Oct. 7, 1952 CARL-OTTO CHRISTIANSON 2,612,744

DEVICE FOR CHANGING BOBBINS IN SPINNING MACHINES

Filed Dec. 12, 1950 3 Sheets-Sheet 1

FIG. 2

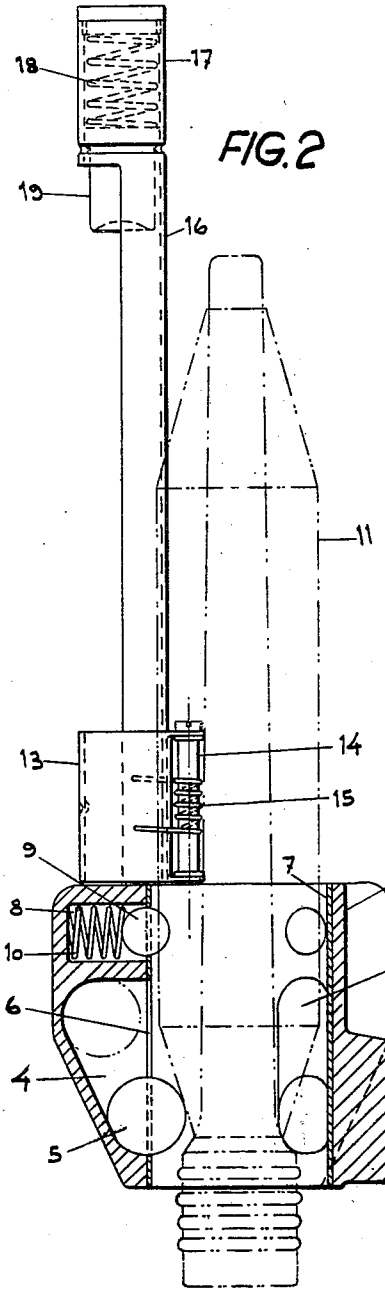
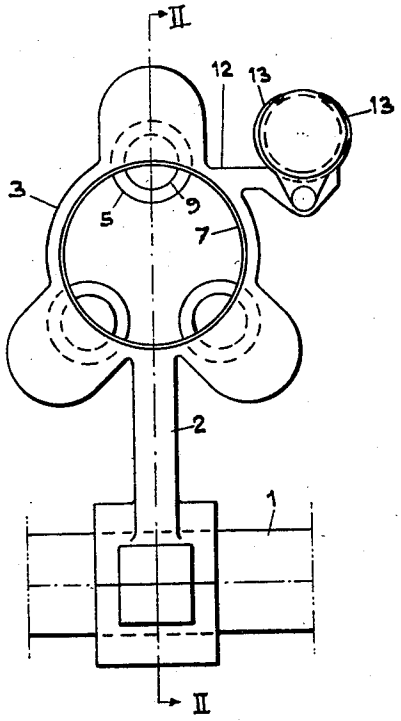


FIG. 1



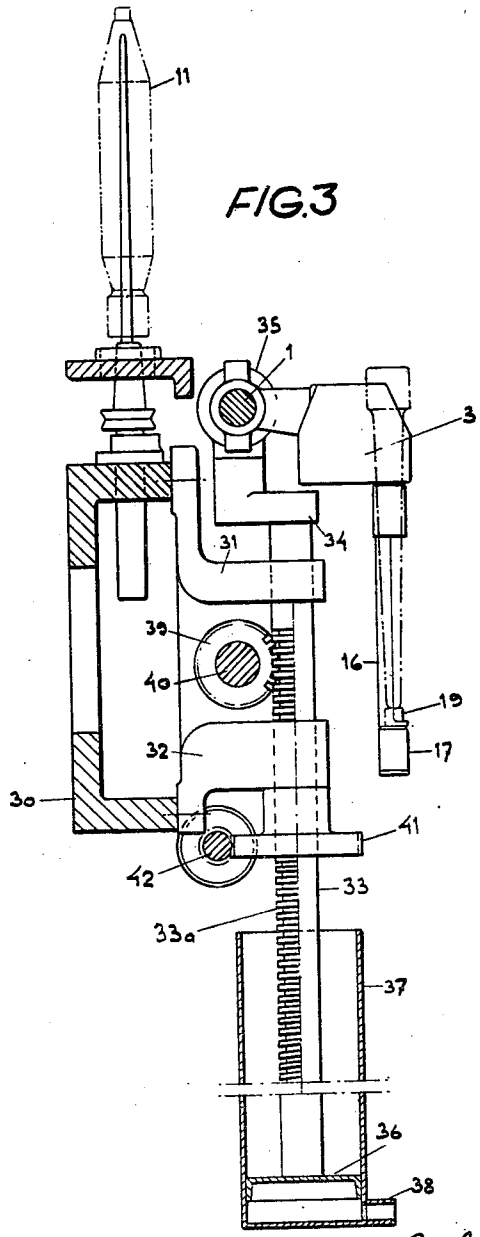
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DEVICE FOR CHANGING BOBBINS IN SPINNING MACHINES

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FIG.3



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DEVICE FOR CHANGING BOBBINS IN SPINNING MACHINES

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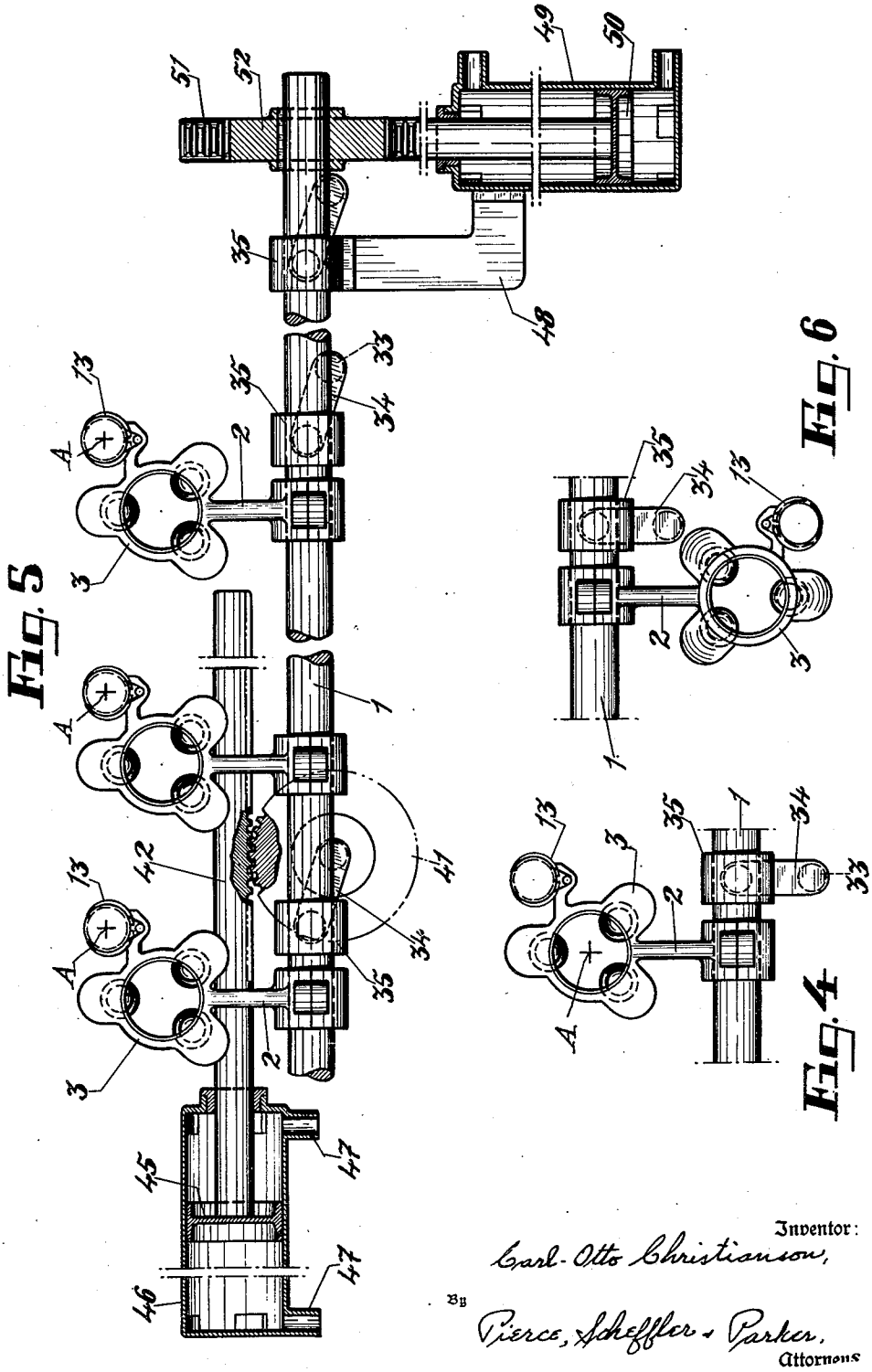


Fig. 5

Fig. 6

Fig. 4

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DEVICE FOR CHANGING BOBBINS IN SPINNING MACHINES

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The change of bobbins in spinning machines is usually effected manually and is rather time-wasting and laborious due to the fact that the bobbins often adhere relatively firmly to the spindles. In order to reduce as far as possible the periods of interruptions in the operation of the machine, a relatively large staff of workmen is required. Efforts have been made, therefore, to provide mechanical devices for the bobbin change, but such devices have proved to be rather complicated and not entirely satisfactory and not suitable for practical service.

It is the object of this invention to provide a bobbin changing device which is simple in construction and highly reliable in operation and which prevents damage of the yarn on the full bobbins during the removal thereof.

I attain this object by mechanism illustrated in the accompanying drawings in which:

Fig. 1 is a plan view of a device according to the invention for lifting full bobbins and creeling empty bobbins; Fig. 2 is a sectional view along the line II—II, Fig. 1; Fig. 3 is a sectional view of a fly frame of a spinning machine having a bobbin changing device according to the invention; and Fig. 4 is a fragmentary plan view showing one bobbin changing device in position to pick up a filled bobbin; Fig. 5 is a fragmentary plan view, with some parts in section, of the bobbin changing apparatus as adjusted to place empty bobbins on the spindles; and Fig. 6 is a fragmentary plan view showing one bobbin changing device in idle position.

Referring to Figs. 1 and 2, numeral 1 denotes a beam or shaft which extends along the fly frame of a spinning machine. For each spindle, the beam 1 carries a bracket 2 which at its free end merges into a sleeve 3. As will be seen from Fig. 2, recesses 4 are provided inside the sleeve 3, the depth or width of the recesses decreasing downwardly. In the recesses 4 there are provided balls or rollers 5. In order to prevent the balls from leaving the recesses, a tube 7 having slots 6 is inserted in the sleeve. The widths of the slots are smaller than the diameters of the balls.

Above the recesses 4, the sleeve has further recesses 8 in which there are provided balls 9 which partly project through openings in the tube 7. The balls 9 are subject to the pressure of helical springs 10 which maintain the balls in engagement with the edges of said openings.

In Fig. 2, the chain-dotted lines indicate a full bobbin over which the sleeve 3 has been moved downwardly. It will be evident that during the downward movement of the sleeve the balls 5 will

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be moved upwards in the recesses 4 so as not to prevent the downward movement of the sleeve. When the sleeve 3 has reached the position shown in Fig. 2, the balls 5 will fall down below the yarn, and when the sleeve 3 is lifted, the bobbin 11 will also be lifted and removed from its spindle.

The balls 5 prevent the lifted bobbin 11 from falling down through the sleeve 3 only if the sleeve is in the position shown in Fig. 2. As will be apparent from the following description, the sleeve 3 will during the exchange of bobbins take other positions than that shown in Fig. 2. In order to prevent unintentional removal of the bobbins 11, the above named spring-actuated balls 9 are provided which engage the yarn at a moderate pressure.

An arm 12 projecting from the sleeve 3 carries a holder for empty bobbins. Said holder comprises a clamping device having two substantially semi-circular legs 13 which are pivotally mounted at 14 and acted upon by a spring 15 which tends to move the legs towards each other. The legs 13 surround a post 16 having a substantially semi-circular cross-section. At its upper end, the post carries a head 17 in which there is provided a spring 18 acting upon a stud 19 which is movable in vertical direction and the lower face of which, as viewed in Fig. 2, is slightly concave. The legs 13 have the purpose of grasping the empty bobbin the top of which abuts against the stud 19. During the mounting of the bobbin on the spindle to be described later on, the spring 18 limits and to a certain extent determines the pressure at which the bobbin is forced downwards against its seat on the spindle.

Fig. 3 is a sectional view of a fly frame for a spinning machine provided with a bobbin changing device constructed in accordance with the invention. The fly frame 30 has secured thereto brackets 31 and 32 serving as guide members for a rotatable shaft 33 which is also movable in vertical direction. At its upper end, the shaft 33 has mounted thereon a crank-like link 34 which at its free end carries the above named beam 1 by means of a bearing 35 which is pivotally connected with the link 34. A plurality of shafts 33 are provided along the machine, and at least one of these shafts is adapted to be actuated by a lifting device which in Fig. 3 is represented by a piston 36 connected to the lower end of the shaft 33 and slidable in a cylinder 37 having at its lower end a connection 38 for the supply of a fluid under pressure, such as oil. If fluid is supplied to the cylinder, the shaft 33 will be lifted so as to lift the beam 1 to such a level that the

sleeves 3 which in Fig. 3 are shown in swung out positions, may be swung inwards above the upper ends of the bobbins 11.

In order to secure a uniform lifting movement of the comparatively long beam 1, the shafts 33 are, at least along part of their lengths, provided with teeth 33a for engagement with gear wheels 39 fixed to a shaft 40 extending along the machine. In this way, a uniform lifting movement of the beam 1 is secured.

Below the bracket 32, there is rotatably mounted a gear wheel 41 which is not rotatable relative to the shaft 33, but permits the shaft of being axially displaced. The gear wheel 41 engages a rack 42 which extends along the machine and is displaced in opposite directions by a double-acting piston 45 slidable in a cylinder 46 having connections 47 for the supply of pressure fluid in known manner, see Fig. 5. By displacing the rack 42, the gear wheel 41 and the shaft 33 can be turned so as to swing the links 34 and to move the beam 1 in a horizontal plane.

A bracket 48 is secured to a bearing 35 near one end of the beam 1, see Fig. 5, and supports a cylinder 49 for a double-acting piston 50. The piston rod is provided with a rack 51 in mesh with a gear wheel 52 keyed on the beam 1, the arrangement being such that an actuation of the piston 50 rotates the beam 1 through an angle of substantially 180° between two end positions. One of these positions, the idle position, is illustrated in Fig. 3 in which the sleeve 3 and the holder 13—19 for empty bobbins are located upside down as compared with the operative position shown in Fig. 2 which is obtained by swinging the beam 1 through an angle of 180° in an anti-clockwise direction as viewed in Fig. 3.

The mode of operation will now be described, reference being also had to Figs. 4 to 6. If it be assumed that the bobbins of the machine are full and empty bobbins are mounted on the holders 13 to 19 in the manner indicated in Fig. 3, fluid under pressure is supplied to the cylinder 37. As a result thereof, the beam 1 is lifted to a position slightly above the tops of the bobbins 11. Then the beam 1 is swung in a counterclockwise direction through an angle of 180° by the piston 50, the sleeves 3 then being coaxial with respect to their appertaining spindles. This position is indicated in Fig. 4 in which the axis of the spindle is diagrammatically represented by a cross A. If then the fluid under pressure is discharged from the cylinder 37, the parts will slide downwards by their own weight, the sleeves 3 being moved down over the bobbins 11 so as finally to take the position shown in Fig. 2. Thereupon, fluid under pressure is again supplied into the cylinder 37. As a result thereof, the beam 1 will be lifted and the bobbins removed from the spindles. When the lower edge of the bobbins has moved above the tops of the spindles, the rack 42 is actuated so as to swing the links 34 from the position shown in Fig. 4 into the position illustrated in Fig. 5, that is, through an angle of somewhat less than 90°. In this position, each holder 13 to 19 is coaxial with respect to its spindle. If now the beam 1 is lowered, the empty bobbins will be put onto the spindles. The downward movement of the beam 1 is limited in a manner such that the spring 18 in the head 17 of the holder is compressed merely to a certain extent so as to prevent any of the bobbins from being forced too firmly onto the spindles.

If the links 34 are swung in a counterclockwise direction from the position shown in Fig. 5 after the bobbins have been forced down on the spindles, the beam 1 will move substantially at right angles to its axis. As a result thereof, the bobbins will force the legs 13 apart and slide out of engagement therewith. The exchange of bobbins is thus completed, and the beam 1 can be turned back into the position shown in Fig. 3. After the links 34 have been swung back, the sleeve and the holder will be in the positions indicated in Fig. 6. Thereupon, the sleeves 3 can be emptied by forcing the bobbins downwards either manually or automatically, and the bobbins may be collected in a carriage running along the machine, and empty bobbins may be mounted on the holders so as to be ready for the next changing operation.

It will be obvious that the details of construction may be modified within the scope of the appending claims.

What I claim is:

1. A device for changing bobbins on the spindles of spinning machines, comprising a sleeve, locking means in said sleeve, and means lifting and lowering said sleeve to telescope the same over a full bobbin on a spindle, said locking means being rolling elements constituting a one-way clutch constructed and arranged to permit said sleeve being moved downward over a full bobbin and to engage the winding on the bobbin upon upward movement of the sleeve to lift said full bobbin from its spindle during upward movement of the sleeve.

2. A device for changing bobbins on the spindles of spinning machines, comprising a sleeve having inner axial tapering recesses, balls in said recesses, and means lifting and lowering said sleeve to telescope the same over a full bobbin on a spindle, said balls being arranged in said recesses to permit said sleeve being moved downward over a full bobbin and to engage the winding on said bobbin upon upward movement of the sleeve to lift said bobbin from its spindle during upward movement of the sleeve.

3. A device for changing bobbins on the spindles of spinning machines, comprising a sleeve having inner axial tapering recesses, balls in said recesses, said recesses having edges retaining said balls in the recesses, and means lifting and lowering said sleeve to telescope the same over a full bobbin on a spindle, said balls being arranged in said recesses to permit said sleeve being moved downward over a full bobbin and to engage the winding on said bobbin upon upward movement of the sleeve to lift said bobbin from its spindle during upward movement of the sleeve.

4. A device for changing bobbins on the spindles of spinning machines, comprising a bracket carrying a sleeve and a holder for an empty bobbin, said sleeve having inner axial tapering recesses, balls in said recesses, a tube in said sleeve, said tube having axial slots narrower than the diameter of said balls, means lifting and lowering said bracket to telescope said sleeve or alternatively said bobbin holder over a spindle and means for moving said bracket to position said sleeve or alternatively said bobbin holder above and in axial alinement with a spindle, said balls being arranged in said recesses to permit said sleeve being moved downward over a full bobbin and to engage the winding on said bobbin upon upward movement of the sleeve to lift said bobbin from its spindle during upward movement of the sleeve, said holder including bobbin-gripping means yieldable upon lateral movement of said bracket

after lowering thereof to place an empty bobbin on the spindle to release the bobbin.

5. A device for changing bobbins on the spindles of spinning machines, comprising a sleeve having inner axial tapering recesses, balls in said recesses, resilient means projecting inwardly in said sleeve for frictional engagement with a full bobbin surrounded by said sleeve, and means lifting and lowering said sleeve to telescope the same over a full bobbin on a spindle, said balls being arranged in said recesses to permit said sleeve being moved downward over a full bobbin and to engage the winding on said bobbin upon upward movement of the sleeve to lift said bobbin from its spindle during upward movement of the sleeve.

6. A device for changing bobbins on the spindles of a spinning machine, comprising a beam extending along said machine, means for lifting and lowering said beam, a number of sleeves connected with said beam for telescoping movement thereby over full bobbins on spindles, locking means in each sleeve, said locking means being constructed and arranged to permit said sleeves being moved downward over full bobbins and to engage the windings on said bobbins upon upward movements of the sleeves to lift said full bobbins from their spindles during the upward movement of the sleeves, a number of holders for empty bobbins, said holders being connected with said beam, and means for moving said beam to telescope said holders over said spindles and to lift the same therefrom thereby to place empty bobbins on said spindles.

7. A device for changing bobbins on the spindles of a spinning machine, comprising a beam extending along said machine, means for lifting and lowering said beam, a number of sleeves connected with said beam for telescoping movement thereby over full bobbins on spindles, locking means in each sleeve, said locking means being constructed and arranged to permit said sleeves being moved downward over full bobbins and to engage the windings on said bobbins upon upward movements of the sleeves to lift said full bobbins from their spindles during the upward movement of the sleeves, a number of holders for empty bobbins, said holders being rigidly connected with said sleeves and movable together therewith, and means for moving said beam to telescope said holders over said spindles and to lift the same therefrom thereby to place empty bobbins on said spindles.

8. A device for changing bobbins on the spindles of a spinning machine, comprising a beam extending along said machine, means for lifting and lowering said beam, a number of sleeves connected with said beam for telescoping movement thereby over full bobbins on spindles, locking means in each sleeve, said locking means being constructed and arranged to permit said sleeves being moved downward over full bobbins and to engage the windings on said bobbins upon upward movements of the sleeves to lift said full bobbins from their spindles during the upward movement of the sleeves, a number of holders for empty bobbins, said holders being connected with said beam and arranged to maintain empty bobbins in positions parallel to the axes of said sleeves, and means for moving said beam to telescope said holders over said spindles and to lift the same therefrom, thereby to place empty bobbins on said spindles.

9. A device for changing bobbins on the spindles of a spinning machine, comprising a beam

extending along said machine, means for lifting and lowering said beam, a number of sleeves connected with said beam for telescoping movement thereby over full bobbins on spindles, locking means in each sleeve, said locking means being constructed and arranged to permit said sleeves being moved downward over full bobbins and to engage the windings on said bobbins upon upward movements of the sleeves to lift said full bobbins from their spindles during the upward movement of the sleeves, a number of holders for empty bobbins, each holder comprising a resilient clamping member for an empty bobbin, and means for moving said beam, sleeves and holders at right angles to the axes of said spindles to position said sleeves or alternatively said holders above and in axial alinement with said spindles.

10. A device for changing bobbins on the spindles of a spinning machine, comprising a beam extending along said machine, means for lifting and lowering said beam, a number of sleeves connected with said beam for telescoping movement thereby over full bobbins on spindles, locking means in each sleeve, said locking means being constructed and arranged to permit said sleeves being moved downward over full bobbins and to engage the windings on said bobbins upon upward movements of the sleeves to lift said full bobbins from their spindles during the upward movement of the sleeves, a number of holders for empty bobbins, said holders being connected with said beam, each holder comprising a resilient clamping member for an empty bobbin, and means for moving said beam towards and away from said spindles.

11. A device for changing bobbins on the spindles of a spinning machine, comprising a beam extending along said machine, means for lifting and lowering said beam, a number of sleeves connected with said beam for telescoping movement thereby over full bobbins on spindles, locking means in each sleeve, said locking means being constructed and arranged to permit said sleeves being moved downward over full bobbins and to engage the windings on said bobbins upon upward movements of the sleeves to lift said full bobbins from their spindles during the upward movement of the sleeves, a number of holders for empty bobbins, said holders being connected with said beam, each holder comprising a resilient clamping member for an empty bobbin, and means for moving said beam longitudinally of its axis and towards and away from spindles.

12. A device for changing bobbins on the spindles of a spinning machine, comprising a beam extending along said machine, means for lifting and lowering said beam, a number of sleeve connected with said beam for telescoping movement thereby over full bobbins on spindles, locking means in each sleeve, said locking means being constructed and arranged to permit said sleeves being moved downward over full bobbins and to engage the windings on said bobbins upon upward movements of the sleeves to lift said full bobbins from their spindles during the upward movement of the sleeves, a number of holders for empty bobbins, said holders being connected with said beam, each holder comprising a resilient clamping member for an empty bobbin, means for turning said beam about its axis, and means for moving said beam longitudinally of its axis and towards and away from said spindles.

13. A device for changing bobbins on the spindles of a spinning machine, comprising a beam

extending along said machine, a number of sleeves located parallel to each other and connected with said beam, locking means in each sleeve, a number of holders for empty bobbins, said holders being parallel to said sleeves and connected to said beam, means for moving said beam so as to place said sleeves above and coaxial to full bobbins on said spindles, means for lowering said beam so as to move said sleeves downward over said full bobbins, means for lifting said beam, said locking means being constructed and arranged to permit said sleeves being moved downward over said full bobbins and to remove said full bobbins from the spindles during said lifting

movement of the beam, means for moving said beam so as to put empty bobbins from said holders onto said spindles, and means for moving said beam, sleeves and holders into inoperative positions.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
755,450	Carey	Mar. 22, 1904