

G. E. BABCOCK.
YARN CHANGER FOR KNITTING MACHINES.
APPLICATION FILED OCT. 24, 1907.

916,966.

Patented Apr. 6, 1909.

8 SHEETS—SHEET 1.

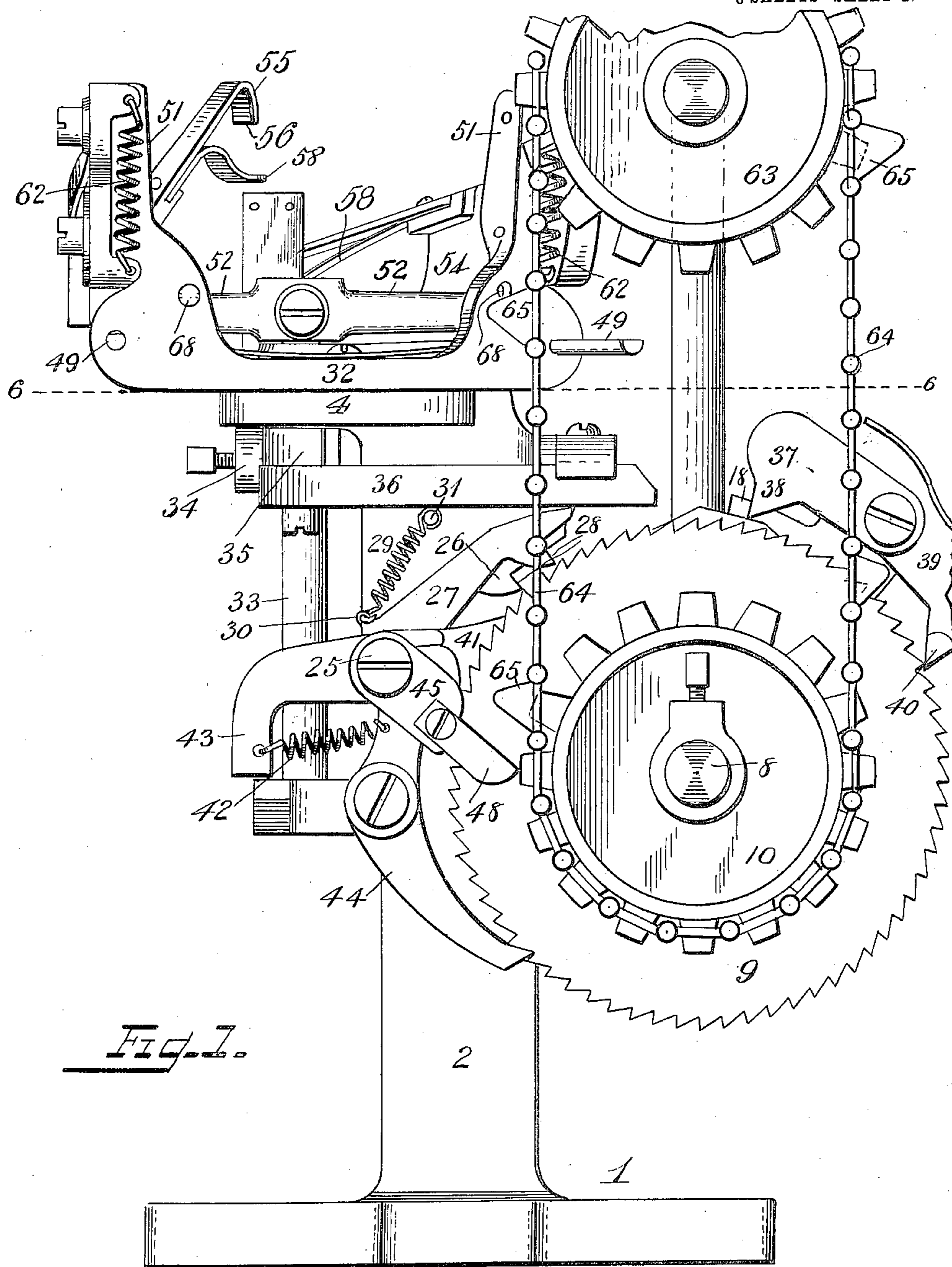


Fig. 1.

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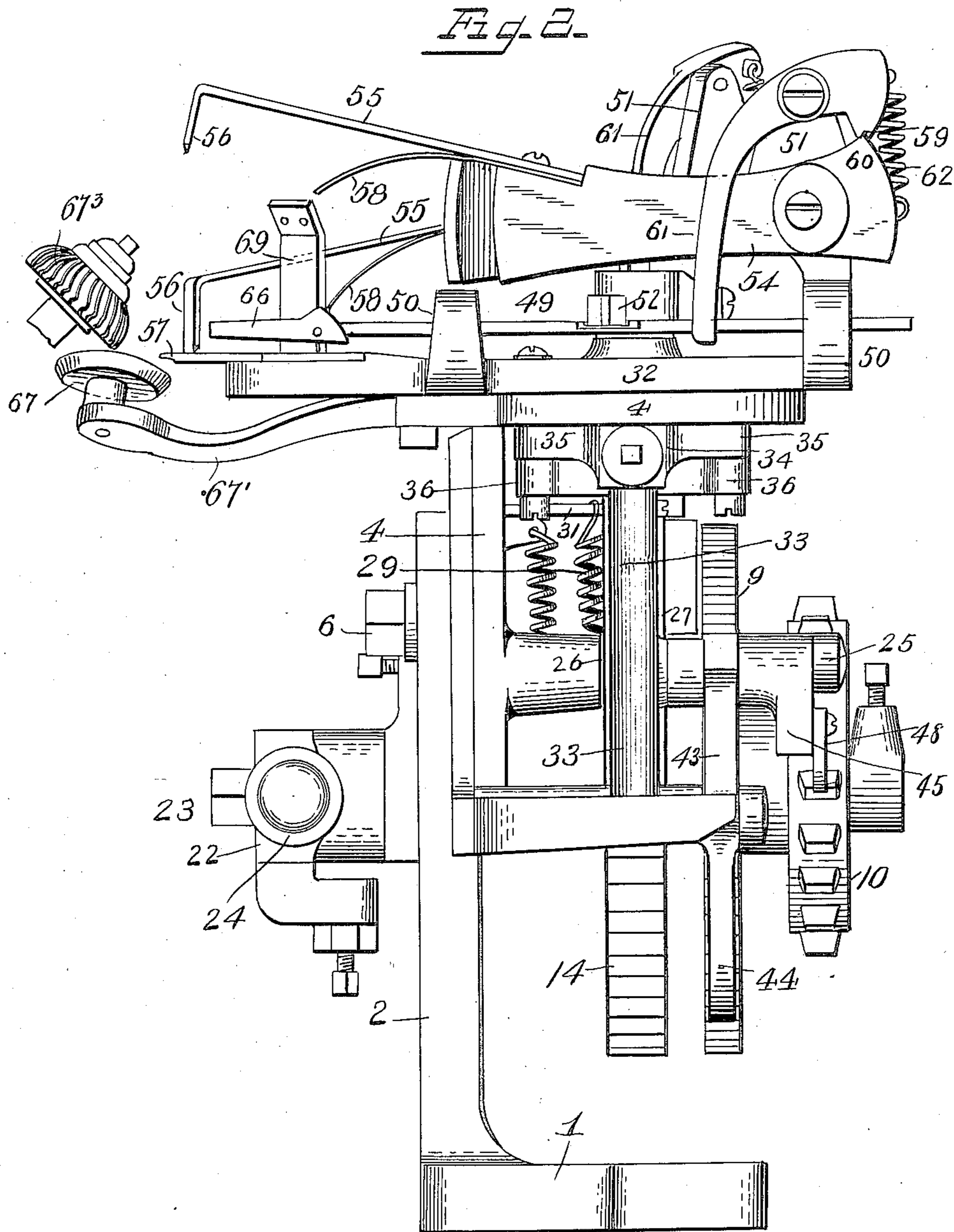
F. L. Ormand

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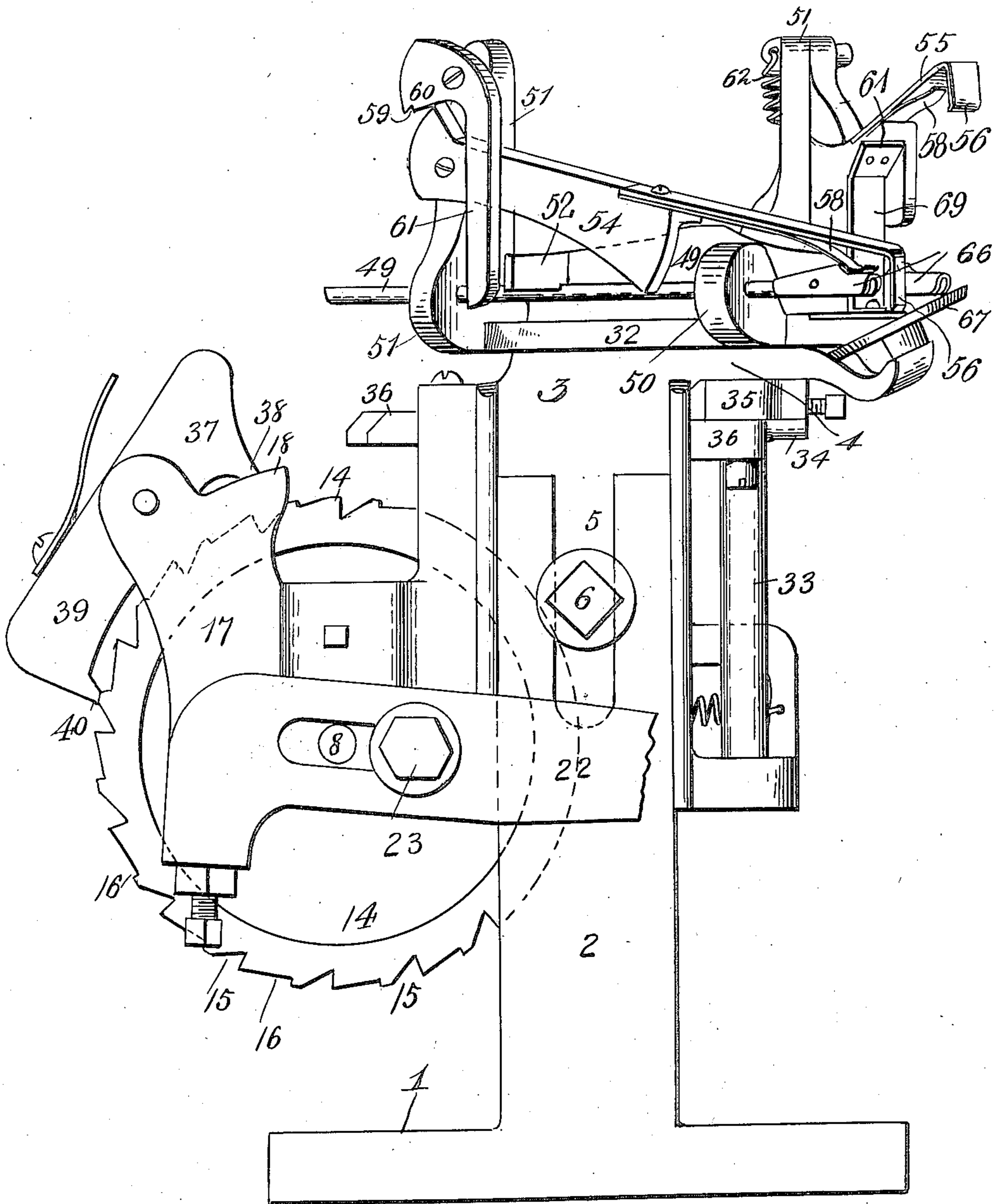
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8 SHEETS—SHEET 3.



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Fig. 3

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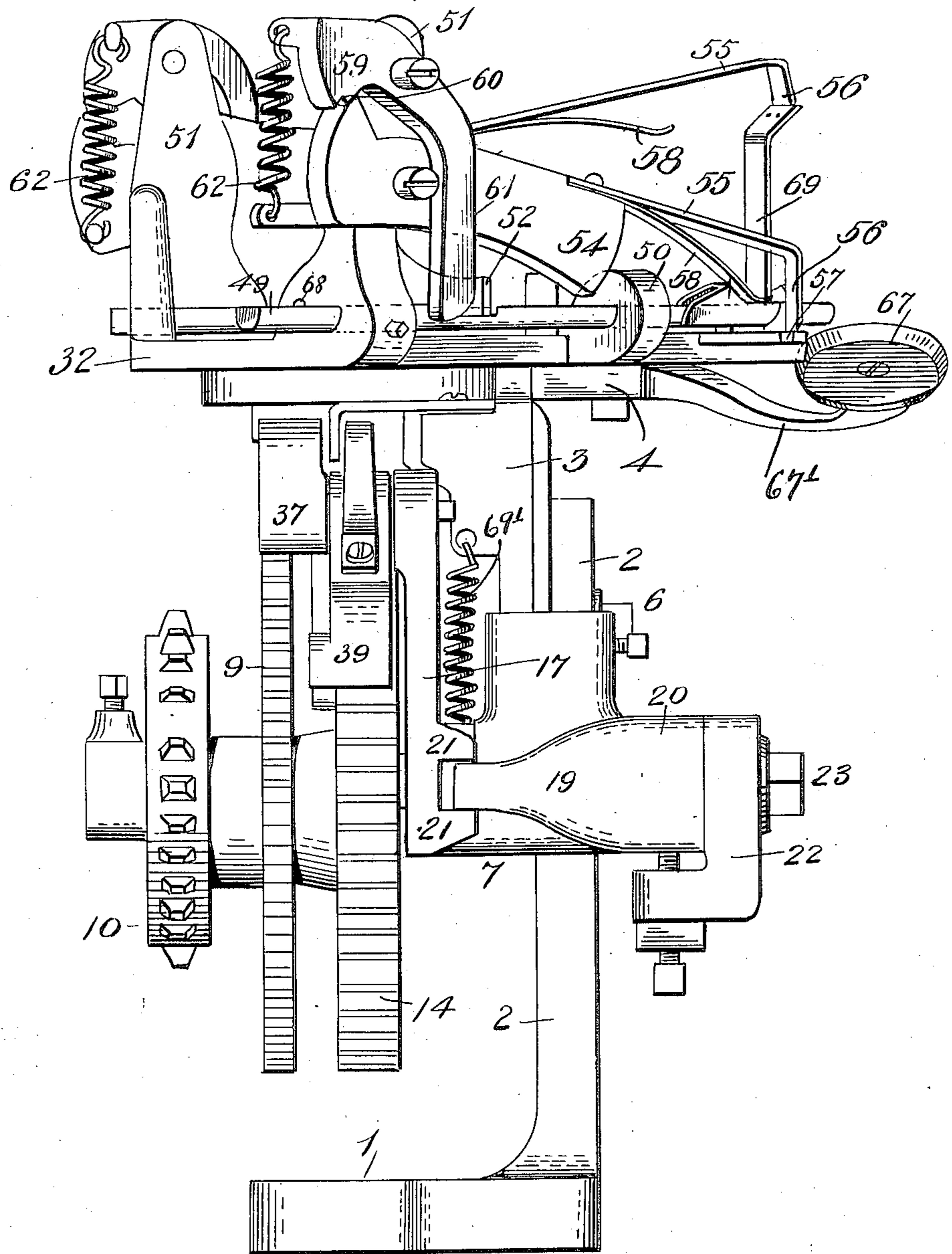


Fig. 4.

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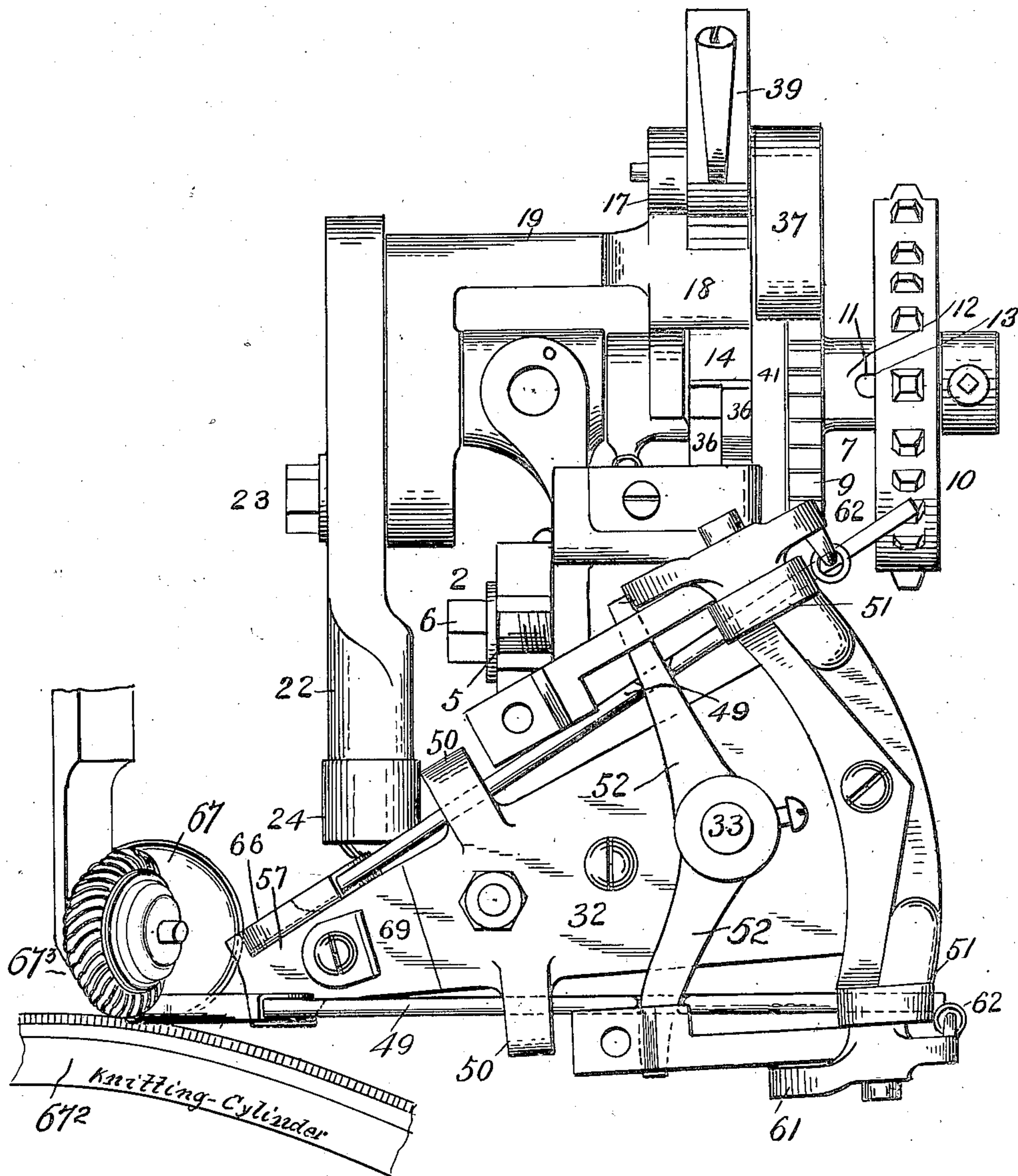


Fig. 5.

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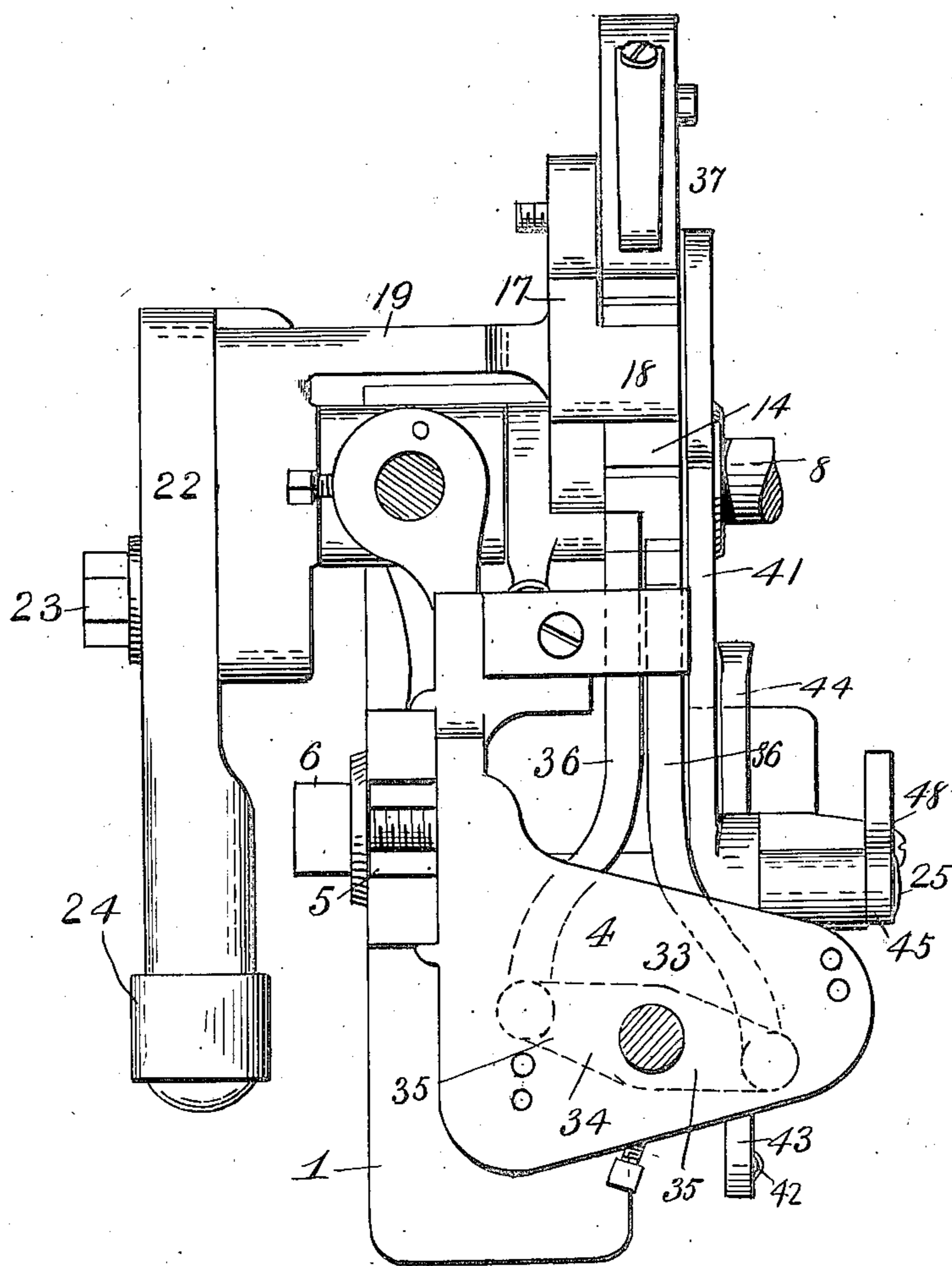
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8 SHEETS—SHEET 6.

Fig. 6.



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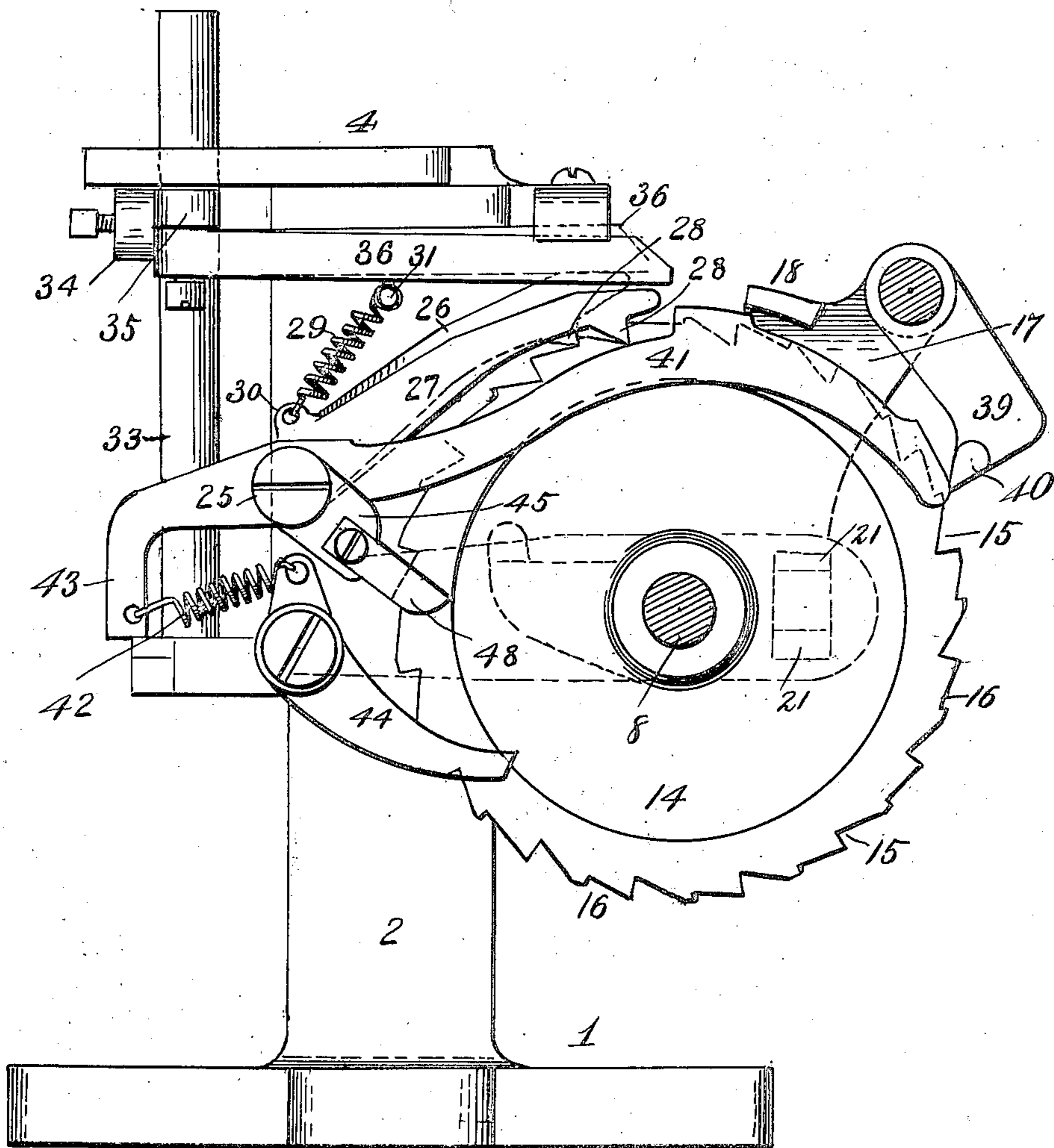
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8 SHEETS—SHEET 7.

Fig. 7.



Witnesses
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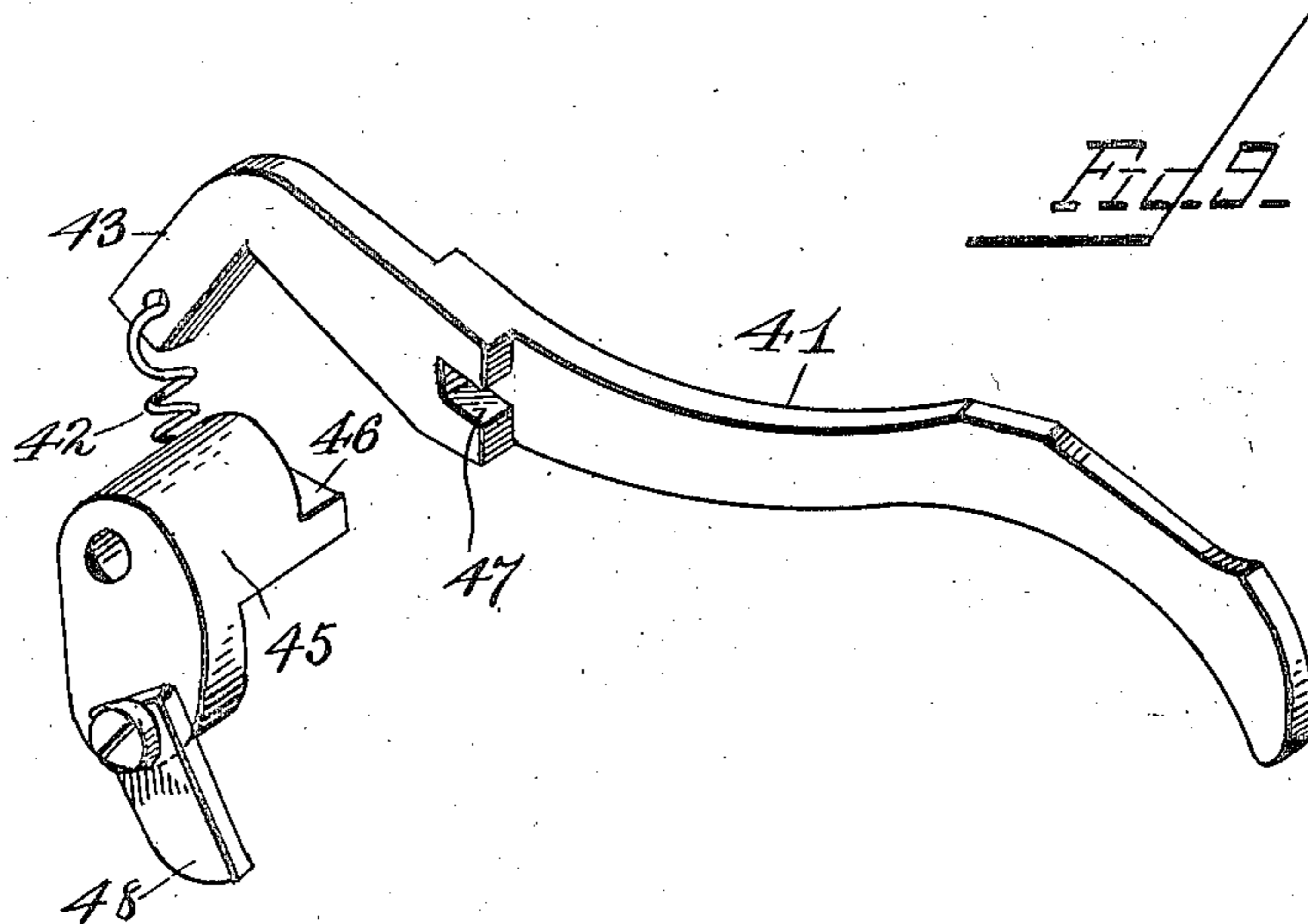
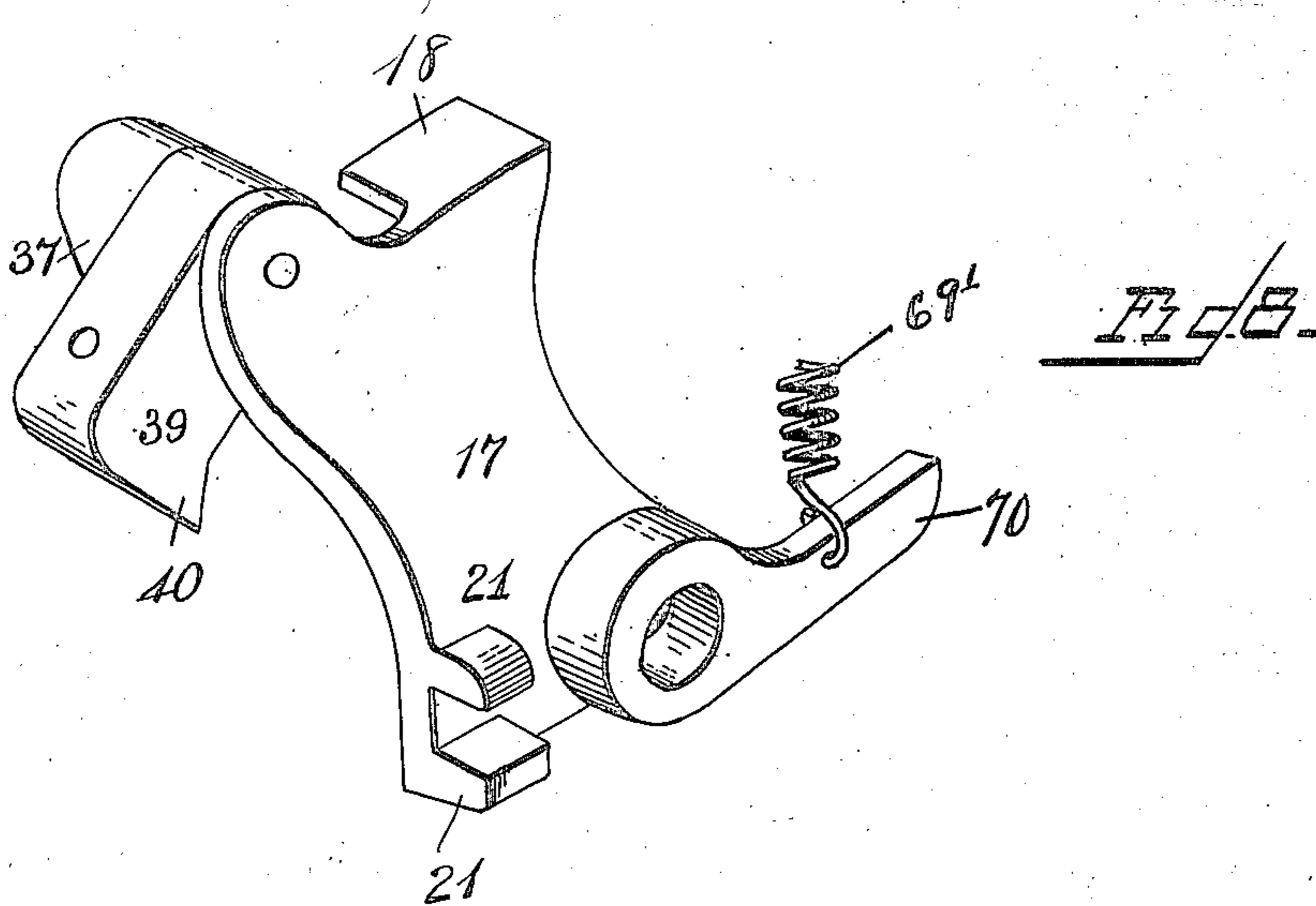
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8 SHEETS—SHEET 8.



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UNITED STATES PATENT OFFICE.

GEORGE E. BABCOCK, OF FORT PLAIN, NEW YORK.

YARN-CHANGER FOR KNITTING-MACHINES.

No. 916,966.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed October 24, 1907. Serial No. 399,008.

To all whom it may concern:

Be it known that I, GEORGE E. BABCOCK, a citizen of the United States, residing at Fort Plain, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Yarn-Changers for Knitting-Machines; and I do 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.

This invention relates to new and useful improvements in yarn changing devices for knitting machines, and is especially applicable to spring needle knitting machines.

The object of the invention is the production of a comparatively simple and efficiently operating device of this character for automatically changing the kind or color of yarn being fed to the machine to yarn of a different kind or color without interfering with the operation of the knitting machine.

In the accompanying drawings,—Figure 1 is a front elevation of a yarn changer constructed in accordance with the invention; Fig. 2 is an end elevation; Fig. 3 is a rear view; Fig. 4 is a similar view to Fig. 2 looking in the opposite direction; Fig. 5 is a top plan view; Fig. 6 is a horizontal section cut on the line 6—6 of Fig. 1 and looking in the direction indicated by the arrows; Fig. 7 is a view similar to Fig. 1 with certain parts removed to more clearly show certain other features of the invention. Fig. 8 is a detail view of the setting mechanism and coöperative parts; and Fig. 9 is a detail perspective view of the regulating bar or member.

Referring more particularly to the drawings, which are for illustrative purposes only and therefore, are not drawn to any particular scale, 1 indicates a suitable frame or supporting structure of the yarn changing device, which essentially comprises an upright or standard 2 adapted to be mounted on the head of a knitting machine in the usual manner and an upright frame comprising a body portion 3 having a horizontal obliquely disposed support 4 extending from its upper end. The upper end of the upright or standard 2 is slotted longitudinally, as at 5, and the supporting frame adjustably or removably sustained in position thereto by a fastening screw 6 or other equivalent means. The body portion of the supporting

frame is provided at one side edge with an outwardly projecting bearing 7 in which is journaled a suitable rock shaft 8.

A ratchet wheel 9, having rearwardly inclined teeth, is loosely mounted on the rock shaft near one end thereof, and is held in removable engagement or locked with a sprocket wheel 10 mounted on the rock shaft by an extension 11, extending from the inner face of the sprocket wheel, and a hub 12 extending from the outer face of the ratchet wheel, said hub having a longitudinal recess 13 for the reception of the extension. A setting wheel 14 is also loosely mounted on the rock shaft and is spaced a suitable distance from the ratchet wheel. Said setting wheel is provided with a series of notches 15, which extend entirely around its circumference and are spaced equidistances apart, and also with a second series of notches 16 between the notches 15 entirely around its circumference, the notches 16, however, being of much less depth than the notches 15.

A rocker member 17 is mounted on the rock shaft between the setting wheel and the bearing 7 and is provided at its upper end with an inwardly projecting head or engaging member 18, which is disposed above and over the periphery of the setting wheel 14, the purpose of which will be disclosed. Said rocker member is keyed with the rock shaft by a connecting member 19, comprising a body 20, which is fixed to the inner end of the rock shaft adjacent the knitting machine, have a laterally projecting finger or engaging member 20, the free end of which is adapted to be received between two receiving lugs or extensions 21 projecting inwardly from one face of the rocker member.

A horizontally disposed operating lever 22 is adjustably secured to the body of the connecting member by a fastening screw 23 or other equivalent means and is provided with a roller 24 at its free end adapted to be engaged by the cam on the cylinder of the knitting machine, which is of well known construction and need not be shown, whereby the free end of the operating lever may be oscillated.

A laterally disposed pivot rod 25 extends outwardly from the outer face of the body portion of the supporting frame, and to this rod are pivoted two setting levers 26 and 27,

respectively, each having a downwardly inclined tooth or engaging portion 28 near its free end adapted to engage in the notches of the setting wheel. The teeth 28 are so arranged relatively to each other that when one engages in one of the notches 15 of the setting wheel, the other engages in one of the notches 16 of such wheel, the purpose of which will be disclosed. The teeth of the setting levers are normally held in engagement with the notches of the setting wheel by obliquely disposed springs 29 hooked at adjacent ends in the eyes of lugs 30 arising from the upper edges and near the pivot ends of the setting levers, and at their opposite or inner ends over a laterally disposed supporting pin 31, extending from the body portion of the supporting frame.

An obliquely disposed frame 32 of approximately V-shaped form is removably mounted on the support 4 of the supporting frame, and is so arranged with its apex adjacent the needles of the knitting machine. A vertical rock shaft 33 extends through the frame 32 near the enlarged end thereof and has fixed to it at a point immediately under said frame 32 a head 34 having oppositely extending laterally disposed arms 35. Two horizontally disposed push or operating bars 36 are loosely connected at adjacent ends to the outer ends of said arms 35 and are arranged to have their free ends work over the free ends of the setting levers 26 and 27. Normally, the free end of one of the push or operating bars projects some little distance beyond the free end of the other bar and is disposed in the path of the head or engaging portion 18 of the rocker member 17, while the other operating or push bar is sufficiently elevated to permit such head or engaging portion to pass thereunder when the rocker member is rocked inwardly.

A dog 37 is pivoted to the upper end of the rocker member 17 at a point outwardly of the head or engaging portion 18 thereof and is provided with an inclined tooth 38 adapted to engage the teeth of the ratchet wheel, and a dog 39 is also pivoted to the rocker member and is provided with an inclined tooth 40 adapted to engage the notches of the setting wheel 14, the purpose of which will be disclosed. A regulating member 41 is pivoted at one end to the pivot rod 25 and is arranged to work between the ratchet and setting wheel, the free end of said member being normally held in an elevated position by a spring 42 connected at one end in an eyed extension 43, depending from the pivot end of the regulating member and at its opposite end to the pivot end of a pawl 44, pivoted to the body of the supporting frame in position to have its front end engage the teeth of the ratchet wheel to prevent a retrograde movement thereof dur-

ing operation of the mechanism. The upper edge of the regulating member 41 is so curved at its free end as to hold the dog 37 from engagement with the ratchet wheel until the rocker member 17 is near the end of its forward stroke or movement, so as to normally turn the ratchet wheel one notch at a time or impart a step-by-step movement thereto. Said regulating member, when in its normal or elevated position, also holds the dog 39 from engagement with the notches of the setting wheel, the purpose of which will be disclosed.

An operating member 45 is pivoted to the outer end of the pivot rod 25, and is provided with an engaging finger or portion 46, adapted to seat in a recess 47 in the outer face of the regulating member and effect an interlocking engagement between said regulating member and operating member. An oblique, inwardly projecting arm or member 48 is fixed to the operating member in position to have its free end disposed in front of the path of the sprocket wheel 10, the purpose of which will be disclosed.

Two horizontally disposed, oppositely movable yarn-changing members 49 are arranged, one near each side edge of the frame 32. These members are in the form of solid rods arranged to work through bearings in the nature of lugs 50, projecting from the side edges of the frame 32 and through corresponding guide openings near the lower ends of two upright supporting arms or members 51, arising from the upper face and enlarged end of said frame. Said yarn-changing members are adapted to move longitudinally in opposite directions when the rock shaft 33 is rocked in its bearings by two oppositely extending arms 52, which engage notches in the yarn-changing members, and extend from a head 53 fixed to the upper end of the rock shaft 33 above the V-shaped frame 32.

Two horizontally disposed lifting members 54 are pivoted to the outer faces of the upright arms or members 51, and attached at their ends to the free ends of these lifting members are yarn cutters 55 in the form of flat bars bent inwardly at approximately right angles at their free ends to form cutting portions 56 adapted to strike a plate 57 disposed in their path and sustained at the outer end of the frame 32 in any suitable manner. The yarn cutters are provided with flat yarn-engaging springs 58, the purpose of which will be apparent. The pivot ends of the lifting members 54 are provided with engaging portions or teeth 59 adapted to be engaged by keepers in the form of recessed jaws or portions 60 formed at the pivot ends of locking levers 61 pivoted to the upright arms or members 51 of the frame 32 above the pivot points of the lifting members. The free ends of these locking mem-

bers project below the lifting members and are disposed in the path of the arms 52.

Coiled springs 62 are arranged between the pivot ends of the lifting members and locking levers, the function of which will be disclosed. In practice, one of the lifting members is held in elevated or inoperative position as shown by its locking lever, while the other member is held in operative or lowered position. The lower or under edges of the lifting members are inclined outwardly so as to be returned to their elevated or inoperative positions by the forward stroke or movement of the arms 52.

A sprocket wheel 63 is journaled a suitable distance above and in alinement with the sprocket wheel 10 and a continuous chain 64 runs over these sprocket wheels. This chain is provided at a suitable point with an outwardly extending engaging portion or member 65 adapted to strike or engage the engaging ringer or portion 46 of the operating member 45 at each completion of its circuit, the purpose of which will be disclosed.

Yarn feeders 66 are pivoted at the inner ends of the yarn changing members and a guide wheel 67 removably mounted upon the outer end of the horizontal arm 67', in proper relation with the yarn feeders, in position to run in contact with the needles of the knitting cylinder 67² and under the stitch or sinker wheel 67³, the purpose of this wheel being to guide the end of the cut yarn between the stitch wheel and needles. In practice, the yarn is fed through suitable guide openings 68 in the arms of the frame 32, thence through guide openings in an upright guide 69 mounted on and near the apex end of said frame, and thence between the yarn changing members 49 and the pivoted yarn feeders 66.

In the operation of the invention, one of the yarn-changing members being in operative or knitting position, the adjacent yarn cutter will be held in an inoperative position, as shown. As the operating lever 32 is pressed downward by the roller 24 thereof, being engaged by the cam on the cylinder of the knitting machine, the rocker member 17 is rocked or moved inwardly by the rock shaft. As the rocker member is near the end of its forward stroke or movement, the dog 37 engages the ratchet wheel 9 and turns it one notch. The rocker member is then caused to return to its initial position by a spring 68 connected at one end with a finger 70 extending inwardly from the rocker member and at its opposite end with the body portion of the supporting frame. As the operating lever is oscillated a step-by-step movement is imparted to the ratchet wheel until the engaging portion 65 of the chain 64 strikes the engaging finger or portion 48 of the operating lever 45 and causes a depression of the free end of the regulating mem-

ber. After the free end of the regulating member has been depressed, the dog 39 engages the setting wheel 14, and as the rocker member returns to its initial position moves the setting wheel one notch and reverses the relative position of the free ends of the push or operating bars; that is, lowers the one that was in elevated position in the path of the head or engaging portion 18 of the rocker member and elevates the other. As the rocker member is now rocked forwardly its head or engaging portion engages the free end of the push or operating bar now disposed in its path, and through the medium of the vertically disposed rock shaft 33, moves the lifting arms in opposite directions. As the arms are moved, one engages the inclined edge of one of the lifting members 54 and raises the yarn cutter that was in lowered or yarn-cutting position to elevated or inoperative position, and carries the adjacent yarn-changing member to its operative or knitting position; and at the same time the other arm moves the other yarn-changing member to its inoperative position and trips the adjacent locking lever 61 when the adjacent yarn cutter is released and cuts the yarn, its spring 58 bearing upon the yarn feeder of the yarn changing member in inoperative position and thereby causing said yarn feeder to hold the cut end of the yarn. During this operation, the dog 37 turns the ratchet wheel a sufficient number of notches to disengage the engaging portion or member 65 of the chain with the engaging finger or portion 48 of the operating member 45 when the regulating member is returned to its normal position by the spring 42.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention, as defined by the appended claims.

Having described my invention I claim:

1. A yarn changer for knitting machines comprising a supporting structure adapted for attachment to the head of the machine, oppositely movable yarn-changing members sustained for endwise movement by the supporting structure, one of the members being in operative or knitting position and the other in inoperative position, yarn cutters pivotally mounted above the yarn-changing members, one of the cutting members being in operative or yarn-cutting position and the other in elevated or inoperative position, and means sustained by the supporting structure and adapted to be actuated by the knitting

machine for reversing the relative positions of the yarn-changing members and yarn cutters.

2. A yarn changer for knitting machines embracing a supporting structure adapted for attachment to the head of the machine, oppositely movable yarn-changing members sustained for endwise movement by the frame, yarn feeders at adjacent ends of the yarn-changing members, yarn cutters pivotally sustained above the yarn-changing members, actuating mechanism for the yarn-changing and cutting members, setting mechanisms for setting said actuating mechanism in operative position, and actuating means sustained by the supporting structure of the yarn changer and adapted to be actuated by the knitting machine for actuating the actuating mechanism for the yarn-cutting and changing members.

3. A yarn changer for knitting machines embracing a supporting structure adapted for attachment to the machine, oppositely movable yarn-changing members sustained for endwise movement by the supporting structure, yarn feeders at adjacent ends of the yarn-changing members, yarn cutters pivotally sustained above the yarn-changing members, a vertically disposed rock shaft journaled to the supporting structure, a head having oppositely extending arms adapted to engage the yarn-changing members fixed to the rock shaft, and means sustained by the supporting structure of the yarn changer adapted to be actuated by the knitting machine for actuating the rock shaft at predetermined intervals.

4. A yarn changer for knitting machines embracing a supporting structure adapted for attachment to the machine, oppositely movable yarn-changing members sustained for endwise movement by the supporting structure, yarn feeders at adjacent ends of the yarn-changing members, a vertically disposed rock shaft journaled to the supporting structure, a head fixed to said shaft, said head having oppositely extending arms adapted to engage with the yarn-changing members, two horizontally disposed push bars fixed at adjacent ends to the rock shaft, setting mechanism sustained by the supporting structure for setting the push bars in operative position, and means sustained by such structure and adapted to be actuated by the knitting machine for actuating the push bars at intervals of predetermined duration.

5. A yarn changer for knitting machines comprising a supporting structure, a vertically disposed rock shaft journaled to the supporting structure, a horizontal rock shaft journaled to the supporting structure, a setting wheel mounted on the rock shaft, said wheel having two series of notches in its periphery, one series being of greater depth

than the other, setting levers pivotally sustained by the supporting structure, the free end of one of the levers normally engaging in a notch of one series and the free end of the other in a notch of the other series, a head fixed to the vertically disposed rock shaft, said head having two oppositely extending obliquely disposed arms, two corresponding oppositely disposed push bars connected at adjacent ends to the ends of said arms, the free ends of the push bars working over the free ends of the setting levers, a head having two oppositely extending arms fixed to the vertically disposed rock shaft above said first-mentioned head, and means sustained by the supporting structure and adapted to be actuated by the knitting machine for actuating the push bars.

6. In a yarn changer, the combination with a supporting structure, of a vertically disposed rock shaft journaled thereto, a head having oppositely extending arms fixed to the rock shaft, a head having oppositely extending oblique arms fixed to the rock shaft below the first-mentioned head, two oppositely disposed push bars fixed at adjacent ends to the arms of said second-mentioned head, means for normally maintaining the push bars in inoperative position, means for setting the push bars in operative position at predetermined intervals, and means sustained by the supporting structure and adapted to be operated by the knitting machine for actuating the push bars.

7. A yarn changer for knitting machines embracing a supporting structure, a horizontal rock shaft journaled thereto, a rocker member mounted on the rock shaft, the free end of said member having a horizontal head or engaging portion, a setting wheel mounted on the rock shaft and arranged to work under the head or engaging portion of the rocker member, said wheel having two series of notches in its periphery, one of the series being of greater depth than the other, two setting levers pivotally sustained by the supporting structure, one of the members normally engaging in one of the notches of one series of the setting wheel and the other in a notch of the other series, a vertical rock shaft journaled to the supporting structure, two oppositely disposed push bars fixed at adjacent ends to the rock shaft, the free ends of said bars bearing upon the free ends of the setting levers, a head having oppositely extending arms fixed to the vertical rock shaft, and means carried by the supporting structure adapted to be actuated by the knitting machine for turning the setting wheel one notch at intervals of predetermined duration, with means for rocking the rock shaft.

8. A yarn changer for knitting machines embracing a supporting structure, two op-

positely movable yarn changing members sustained thereby, yarn feeders at the ends of said members, lifting members pivotally mounted upon the supporting structure above the yarn changing members and provided at their pivoted ends with engaging portions, locking levers pivotally mounted above the pivoted ends of the lifting members and having keepers to receive the engaging portions of the lifting members whereby the latter are held in elevated position, springs between the pivoted ends of the lifting members and the locking levers for normally holding the keepers of the latter in engaged relation with the extensions of the former, and actuating means for the yarn changing members and the lifting members.

9. A yarn changer for knitting machines embracing a supporting structure adapted for attachment to the machine, a horizontal rock shaft journaled thereto, a ratchet wheel loosely mounted on the shaft, means for imparting step-by-step movement to the ratchet wheel, a rocker member fixed to the rocker shaft, a dog pivoted to the free end of the rocker member, a regulating member pivoted to the supporting structure, the upper edge of said regulating member being so curved as to only permit said dog to engage the ratchet wheel when the rocker member is near the end of its forward movement so as to impart a step-by-step movement to said

wheel, a setting wheel loosely mounted on the rock shaft, said wheel having two series of equally spaced notches in its periphery, one of the series being of greater depth than the other, two setting levers pivoted at adjacent ends to the supporting structure, the free end of one of the levers normally engaging in a notch of one of the series in the setting wheel and the free end of the other lever in a notch in the other series, means fixed to the rocker shaft and operable by the knitting machine to actuate said shaft, and means for depressing the free end of the regulating member at predetermined intervals.

10. A yarn changer for knitting machines embracing a supporting structure adapted for attachment thereto, oppositely movable yarn changing members sustained by the supporting structure, yarn feeders at the outer ends of the yarn changing members, a stitch wheel and a guide wheel arranged for contact with the needles of the knitting machine and to feed the yarn between the needles and stitch wheel.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE E. BABCOCK.

Witnesses:

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A. L. GROS.