15. It will be observed that when the extractors are lowered down over the bobbins, the gripping members 21 swing outwardly against the action of their springs, and when the extractors are raised, the upper inner edges of the gripping members 21 bite into the yarn on the bobbins and thus insure their rising when the extractors are raised. After the extractors are thus charged with the filled bobbins, the crank 17 is operated to slide the bar outwardly away from the spinning-frame. After they are thus adjusted to their outer, discharging position, the discharging is accomplished by a simple device which simultaneously tilts outwardly all the tripping-fingers 24. This tripping means consists of a crank 26 formed by bending a rock-shaft 27 whose ends are journaled in the frame 11, one end of this rock-shaft being provided with a crank-handle 28 for convenience in manipulation. When the lower end of the crank-handle 28 is swung outwardly, the bail 26 is swung downwardly over the fingers 24 and tilts them outwardly, thus releasing the filled bobbins and permitting them to drop simultaneously into a suitable receptacle, not shown. The slidable connection between the ends of the bar 18 and the lower member of the frame 11 is obtained by channel-irons 29, one at each side of the frame. These channel-irons slidingly embrace the lower member of the frame 11, and the ends of the bars 18 extend through holes in the upstanding flanges of the channel-irons, thus locking the bar 18 slidably to the lower member of the frame 11. Shaft 27 has its bearings in this channel-iron 29, so that it partakes of the sliding movement of the bar 18, thus insuring the tripping bail 26 always to be in proper position for tripping action.

The mechanism for placing empty bobbins on the spindles 14 is mounted on the frame 11. It consists of a hopper 30 for each one of the spindles, each hopper consisting of a vertical open tube 31 having downwardly-inclined guideways 32, the lower one of these guideways being provided with a

downwardly-inclined bottom 33 on which the butt ends of the empty bobbins rest. The bobbins gravitate into the tube 31 down the inclined bottom 33, the bobbins being maintained by the guides 32 in vertical position. The bobbins are held up in the tubes by a common gate-bar 34 hinged in front of the tubes 31 and adapted to swing rearwardly and upwardly to close the lower ends of the tubes, the bobbins in the tubes resting upon this gate 34. This gate is swung to open position, to permit the bobbins to simultaneously fall down onto the spindles 14 by means of a shaft 35 operated by a hand-crank 36, the shaft 35 being connected to the gate by an arm 37 affixed to said shaft 35 and a link 38 connecting the outer end of the arm 37 to the gate, this latter connection being virtually a universal joint. With this arrangement, it will be seen that the gate 34 may be readily opened and closed.

The shaft 35 is utilized to operate a separator for the magazines, i. e., a device for separating from the plurality of bobbins in the magazines a single bobbin in each magazine that is to be dropped onto the spindle. This mechanism consists of a slidable bar 39 suitably mounted in the frame 11 and connected to the shaft 35 by means of an arm 40 affixed to said shaft. The bar 39 carries, for each magazine, a stop or separating finger 41 which, when the gate 34 is moved into open position to drop the bobbins, enters holes 42 in the sides of the hoppers and extends in between the first bobbin and the second bobbin and thus serves as a stop to prevent more than one bobbin from falling out at a time. In using the foregoing appliance for depositing the empty bobbins on the spindles, the frame 11 is first shifted to a point with the gate 34 just over the top ends of the spindles; then the shaft 35 is actuated to bring the separating fingers 41 into action and at the same time open the gate 34; this allows the bobbins to drop simultaneously onto the spindles. After the bobbins are thus deposited on the spindles, the gate 34 is closed and then the frame 11 is lowered until the gate 34 strikes lightly against the empty bobbins, thereby insuring the bobbins being jammed on the spindles with sufficient tightness to insure rotation with the spindles.

Instead of the multiple magazines for the empty bobbins, we may use a single magazine tube for each of the spindles, as shown in Fig. 6. In this construction, it will of course be unnecessary to use the separating-fingers 41, as there will be but one bobbin in each tube.

What we claim as new is:

1. In a machine of the class set forth, a vertically-movable frame mounted on the spinning-frame, a series of magazines on said frame each adapted to hold a plurality of bobbins, a common gate for the lower ends of said magazines, a separating-finger for each magazine, and means on said frame whereby the separating-fingers are put into action and said gate simultaneously opened, for the purpose set forth.

2. In combination with a spinning-frame, a frame slidably mounted thereon, a filled bobbin removing means mounted on said slidable frame and embodying filled-bobbin extractors, a horizontally-slidable frame supporting said extractors, and means for shifting this frame toward and from the spinning-frame, for the purpose set forth.

3. In combination with a spinning-frame, a frame slidably mounted thereon, a filled-bobbin removing means mounted on said slidable frame and embodying filled-bobbin extractors, a horizontally-slidable frame supporting said extractors, means for shifting this frame toward and from the spinning-frame, and a device mounted to slide with the extractors for releasing the extracted bobbins.

4. In a doffing apparatus of the class set forth, a frame vertically movable in a plane adjacent the spindles, magazines on said frame adapted to carry empty bobbins, a common gate for said magazines, this gate being pivotally mounted on an axis at one side of the lower ends of the magazines and adapted to swing upwardly toward the lower ends thereof to serve as a rest for the bobbins, a slidable bar mounted in said frame and provided with a series of bobbin separating-fingers adapted to enter the several magazines, and mechanism for simultaneously sliding said bar and operating said gate, for the purpose set forth.

In testimony whereof we hereunto affix our signatures this 31st day of July, 1925.

ALISTER E. SMITH.
CLYDE C. SMITH.
JESSE A. LANDS.