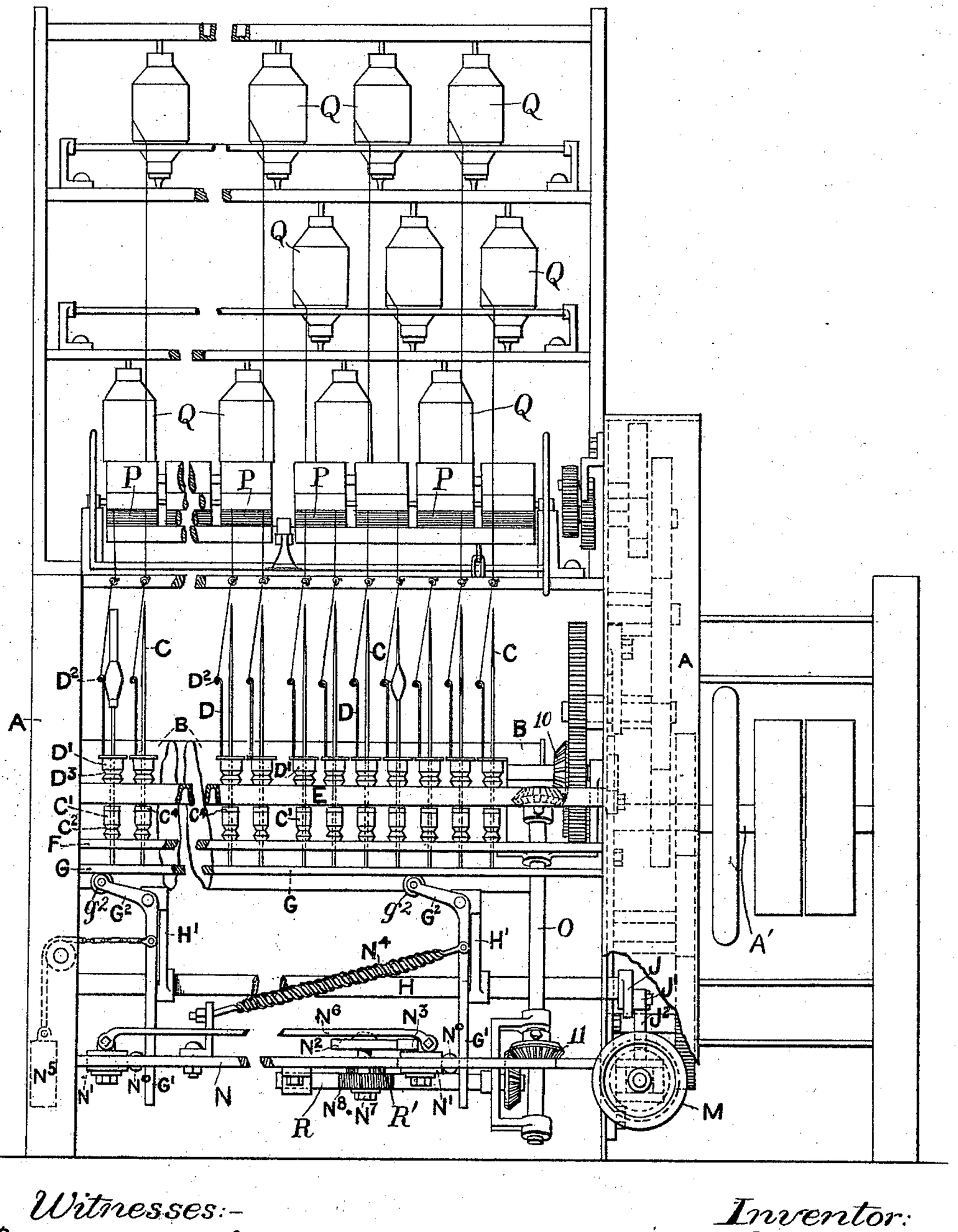
(No Model.) 3 Sheets—Sheet 1.

J. BRINDLE.

SPINNING FRAME.

No. 545,844. Patented Sept. 3, 1895.

FIG. 1.



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(No Model.) 3 Sheets—Sheet 2.

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FIG. 2.

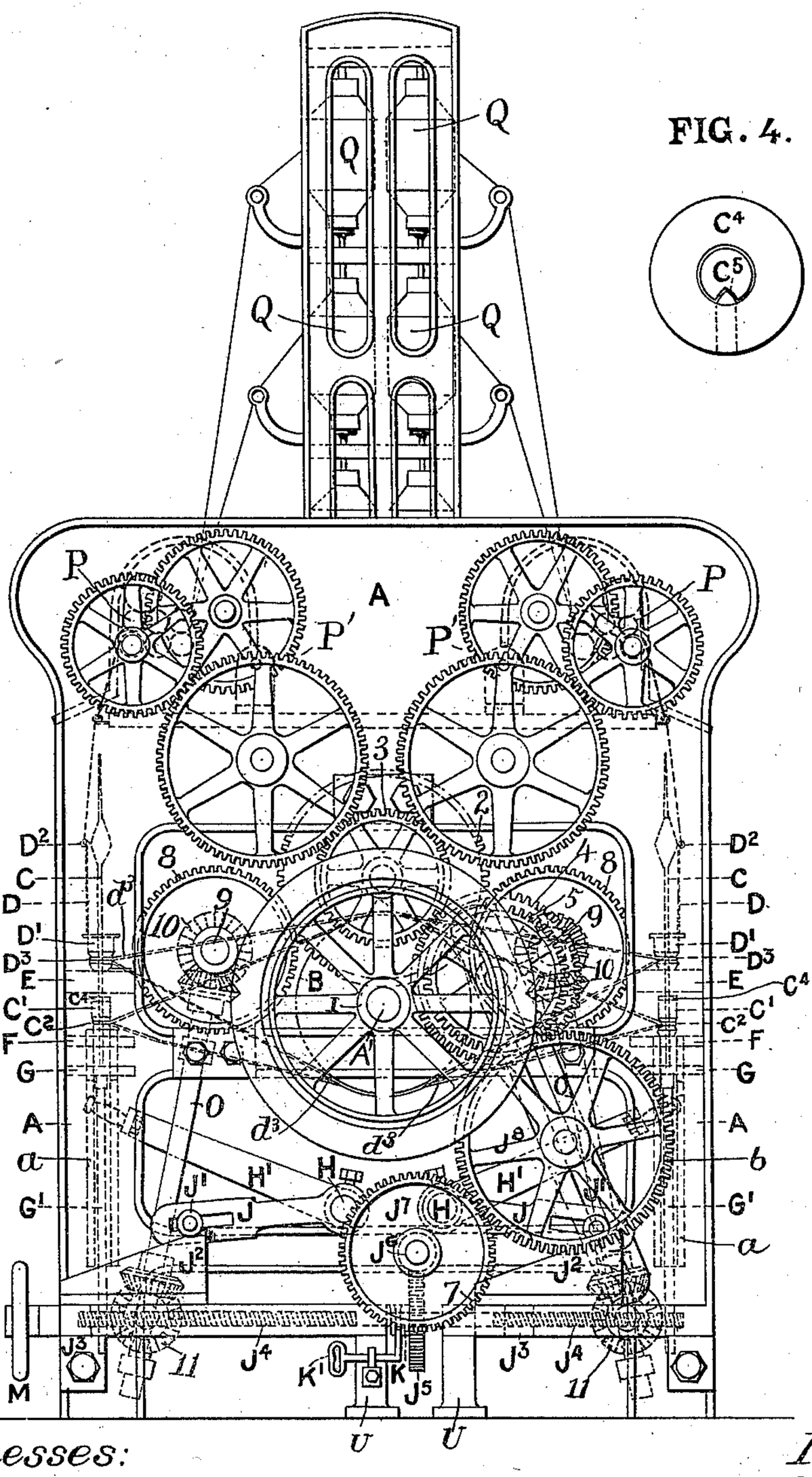
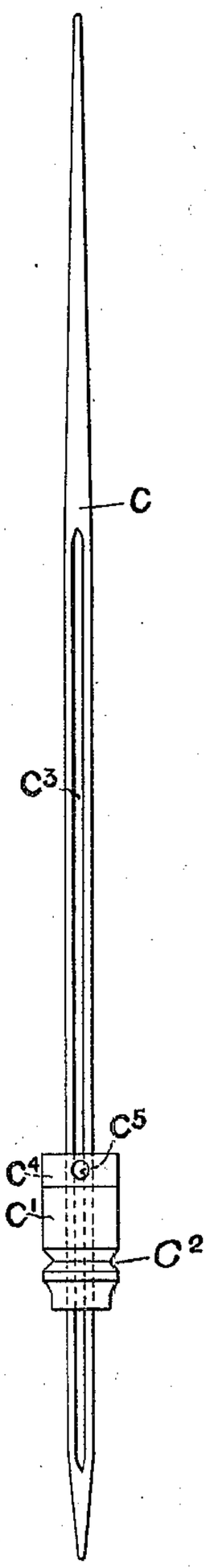


FIG. 3.

FIG. 4.



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(No Model.)

3 Sheets—Sheet 3.

J. BRINDLE.

SPINNING FRAME.

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FIG. 5.

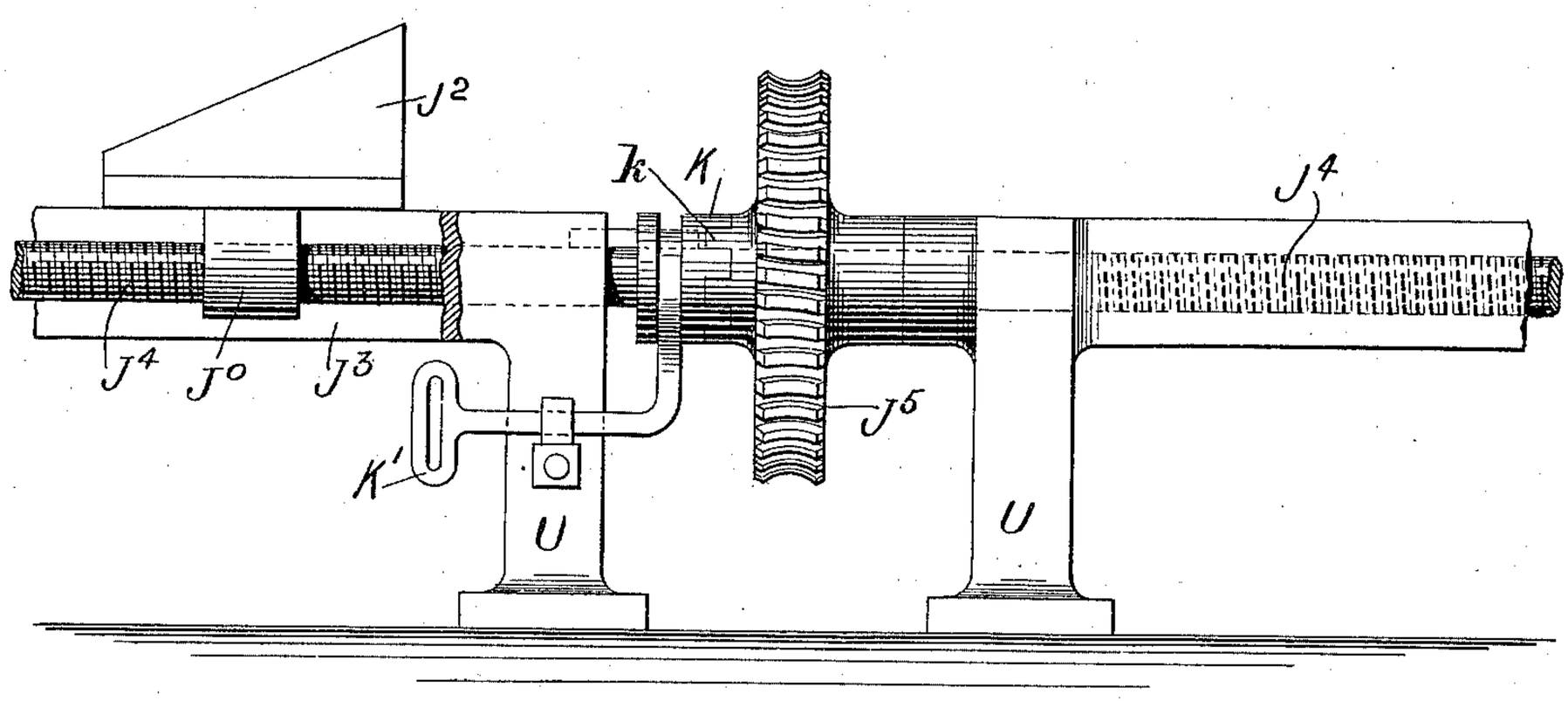

FIG. 6.

FIG. 7.

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UNITED STATES PATENT OFFICE.

JOSEPH BRINDLE, OF FAILSWORTH, ASSIGNOR OF TWO-THIRDS TO JOHN TAYLOR AND RICHARD LOVETT READE, OF SALE, ENGLAND.

SPINNING-FRAME.

SPECIFICATION forming part of Letters Patent No. 545,844, dated September 3, 1895.

Application filed May 22, 1893. Serial No. 475,153. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH BRINDLE, a subject of the Queen of Great Britain, residing at Failsworth, in the county of Lancashire, England, have invented certain new and useful Improvements in Spinning-Frames; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in twisting or spinning machines, and to the construction of the twisting-fliers and spindles, and has for its object to provide means for driving the spindles and fliers and for raising and lowering the same to build up a cop thereon.

Reference is had to the accompanying drawings, in which like letters and numerals of reference denote corresponding parts in the several views.

Figure 1 represents a front elevation of a spinning-machine constructed in acccordance with my invention. Fig. 2 represents an end elevation of the same. Fig. 3 represents a detail view, on an enlarged scale, of one of the winding-spindles. Fig. 4 represents an end view of the same. Fig. 5 represents a detail view of the clutch and screw mechanism for raising and lowering the spindles, and Figs. 6 and 7 illustrate a modified form of spindle.

A A designates the frame of a spinning-machine of the Throstle type. A′ is the main shaft journaled in the said frame and carrying at one end fast and loose pulleys to receive motion from any suitable source of power, and B designates the winding-drum keyed upon the said shaft A′. A bar E extends across the front of the frame and is provided with bearings in which are journaled the flier-pulleys D′ each provided with an annular groove D^3, in which runs a band or cord d^3 from the winding-drums B to impart rotary motion to the said flier-pulleys. These flier-pulleys are bored out axially to allow the spindles C to pass through, and the bar E is also bored through in line with the holes through the pulleys. A bar F is secured a short distance below the bar E and also provided with a series of holes corresponding with and in line below the holes in the said bar E. The copping-rail G is arranged below the bar F to move vertically in the guides *a* in the end of the frame A, and is supported upon rollers g^2, journaled in the upper ends of the bell-crank levers G^2, supported as will be hereinafter described. The copping-rail G is provided with a series of bearings directly in vertical line with the holes through the bars E and F. The spindles C pass through the flier-pulleys D′, the bar E, the spindle-pulleys C′, the bar F, and are journaled at their lower ends in the bearings in the copping-rail G. The spindle-pulleys C′ are provided with grooves C^2, in which run bands or cords from the winding-drum B to impart rotary motion to the said pulleys, and these pulleys are mounted loosely upon the spindles C between the bars E and F, being journaled in the latter. The spindles C, as shown in Fig. 3, are slotted longitudinally, as at C^3, and provided with a loose collar C^4, which is free to slide longitudinally thereon, but held from rotation by the pin C^5, which passes through the said collar and the slot in the spindle. When the spindles are in their operative position, as shown in Fig. 1, the collars C^4 will rest upon the top of the pulleys C′ and receive rotary motion by frictional contact therewith and thus rotate the spindles. The collars C^4 may be weighted, in order to increase the friction, or they may be pressed in contact with the pulleys by means of a spring if desired. If found necessary in practice the abutting surfaces of the pulleys C′ and the collars C^4 may be covered with leather or other suitable material to increase the friction, the object being to give the proper "drag" or "slip" to the rotary motion of the spindles. A set of spindles, fliers, and operating mechanism is provided for each side of the machine, and both sets are operated from the same winding-drum B.

In the ends of the frame A below the drum B are journaled two rock-shafts H, each having two arms H′, the arms from one of the said rock-shafts extending toward the front and the arms from the other extending toward the back of the machine. The bell-crank levers G^2 are pivoted on the ends of the arms H′, and

the upper arms of the said levers are provided with rollers g^2, upon which the copping-rails G and the sets of spindles carried thereby are supported. The lower arms of the bell-crank G^2 extend down through slots in the cross-rail N and bear against rollers N° carried by carriages N'. These carriages are mounted so as to slide on the rail N and connected together by the rod N^6, so as to act simultaneously on the lower arms G' of the bell-crank levers G^2. The helical spring N^4 and pendent weight N^5 hold the lower arms G' of the bell-crank levers G^2 against the rollers N° of the carriages N' and keep the roller N^3 mounted on the right-hand carriage against the rotary peripheral cam N^2, mounted in bearings on the rail N, and also hold the rollers g^2 of the bell-crank levers G^2 against the copping-rail G to support it and its set of spindles in their elevated position. It will be seen that according to the cut of the rotating cam the carriage N^2 will be forced toward the right hand of the frame, thereby lowering the copping-rail, and then carried back toward the left hand by the spring and weight, and that independently of the falling movement given to the copping-rail G by the arm H' carrying the bell-crank levers. This falling motion of the arm H' is obtained in the following manner: Outside the side frame is a screw J^4, mounted in bearings between two transverse bars or rails J^3 carried by brackets from the framing and short side boards or feet U. Upon these rails are fitted to slide the two inclined plates J^2, having nuts J°, which take into the threads of the screw J^4, and upon these plates bear rollers J', carried by arms J, keyed to the outer ends of the rock-shaft H. The outer end of the screw J^4 carries a hand-wheel M, by which it can be turned to adjust the position of the inclined plates J^2 and raise the copping-rail and spindles previous to starting the spinning action of the frame. Centrally between the feet or standards supporting the screw J^4 is mounted a worm-wheel J^5 for automatically operating the screw and through the sliding plates J^2 raising the copping-rail and spindles.

Rotary motion is communicated from the main shaft A' by a spur-pinion I to the spur-wheel 2, carried on a stud-axle from a bracket bolted on the frame. Secured to this wheel is another spur-wheel 3, gearing with the spur-wheel 4, which carries the wheel 5, meshing with the idle-wheel 6, which is in gear with the spur-wheel 7. On the axle of this wheel 7 is a worm, gearing with the worm-wheel J^5, mounted loosely on the screw J^4 and coupled thereto when required by the sliding clutch K. (Shown on an enlarged scale in Fig. 5.) This clutch K is fitted to the screw by a tongue-and-groove connection and thrown into and drawn out of gear with clutch-teeth *k*, formed on the boss of the worm-wheel by means of the forked disengaging-rod K', carried on one of the standards. The plates J^2 having been previously adjusted, so as to bring their highest part under the rollers J', in the manner described, the clutch K is then pushed into gear with the worm-wheel by the handle K'. Motion will be transmitted to the screw J^4, and the sliding plates J^2 will be gradually drawn from under the rollers of arms J, rocking the shaft H gradually and lowering the arms H', supporting the coupling-rail.

Motion is transmitted from the main shaft A' indirectly through the spur-wheels 2 to the spur-wheels 8, keyed on the shafts 9, and motion is transmitted from the shafts 9 to the inclined shafts O by miter-wheels 10, and from the lower ends of the inclined shafts O to the horizontal shaft R by other pairs of miter-wheels 11. This shaft R is furnished with a worm adapted to engage a worm-wheel N^8 on the lower end of the axle of the peripherical cam N^2, which, during its rotation, transmits through the bell-crank levers G^2 an independent up-and-down motion to the copping-rail, distributing the spun yarn and forming any desired shape of cop, according to the cut of the cam N^2. By this compound rising-and-falling motion of the copping-rail, obtained from the united action of the inclined plates J^2 and the peripherical cam N^2, the winding of the cops on the spindles is commenced at the bottom of the cop, and while the spindles are gradually lowered by the action of the cam-plates J^2, (acting through the rocking-arms J and H' of the rock-shafts H,) the cam N^2 will, by its action on the bell-crank levers G^2 G^2, raise and lower or vibrate the copping-rail G during its gradual fall, so as to distribute the spun yarn as it is wound upon the spindles and built-up cops of any desired shape, which may be varied according to the cut given to the cam N^2, which may be in use at the time.

When the cop has been built up and ready for doffing, the clutch is disengaged from the wheel J^5 by drawing out on the forked lever K by the handle K'. The copping-plates J^2 are then to be set back to their original position by turning the screw J^4 by means of the hand-wheel M, previous to again starting the spinning action, as before mentioned. It will be, perhaps, convenient or necessary in some cases when doffing the cops to adjust the height of the spindles. This can be readily done after the disengagement of the driving-wheels from the screw J by turning the hand-wheel M so as to place the cops and the spindles at a convenient height for doffing.

P P are drawing-rollers of the usual character driven by a train of gear-wheels P from the spur-wheels 3 and supplied with sliver or roving from bobbins Q. When this improved spinning-frame is used for spinning or doubling or for any purpose where the spindle is not required to raise and fall, I use the modified construction of the spindle C, (shown in Figs. 6 and 7,) forming it with a collar or flange C^6, which may be at any convenient or desired height on the spindle, and when in place the collar C^6 will rest upon the

spindle-pulleys C′, so that the spindle will be driven by frictional contact in like manner to the first arrangement.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a spinning machine, the combination of a reciprocating live spindle, a grooved pulley mounted on the said spindle, a collar connected to the spindle and adapted to drive the same through frictional contact with the pulley and a flier standing up vertically from a loosely mounted pulley driven independently of the spindle, and means for rotating the spindles and fliers, substantially as and for the purpose described.

2. In a spinning machine, the combination of the spindles C, pulleys C′, mounted loosely on the said spindles, collars upon said spindles resting upon the said rollers, so as to transmit rotary motion by frictional contact, to the spindles the pulleys carrying fliers mounted loosely on the spindles above the said pulleys C′ to allow of the rotation at high speed of the fliers independently of the spindles, to give the twisting or spinning action to the roving or sliver, substantially as herein described.

3. In a spinning machine, the combination of the spindles C, pulleys C′, mounted loosely on the said spindles, collars upon the said spindles resting upon the said rollers, so as to transmit rotary motion by frictional contact, to the spindles the pulleys carrying fliers mounted loosely on the spindles above the said pulleys C′ to allow of the rotation at high speed of the fliers independently of the spindles, to give the twisting or spinning action to the roving or sliver, and the copping rail G movably mounted in the frame and means for operating the several parts, substantially as described.

4. In a spinning machine, the combination with the fliers and spindles, and copping rail supporting the spindles, of the sliding plates J^2, the rock shafts H, having the arms J and H′, to lower the copping rail, bell crank levers G^2, pivoted to the ends of the arms H′, and bearing on the under side of the copping rail G, spring actuated sliding carriages N′, bearing on a peripherical cam N^2, to give to the bell crank levers the requisite vibrating motion to form the cop during the falling motion of the spindles, and means for operating the several parts, substantially as described.

5. In a spinning machine, the combination with the frame, bars E and F secured in the frame, copping rails G movably mounted in the said frame, spindles C journaled in the said copping rails and passing through the bars E and F, pulleys C′ loosely mounted on the said spindles, collars C^4 slidingly mounted upon the said spindles to rest on the pulleys C′ and receive motion from the latter, and means for rotating the said pulleys, of the rock shafts H having the arms J and H′, bell crank levers pivoted to the ends of the arms H′ and supporting the copping rails G; sliding carriages N′ to move against the lower ends of the bell crank levers, means for holding the bell crank levers against the said sliding carriages, cams N^2 bearing against the rollers on the said sliding carriages to reciprocate the latter and transmit motion through the bell crank levers to the copping rails G, the inclined sliding plates J^2 to raise and lower the arms J and rock the shafts H, to move the copping rails, and means for rotating the cams N^2, and for sliding the plates J^2, substantially as described.

6. In a spinning machine, the combination with the frame, bars E and F secured in the frame, copping rails G movably mounted in the said frame, spindles C journaled in the said copping rails and passing through the bars E and F, pulleys C′ mounted loosely on the said spindles between the bars E and F, collars C^4 slidingly mounted upon the said spindles to rest on the pulleys C′ and receive motion from the latter; pulleys D′ carrying the fliers D, and loosely mounted upon the spindles C above the bars E, and means for rotating the said spindle and flier pulleys; of the rock shafts H having the arms J and H′, bell crank levers pivoted to the end of the arms H′ and supporting the copping rails G; sliding carriages N′ to move against the lower ends of the bell crank levers, means for holding the bell crank levers against the said sliding carriages, cams N^2 bearing against rollers on the said sliding carriages to reciprocate the latter and transmit motion through the bell crank levers to the copping rails G, the inclined sliding plates J^2 to raise and lower the arms J and rock the shafts H, to move the copping rails, and means for rotating the cams N^2, and for sliding the plates J^2, substantially as described.

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