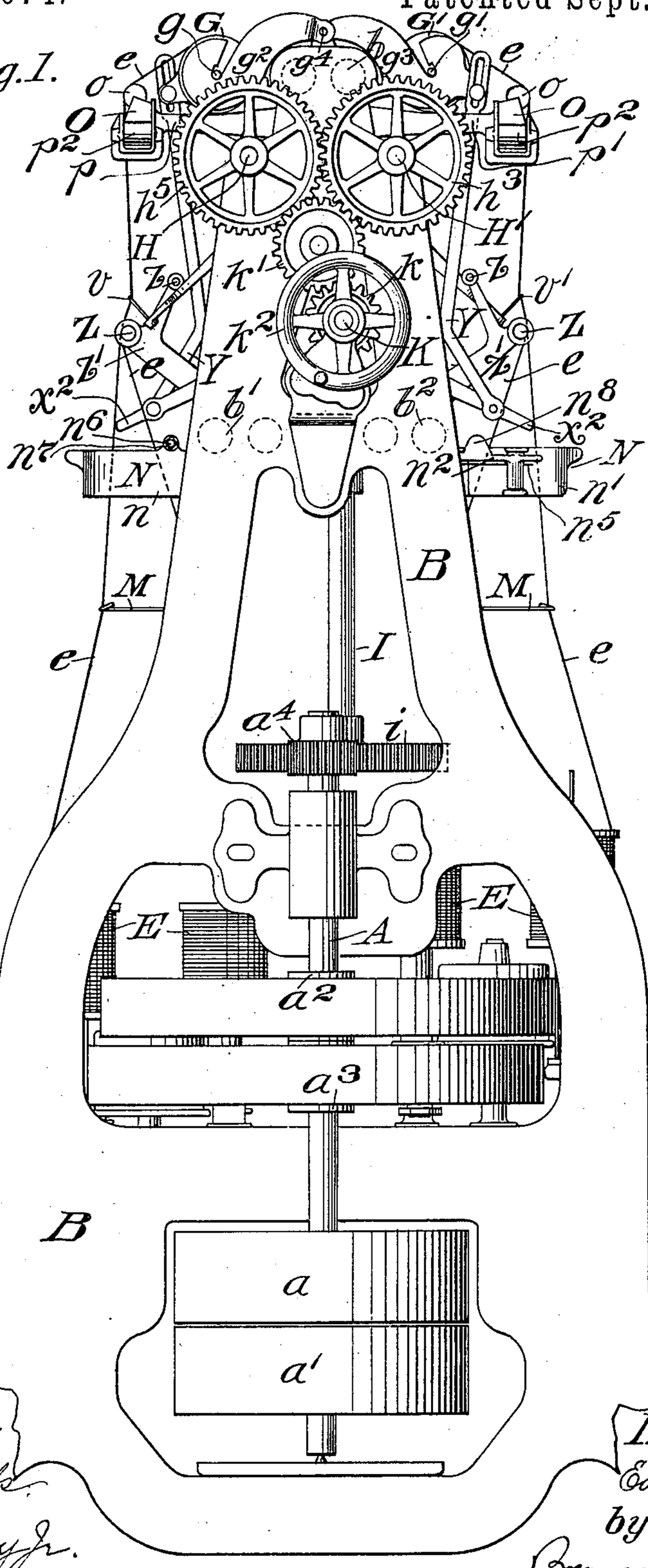
(No Model.) 4 Sheets—Sheet 1.

E. E. BRADLEY.

COMBINED SPINNING AND DOUBLING MACHINE.

No. 567,074. Patented Sept. 1, 1896.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

E. E. BRADLEY.

COMBINED SPINNING AND DOUBLING MACHINE.

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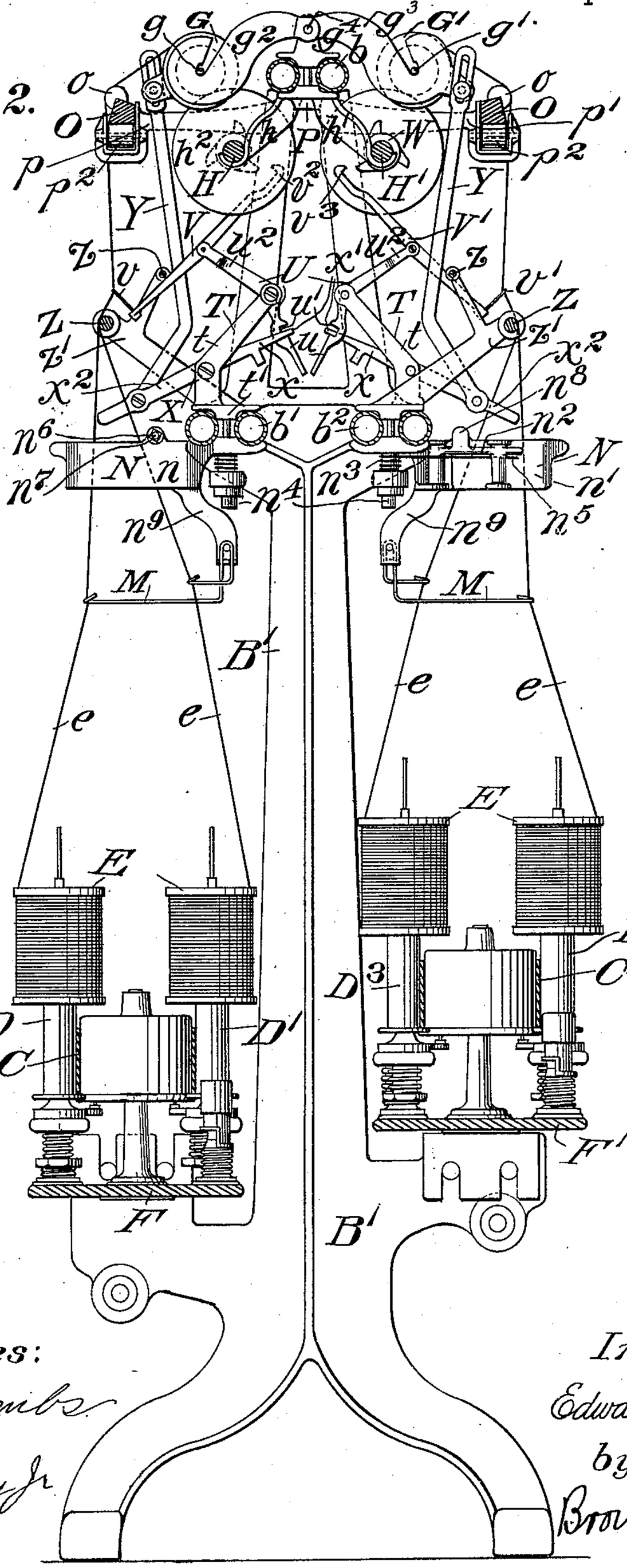
Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

E. E. BRADLEY.

COMBINED SPINNING AND DOUBLING MACHINE.

No. 567,074. Patented Sept. 1, 1896.

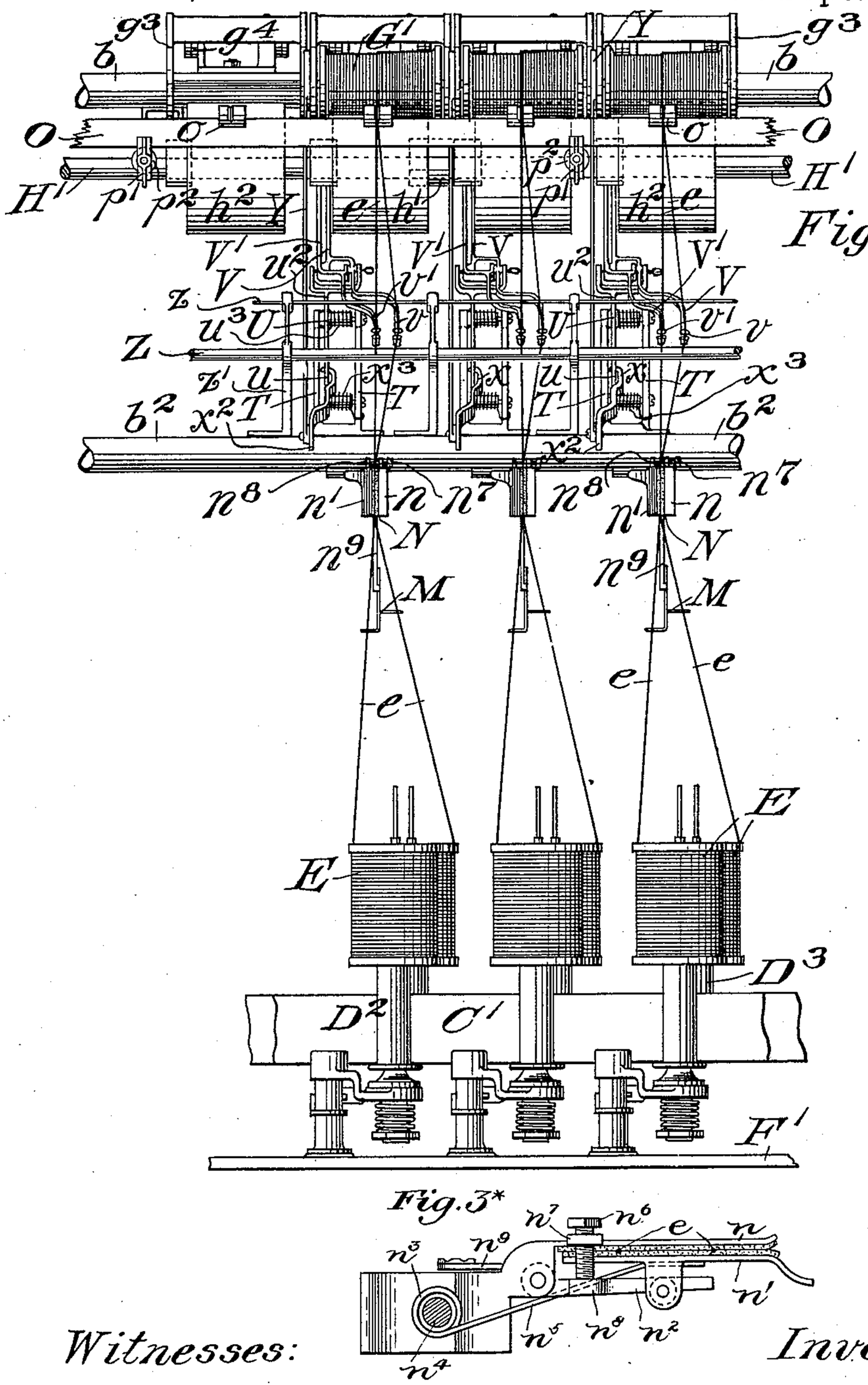

Fig. 3.

Fig. 3*

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(No Model.) 4 Sheets—Sheet 4.

E. E. BRADLEY.

COMBINED SPINNING AND DOUBLING MACHINE.

No. 567,074. Patented Sept. 1, 1896.

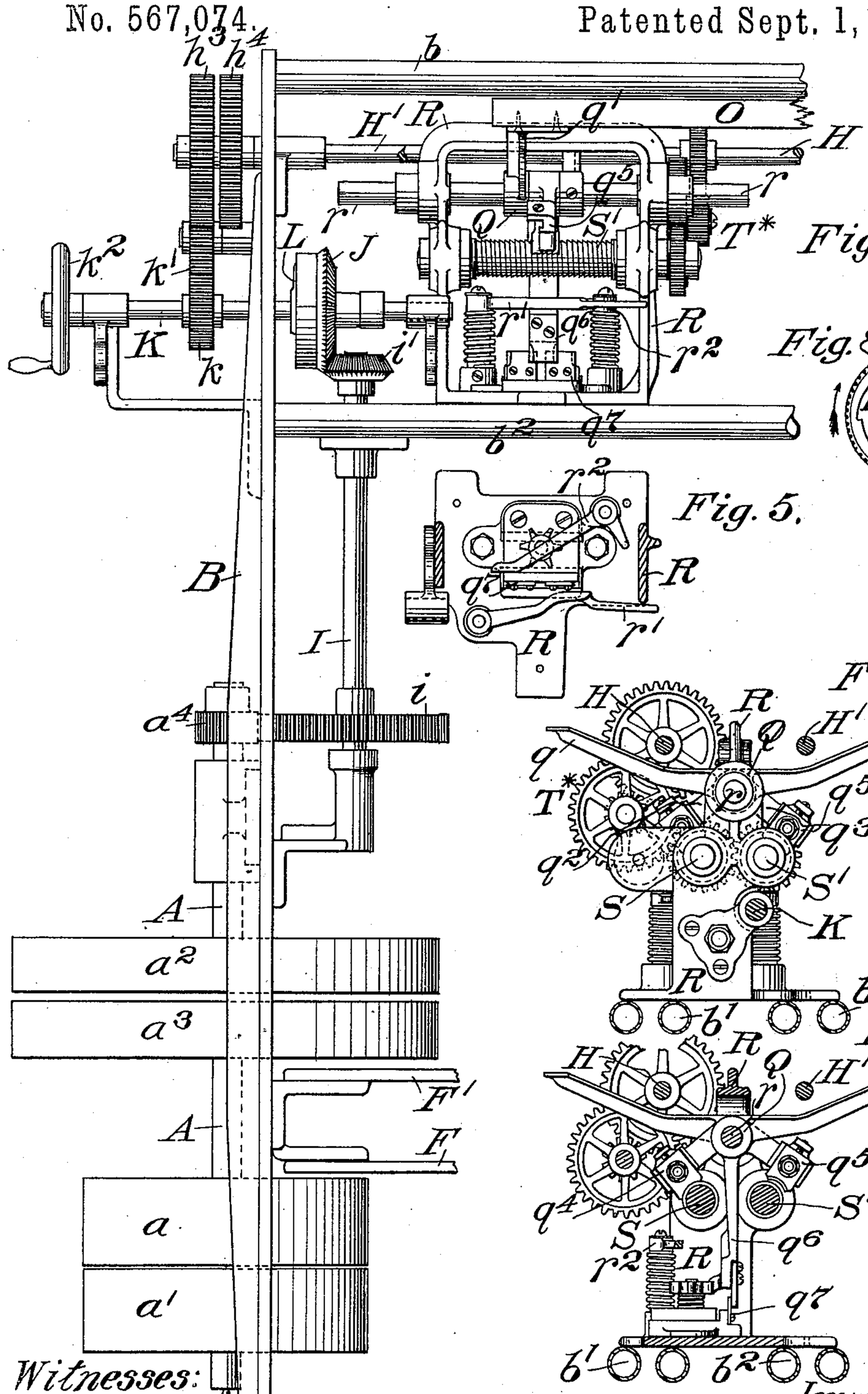

Fig. 4.

Fig. 8.

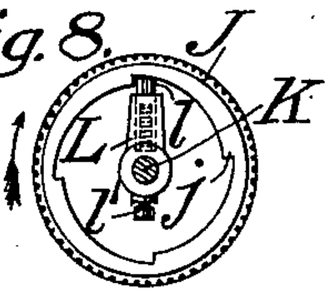

Fig. 5.

Fig. 6

Fig. 7.

Inventor:
Edward E. Bradley.
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UNITED STATES PATENT OFFICE.

EDWARD E. BRADLEY, OF STONINGTON, CONNECTICUT, ASSIGNOR TO THE ATWOOD MACHINE COMPANY, OF SAME PLACE.

COMBINED SPINNING AND DOUBLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 567,074, dated September 1, 1896.

Application filed November 30, 1895. Serial No. 570,579. (No model.)

To all whom it may concern:

Be it known that I, EDWARD E. BRADLEY, of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in a Combined Spinning and Doubling Machine, of which the following is a specification.

One object of my invention is to provide a machine of the above class which will be simple in construction, positive in operation, and in which the capacity of the machine may be considerably increased.

A further object is to provide an improved mechanism for taking up the slack in the threads that have been spun off the spinning-bobbins, independently of the main driving mechanism.

Another object is to provide an improved tension for the threads and also an automatic stop-motion, which stop-motion is adapted to automatically throw the winding-bobbin and its support out of engagement with its frictional driving mechanism when one of the threads which is being wound thereon breaks.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a face view of the front end of the machine. Fig. 2 is a vertical cross-section through the machine, showing more clearly the tension and stop mechanisms. Fig. 3 is a view of a portion of one side of the machine, showing the manner of spinning the threads off the bobbins on the spinning-spindles and winding and doubling them onto the bobbins on the winding-spindles. Fig. 3* is an enlarged top plan view of the tension device. Fig. 4 is a side view of a portion of the front end of the machine, showing clearly the hand-gear take-up for winding up the slack of the threads after the main driving mechanism has been stopped. Figs. 5, 6, and 7 are views in detail of the mechanism for causing the guide-bar to have a traverse movement for winding the threads accurately and smoothly onto the winding-bobbin; and Fig. 8 is a back view of the ratchet bevel-gear which connects the main driving mechanism, through the hand-gear take-up mechanism, with the winding-spindle-driving mechanism.

Proceeding to describe my machine, the upright head-shaft A is mounted in suitable bearings in the front upright B of the frame, and the said shaft is provided with suitable driving and loose pulleys a a', respectively, for the reception of a driving-belt. (Not shown.) This head-shaft is further provided with belt-driving pulleys a^2 a^3, respectively, for engaging spindle-driving belts C C'. The spindle-driving belt C, after passing around its belt-driving pulley a^3, extends along between two rows of spinning-spindles D D' upon one side of the machine and frictionally engages the same for rotating them. The spindle-driving belt C', after passing around its belt-driving pulley a^2, passes between two rows of spinning-spindles D^2 D^3, located along the other side of the machine, and frictionally engages the same for driving them.

Spinning-bobbins E are located upon each of the spinning-spindles. These rows of spinning-spindles are mounted in suitable bearings secured to cross-plates F F', which extend between the front and rear uprights B B' of the frame.

The front and rear uprights B B' of the frame are connected together by suitable pairs of tubular braces. The upper pair of tubular braces is denoted by b, and below this upper pair of tubular braces are located two pairs b' b^2 upon opposite sides of the machine.

A row of winding-bobbins G is mounted upon suitable winding-spindles g upon one side of the machine at its top and a row of winding-bobbins G' is mounted upon suitable winding-spindles g' upon the opposite side of the top of the machine. Each of these spindles g g' is mounted in suitable swinging supports g^2 g^3, which are pivoted at their inner ends, as shown at g^4, and are secured to the pair of tubular braces b. These winding-bobbins G G' are driven by friction by the following means: A frictional-drum-carrying shaft H is mounted upon one side of the machine a short distance below the bobbins G, and a friction-drum-carrying shaft H' is mounted upon the opposite side of the machine a short distance below the bobbins G'. These shafts are suitably mounted in the end uprights B B' of the frame and are further supported by suitable brackets h h', secured to the tubular braces b. These shafts H H' carry suitable friction-drums h^2, the

surfaces of which are adapted to engage the bobbins G G′ and rotate them to wind the doubled thread thereon as the shafts H H′ are rotated. The threads *e* from the spinning-bobbins E are led upwardly in pairs through suitable guide-brackets M and from thence through suitable tension devices N. From said tension devices N the threads are led upwardly over guide-rods O onto the winding-bobbins G or G′. Each of the tension devices N consists of two plates n n', which plates are provided along their meeting faces with pads, of felt between which two threads *e* pass. The plate n is secured to one of the pairs of tubular braces b' b^2, as the case may be. The other plate, n', is hinged to an arm n^2, which in turn is hinged to the plate n, so as to allow the plate n' to move bodily toward and away from the plate n. The plate n' of the tension device is held against the plate n by spring-tension. This spring-tension, in the present instance, is caused by a spring n^3, which surrounds the bolt n^4, which secures the plate n to the pair of tubular braces, the said spring n^3 having a forwardly-extended arm n^5, which presses against the said plate n'. The plates n n' may be accurately adjusted toward and away from each other to regulate the compression of the pads of yielding material by means of a suitable set-screw n^6, which extends through an upwardly-extended ear or lug n^7 on the plate n and abuts against an upwardly-extended lug or ear n^8 on the bar n^2.

The guide M is preferably attached to the depending frame-arm n^9, which extends downwardly from the plate n of the friction device N.

The guide-bars O are provided with suitable guides *o* thereon, which serve to direct the doubled threads *e* onto the winding-bobbins G and G′. The guide-bars O upon opposite sides of the machine are supported along their length by a suitable bracket P, which is secured to the pair of tubular braces *b* and is provided with laterally-extended arms p p', the outer ends of said arms being provided with rollers p^2, upon which the guide-bars O rest. These guide-bars O are caused to have a traverse movement along the machine for directing the doubled threads evenly and smoothly onto the winding-bobbins G G′. The mechanism which I have employed for imparting to the said guide-bars this traverse movement is shown clearly in Figs. 4 to 7, inclusive. The forward ends of the bars O are secured to the laterally-extended arms q q' of the traveler Q, which traveler slides upon a shaft r, mounted in a suitable frame R, which frame is secured to the pairs of tubular braces b' b^2 in any suitable manner. Within the frame R, I swivel two screws S S′, which screws are rotated in opposite directions by a train of gearing T*, which connects the said screws with one of the friction-drum-carrying shafts H H′. In the present instance the shaft H is shown connected with the screws S S′ for rotating them. The traveler Q is provided with two downwardly and laterally extended arms q^2 q^3, which carry suitable segmental traveling nuts q^4 q^5, respectively, which nuts are adapted to alternately engage the swiveled screws S S′ for moving the guide-bars O forward and backward along the machine.

The arm q^6 depends from the traveler Q down into position to engage a guide q^7 at the base of the frame R. This bar q^6 is rocked laterally in one direction when it has passed the end of the guide q^7 by a spring-arm r' to throw the segmental nut q^5 into engagement with its screw S′; and after the traveler has moved along until the arm q^6 is free of the other end of the guide q^7 a spring-arm r^2 swings the arm q^6 laterally for throwing the segmental nut q^4 into engagement with its screw S. This alternate engagement of the nuts q^4 q^5 with their respective screws will cause the guide-bars O to automatically travel back and forth along the machine for guiding the doubled threads evenly onto their respective bobbins.

The shafts H H′ are driven from the upright head-shaft A in the following manner: The shaft A is provided with a gear a^4, which gear meshes with a gear i upon a vertical shaft I, mounted on the upright B. This shaft I is provided with a beveled gear i', which meshes with a beveled gear J on a suitable horizontal shaft K, mounted on the front upright B. The beveled gear J is provided with ratchet-teeth j, (in the present instance four are shown,) which ratchet-teeth are adapted to engage a spring-actuated sliding dog l, mounted in a suitable support L, which support is locked to rotate with the shaft K, in the present instance by means of a suitable set-screw l'. As the beveled gear J is driven in the direction shown by the arrow (see Fig. 8) it will—because of its ratchet-and-dog connection with the shaft K—cause the said shaft to rotate. The shaft K is provided with a gear k, which meshes with the intermediate gear k', carried by the upright B, which intermediate gear meshes with a gear-wheel h^3 on the friction-drum shaft H′. A second gear-wheel h^4, back of the gear-wheel h^3 on the shaft H′, meshes with a gear h^5 on the shaft H. It will thus be seen that as the upright shaft A is rotated it will drive the drum-carrying shafts H H′ in opposite directions and will, by reason of the frictional engagement of the drums h^2 with the winding-bobbins G G′, wind the threads upon the said bobbins.

If there should be any slack threads after the upright shaft A has stopped rotating, they may be wound up upon the winding-bobbins G G′ in the following manner: The shaft K is provided with a hand-wheel k^2 for use in rotating the said shaft. This shaft K, by reason of its pawl-and-ratchet connection with the beveled gear J, can be rotated without turning the said wheel J, the pawl l being

allowed to slide over the ratchet-teeth j on the said gear J. As the shaft K is rotated it will, by reason of the gears k, k', h^3, h^4, and h^5, drive the shafts H H', thereby winding the bobbins G G'. If one or the other of the threads which are doubled upon any one of the winding-bobbins should break, the said bobbin, together with its support, is automatically thrown out of engagement with its friction-drum h^2 by the following means: A support T is secured to the pair of tubular braces b' or b^2, and the said support is provided with two upwardly-extended arms t. At the outer ends of the arms t is pivotally secured a two-armed rocking lever U, the downwardly and inwardly extended arm u of which is provided with a suitable notch or recess u'. To the forwardly-extended arm u^2 of the rocking lever U, I secure two trip-levers V V', one for each of the threads e. These levers V V' are provided with suitable eyes v v', through which the threads e extend on their way from the tension device N to the guide-rod O. The opposite arms of the levers V V' are provided with suitable hooks v^2 v^3, respectively, which are adapted to engage the teeth upon a rotary trip-dog W on the friction-drum-carrying shaft, if the threads e should break.

The lever for raising the bobbin-support is denoted by X and is mounted in rocking adjustment in the upwardly-extended arms t of the support T a short distance above the base t' of the support. This support-operating lever X is provided with a rearwardly-extended arm x, having a nose x' for engaging the recess u' upon the two-armed lever U when the winding-bobbin and its support are in their normal position. The outwardly-extended arm x^2 of the lever X is connected with the outer end of the winding-bobbin support by a suitable connecting rod or bar Y, whereby as the said arm x^2 is raised it will raise the bobbin-support. A spring x^3 is engaged with the lever X for tending to rock the lever X, so as throw the outwardly-extended arm x^2 upwardly. Another spring u^3 engages the two-armed lever U, tending to throw the downwardly-extended arm u thereon inwardly. When the threads e are unbroken and are being drawn properly through the guide-eyes b b' in the tripping-levers V V', the said levers are held in such a position that the hooks v^2 v^3 are held out of the path of the teeth on the tripping-dog W. However, if one of the threads e should break it will allow the hook on its corresponding tripping-lever to swing into the path of the teeth on the tripping-dog, and as the tripping-dog rotates it will draw the said lever upwardly, thereby rocking the lever U in such a manner that the recess u' in its downwardly-extended arm u will swing out of engagement with the nose x' of the bobbin-support-operating lever X, which will release said lever X and allow its spring x^3 to throw the outwardly-extended arm x^2 upwardly. This upward movement of the arm x^2 will, by reason of the connecting-bar Y, throw the winding-bobbin support upwardly, so as to disengage the bobbin from its frictional engagement with the drum h^2 on the drum-carrying shaft. The further rotation of the tripping-dog W will release the hook on the tripping-lever from engagement therewith. The broken thread may then be mended, and by depressing the arm x^2 of the lever X the inwardly-extended arm x will be raised until its nose x' again engages with the recess u' in the lever U, when the parts will again be in position to allow the further winding of the doubled threads.

Cross-bars Z z are secured in suitable brackets z', located along the machine. The brackets z' are secured in a suitable manner to the pairs of tubular braces b' b^2. The threads e extend partially around the cross-bar Z and from thence through their corresponding eyes v v' in the tripping-levers V V' for holding the hooks on the said levers out of the path of the teeth on the tripping-dogs W, the lower arms of the levers V V' being stopped by the cross-bar z.

From the above description it will be seen that the several mechanisms are driven from a single upright head-shaft at the front of the machine, and also that if there should be any slack in the spun threads after the upright shaft has been stopped the hand-gear connection may then be operated for winding up the said slack independently of the upright shaft. Again, it will be seen that when any one of threads should become broken the bobbin upon which it is to be wound will be automatically thrown out of engagement with its driving-drum by the improved stop mechanism hereinbefore described.

The tension devices which I have shown and described may be easily and accurately regulated so as to produce the required tension upon the threads for producing the most satisfactory results.

It is evident that slight changes might be resorted to in the construction and operation of the several parts herein described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth, but

What I claim is—

1. The combination in a spinning and doubling machine, of two rows of spinning-spindles located side by side upon each side of the machine, a single row of winding-bobbins common to the two rows of spinning-spindles located upon each side of the machine, the bobbin on each of the winding-spindles being adapted to wind simultaneously a thread from a spinning-spindle in each of the two rows upon the same side of the machine, and means for driving the several spindles, substantially as set forth.

2. The combination in a spinning and dou-

bling machine, of two rows of winding-spindles, rotary drum-carrying shafts, friction-drums thereon engaging bobbins on the winding-spindles, a hand-shaft having a geared connection with the drum-carrying shafts, a head-shaft and means of driving the same, a gear on said head-shaft, an intermediate shaft, a gear thereon meshing with the gear on the head-shaft and a ratchet-gear connecting the said intermediate shaft with the hand-shaft, whereby the winding-spindles may be driven by the hand-shaft independently of the head-shaft, substantially as set forth.

3. The combination in a spinning and doubling machine of a pair of spinning-spindles, a support therefor, a winding-spindle and a swinging support therefor, a rotary drum-carrying shaft, a friction-drum thereon for engaging a bobbin on the winding-spindle, a stop mechanism connected with the said swinging support and engaging the threads from the spinning-spindles, a tripping device carried by said drum-carrying shaft in position to engage the stop mechanism when the thread from either spinning-spindle is broken and connections between the swinging support and the tripping device, for raising the swinging support and thereby elevating the bobbin on the said winding-spindle out of engagement with its driving-drum, substantially as set forth.

4. The combination in a spinning and doubling machine, of a pair of spinning-spindles, a support therefor, a winding-spindle, a swinging support therefor, a rotary drum-carrying shaft, a friction-drum thereon for engaging a bobbin on the winding-spindle, a trip-dog carried by the said shaft and a stop mechanism comprising a spring-actuated rocking lever connected with the said swinging support and tending to raise it, a two-armed spring-actuated lever engaging the said rocking lever for keeping the winding-bobbin in engagement with the said drum, and tripping-levers carried by said two-armed lever and engaged by the threads from the spinning-spindles, the said tripping-levers being in position to swing into the path of the tripping-dog, if either thread should break, for releasing the rocking lever and allowing it to positively raise the winding-bobbin out of engagement with the drum, substantially as set forth.

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