

No. 683,377.

Patented Sept. 24, 1901.

J. C. BREWIN.

TAKE-UP MECHANISM FOR KNITTING MACHINES.

(Application filed Sept. 22, 1900.)

(No Model.)

4 Sheets—Sheet 1.

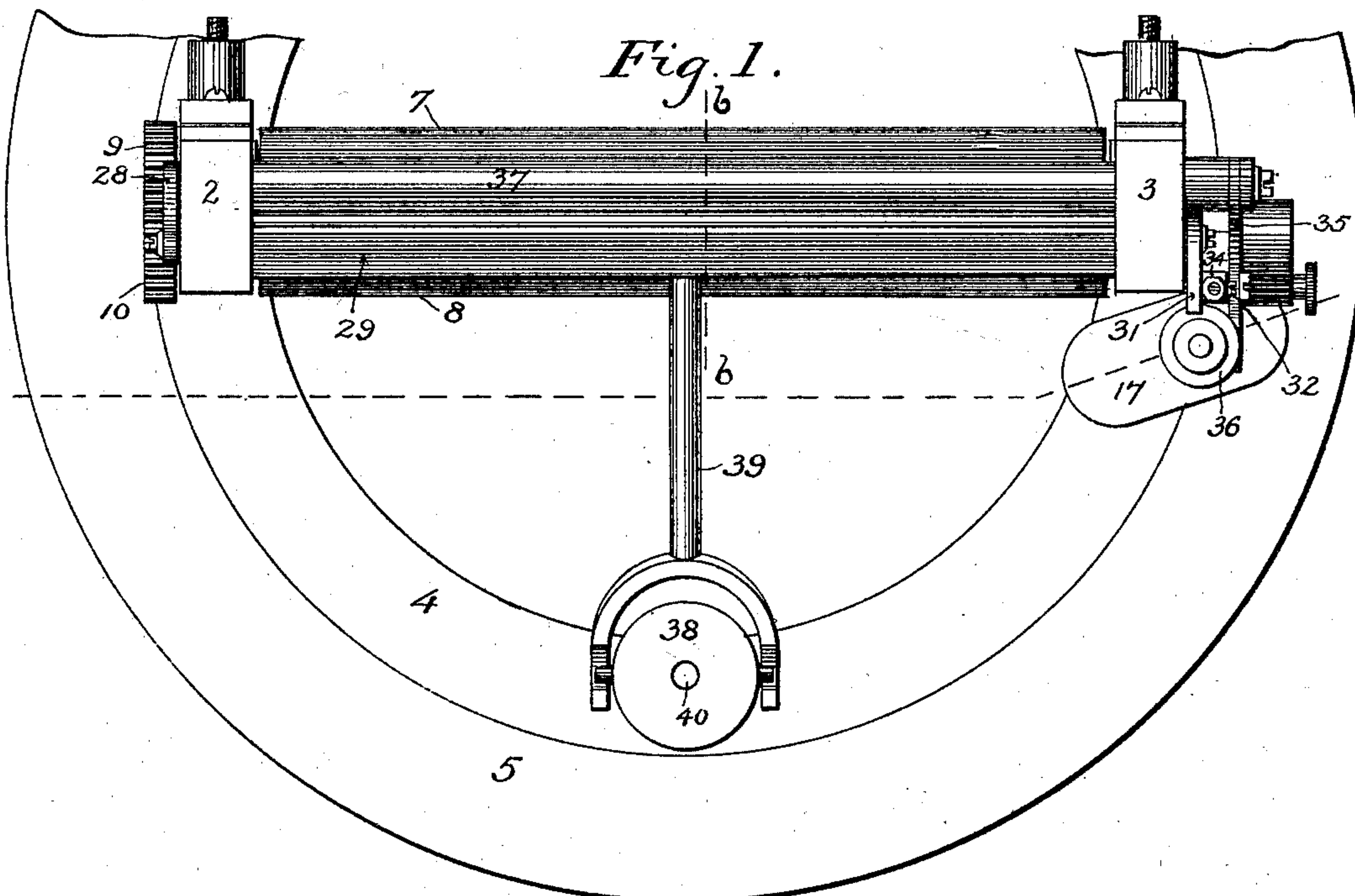
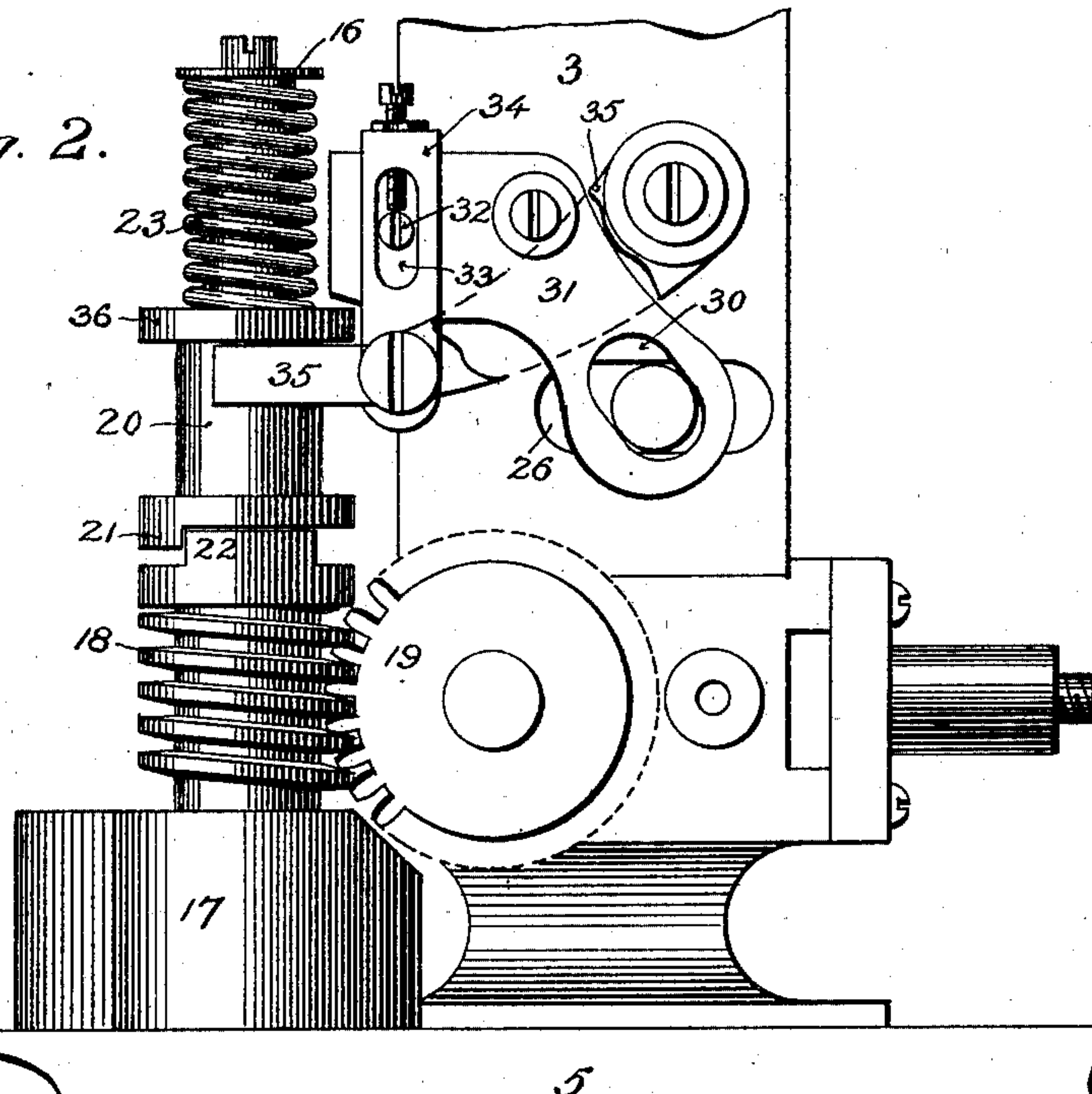


Fig. 2.



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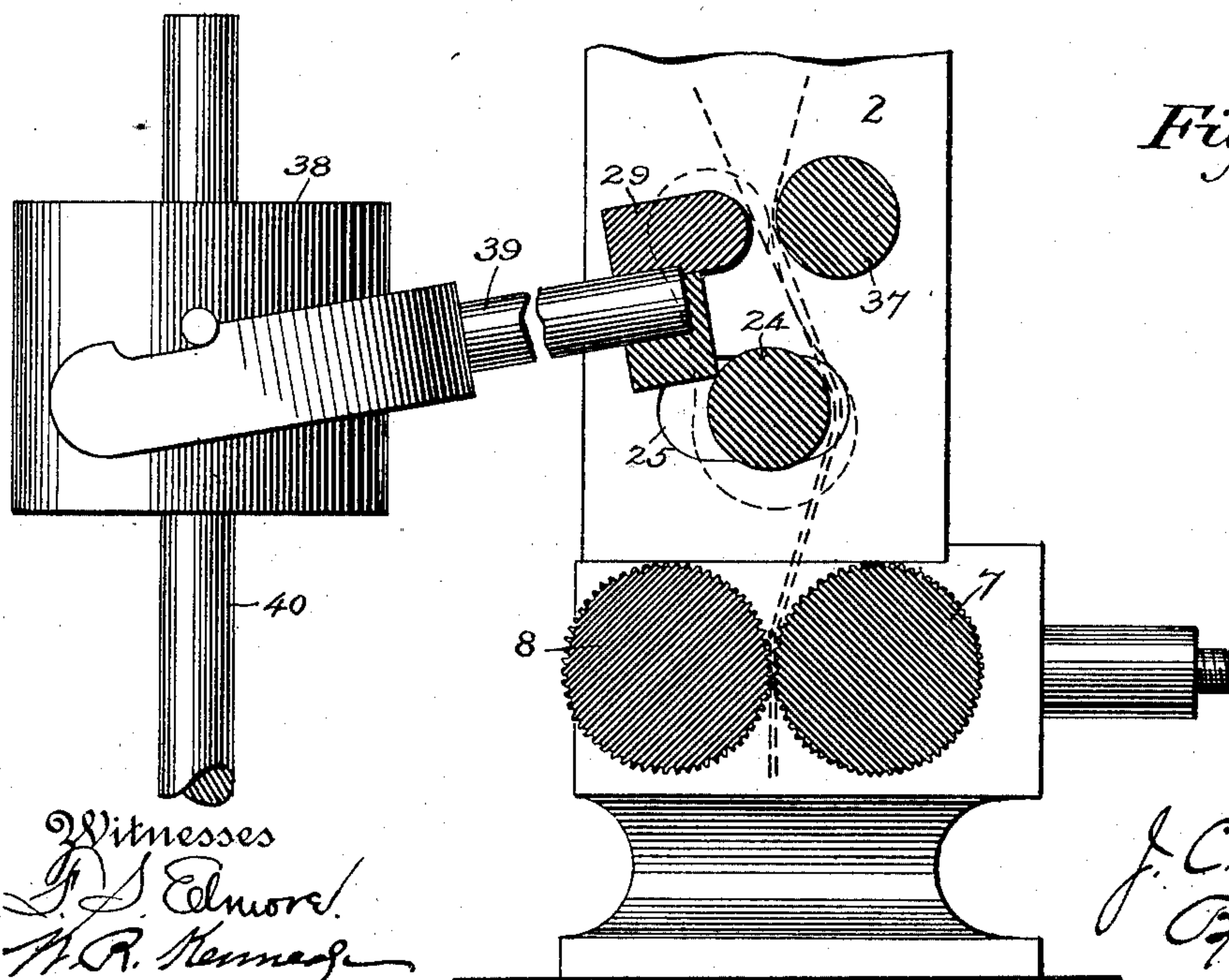
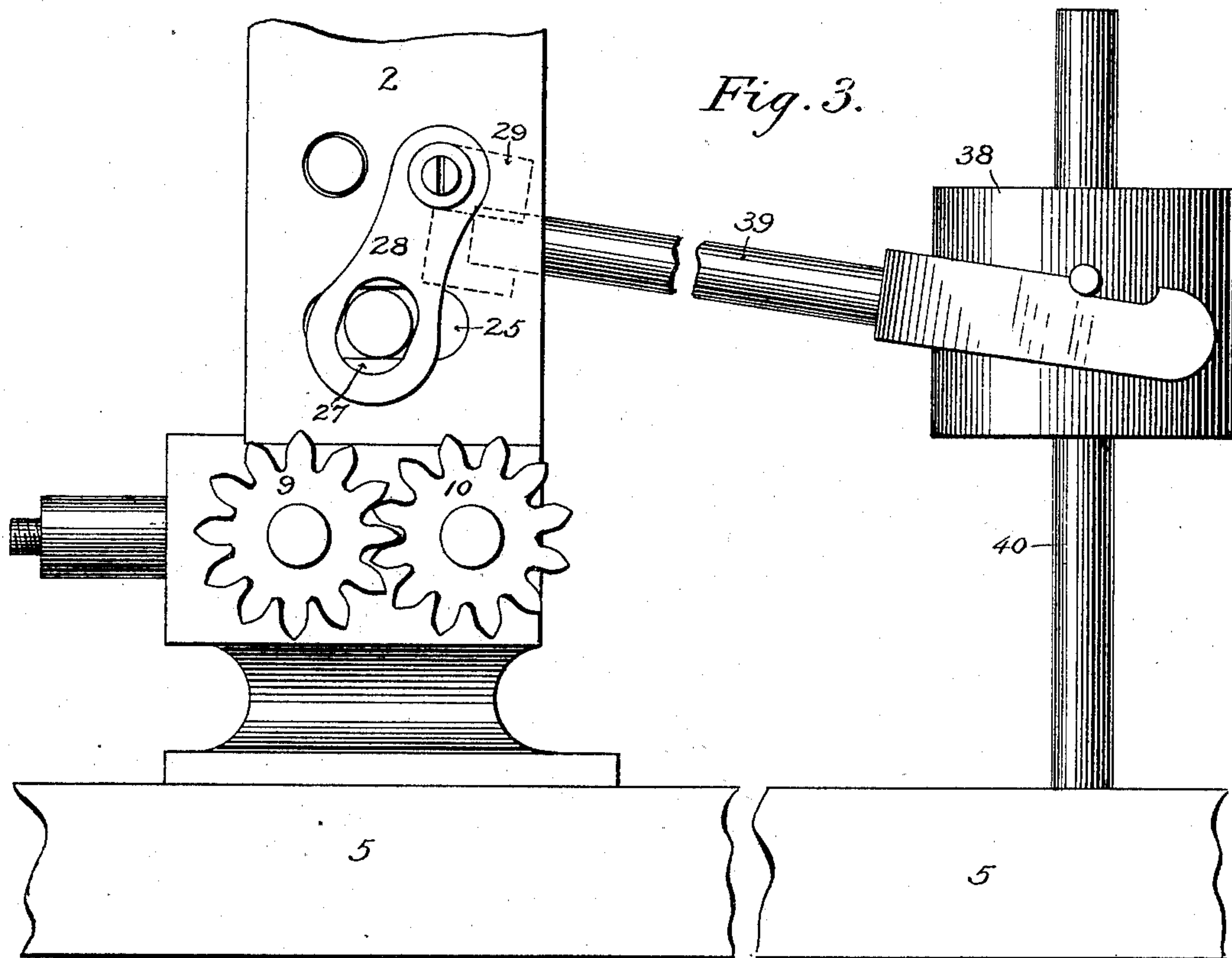
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4 Sheets—Sheet 2.



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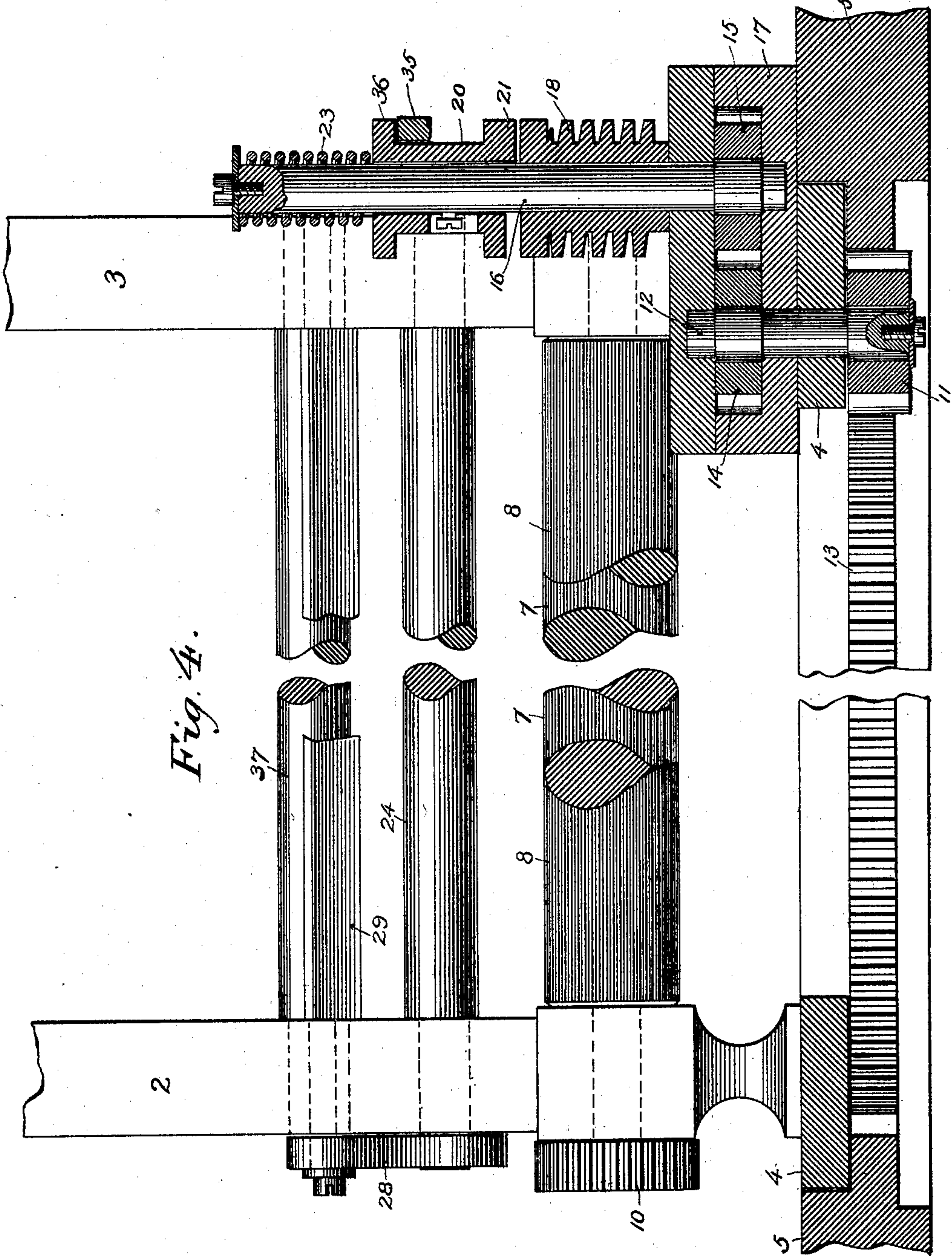
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4 Sheets—Sheet 3.



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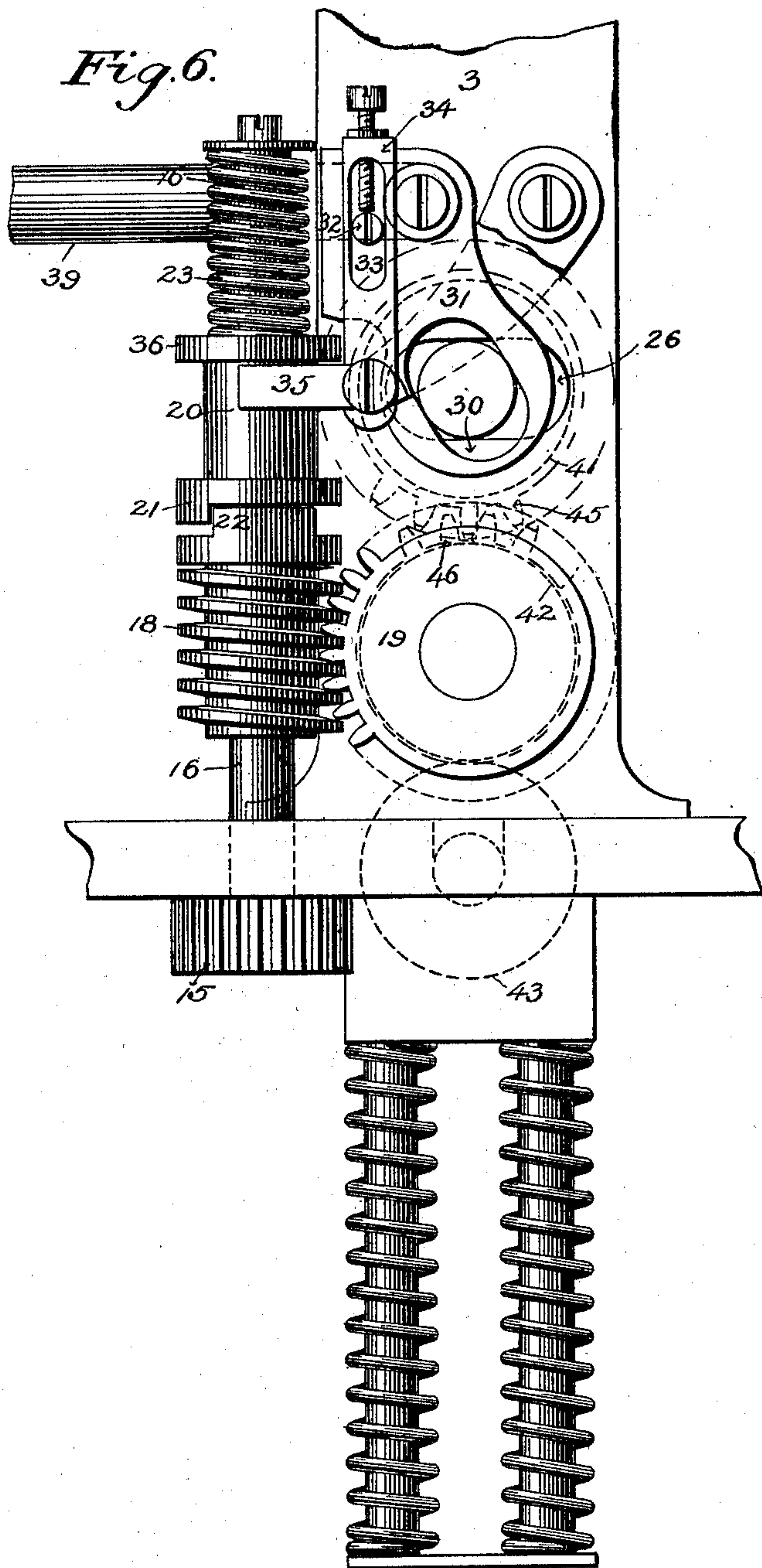
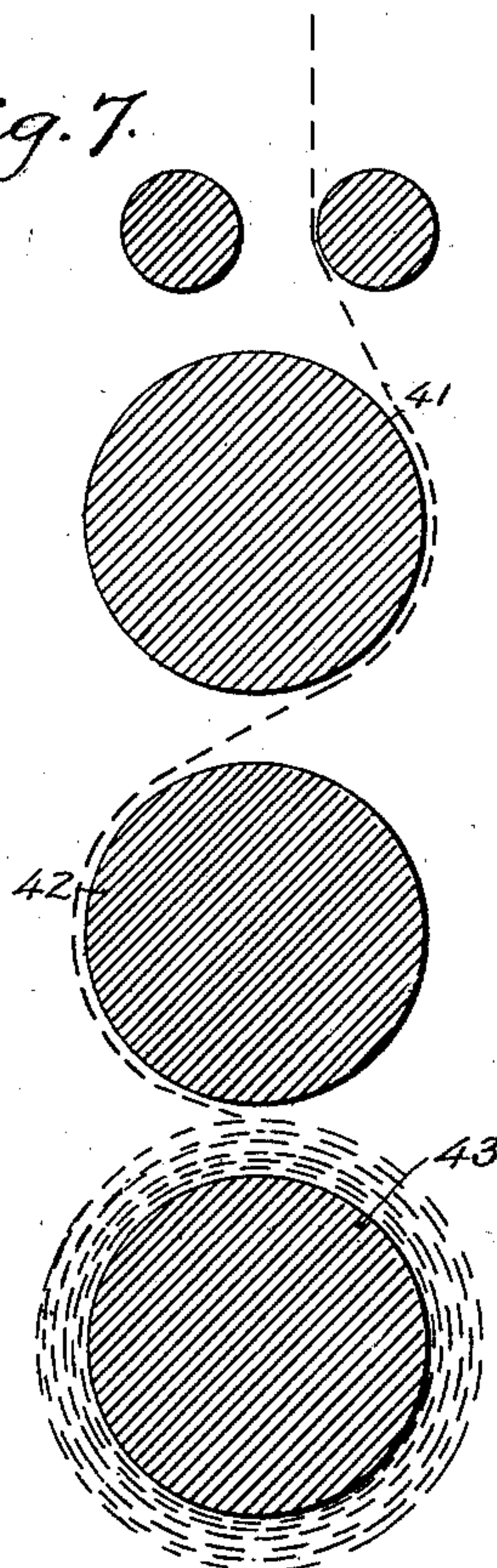


Fig. 7.



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TAKE-UP MECHANISM FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 683,377, dated September 24, 1901.

Application filed September 22, 1900. Serial No. 30,806. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. BREWIN, of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Take-Up Mechanisms for Knitting-Machines, of which the following is a specification.

This invention relates to a work-take-up mechanism for circular-knitting machines, and has reference more particularly to the take-up of machines in which the needle cylinder revolves, the work as it is produced being carried around with the cylinder subject to the action of the take-up mechanism partaking of a like motion.

The invention consists of improved means for controlling the action of the mechanism for taking up the fabric by a movable device which engages the fabric with a predetermined pressure.

The invention consists also in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a top plan view of my improved mechanism. Fig. 2 is an end elevation of the same as viewed from the right in Fig. 1. Fig. 3 is a similar view of the opposite end. Fig. 4 is a vertical sectional elevation on the line *a a* of Fig. 1. Fig. 5 is a transverse sectional elevation on the line *b b* of Fig. 1 as viewed in the direction of the arrow. Fig. 6 is an end elevation of a modification. Fig. 7 is a transverse section of the same.

Referring to the drawings, 1 represents the usual take-up frame, comprising two vertical bars 2 and 3, connected at their upper ends with a revolving needle-cylinder (not shown) and fixed at their lower ends on a rotary ring 4, mounted in a fixed annular bed-plate 5, suitably sustained by legs, the construction being such that as the cylinder rotates the take-up frame will partake of a like motion, with the fabric from the needle-cylinder passing downward through the opening in the annular bed-plate.

Journaled in the lower end of the take-up frame side by side are two rotary drawing-rollers 7 and 8, having roughened surfaces and constituting a well-known form of take-up rolls, their motion serving to positively draw the fabric downward between them.

At one end these rollers are geared together by intermeshing gears 9 and 10, Fig. 3, while at the other end motion is imparted to one of the rollers by a train of gearing operated by the rotary motion of the take-up frame, the result being that as the frame is carried around with the needle-cylinder the drawing-rolls will in addition to being carried around on a vertical axis rotate around their longitudinal axes and acting on the fabric will draw the same downward between them.

The rotation of the drawing-rolls is effected by a horizontal pinion 11, Fig. 4, fixed on the lower end of a vertical shaft 12, mounted in the rotary ring 4, and meshing with an internal gear 13 on the inner edge of the fixed annular bed-plate 5. The upper end of the shaft carries a horizontal gear 14, meshing with a horizontal pinion 15, keyed to a vertical shaft 16, mounted in bearings in a casing 17, fixed to the upper side of the ring-frame and inclosing said gears. The shaft 16 is extended upward through the casing and is loosely encircled by a worm 18, engaging a worm-wheel 19, Fig. 2, on the end of the drawing-roll 8. The worm is adapted to be driven from the shaft 16 through a clutch, comprising a clutch-block 20, slidably connected with the shaft above the worm and provided on its adjacent face with an engaging tooth 21, adapted to interlock with a corresponding tooth 22 on the upper end of the worm, a spring 23 encircling the shaft above the block and bearing thereon and tending to move it into engagement with the worm.

As a result of the foregoing construction when the clutch is connected and the take-up frame revolved the pinion 11, engaging the rack, will be rotated and will drive the gear 14, which, engaging pinion 15, will operate the worm, which in turn will impart a rotary motion to the worm-wheel and actuate the drawing-rolls.

I propose to provide for controlling the operation of the clutch by the tension or pull on the fabric, so that in case the fabric is not produced in quantities commensurate with the capacity of the drawing-rolls the increased strain on the fabric will act to automatically arrest the motion of the rolls. This is effected by a movable device adapted to engage the fabric before the latter is acted

on by the drawing-rolls and subject the fabric to a predetermined and uniform pressure, the arrangement being such that when the tension on the fabric is increased for any reason beyond the pressure exerted by the movable device the resulting movement of the latter will operate the clutch and arrest the motion of the drawing-rolls. This movable device is in the form of a horizontally-movable roller 24, extending parallel with the drawing-rolls and above them, with its ends extended outward through horizontal slots 25 and 26 in the respective bars of the take-up frame. At one end, to the left in Fig. 1, the roller is extended loosely through a slot 27 in the lower end of an arm 28 at the outer side of the frame-bar, which arm has its upper end fixed to the extended end of a rocking bar 29, Fig. 5, mounted loosely between the bars of the take-up frame. The opposite end of the roller is loosely sustained in a slot 30 in one end of an angular lever 31, mounted between its ends loosely on the extended end of the rocking bar 29, the opposite end of the lever being provided with a lateral finger 32, engaging in a vertical slot 33 in a vertical plate 34. The lower end of the plate is jointed to an arm 35, pivoted at one end to the frame-bar 3 and having its opposite end extended beneath an annular shoulder 36 on the clutch-block. As a result of this construction when the roller is moved to the left in Fig. 2 the lever 31 will be rocked and its end raised, and this lifting the pivoted arm 35 the end of the latter will engage the clutch-block and elevating the same against the action of its spring will disconnect the worm. When, on the other hand, the roller is moved in the opposite direction, the end of the lever 31 will be lowered and the spring will be permitted to positively depress the clutch-block and connect the same with the worm. The fabric from the needle-cylinder passes in engagement with a friction-bar 37, mounted between the bars of the take-up frame, then at the side of the movable roller 24, and finally between the drawing-rolls, the movable roller exerting its pressure on the fabric just in advance of the drawing-rolls and beneath the friction-bar.

The tension or pressure which the movable roller applies to the fabric is given by a weight 38, seated on an arm 39, fixed to the rocking bar 29 and sliding vertically on a fixed guide-rod 40, rising from the rotary ring-frame. This weight is so proportioned with relation to the character of the work, the speed of production, and the capacity of the drawing-rollers that the movable roller will be held in such position under normal conditions that the clutch will be connected with the drawing-rolls in operation, as shown in Fig. 2. If for any reason there is an interruption or variation in the production of the fabric or if the drawing-rolls operate more rapidly than is necessary to properly take up the fabric, there will be an increase

of tension on the fabric, which will tend to straighten out the work-line between the friction-bar 37 and drawing-rolls, which action will result in a slight movement of the movable roll to the left, and this, through the mechanism described, will disconnect the clutch and arrest the motion of the drawing-rolls. The movable roller under the influence of its weight then begins to move in the opposite direction to take up the additional slack, due to the interruption in the drawing action of the rolls, and when the slack is sufficient to permit the roller to move far enough it will act to again connect the clutch to continue the motion of the drawing-rolls. The controlling action of the roller is wholly automatic, its motion being but slight, and the action of the clutch is sensitive, so that there is an immediate response to any undue strain on the fabric. Furthermore, there is at no time a cessation in the taking up of the work, the weighted roller acting with a uniform pull when the drawing-rolls are not acting, and the latter being prevented by the clutch mechanism from drawing unduly beyond the proper degree.

It is obvious that my invention is not limited to drawing-rolls actuated to draw the work downward between them, as shown in the accompanying drawings, but is applicable to any form of mechanism which will act on the fabric to draw the same from the cylinder. For instance, in Figs. 6 and 7 I have represented my invention applied in connection with drawing-rolls of a different type. In this case the fabric instead of being drawn between two rolls side by side is lapped around the opposite sides of two roughened rolls 41 and 42, one lying above the other, the fabric from the lower roll being wound on a yielding winding-drum 43. The lower roll 42 is driven from the worm like in the first instance described and imparts motion to the upper roll through intermeshing gears 44 and 45. The upper roll in this form of take-up serves also as the movable device corresponding with the movable roller 24 in the first construction described, and it is mounted and connected with the clutch in the same manner, an increase of tension on the fabric causing the roll to yield and through its yielding motion to disengage the clutch.

Having thus described my invention, what I claim is—

1. The combination of a fixed bed-plate formed with a circular rack, a rotary ring mounted on the bed-plate, a take-up frame sustained by the ring, take-up rolls mounted in the frame, a vertical shaft mounted in bearings on the rotary ring, a pinion operatively connected with the shaft and engaging the rack, a worm mounted loosely on the shaft, a clutch member rotatable with the shaft and adapted to be engaged with the worm, a movable pressure-bar mounted in the take-up frame in position to engage the fabric, a weight acting on the bar, and con-

nections between said bar and the clutch member for controlling the latter.

2. The combination with the take-up frame formed with horizontal guides, of a horizontal pressure-bar movable in said guides and adapted to engage the fabric, a horizontal rocking bar mounted in the take-up frame above the pressure-bar, a weight applied to the rocking bar, connections between the two bars, a take-up mechanism mounted in the frame, a clutch controlling the operation of the take-up mechanism, and a connection between the clutch and the pressure-bar.

3. The combination with the take-up frame of horizontal slots therein, a horizontal pressure-bar movable in said slots, a rocking bar above the same, arms on the rocking bar provided with slots in which the ends of the pressure-bar extend, a weight applied to the rocking bar, take-up mechanism mounted in the frame, a clutch controlling the operation of the same, and suitable connections between the clutch and pressure-bar.

4. The combination with a take-up frame, of a horizontally-movable pressure-bar, a rocking bar, connections between the same whereby the horizontal movements of the pressure-bar will rock the rocking bar, an arm projecting from the rocking bar, a vertical fixed guide, a weight movable vertically thereon and resting on the arm and tending to depress it, a take-up mechanism, a clutch controlling the operation of the same, and connections between said clutch and pressure-bar.

5. The combination of the take-up frame, a horizontally-movable pressure-bar, a rocking bar above it, suitable connections between them, a weight applied to the rocking bar, a fixed guide-bar opposite the rocking bar in position to be engaged by the work, take-up rolls below the pressure-bar, a clutch controlling the operation of said rolls, and connections between the clutch and the pressure-bar.

6. The combination of the take-up frame, take-up rolls, a vertical worm, a worm-wheel on the rolls engaged by the worm, a vertically-movable clutch member adapted to engage the worm, means for driving the clutch member, a spring acting on the clutch member to hold it in engagement with the worm, a hori-

zontal pressure-bar, a weight acting on the same, a lever operated by said bar, and a finger engaging the clutch member in opposition to the pressure of the spring and disconnected from the clutch member, said finger being engaged by the lever.

7. The combination of the take-up frame, take-up rolls, a worm-wheel on one of the rolls, a vertical shaft, a worm mounted loosely on the shaft, a clutch member rotatable with the shaft and movable endwise, a spring acting to maintain the engagement of the clutch member with the worm, a lever pivoted to the frame and engaging beneath a collar on the clutch member and disconnected from the same, a horizontally-movable pressure-bar, a rocking bar, an arm on the rocking bar engaged by the pressure-bar, said arm engaging the lever, and a weight on the rocking bar.

8. The combination of a fixed bed-plate provided with an internal circular rack, a rotary ring mounted thereon, a take-up frame on the ring, a pinion carried by the ring and engaging the rack, a gear driven by this pinion, a vertical shaft, a pinion on the lower end of the shaft and engaged by the gear, a worm on the shaft, a clutch member for engaging the worm with the shaft, take-up rolls driven by the worm, a movable device engaging the fabric and suitable connections between the same and the clutch member.

9. The combination of a fixed bed-plate formed with a circular rack, a rotary ring mounted on the bed-plate, a take-up frame sustained by the ring, take-up rolls mounted in the frame, a driving-shaft mounted in bearings on the rotary ring, a pinion meshing with the rack and operatively connected with the driving-shaft, operative connections between the driving-shaft and the take-up rolls, a clutch driven by the shaft, a movable device adapted to engage the work with a predetermined pressure and suitable connections between the movable device and clutch.

In testimony whereof I hereunto set my hand, this 6th day of September, 1900, in the presence of two attesting witnesses.

JOHN C. BREWIN.

Witnesses:

HOWARD W. WRIGHT,
EDWIN H. MARSTELLER.