

No. 744,449.

PATENTED NOV. 17, 1903.

T. S. WILKIN.  
SET WORKS FOR SAWMILLS.

APPLICATION FILED FEB. 20, 1902.

NO MODEL.

4 SHEETS—SHEET 1.

Fig. 1.

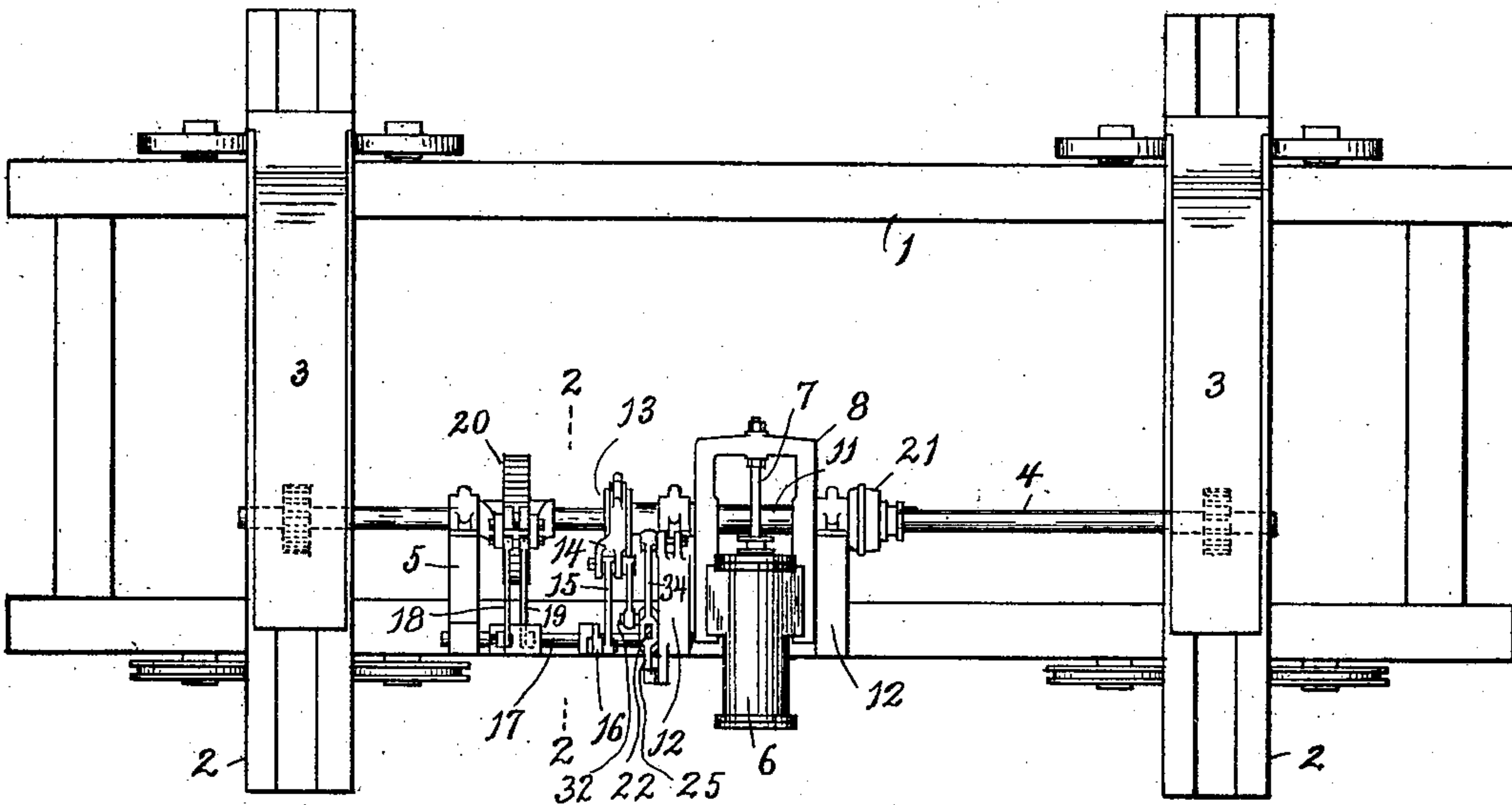
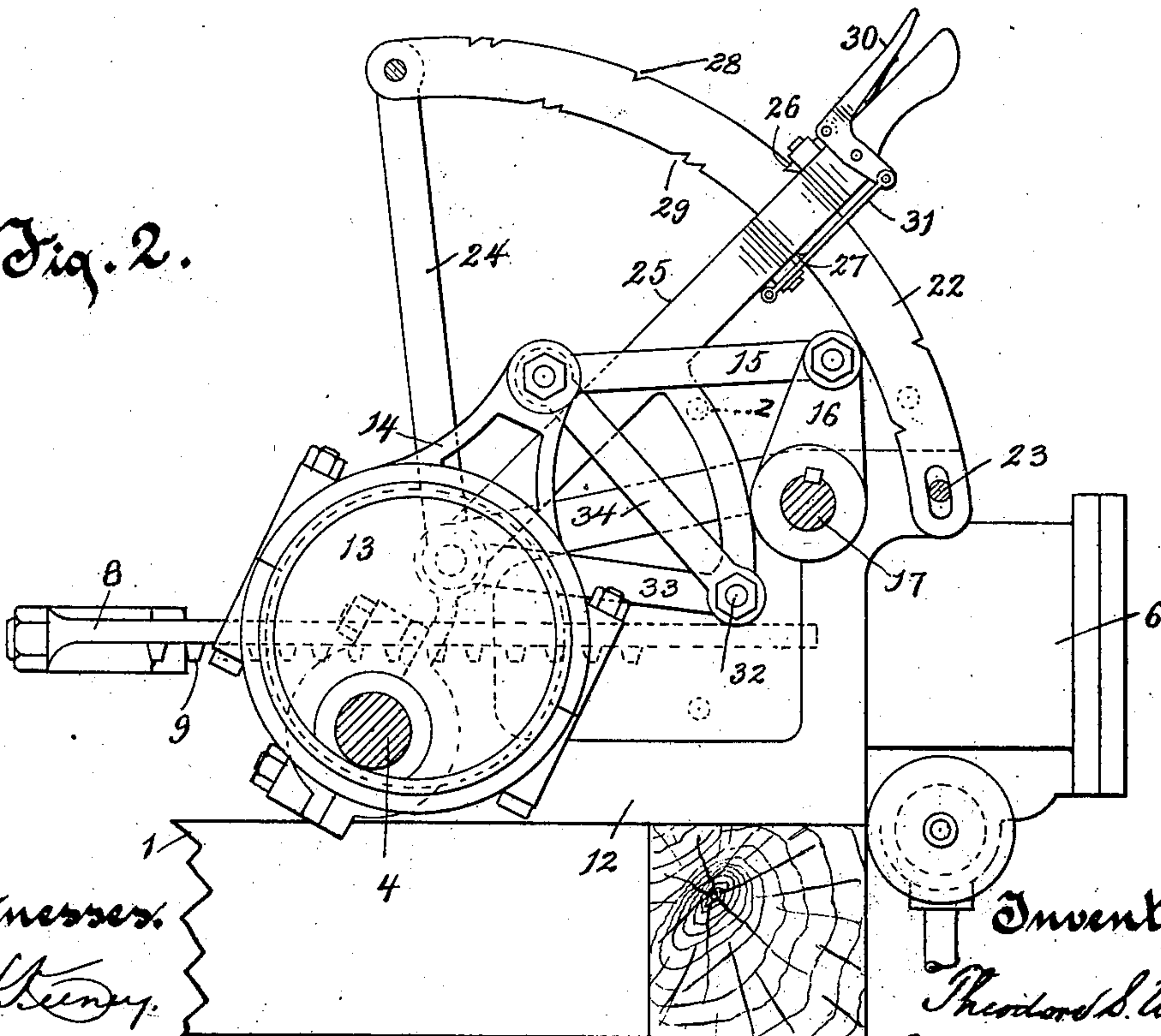


Fig. 2.



Witnesses.

C. H. Keeney.

Anna C. Faust.

Inventor.

Theodore S. Wilkin

By Benedict & Mossell.  
Attorneys.

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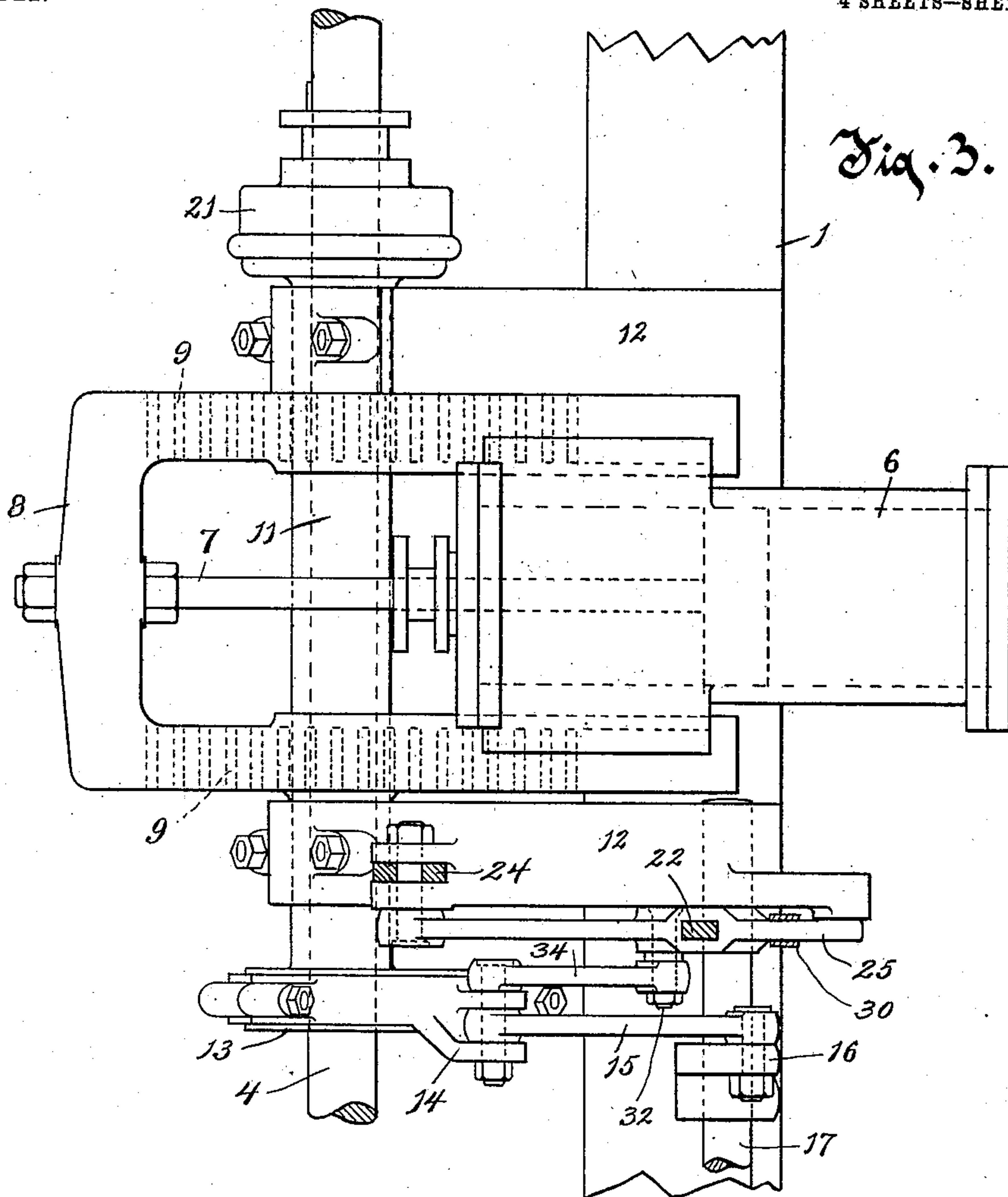
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4 SHEETS—SHEET 2.



Witnesses.  
C. N. Kenney.  
Anna C. Faust.

Inventor.  
Theodore S. Wilkin.  
By Benedict & Morsell.  
Attorneys.

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4 SHEETS—SHEET 3.

Fig. 4.

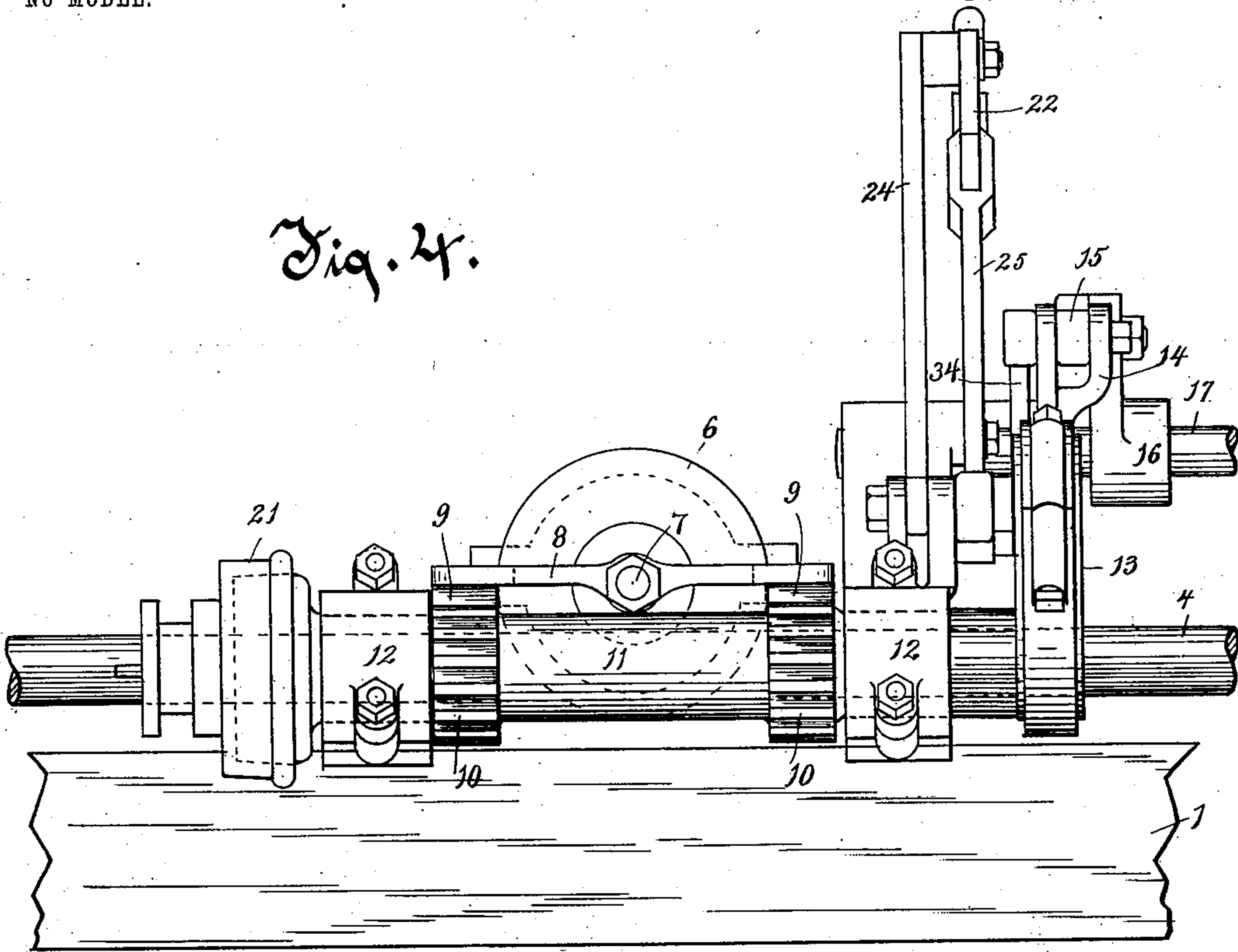
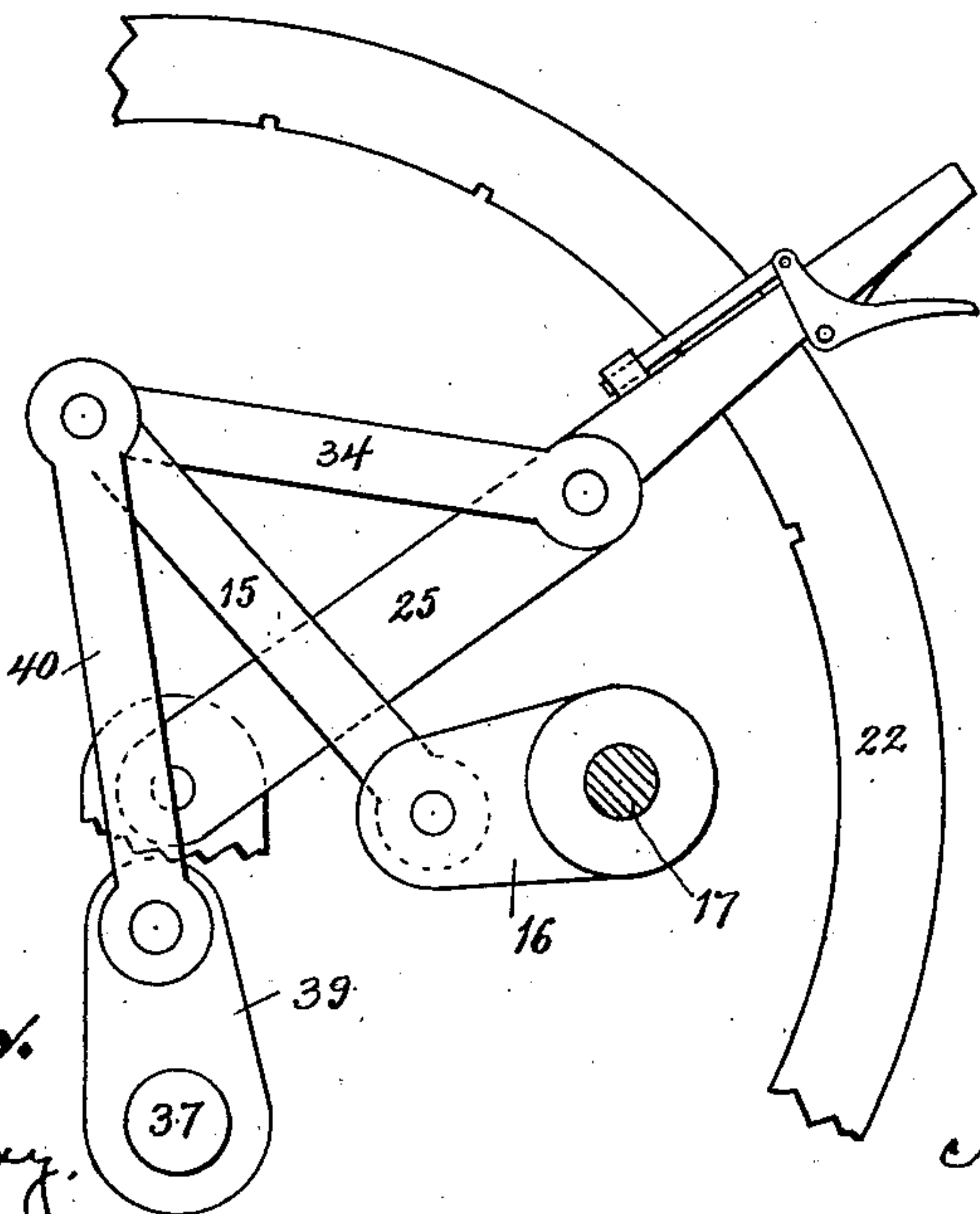


Fig. 7.



Witnesses.

*C. H. Kenney.*

*Anna C. Faust.*

Inventor.

*Theodore S. Wilkin.*

*By Benedict & Morsell.*

*Attorneys.*



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4 SHEETS—SHEET 4.

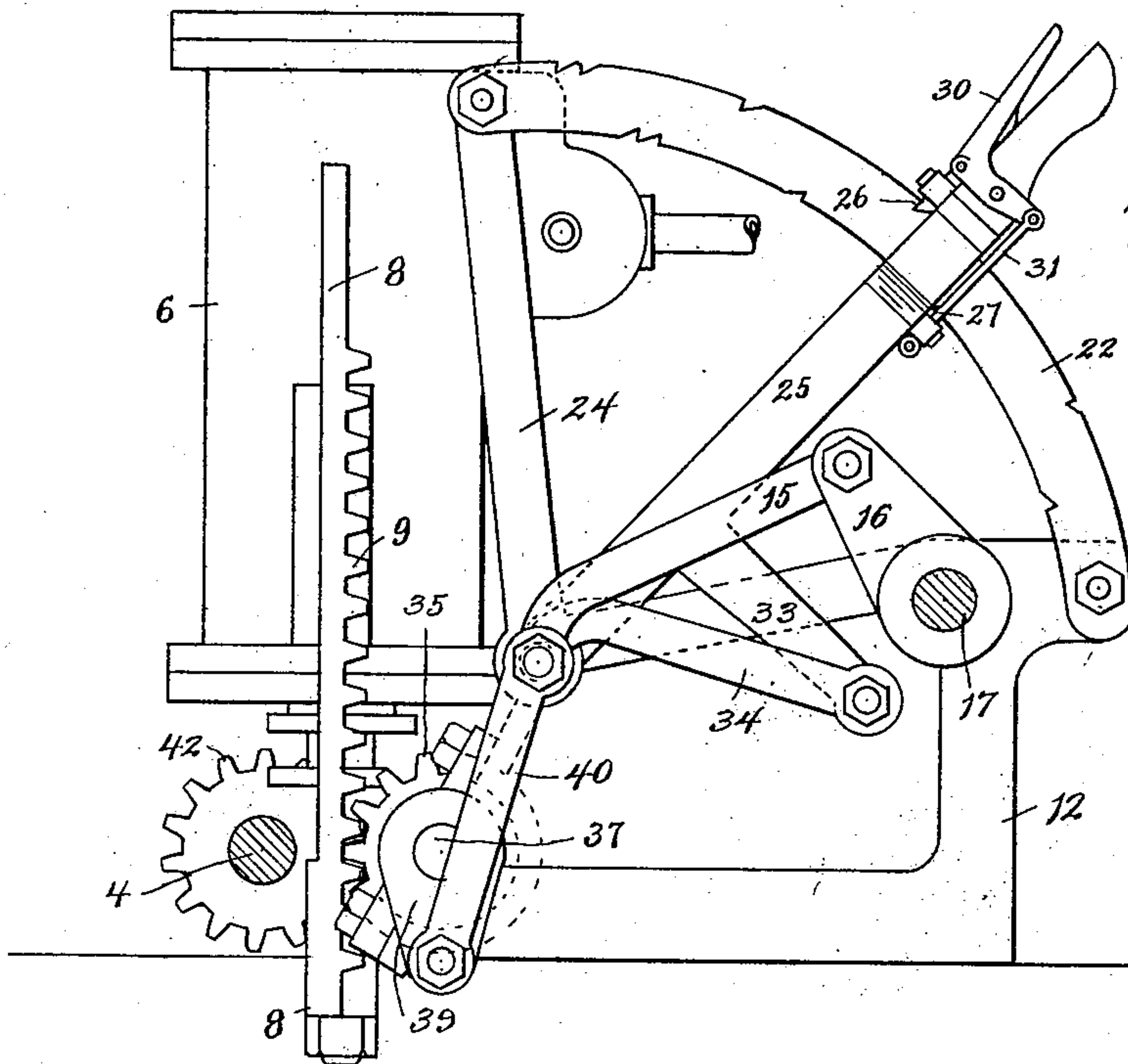


Fig. 5.

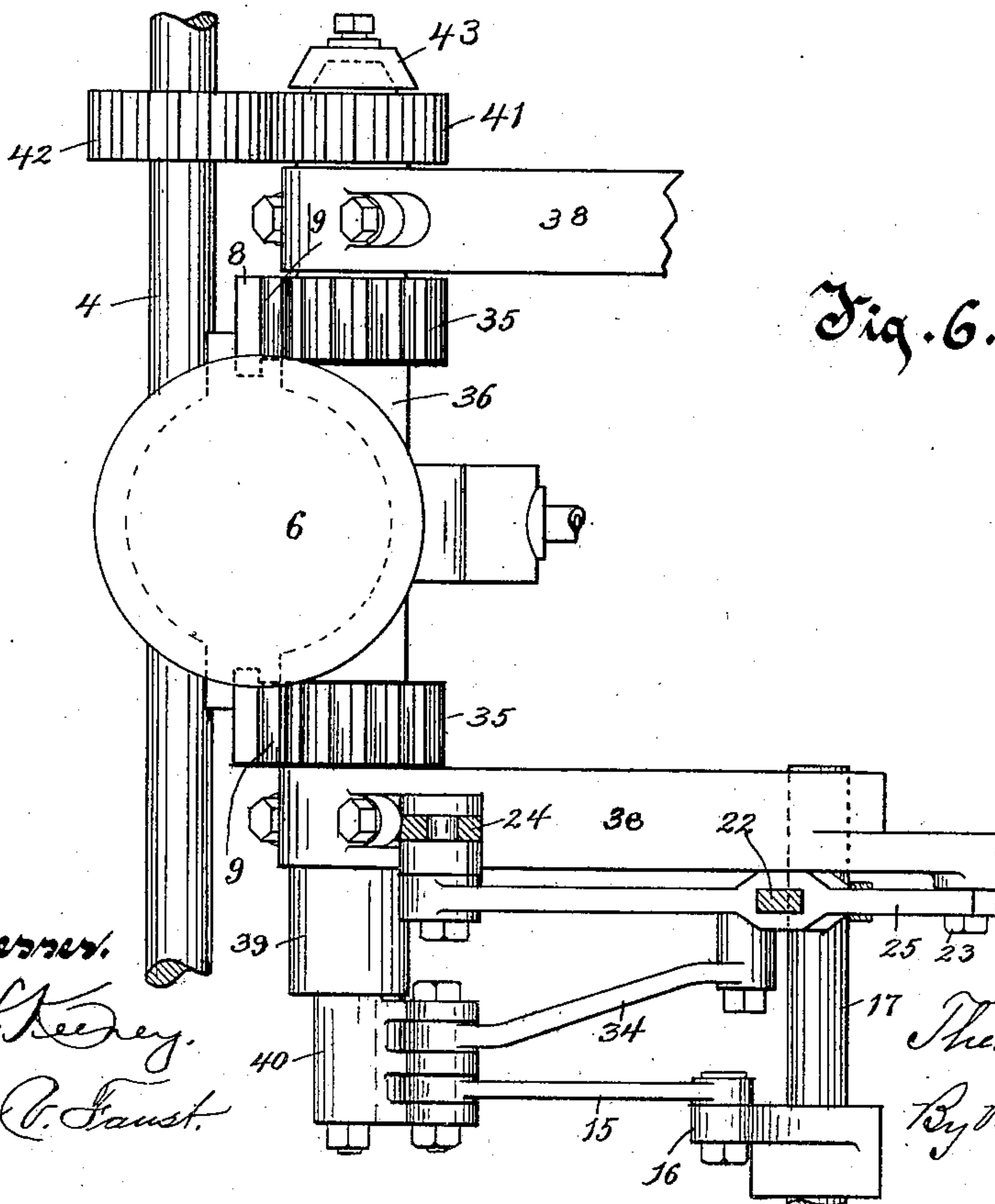


Fig. 6.

Witnesses.  
C. H. Keeney.  
Anna C. Faust.

Inventor.  
Theodore S. Wilkin  
By Benedict & Morsell.  
Attorneys.



# UNITED STATES PATENT OFFICE.

THEODORE S. WILKIN, OF MILWAUKEE, WISCONSIN.

## SET-WORKS FOR SAWMILLS.

SPECIFICATION forming part of Letters Patent No. 744,449, dated November 17, 1903.

Application filed February 20, 1902. Serial No. 94,930. (No model.)

*To all whom it may concern:*

Be it known that I, THEODORE S. WILKIN, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Set-Works for Sawmills, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

The purpose of my invention is to provide improved means in set-works for sawmills for operating and controlling the knees on the log-carriage, such means being embodied in simple, easily-operated, strong, and reliable mechanism capable of being constructed at a minimum of expense so disposed as to be subject to the least possible friction, thereby obviating wear and undue play of parts, especially such as would occur in sliding parts, and adapted without positive stops, which result in shocks, to move quickly and surely, but with such gradually-decreasing rapidity toward the close of the movements as to prevent excess movement or overthrow and securing accuracy in setting the knees on the carriage.

The invention consists of the mechanism, its parts, and combinations of parts, as herein described and claimed, or the equivalents thereof.

In the drawings, Figure 1 is a top plan view of a log-carriage with the knees thereon movable laterally thereof and with my improved set-works in a proper relation to the carriage and knees. Fig. 2 is a transverse section of the set-works enlarged, on line 2 2 of Fig. 1, looking toward the right. Fig. 3 is a plan of the mechanism shown in Fig. 2. Fig. 4 is a view of the mechanism shown in Fig. 2 looking at it from the left toward the right. Figs. 5 and 6 are respectively an end view and a plan of a varied or modified form of parts of the mechanism and with which the steam-cylinder is shown in upright position. Fig. 7 illustrates a variation in form of features of the invention, the construction being allied to that shown in Figs. 5 and 6.

In the drawings, 1 represents the log-carriage of a form common in sawmills.

2 2 are the transverse head-blocks of the carriage, which head-blocks are provided with ways on which the knees 3 3 are mounted and

travel transversely of the carriage. The knees are provided on their under surface with toothed racks which mesh with pinions on the shaft 4, whereby by the rotation of the shaft the knees are coincidently moved forward or back on the head-blocks.

The construction thus far described is shown in the drawings only in outline, as such mechanism is common in sawmills and forms no part of the present invention except only as the same are related to and operated by the set-works embodying my invention.

The shaft 4 has its support in bearings therefor in the head-blocks and also in the bracket 5, fixed on the carriage. For rotating the shaft a motor is required, and in the present instance I have shown a cylinder 6 of an engine or motor having a piston provided with a rod 7, which is secured to the head or transverse member of a yoke or frame 8, the parallel longitudinal sides or legs of which yoke slide in guides therefor on the steam-cylinder, and these legs are provided with toothed racks 9, as shown in Figs. 2 and 3. These toothed racks mesh with pinions 10 10 on a sleeve 11, loose on the shaft 4. The sleeve 11 has its bearing in brackets 12 12, fixed on the log-carriage. For convenience of construction the shaft 4 may extend loosely through sleeve 11.

An eccentric 13 is mounted rigidly on the sleeve 11, and an eccentric-strap arm 14 rides on the periphery of the eccentric and is reciprocated by the rotation of the eccentric. The eccentric-arm 14 is connected by a rod 15 to the wrist of a crank-arm 16, keyed on a rock-shaft 17, which rock-shaft is mounted in the brackets 5 and 12 on the log-carriage. Two links 18 19, one joined to the wrist of a crank projecting upwardly from the rock-shaft 17 and the other jointed to the wrist on a crank projecting downwardly from the rock-shaft 17, are connected at their other ends to carriers provided with pawls that severally engage a ratchet-wheel 20, fixed on the shaft 4, in one direction, being adapted alternately to rotate the wheel and the shaft, thereby producing a continuous rotation of the shaft when in action.

By means of the construction just described when the piston-rod 7 and yoke 8 are moved in one direction the full extent of their travel



the sleeve 11 is correspondingly rotated in one direction a full revolution. At the same time (if the set-works are so adjusted that the rock-shaft 17 is oscillated to any extent whatever by the rotation of the sleeve 11) the pawls on the pawl-carriers will alternately engage the ratchet-wheel 20 in one and the same direction and rotate it, thereby rotating the set-shaft 4 and correspondingly moving the knees 3 in one direction a predetermined distance for which the set-works have been adjusted, and when the rod 7 and yoke 8 are moved in the reverse direction—that is, returned to initial position—the sleeve 11 is correspondingly rotated a full revolution in the reverse direction, thereby again causing the pawls on the carriers to engage the ratchet-wheel 20 and again to rotate the shaft 4 in the same direction as before and to the same extent. Thus when the yoke 8 is moved outwardly or away from cylinder 6 the full extent of its travel the knees (when the set-works have been adjusted therefor) are set up for cutting one board, and when the yoke is moved inwardly or returned toward the cylinder the knees are again set up for cutting a second board. When it is desired or becomes necessary, either because of the completion of the cutting up of a log on the carriage, or otherwise, to move the knees 3 in the opposite direction—that is, to return them to initial position—the pawls on the carriers are tilted away from the ratchet-wheel 20, and the sleeve 11 is locked to the shaft 4 by means of a friction-clutch, one member of which is the enlarged end of the sleeve 11 and the other member 21 of which is splined on the shaft 4. This member 21 may be thrown into and out of engagement with the clutch member on sleeve 11 by a shifting-bar riding in a groove on the clutch member 21, which bar is not shown in the drawings, as such shifting bars or handles are in common use as a means for shifting a clutch member. Thereupon by keeping the shaft by means of the clutch member 21 in engagement with the sleeve 11 when it is rotating in the proper direction the knees can be brought back to initial position or can be set out rapidly, providing a quick-setting mechanism, sometimes desirable.

To provide for so setting the mechanism that the rotation of the eccentric 13 will oscillate the rock-shaft a predetermined distance and will correspondingly set up the knees 3 by the movement in one direction, either out or in, of the yoke 8 or even to so set the mechanism that the rotation of the eccentric 13 will not oscillate the rock-shaft 17 to any extent whatever, I employ means as follows: A segment rack or quadrant 22 is mounted on the carriage, one extremity of the rack being supported conveniently by a brace-rod 24, pivoted thereto and to the carriage, the other extremity of the rack being secured to the carriage by a bolt 23, fixed in the carriage and extending through the rack in a slot therefor, providing for the limited

adjustment of the rack endwise to obtain exactness of position and to take up wear, &c. A lever-handle 25, pivoted on the carriage in line with and conveniently by the same bolt with the brace-rod 24 and concentric with the segment-rack 22, straddles said rack and is provided with an outer latch 26 and an inner latch 27, adapted to take into corresponding properly-spaced notches 28 and 29 therefor, respectively, on the outer and inner circles or edges of the segment-rack. The segment-rack is to be provided with as many notches as is desired to enable the mechanism to be set so as to obtain a greater or less movement to any extent required; but only a few notches have been shown in the drawings to illustrate the arrangement and use of the notches. The latches 26 and 27 are actuated by a cranked spring-actuated thumb-lever 30, pivoted on the lever-handle 25, the latch 27 being connected to the thumb-lever by a rod 31. It should be understood that the latch 26 takes into a notch 28 at the same time that the latch 27 takes into a corresponding notch 29. The lever-handle 25 is provided with a stud-anchor pin 32, fixed on an offset 33 of the lever-handle, and a bar 34, pivoted on the anchor-pin 32, is also pivoted to the eccentric-arm 14 concentrically with the rod 15 and conveniently by means of a common bolt or pivot. The radial anchor-bar 34 is of the same length as the rod 15 and as the radius of the offset 33 from the axis of the lever 25 to the stud-pin 32. By this means the eccentric 14 is anchored or tied by the bar 34 to the lever-handle 25, and during the reciprocation of the eccentric 14 its point of connection with the rod 15 and the bar 34 will move in an arc about the anchor-pin 32. With this construction if the lever-handle 25 is swung to the uppermost notches on the rack 22 the anchor-pin 32 will be brought to a point indicated by the small dotted circle *z* on Fig. 2, and the connection between rod 15 and crank 16 will be in axial alinement therewith, and when so set the eccentric 13 can be rotated indefinitely without oscillating the rock-shaft 17 at all; but when the lever-handle 25 is swung down on the rack 22 a little distance from its upper end the anchor-pin 32 is placed in such position that the reciprocating movement of the eccentric-arm 14, caused by the rotation of the eccentric 13, gives the rock-shaft 17 a slight oscillatory movement, thus providing for so setting the mechanism that the rotation of the shaft 4 moves the knees 3 a short distance, thereby setting the log on the knees up so short a distance as to cause the saw to take off only a thin board or veneer from the log, whereas by shifting the lever-handle down on the rack 22 to near the lower extremity thereof the anchor-pin 32 is set in such position as to cause a single rotation of the shaft 4 to rock the shaft 17 to a much greater extent, whereby a log would be moved up to cut a plank or even thicker part from it. By a relatively



medial movement of the lever 25 the mechanism would be set for cutting a plank or board of correspondingly medial thickness.

It should be observed that Figs. 1, 2, and 3 show the yoke 8 at the middle of a movement either out or in and with the eccentric 13 and related parts in corresponding positions—that is to say, the mechanism is shown in the middle of a stroke or at half-stroke. It will be understood from what has hereinbefore been said of the mechanism that the yoke 8 always starts with a contact of its racks at one end thereof, either the outer end or the inner end, with the pinions 10 on the sleeve 11, and the yoke moves in one direction its entire length, thereby rotating the sleeve 11 one complete revolution to make one movement or set-up of the knees 3. This starting and stopping position of the yoke 8 always exists at each of the two ends of the racks on the yoke, and the eccentric 13 is always at that time at a half-revolution from where it is shown in Fig. 2, or, in other words, it is at its "home" position. In fact, not only the eccentric but the set-up mechanism of the set-works are at their home position, or position of rest, from which a start to set up the knees is always made and to which position the mechanism always returns when the set-up of the knees is completed. When at this home position, the axis of the connection of anchor-bar 34 with eccentric 14 is in line with the axis of the lever 25, and the axis of the connection between rod 15 and crank 16 will be at the home position *z*, from which home positions, as before stated, the mechanism always starts in making a set-up of the knees, and when in this home position the lever 25 can be swung up or down unlimitedly within its travel, and the rock-shaft 17 will not be rotated in the least thereby. This enables the operator to swing the arm 25 to such position as is necessary to adjust the set-works with reference to a movement of the knees to any desired extent without by such swinging of the lever 25 disturbing the rock-shaft 17, and, as hereinbefore stated, when the lever 25 is swung to the uppermost notches and is set there the eccentric 13 may be rotated indefinitely by the reciprocation of the yoke 8 without oscillating the shaft 17 to any extent whatever, because the pivot connection of arm 14 with rod 15 and anchor-bar 34 will be merely reciprocated in an arc about the anchor-pin 32, which pin 32 and the pivot connection of rod 15 to crank 16 will be in axial alinement at the point *z*; but if the arm 25 is moved and set at any angle to such uppermost position the set-works will be "set" for setting up the knees on the carriage to an extent corresponding with the adjustment of the lever-handle 25 on the segment-rack 22. When the lever 25 is so set for a movement of the rock-shaft 17 and of the knee 3, then any complete movement of the yoke 8 in one direction, either out or in, will rotate the eccentric 13 one complete rev-

olution and thereby set up the knees the predetermined distance for which the lever-handle 25 has been adjusted.

From the foregoing description it will be seen that the operator when he has adjusted or set the lever 25 to position for moving up the knees 3 the desired distance at each movement of the set-works thereupon has only to shift a lever to admit steam to one side of the piston in the cylinder 6, and thereupon the yoke 8 is moved from its home position a complete movement in one direction, and that by such movement of the yoke 8 the eccentric 13 is rotated a complete revolution, and the set-shaft 4 is rotated to the extent provided for by the setting of the works, and the knees are correspondingly moved, and that when the time comes for the next movement of the knees the operator has only to shift the lever of his steam-valve and admit steam to the other side of the piston, and thus reverse the movement of the yoke 8 to cause one complete rotation of the eccentric 13, and thereby again to set up the knees to the same extent as before, so that a single movement of the lever of the steam-valve, and a single movement of the yoke in either direction, all that is required to complete the set-up of the knees and put the mechanism in condition for the next set-up.

A valuable feature of my improved set-works is that the mechanism consists chiefly of bars and cranks pivoted to each other, so as to get direct strain on the connected members, and that there are no sliding or reciprocating blocks or heads, the friction of such sliding blocks or heads whether merely that of the block itself or of a more embarrassing kind produced by cross strain being wholly obviated. It should also be observed that the eccentric-arm 14, starting from the home position, moves the rod 15 and crank 16 slowly at first and then more rapidly as the positions recede from home positions, and as the eccentric 13, making a complete revolution, brings the parts back again they slow up as they approach the home positions, so that when they arrive at home positions and the shaft and eccentric stop the mechanism stops without shock and the knees and the log or load they are pushing slow up and stop at the exact place where they should stop and without the slightest overthrow or excess movement. It is believed that this result cannot be obtained by mechanism requiring two movements to set up the knees and their load on a carriage.

In Figs. 6 and 7 I have shown forms of mechanism embodying my invention which are especially adapted for being applied to sawmills already in operation having a driven shaft and means therewith for operating the knees, but without any specific means for adjusting the mechanism, so as to give a predetermined greater or less throw of the knees by the same revolution of the driving-shaft.

In Figs. 5 and 6 the steam-cylinder 6 for op-



erating the set-works is shown in upright position, and the yoke 8 is so disposed that the rack 9 thereon meshes with pinions 35 35 on a sleeve or hub 36, keyed on an auxiliary shaft 37, having its bearings in standards 38 38 fixed on the carriage. This shaft 37 is provided with a crank 39, which is connected by a rod 40 to the rod 15 and the bar 34 pivotally as the eccentric arm 14 in the form of mechanism shown in Figs. 1 to 4 is connected to the rod 15 and the bar 34. In this form of construction the crank 39 and the rod 40 are the mechanical equivalents of the eccentric 13 and the eccentric-arm 14 of the form shown in Figs. 1 to 4. The auxiliary shaft 37 is provided with a loose pinion 41, which meshes with a pinion 42 on the shaft 4, which is of course provided with the ratchet-wheel 20 of the other form of construction, while the rock-shaft 17 in the form of construction shown in Figs. 5 and 6 is provided with the pawls 18 and 19 of the form of construction shown in Figs. 1 to 4. A clutch 43 is a means for locking shaft 37 to pinion 41 releasably.

In Fig. 7 I have shown a variation in form of the mechanism illustrated in Figs. 5 and 6. In the form shown in Fig. 7 the branch or offset 33 of the lever-handle 25 is omitted, and the bar 34, pivoted at one end to the rods 15 and 40, is at the other end pivoted directly on the lever-handle 25. The change in the form of construction places the bar 34 in a position above the connecting-rod 15, while the connecting-rod 15 is made to incline downwardly toward the crank 16, which is also turned down from its positions in the two other forms of construction. The mechanical value of this construction is the same as that shown in the other two forms of mechanism.

What I claim as my invention is—

1. In sawmill set-works, the combination with movable knees provided with racks, and a shaft provided with pinions meshing with the racks on the knees, of a revoluble sleeve on the shaft, means connecting the sleeve operatively to the shaft whereby rotation of the sleeve will to a predetermined extent rotate the shaft, and means for adjusting the first-mentioned means so that when the sleeve is rotated an uninterrupted full revolution the shaft will be rotated only to a predetermined extent for which said first means has been adjusted and the knees will be correspondingly moved.

2. A sawmill set-works, comprising in combination a set-shaft, a reciprocating motor, means engaging the set-shaft having motion from a "home" position forward and back to said position, and means operated by a single full-length stroke of the motor to give said first-mentioned means said motion forward and back in varying degree according to the predetermined "set" desired.

3. In a sawmill set-works, the combination with movable knees, and a set-shaft adapted to move the knees, of a motor-actuated recip-

rocable device, a rotatable device geared to said reciprocable device so that one complete movement of the reciprocable device in one direction will rotate the rotatable device one full revolution, an eccentric on the rotatable device, a rock-shaft, adjustable means connecting the eccentric to a radial arm on the rock-shaft so that a rotation of the eccentric will oscillate the rock-shaft to a greater or less extent according to adjustment, and means connecting said rock-shaft to said set-shaft so that the oscillation of the rock-shaft in either direction will rotate the set-shaft in one and the same direction.

4. In sawmill set-works, the combination with movable knees, and a set-shaft adapted to move the knees, of a motor-actuated reciprocable device, a rotatable device geared to said reciprocable device so that one complete movement of the reciprocable device in one direction will rotate the rotatable device one full revolution, an eccentric on the rotatable device, an eccentric-arm on the eccentric, a rock-shaft having a crank-arm, a rod connecting the crank-arm of the rock-shaft to the eccentric-arm, a shifting lever-handle, an anchor-bar jointed to the eccentric-arm at the connection of the crank connecting-rod therewith and to the lever-handle whereby by the shifting of the lever-handle the pivot of the bar to the lever-handle can be placed in the axis of the pivot of the rock-shaft crank to the rod, or eccentric thereto, so that the rotation of the eccentric will not oscillate the rock-shaft, or will oscillate it in varying degree according to the eccentricity of the bar-and-lever connection to the crank-and-rod connection, and means connecting said rock-shaft to said set-shaft so that the oscillation of the rock-shaft in either direction will rotate the set-shaft in one and the same direction.

5. In sawmill set-works, a rock-shaft connected to a set-shaft so as to communicate rotary movement to the set-shaft by the oscillation of the rock-shaft, a reciprocating device connected by a rod to a crank on the rock-shaft, said reciprocating device being adjustable so that by its reciprocation the device may not oscillate the rock-shaft at all or will oscillate it to a small or greater extent as adjusted, means for adjusting and controlling the movement of the reciprocating device during reciprocation comprising a shifting lever-handle, and a radial anchor-bar the same length as the rod connecting the reciprocating device to the crank of the rock-shaft pivoted on the shifting-bar and to the reciprocating device concentrically with said crank-connecting rod.

6. In sawmill set-works, the combination of a knee-actuating shaft, an independently-revoluble device, means for rotating the independently-revoluble device continuously one full revolution, a rock-shaft connected by pawls to said shaft, adjustable means connecting the independently-rotatable device



to the rock-shaft whereby the rotation of the independently-rotatable device will rotate the shaft in one direction, and a clutch on the shaft adapted to lock the shaft releasably to the independently-rotatable device, whereby by reversing the motion of the independently-rotatable device the shaft may be rotated in the other direction.

7. In a sawmill set-works, a set-shaft, a motor for actuating the set-shaft, and means connecting the motor mechanically to the set-shaft and for adjustment thereof to produce no movement of the set-shaft or such movement thereof as desired, said means including a swinging radial anchor-bar having a home position at which no movement is imparted to the set-shaft by the movement of the motor and from which home position said anchor-bar is adjustable so as to cause such variable movement as is desired to be imparted to the set-shaft by the movement of the motor.

8. In a sawmill set-works, a set-shaft, a motor for actuating the same, a member movable from and to a home position for imparting a variable movement from the motor to the set-shaft and means for determining the extent of said movement according to the predetermined set desired, said means comprising a radial anchor-bar having a pivot or anchor adjustable from and to a home position in which no movement is imparted to said member by the movement of the motor, said member when in its home position being also immovable by the adjustment of said pivot or anchor for varying the set.

9. In a sawmill set-works, a set-shaft, a motor for actuating the same, and means for determining the extent of movement imparted from the motor to the set-shaft according to the predetermined set desired, said means comprising a rod and a bar of the same length having a common pivot at one end, and movable at that end an invariable distance between predetermined limits, the bar having at its opposite end a pivot or anchor adjustable from and to a home position in which no movement is imparted to the set-shaft by the movement of the motor.

10. In a sawmill set-works, a set-shaft, a motor for actuating the same, a member movable from and toward a home position for imparting a variable movement from the motor

to the set-shaft, and means for determining the extent of such movement according to the predetermined set desired, said means comprising a rod and a bar of the same length having a common pivot at one end and movable at that end an invariable distance between predetermined limits, said bar having at its opposite end a pivot or anchor adjustable from and to a home position in which home position the movement of the motor produces no movement of the set-shaft.

11. In a sawmill set-works, the combination of a set-shaft, a motor for actuating the same, a member movable from and to a home position for imparting a variable movement from the motor to the set-shaft, and means for determining the extent of such movement, said means comprising an adjusting-lever, and a bar and a rod of the same length having a common pivot at one end and movable at that end an invariable distance between predetermined limits, one of which limits is the projection of the axis of the fulcrum of said lever, the bar being pivoted at its other end to said lever at a distance from its fulcrum equal to the length of the rod, and the corresponding end of the rod which is connected with said member, being in line with the end of the bar connected with said lever when it is in its home position.

12. In a sawmill set-works, a set-shaft, a motor for actuating the same, a member movable from and to a home position, and means operated by a single full-length stroke of the motor to impart to said member a variable movement from and to its home position, according to the predetermined set desired.

13. A sawmill set-works, comprising in combination a set-shaft, a reciprocating motor, means engaging the set-shaft having motion from a home position forward and back to said position, and means operated by a single full-length stroke of the motor to give said first-mentioned means said motion forward and back in varying degree according to the predetermined set desired.

In testimony whereof I affix my signature in presence of two witnesses.

THEODORE S. WILKIN.

Witnesses:

C. T. BENEDICT,  
ANNA V. FAUST.