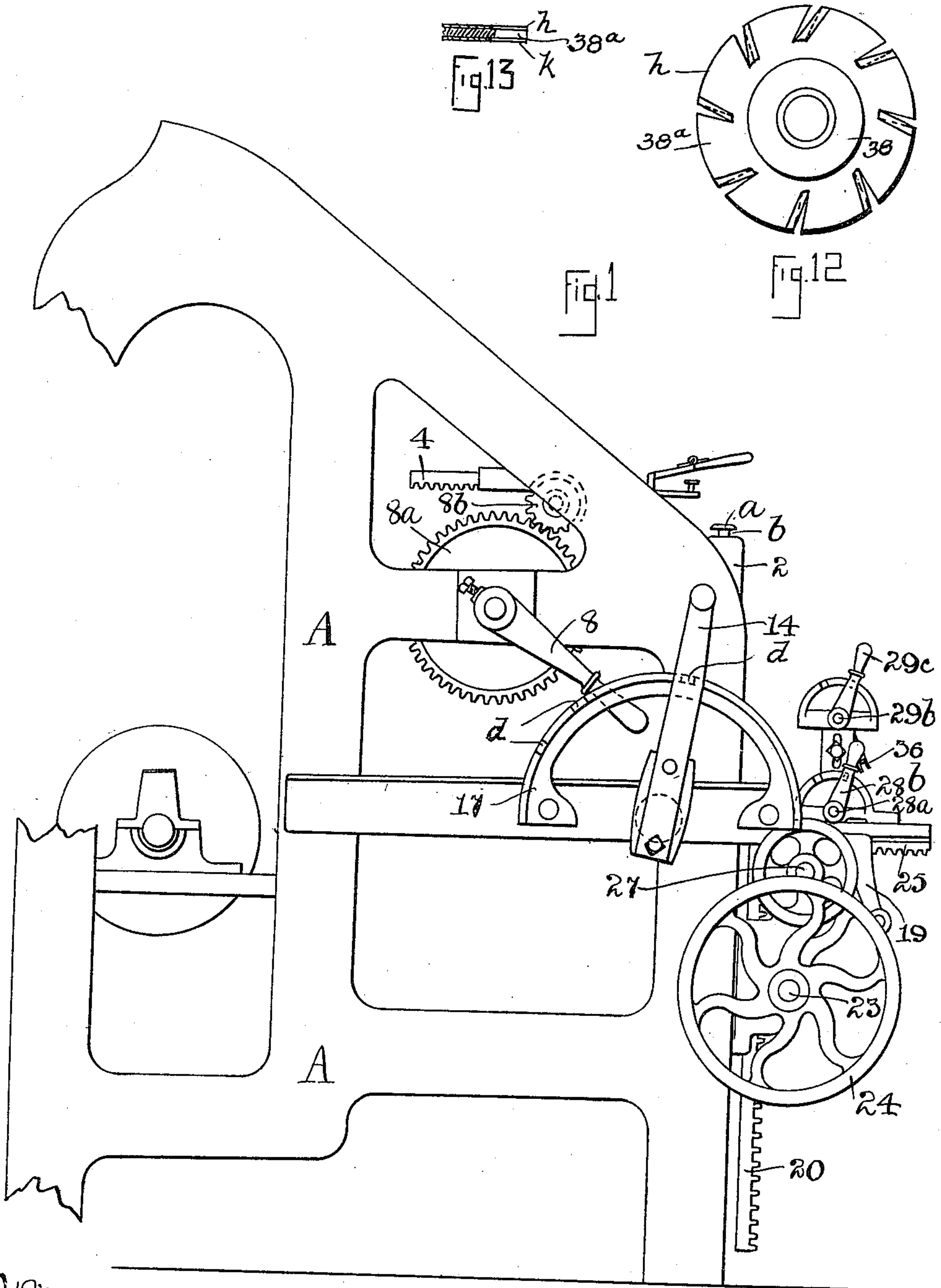


A. & J. STELL.  
SPINNING MACHINE.  
APPLICATION FILED JUNE 6, 1908

993,467.

Patented May 30, 1911.

5 SHEETS--SHEET 1.



Witnesses  
P. H. Tazzetti  
F. R. Roulstone

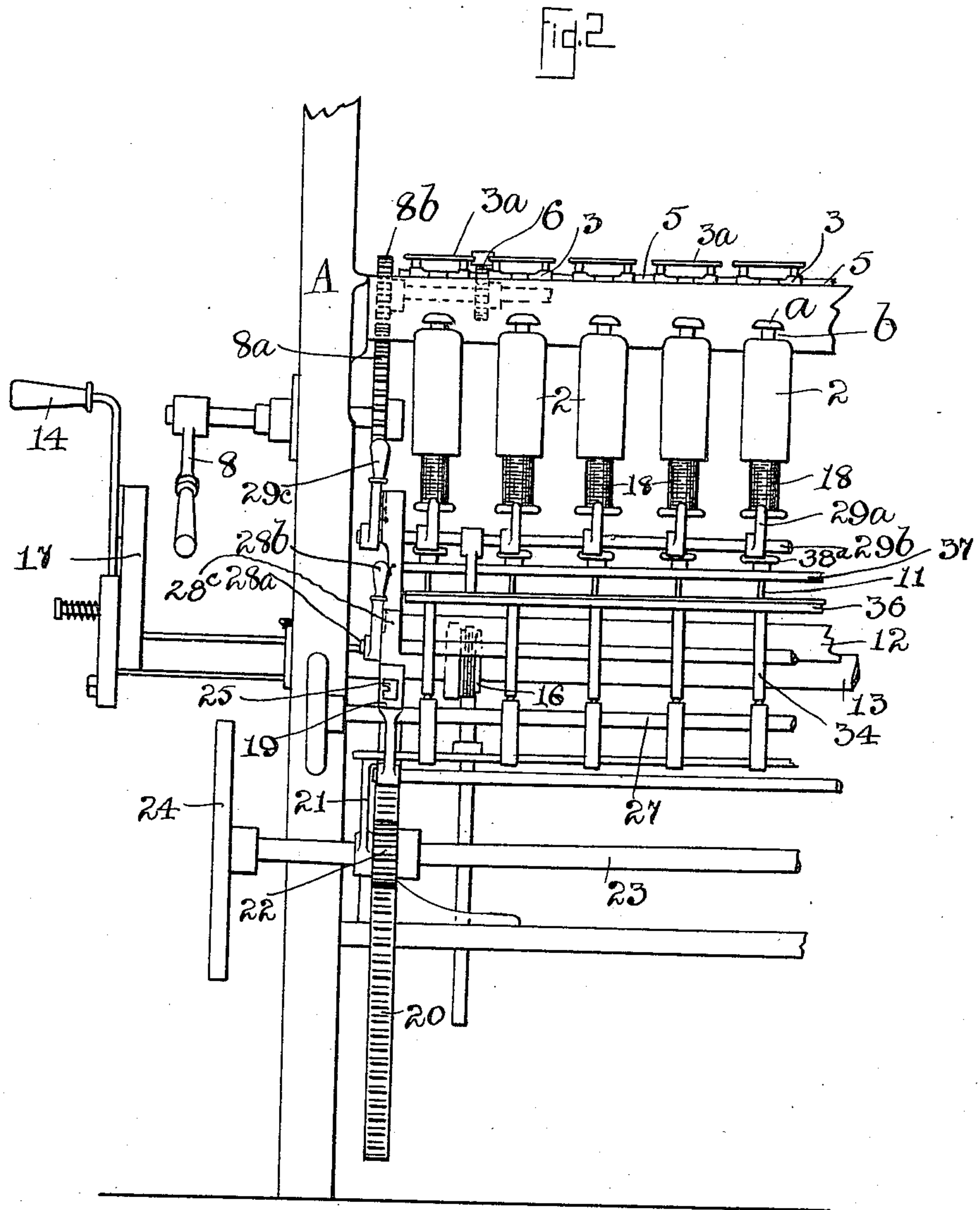
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5 SHEETS—SHEET 2.



Witnesses  
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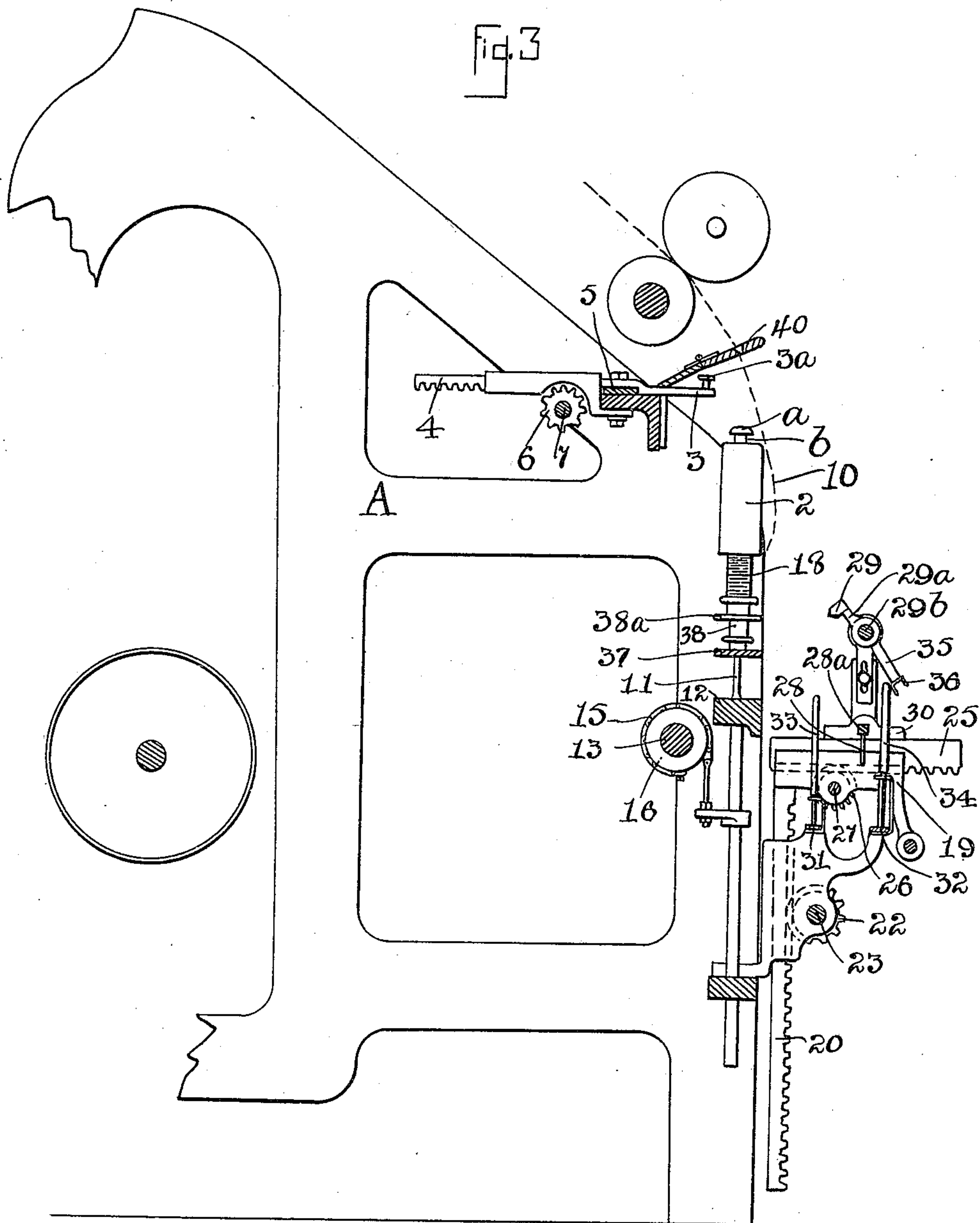
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5 SHEETS—SHEET 3.

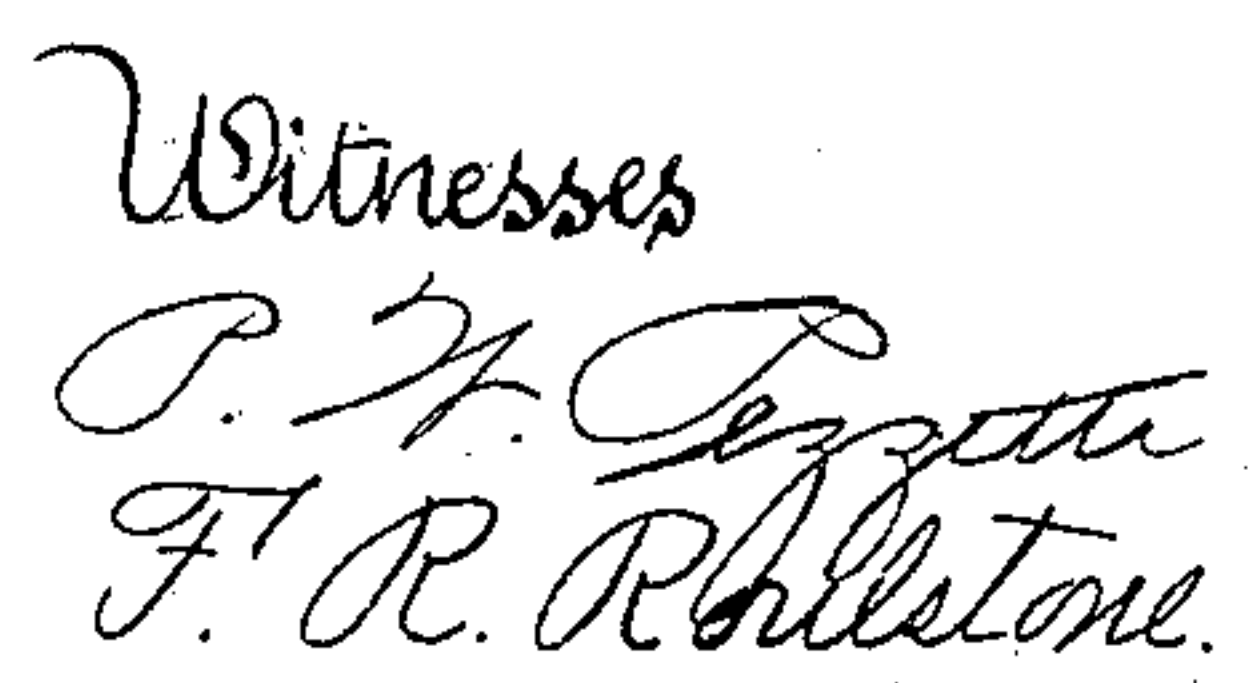


Witnesses  
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5 SHEETS—SHEET 4.



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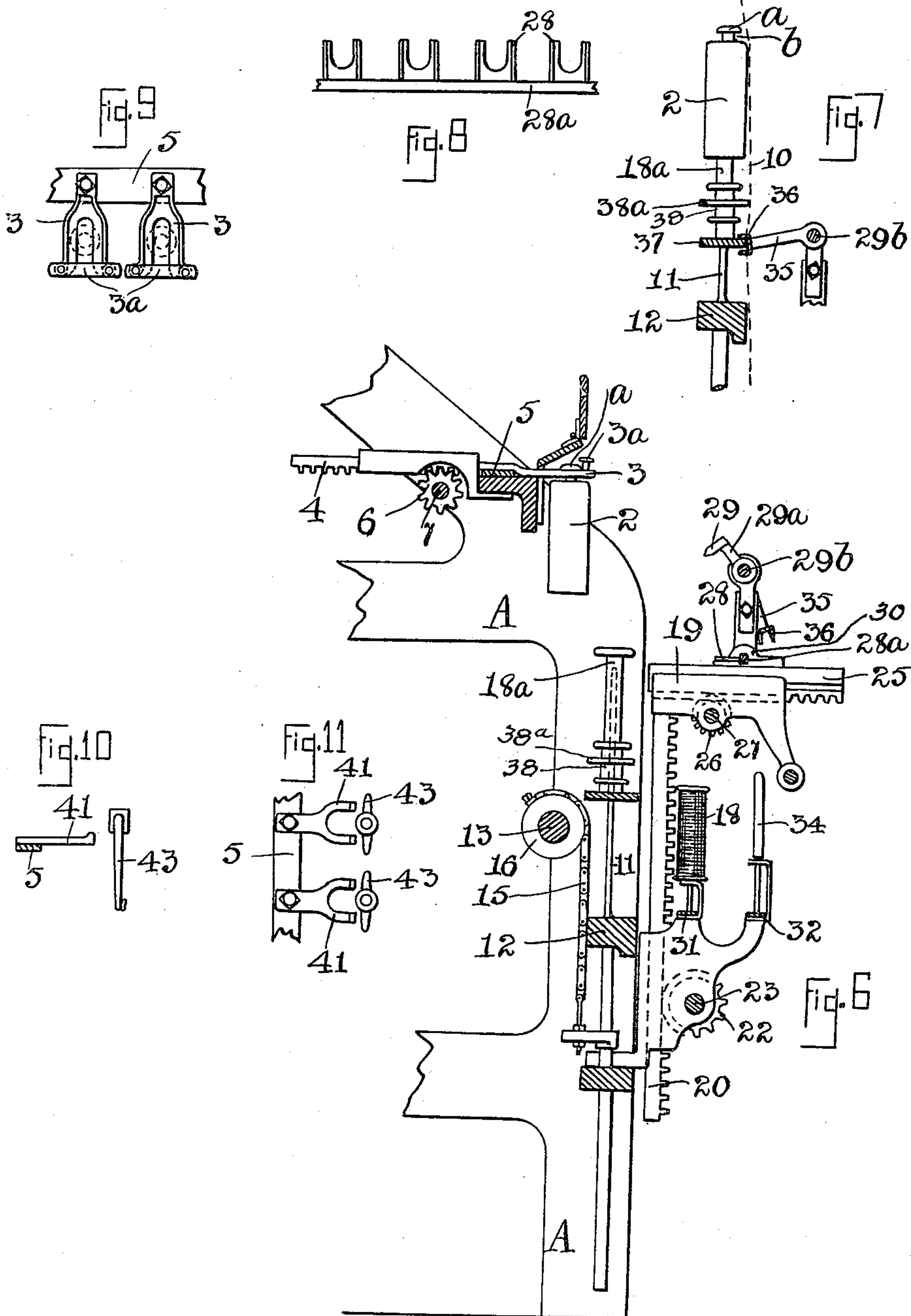


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6 SHEETS-SHEET 5.



Witnesses

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# UNITED STATES PATENT OFFICE.

ALFRED STELL, OF STEETON, NEAR KEIGHLEY, AND JOHN STELL, OF KEIGHLEY,  
ENGLAND.

## SPINNING-MACHINE.

993,467.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed June 6, 1908. Serial No. 437,142.

*To all whom it may concern:*

Be it known that we, ALFRED STELL and JOHN STELL, subjects of the King of Great Britain, and residing, respectively, at Greenhill, Steeton, near Keighley, in the county of York, England, and 30 Devonshire street, Keighley aforesaid, have invented certain new and useful Improvements in Spinning-Machines, of which the following description, together with the accompanying sheets of drawings, is a specification.

This invention relates to doffing mechanism for spinning, doubling, twisting, and like machines used in the production of yarns or threads of fibrous substances and consists in constructing and arranging the several parts or devices for carrying out said process of doffing that is to say to simultaneously effect the removal of all the full bobbins from their spindles and then place thereon empty bobbins with the yarns or threads so secured that the spinning or like operations may be restarted, the said process by the employment of our improved devices being carried out with precision.

Our said invention has especial reference to the class of spinning machines known as "cap-spinning frames" but with slight alterations the same devices and the same methods of operation may be carried out in connection with what are known as "flyer-spinning frames".

In the accompanying sheets of drawings which are illustrative of our invention:—  
Figure 1 is an end elevation of sufficient of a cap-spinning frame to illustrate the application of our invention. Fig. 2 is front elevation of certain of the parts shown by Fig. 1. Fig. 3 is a sectional end elevation of the devices illustrated by Fig. 1 and shows the several parts in the positions they occupy during the process of spinning. Fig. 4 is a similar view to Fig. 3 but shows the parts in position as when the caps are being laid-hold-of to remove them from their spindles. Fig. 5 is also a similar view to Fig. 3 but shows the parts in position as when the full bobbins are being laid-hold-of. Fig. 6 is also a similar view to Fig. 3, but shows the several parts in position as when empty bobbins are being placed upon the spindles. Fig. 7 is a sectional end elevation showing certain of the parts as in position for severing the threads or yarns. Figs. 8 and 9 are drawings in detail showing parts

in plan hereinafter explained. Figs. 10 and 11 are sectional side elevation and plan showing devices used when our invention is applied to a "flyer" spinning frame. Figs. 12 and 13 are drawings in detail hereinafter explained.

Similar letters and figures of reference indicate similar parts throughout the several views.

A indicates the framework of the machine.

To carry our invention into effect we make use of that well known form of cap 2 which is constructed with a head-part *a* at its upper end and with a neck-part *b* intervening between same and the part below. To the rear of these caps 2, holding devices 3 are mounted on racks 4 supported by bearings 5 in such positions that on being advanced by their said racks 4 being moved by rotating the pinions 6 fixed on the shaft 7 (which may be effected by the operative rotating the handle 8 the motion of which is transmitted to the shaft 7 throughout the wheels 8<sup>a</sup> and 8<sup>b</sup>), they will lay-hold-of or span the neck-parts *b* and at the same time their cross bars 3<sup>a</sup> will carry their threads to the front of the caps 2 so that in this position they are clear of parts that might otherwise obstruct them.

To enable the devices 3 to lay-hold-of the caps 2 as above described, the spindles 11 upon which they are mounted, are raised by their supporting rail 12 being made to slide upon the framework A as the shaft 13 is rotated by the handle 14. The motions of this shaft 13 are transmitted to the rail 12 by being coupled thereto by the supporting chains 15 which take over pulleys 16 fixed upon said shaft 13. The handle 14 as it is moved from one position to another takes into notches *d* made in the quadrant 17 to retain the rail 12 in any of its several positions hereinafter explained. On the caps 2 being laid-hold-of by the devices 3 the rail 12 is then lowered or allowed to descend until the spindles 11 and their full bobbins 18 are so far below the lower edges of the caps 2 that these latter may be moved to the rear thereof to afford sufficient space between the upper ends of the spindles 11 and said caps 2 to allow the bobbins 18 to be raised from said spindles as shown by Fig. 5 after which the receding movements of the several parts carries the bobbins 18 away



from said spindles 11 as hereinafter explained.

When the rail 12 has been adjusted in its position last before described, the supports 19, carried by the racks 20, which are arranged to operate within or through the bearings 21 secured to the framework A, are adjusted in position by said racks 20 being actuated by the pinions 22 carried by the shaft 23 to which the hand wheel 24 is fixed. Said position of the supports 19 at this time is such that on the racks 25 carried by them being caused to advance by the pinions 26 (carried by and actuated with the shaft 27 through the hand wheel 27<sup>a</sup>) toward the spindles 11, said racks 25 will carry the bobbin supports 28 (hereinafter described) so that their projecting ends will pass beneath the bobbins 18 while the pegs or pins 29 (hereinafter described) are in position for taking into the openings at the upper ends of the said bobbins 18 these said positions of the several parts being shown by Fig. 5.

The bobbin-supports 28 (shown by plan Fig. 8) are fixed upon the shaft 28<sup>a</sup> carried by bearings 30 fixed upon the racks 25 so that as said shaft 28<sup>a</sup> is moved by the handle 28<sup>b</sup> the supports 28 may be secured or adjusted in the horizontal position shown by Fig. 5 and there held by the handle 28<sup>b</sup> taking into a notch in the adjusting or retaining quadrant 28<sup>c</sup>, while when not required in this position then the handle 28<sup>b</sup> may be turned to bring the supports 28 into their pendant inoperative positions shown by Fig. 3.

The pegs or pins 29 which are to take into the openings at the upper ends of the bobbins are carried by arms 29<sup>a</sup> secured to the shaft 29<sup>b</sup> upon which is fixed a handle 29<sup>c</sup> for actuating same, so that as such handle 29<sup>c</sup> is moved and placed in one or other of the notches in the quadrant 29<sup>d</sup> the pins 29 may be made to occupy the positions shown by Fig. 5 or those shown by Fig. 3. Mounted upon rails 31 and 32, which are fixed upon the bearings 21, are the series of pegs 33 and 34 for the reception of the full and empty bobbins respectively, while loosely mounted upon the shaft 29<sup>b</sup> (or fixed thereto if desired) are arms 35 which carry a grooved bar 36 fixed upon them, so that it may be turned into position and held in front of the lifter plate 37 in order that by moving it horizontally against such lifter plate its groove (which is preferably of a slightly tapering form from its outer edges to its base) may take over same for holding or retaining the threads 10 against the edges of said lifter plate 37 as shown by Fig. 7 for purposes hereinafter explained.

Operating in conjunction with the thread holder 36 are the flanges 38<sup>a</sup> of the whirls 38. The edges of these flanges 38 are ser-

rated or have notches cut into them as shown by Fig. 12, while on the upper and lower surfaces of these flanges are secured disks *h* and *k* with their notches at such an angle to those in the flange 38 that a double tapering groove is formed in order that they may better lay-hold-of and secure their respective threads to wind them upon their bobbins as hereinafter described, while the metal tubes carried by the whirls 38 are formed of the well known spring construction so that as the bobbins 18 are placed upon them said tubes are enabled to press against the inner walls of said bobbins to carry same with them during all their rotary movements.

The operations of the several parts are as hereinafter explained. On the spinning operations being completed and the full bobbins 18 required to be "doffed" or removed for empty bobbins 18<sup>a</sup> already placed on their series of pegs 34 to take their place upon the spindles 11, the motion of the machine is arrested. The handle 14 is then actuated or moved to raise the rail 12 so that all the caps 2 are lifted into the position shown by Fig. 4. The devices 3 are then caused to advance to lay-hold-of the caps 2 also as shown by Fig. 4. On the caps 2 being thus secured, the rail 12 and all its spindles 11 are caused to descend to their lowest position or that shown by Fig. 5, and the devices 3 are moved to bring their caps 2 to the rear of the spindles 11. The bobbin supports 28 are then adjusted in their horizontal positions shown by Fig. 5 and the pins 29 in their positions shown by Fig. 3, the shaft 27 is then rotated by the hand wheel 27<sup>a</sup> to carry the racks 25 forward for the supports 28 to pass beneath the bobbins 18, on which the shaft 29<sup>b</sup> is rotated and the pins 29 are caused to enter the openings in the ends of the bobbins 18 so that these are thus firmly held between said pins 29 and the supports 28. The hand wheel 24 is then rotated to raise the racks 20 and consequently all the parts carried by same in order to lift the bobbins 18 above the spindles 11 as shown by Fig. 5, on which the hand wheel 27<sup>a</sup> is rotated to bring the bobbins 18 vertically above the pegs 33. When this position is reached the hand wheel 24 is actuated to lower the bobbins 18 on to said pegs 33 and that the supports 28 and the pins 29 are removed and by continuing the motion of the hand wheel 27<sup>a</sup> the supports 28 are brought to take beneath the series of empty bobbins 18<sup>a</sup> on the pegs 34. The hand wheel 24 is then actuated to raise the parts so that by moving the hand wheel 27<sup>a</sup> they may advance to positions vertically above the spindles 11 on which by again actuating the hand wheel 24 they may place the empty bobbins upon the spindles 11 and afterward be moved into their inoperative positions.



The spindle rail 12 and the caps 2 and the lifter rail 37 are then all adjusted (by actuating the several parts hereinbefore described) in position ready for the spinning operations to be recommenced. At this time the loose threads 10 will extend from the thread guides 40 down to the full bobbins 18 on the pegs 33 so that on the operative moving the bar 36 over and into position so that by being then moved horizontally and forced against the lifter rail 37 as shown by Fig. 7 all the series of threads 10 will be held between said parts and said threads will be thus brought into contact with the flange 38<sup>a</sup> on the whirl 38 by these means on the machine being started into motion, the rotations of said whirls 38 will cause one or other of the notches in their flanges 38<sup>a</sup> to seize upon its thread 10 and so carry same around with it to wind it upon the empty bobbin 18<sup>a</sup> now upon its spindle. At the same time and by the same movement the thread will be severed or broken by reason of the bar 36 holding it against the rail 37, thus the spinning operations are recommenced.

By making use of the flyer holder 41 shown by Figs. 10 and 11 instead of the device 3, and so shaping same that they will lay-hold-of the legs of the flyer 43 (which are in this case of one or other of the well known formations enabling their ready detachment from their spindles) instead of hold of the cap 2, and by making the thread holder 36 not to retain the threads 10 until after a certain number of coils have been wound upon the bobbins on which its hold is made to retain same until broken, it will be seen that all the devices hereinbefore described may also be used in connection with this type of spinning machine as well as with the other in conjunction, with which it is fully explained.

Such being the nature of our said invention what we claim is:—

1. In doffing mechanism for spinning machines and the like, the combination with upper and lower grasping members, of means for actuating said members to cause them to grasp and release the bobbins, and means for bodily shifting the upper and lower members simultaneously to transport the bobbins while grasped.

2. In doffing mechanism for spinning machines and the like, the combination with

upper and lower grasping members, of means for actuating said members to cause them to grasp and release the bobbins, and means for bodily shifting the upper and lower members simultaneously, horizontally and vertically to transport the bobbins while grasped.

3. In doffing mechanism of the character described, the combination with a spinning machine of a horizontally movable support, a rock shaft mounted therein, bobbin engaging members carried by said shaft and movable therewith, a grooved thread-engaging bar pivotally mounted on said shaft and extending lengthwise of the spinning machine, and means for moving said support back and forth.

4. In a doffing machine of the character described the combination with a lifter plate, of a support, a rock shaft mounted therein, bobbin engaging members carried by said shaft, a grooved thread-engaging bar pivotally mounted on said shaft and movable therewith and extending parallel with said lifter plate, and means for moving said support.

5. In a doffing mechanism of the character described, a carrier, means for reciprocating the same horizontally, upper and lower rock shafts mounted in said carrier, independent coöperating bobbin grasping members secured to the said rock shafts, and means for independently actuating said rock shafts.

6. In a doffing mechanism of the character described, a carrier, upper and lower bobbin grasping members mounted therein, a thread engaging member also mounted in said carrier, means for operating said member, and means for shifting said carrier.

7. In a doffing mechanism of the character described, a carrier, upper and lower bobbin grasping members mounted therein, means for permitting the operation of said members, and means for shifting said carrier, said shifting means including intermeshing racks and pinions.

In testimony whereof we have hereunto affixed our signatures in presence of two witnesses.

ALFRED STELL.  
JOHN STELL.

Witnesses:

FRED HAMMOND,  
SAMUEL HEY.