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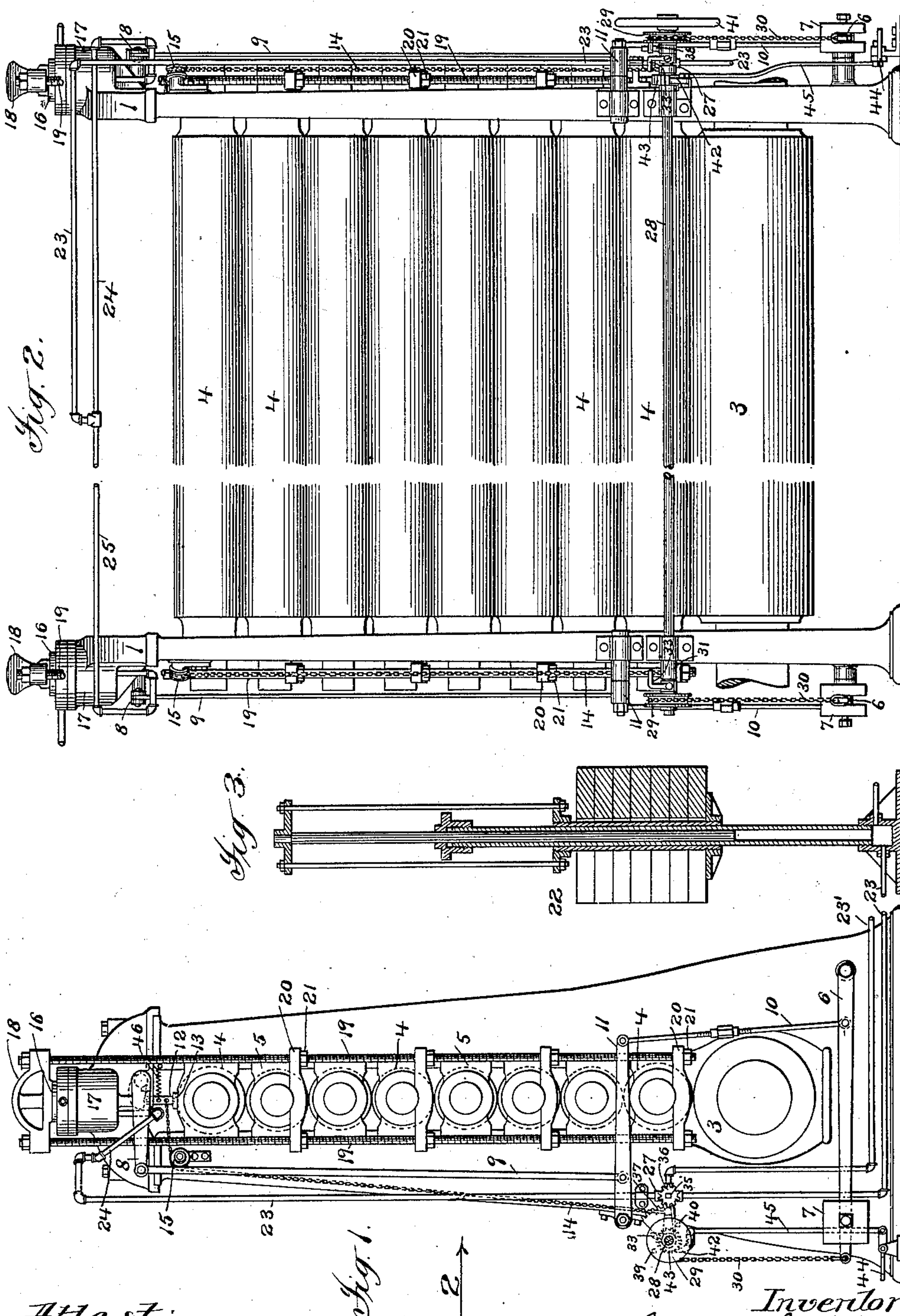
Patented Jan. 28, 1902.

M. J. WHITLOCK.
CALENDERING MACHINE.

(Application filed May 27, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Attest:
T. F. Kehoe
J. W. Bourke

Inventor:
Myron J. Whitlock
by Philipp Sawyn. Rice & Kennedy
Attys

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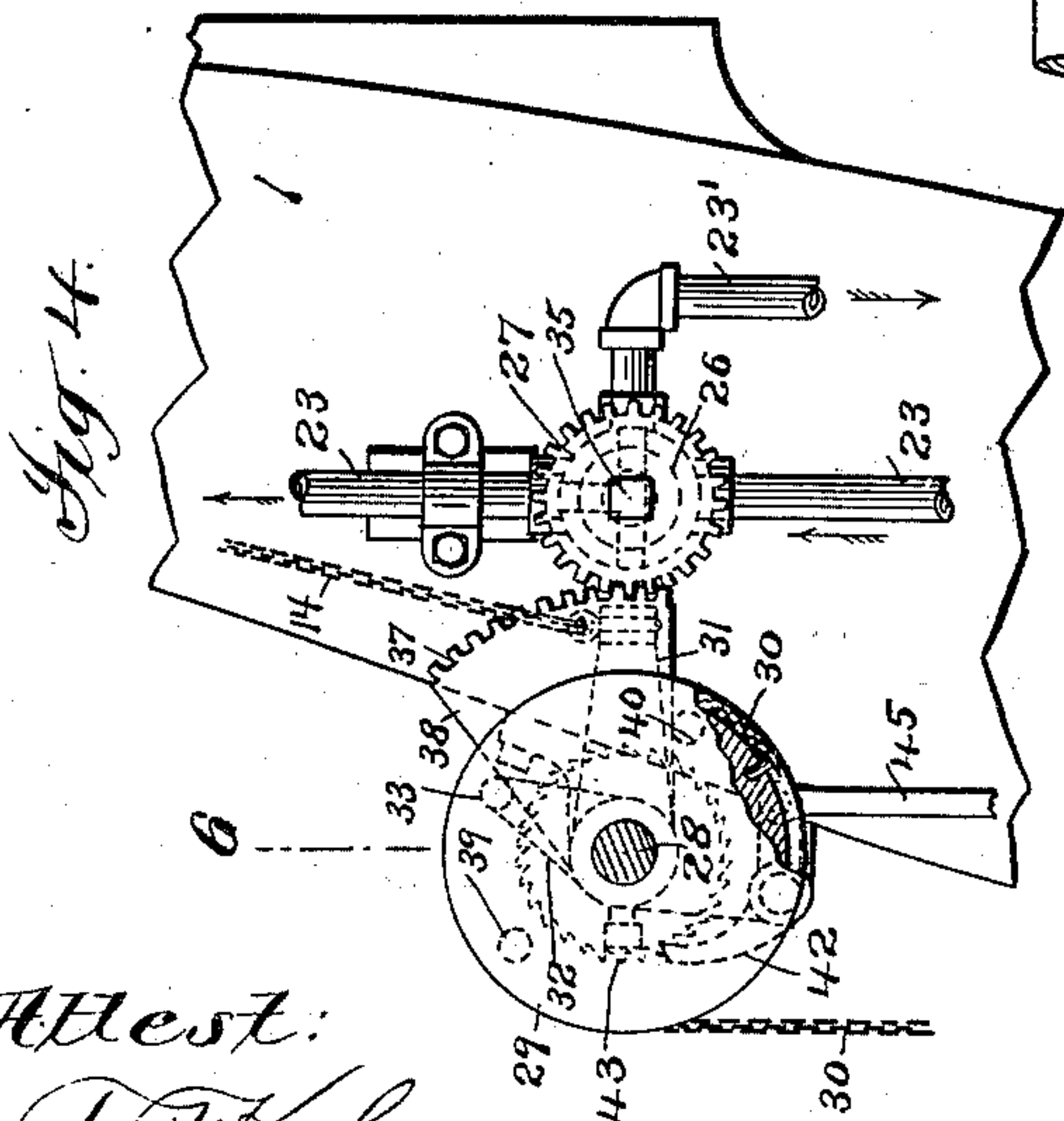
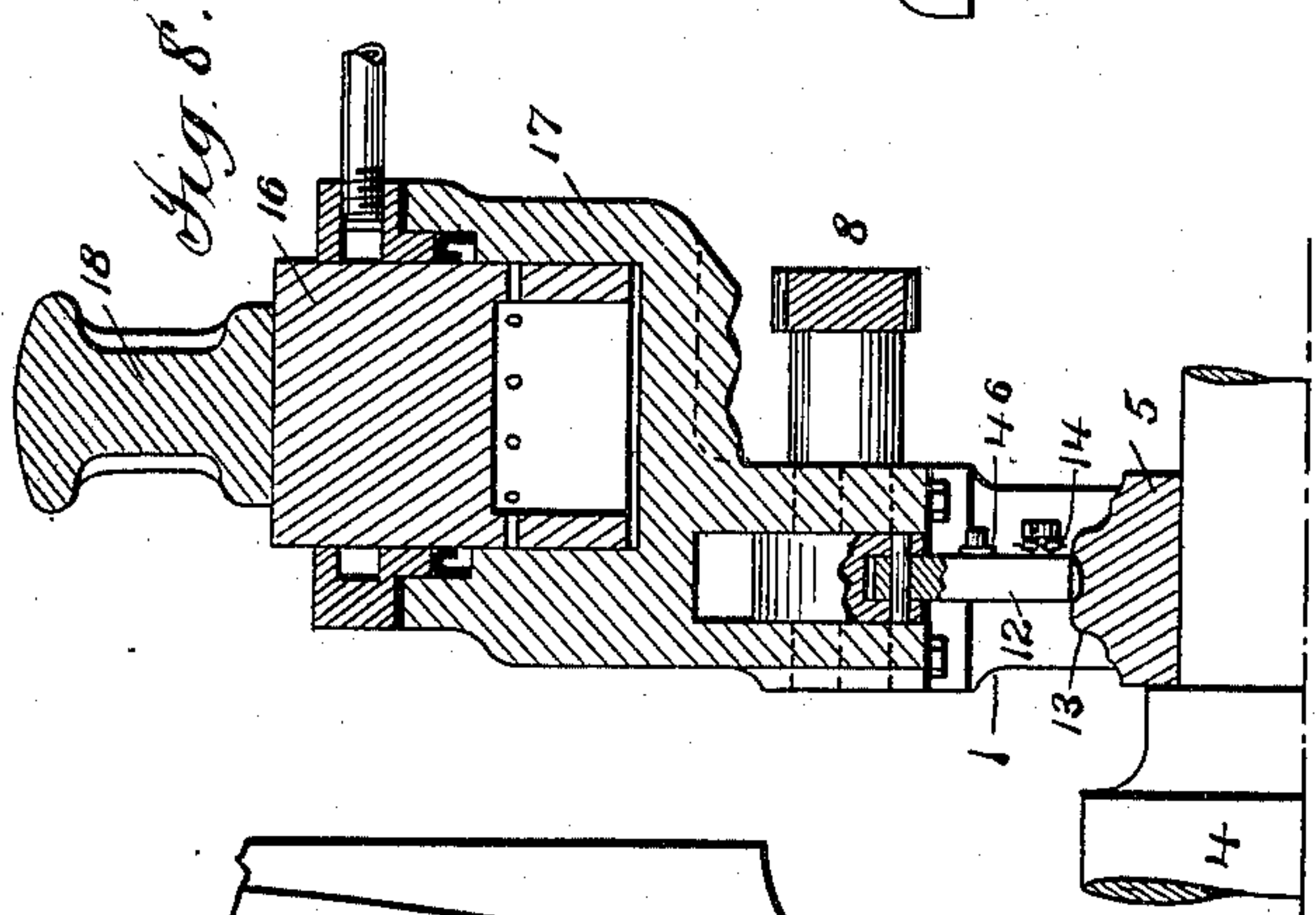
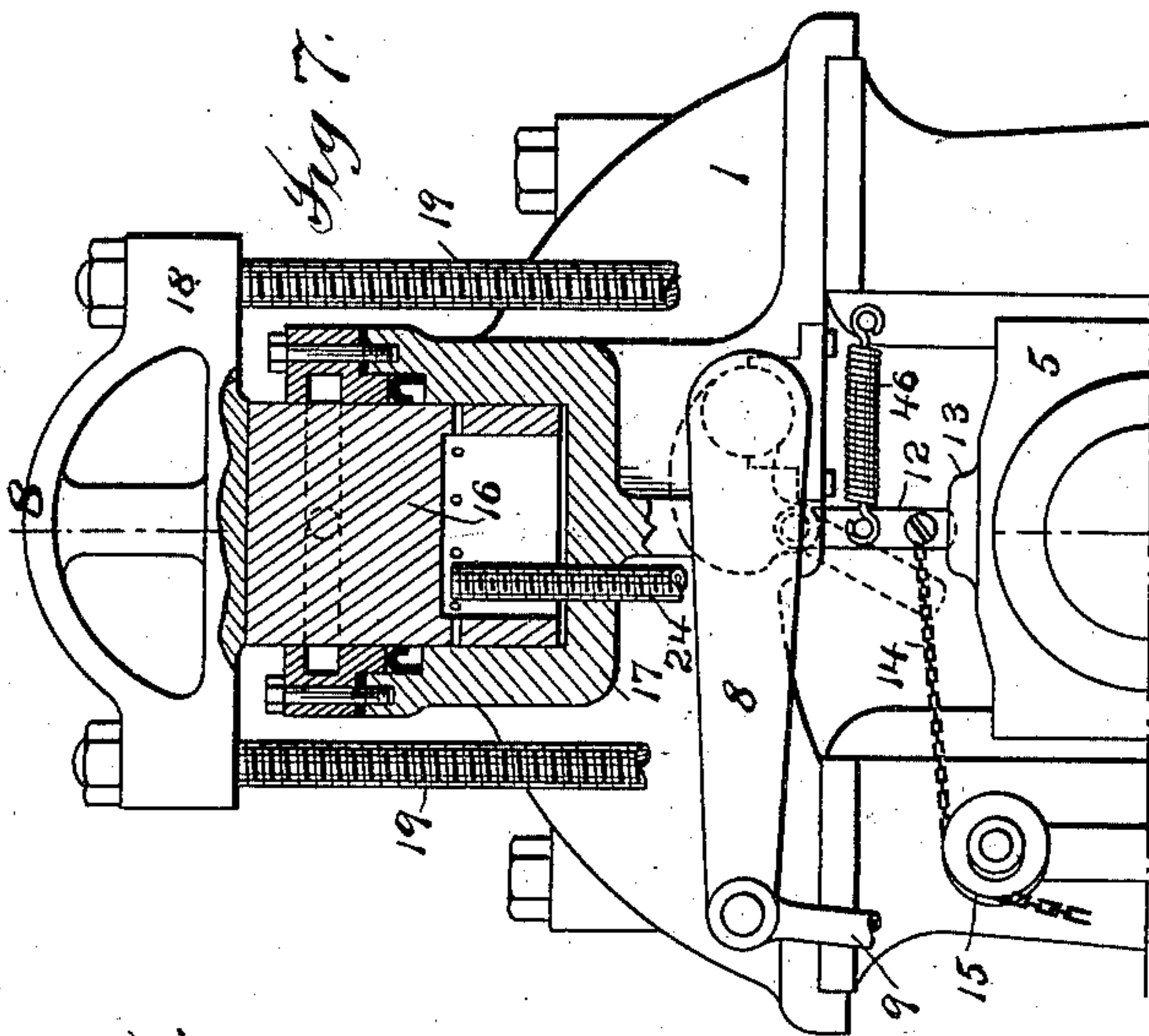
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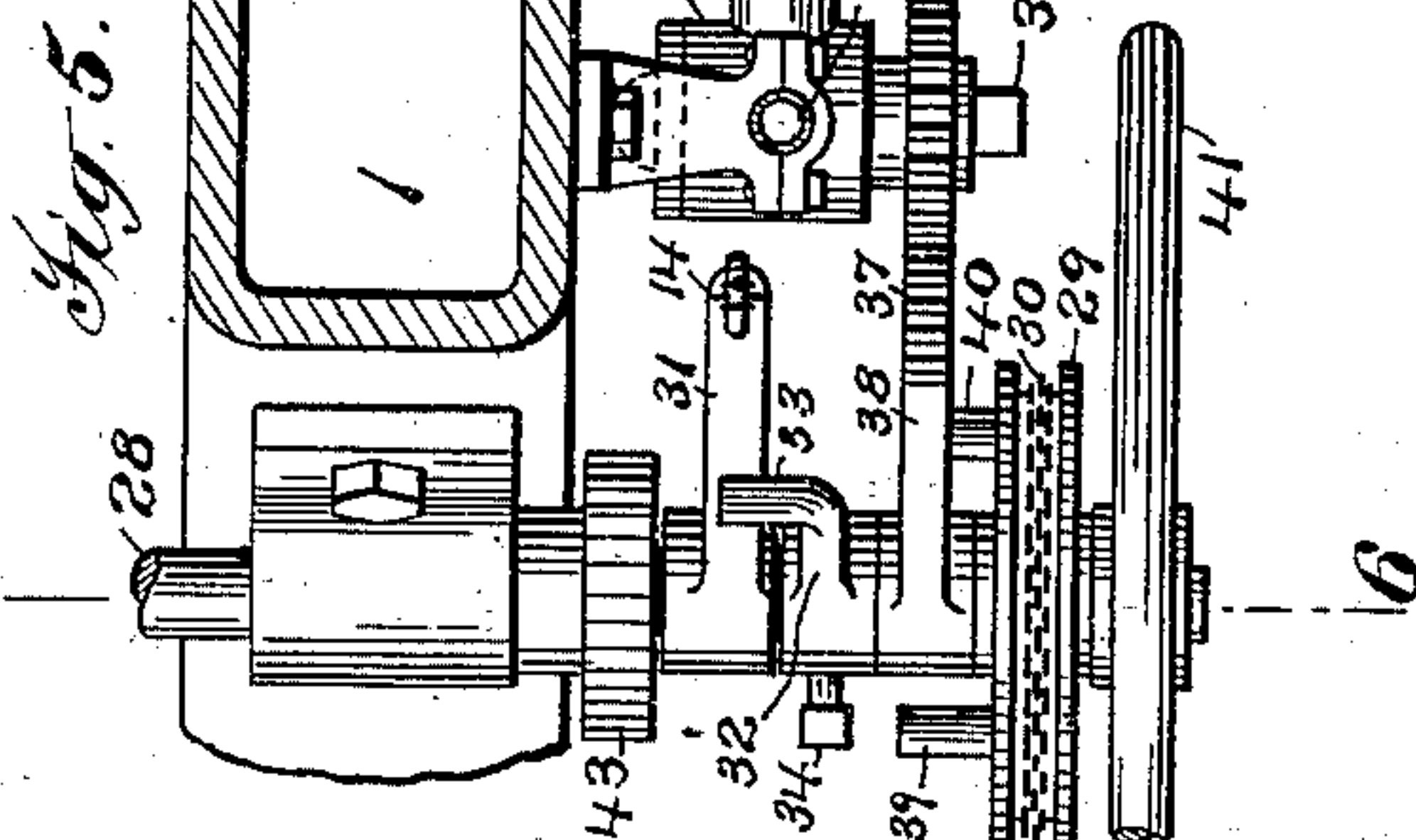
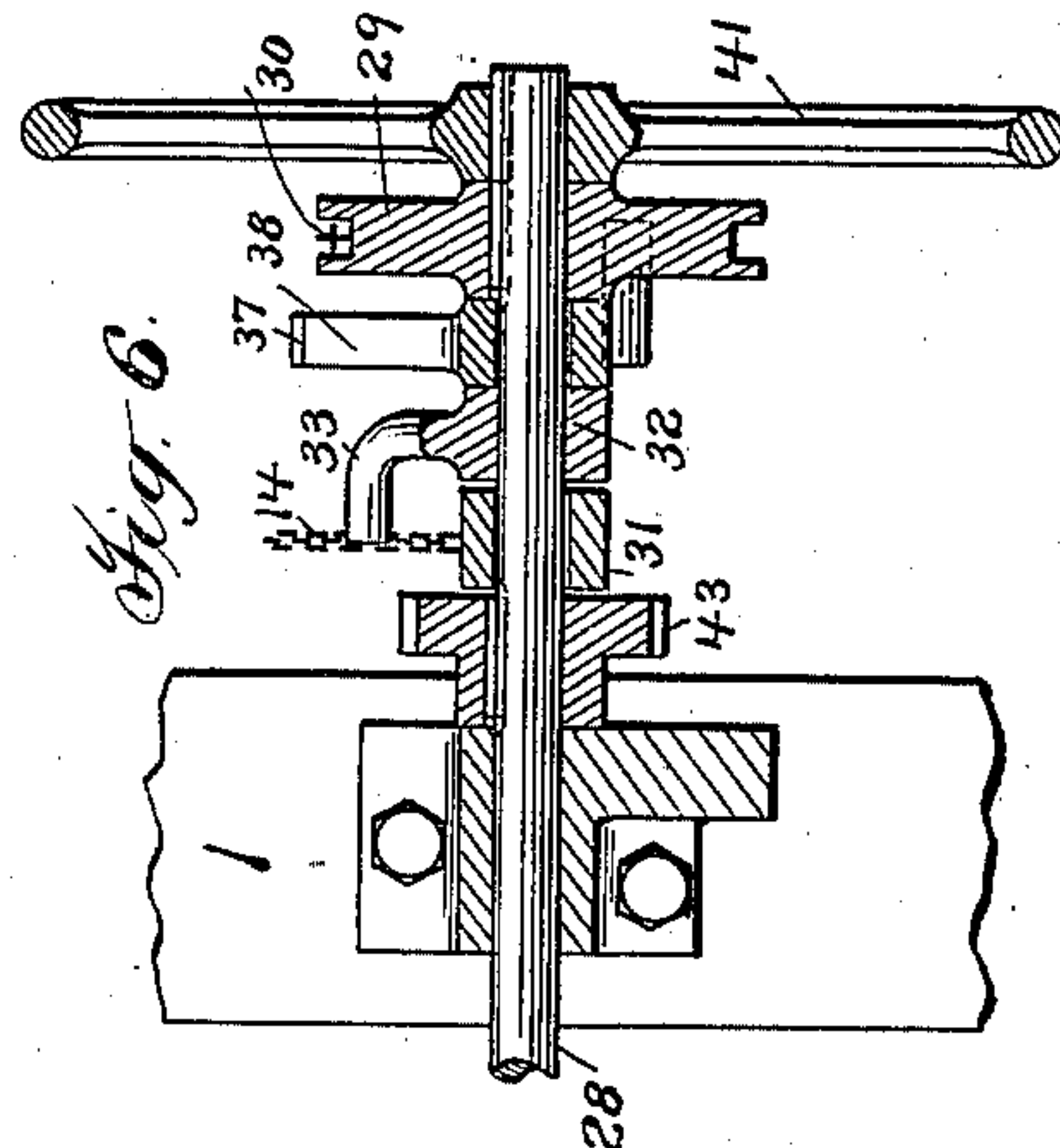
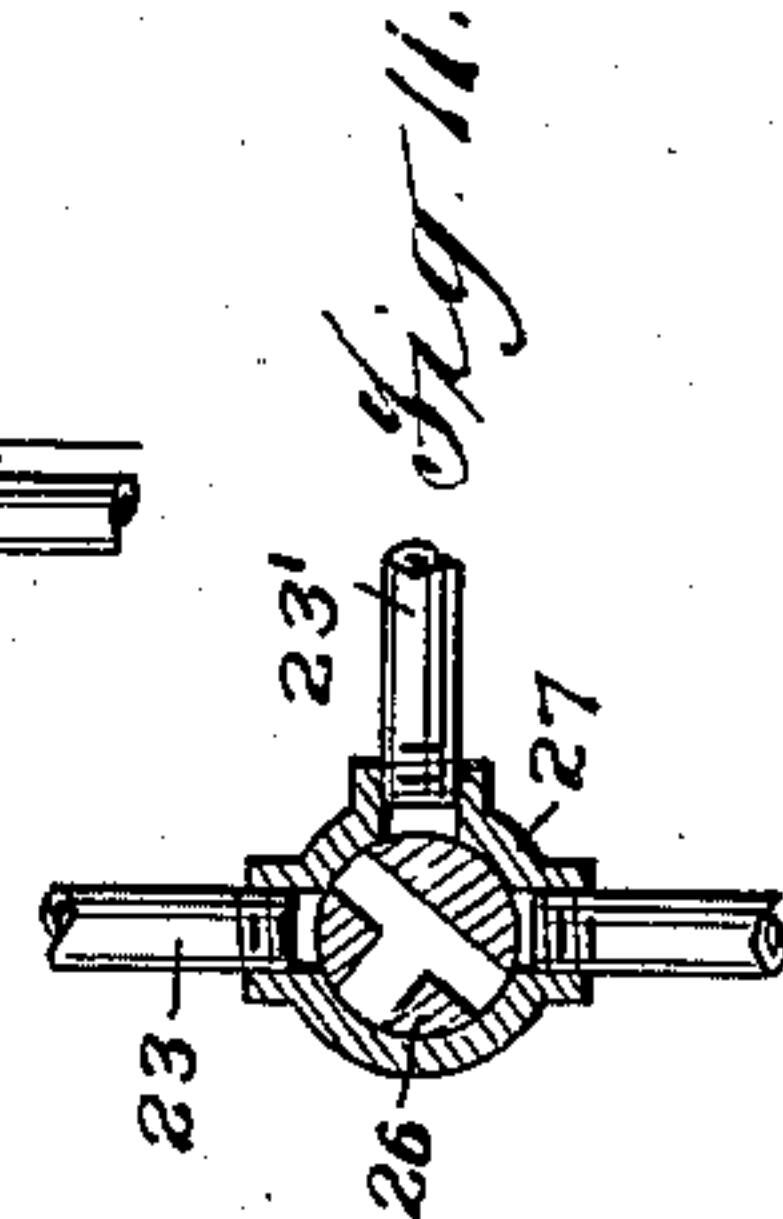
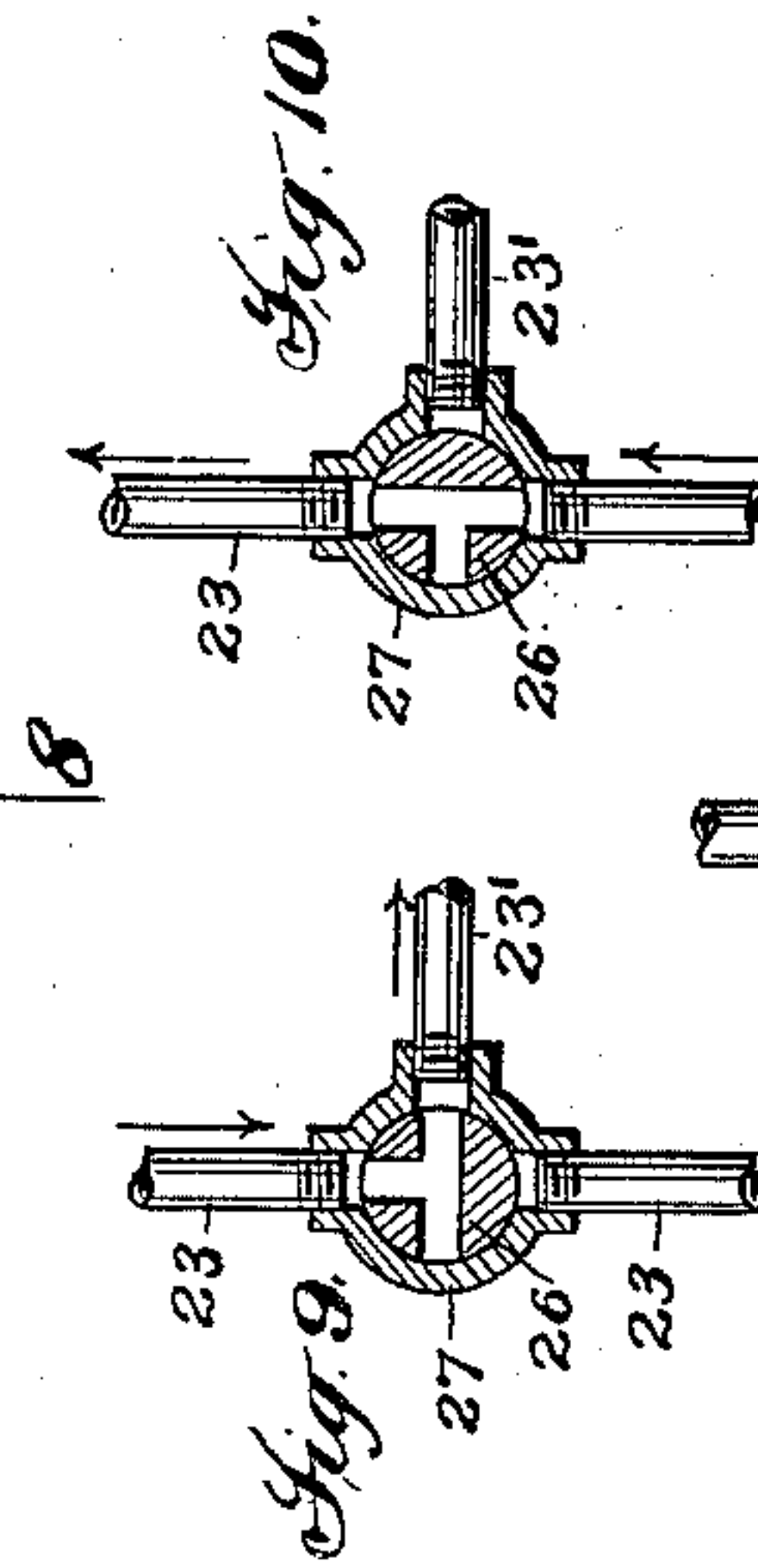
(Application filed May 27, 1901.)

(No Model.)

2 Sheets—Sheet 2.



Attest:
T. F. Kehoe
A. V. Bourke



Inventor:
Myron J. Whitlock
by Philipp. Burge, Rice & Kennedy
Atty.

UNITED STATES PATENT OFFICE.

MYRON J. WHITLOCK, OF ANSONIA, CONNECTICUT.

CALENDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 691,923, dated January 28, 1902.

Application filed May 27, 1901. Serial No. 61,997. (No model.)

To all whom it may concern:

Be it known that I, MYRON J. WHITLOCK, a citizen of the United States, residing at Ansonia, county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Calendering-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in calendering-machines.

In calendering-machines as ordinarily constructed the rolls are forced together by means of a system of compound levers and weights, pins or blocks being interposed between the final levers of the system and the bearings of the upper roll in order to transmit the power from the system to the bearings. Whenever it is desired to raise the rolls, it is necessary for the machine-tender to climb up on the machine-frame and to remove these pins or blocks by hand, this operation consuming considerable valuable time. Furthermore, it is usual in calendering-machines to operate the weight-carrying levers of the system by one operating device and the roll-raising mechanism by an independent device. When, therefore, the rolls of the machine are to be raised, two independent operations are necessary, and these operations must be performed in their proper sequence, for if it be attempted to raise the rolls before releasing the weight leverage system there is liability of breakage and disarrangement of this system.

It is one of the objects of this invention to produce a calendering-machine in which the line of connections between the means for forcing the rolls together and the roll-bearings may be mechanically interrupted.

A further object of the invention is to produce a calendering-machine in which the line of connections between the means for forcing the rolls together and the roll-bearings may be mechanically interrupted and in which a single operating device is employed for controlling the operation of the means for forcing the rolls together and the means for mechanically interrupting the connections.

A further object of the invention is to produce a calendering-machine in which mechanical means are employed for interrupt-

ing the line of connections between the devices for forcing the rolls together and the roll-bearings and in which a single operating device is employed for controlling the operation of the means for forcing the rolls together, the means for separating the rolls, and the mechanical means for interrupting the connections between the means for forcing the rolls together and the roll-bearings.

With these and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, which will be hereinafter described and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings, forming a part of this specification, in which like characters of reference indicate the same parts, Figure 1 is a side elevation of one form of calendering-machine embodying the invention. Fig. 2 is a front view of the machine shown in Fig. 1. Fig. 3 is a sectional elevation of an accumulator mechanism which may be employed in connection with the roll-raising devices. Fig. 4 is a detail view, partly in section, of the valve-controlling means for the roll-raising mechanism. Fig. 5 is a plan view of the construction shown in Fig. 4, said view also illustrating certain other operating devices. Fig. 6 is a section on the line 6 of Figs. 4 and 5. Fig. 7 is a view, on an enlarged scale, of the upper part of one side of the calendering-machine, certain parts being shown in section. Fig. 8 is a section on the line 8 of Fig. 7, and Figs. 9, 10, and 11 are detail views illustrating the construction of the valve employed.

Referring to the drawings, which illustrate one embodiment of the invention, the side frames of the calendering-machine are indicated at 1. The lower calender-roll 3 is supported in stationary bearings in these side frames, and the upper rolls 4 are mounted in suitable bearings 5, which are arranged to slide in ways in the side frames, so that the rolls may be separated or forced together.

The means for forcing the rolls together may be of any desired construction. As shown, the machine is provided with a pair of levers 6, one of said levers being arranged on each side of the machine. These levers carry weights 7, which are adjustably mount-

ed thereon and which are the source of power for the system, although it is to be understood that the levers might be operated by springs. A second pair of levers 8 are pivoted on the machine-frame above the bearings for the upper pair of rolls, one of these levers being pivoted on each side of the frame. This second pair of levers 8 may be connected to the first pair in any desired manner. As shown, this connection is effected through links 9 and 10 and intermediate levers 11, a compounding system of great power being thus formed and one in which only a slight movement of the upper levers is necessary in order to produce great pressure on the roll-bearings.

The means by which the upper levers transmit the power of the system to the roll-bearings may be varied in form. As shown, these means consist of blocks 12. (See Fig. 7.) In the preferred form of the construction these blocks are pivoted to the levers 8 and rest upon bosses 13 on the upper-roll bearings, said bosses being preferably slightly concave, as indicated. When the rolls are to be lifted, the line of connections between the means for forcing the rolls together, which in this case consist of the weight-carrying levers 6 and the roll-bearings, should be interrupted, since owing to the compounding produced by the system of levers employed a very slight movement of the upper levers 8, which would be produced by raising the roll-bearings, would produce a very large movement of the levers 6. If the line of connections were not interrupted, therefore, the lifting of the rolls might be prevented altogether, or if the lifting device were powerful enough the connecting system would be broken.

While the line of connections between the means for forcing the rolls together may be interrupted at any desired point, this will preferably be accomplished by shifting the position of the blocks 12, and according to the present invention mechanical means are provided for this purpose. The mechanical means employed for interrupting the line of connections may be varied in construction. As shown, each of the blocks 12 has connected therewith a chain 14, although it is obvious that a cable or other similar device might be employed. These chains 14 run over guiding-pulleys 15, mounted on the sides of the frame, and at their lower ends are connected to an operating device, which will be hereinafter described.

Any suitable means may be employed for separating the rolls. As shown, these means consist of pistons 16, which are arranged to operate in fluid-containing chambers 17 of ordinary construction. Each of these pistons 16 serves to operate a yoke 18, said yokes having connected therewith long screws 19, which extend down on each side of the roll-bearings. Lifting-blocks 20 are arranged under the ends of the shafts of the lower roll of each pair of rolls in the stack, the position of these

lifting-blocks being determined by nuts 21. This arrangement of screws and blocks is a well-known one, its purpose being to enable the rolls to be lifted in sequence, the first pair of rolls beginning its movement upward before the second pair of rolls begins its movement, and so on throughout the system.

The fluid for operating the pistons, which may be of any desired character, but is preferably water or oil, is supplied from any suitable source, such as a hand-pump, a power-pump, or a pump used in connection with an accumulator. In the construction shown the fluid is maintained under pressure in an accumulator 22. The construction of this accumulator is well known in the art, and since it has no reference to the present invention a detailed description of it is unnecessary. From the accumulator a pipe 23 leads to the top of the machine and preferably to a point midway between said frames, where it divides into two branches, the branch 24 leading to one of the chambers 17 and the branch 25 to the other chamber. A three-way valve 26, which is contained in a valve-chamber 27, is located at any suitable point in the pipe 23. A waste-pipe 23' leads from this valve-chamber to any suitable delivery-point.

The means for operating the weight or power levers 6, the means for breaking the line of connections between these power-levers and the roll-bearings, which in the present construction is accomplished by shifting the blocks 12, and the means for controlling the valve by which the supply of fluid to the piston-chambers is regulated may be entirely independent of each other, if desired, or any two of these sets of means—as, for instance, the block-shifting devices and the power-levers—may be operated by a single device, and the other set of means—as, for instance, the valve—may be independently controlled. Preferably, however, and as shown, a single operating device is provided which operates all three of these sets of means. This operating device may be variously constructed. In the construction shown, however, the machine is provided with a shaft 28, which extends across the machine from side to side and is provided on each side of the machine with drums 29, which are fast on the shaft. Chains 30 connect these drums to the levers 6, so that as the shaft is rotated the drums wind up the chains and lift the levers 6 and the weights connected therewith, thus making it possible to break the line of connections, which, as before stated, is done by shifting the blocks 12. In order to cause the shaft to shift the blocks 12, the chains 14, which are secured to the blocks, are connected to arms 31, which are loosely mounted on the shaft. The shaft also carries arms 32, having bent ends 33, which extend over the arms 31, the hubs of these arms 32 being connected to the shaft in any suitable manner, as by set-screws 34. The arms 32 are so arranged on the shaft that their bent ends 33 will not strike

the arms 31 until after the levers 6 have been raised through the drums 29 and chains 30, before described.

When it is desired to operate the controlling-valve 26 in the pipe 23 from the shaft, suitable means will be provided for this purpose. In the construction shown the stem 35 of the valve is provided with a small gear 36, which meshes with a segment 37 on a segment-arm 38, loosely mounted on the shaft 28. One of the drums 29 is provided with two pins 39 and 40. (See Figs. 1 and 5.) These pins are so located on the drum 29 that after the shaft has been revolved sufficiently to cause the levers 6 to be raised and the blocks 12 to be shifted the pin 39 strikes the segment-arm 38 and causes it to rotate the valve 26 from the position shown in Fig. 9 to the position shown in Fig. 10, thus permitting the fluid to flow through the pipe into the piston-chambers and raise the pistons. When the rolls have been sufficiently raised, a slight further movement of the shaft causes the valve to assume the position shown in Fig. 11, in which position the pipe 23 is closed, and the pistons will be maintained in their upper position. A hand-wheel 41 is or may be provided for rotating the shaft, and a suitable stop-pawl 42 may be provided for holding the shaft in any desired position, said pawl engaging with a ratchet 43, suitably mounted on the shaft. As shown, the pawl is operated from a treadle 44, (see Fig. 1,) said treadle being connected to the pawl by means of a link 45.

When it is desired to restore the parts to their normal or operative position, the machine-tender steps on the treadle, thus releasing the pawl, and the pawl is allowed to rotate in the reverse direction. As the shaft rotates in the reverse direction the pin 40 strikes the segment-arm 38, and the valve 26 is rotated back into the position shown in Fig. 9, so as to permit the fluid to escape from the piston-chambers and the rolls to descend.

It may be here remarked that the machine-tender can through the hand-wheel control the movement of the shaft, so as to permit the shaft to turn as slowly as may be desired, thus controlling the escape of the fluid and permitting the rolls to descend at any rate of speed desired.

After the rolls have descended a further movement of the shaft slacks off the chains 14, and the blocks 12 are allowed to return to their operative position. If desired, the return of these blocks may be assisted by means of springs 46, which are connected to the blocks and the frame. When the blocks have reached their operative position, the further movement of the shaft slacks the chains 30 and permits the power-levers to force the rolls together, the amount of power developed depending, of course, on the weight employed and the position of the weights on the levers.

While the mechanism which has been described is a preferred one for carrying the invention into effect, it is to be understood that

it may be widely varied. The invention is not, therefore, to be limited to the specific details of construction which have been hereinbefore described.

What is claimed is—

1. In a calendering-machine, the combination with a power device for forcing the rolls together, of a line of connections between said power device and the rolls, and mechanical means for interrupting said line of connections, substantially as described.

2. In a calendering-machine, the combination with a power device for forcing the rolls together, of a line of connections between said power device and the rolls, means for rendering said power device inoperative, and mechanical means for interrupting said line of connections, substantially as described.

3. In a calendering-machine, the combination with a power device for forcing the rolls together, of a line of connections between the power device and the rolls, means for separating the rolls, and mechanical means for interrupting the line of connections when the rolls are to be separated, substantially as described.

4. In a calendering-machine, the combination with a power device for forcing the rolls together, of a line of connections between the power device and the rolls, means for rendering said power device inoperative, means for separating the rolls, and mechanical means for interrupting the line of connections when the rolls are to be separated, substantially as described.

5. In a calendering-machine, the combination with a power device for forcing the rolls together, of a line of connections between the power device and the rolls, means for rendering said power device inoperative, mechanical means for interrupting the line of connections, and a single operating device for both sets of means, substantially as described.

6. In a calendering-machine, the combination with a power device for forcing the rolls together, of a line of connections between the power device and the rolls, means for rendering said power device inoperative, means for separating the rolls, mechanical means for interrupting the line of connections when the rolls are to be separated, and a single operating device for the means for rendering the power device inoperative and the mechanical means, substantially as described.

7. In a calendering-machine, the combination with a power device for forcing the rolls together, of a line of connections between the power device and the rolls, means for rendering said power device inoperative, means for separating the rolls, mechanical means for interrupting the line of connections when the rolls are to be separated, and a single operating device for said three sets of means, substantially as described.

8. In a calendering-machine, the combination with weights for forcing the rolls together, means for transmitting the power de-

veloped by the weights to the rolls, said means including links, levers, and blocks between said levers and the roll-bearings, means for raising the weights, and mechanical means
5 for shifting the blocks, substantially as described.

9. In a calendering-machine, the combination with weights for forcing the rolls together, means for transmitting the power developed by the weights to the rolls, said means including links, levers and blocks between said levers and the roll-bearings, means for raising the weights, mechanical means for shifting the blocks, and a single operating device for operating the weight-raising means and the block-shifting means, substantially as described.

10. In a calendering-machine, the combination with a power device for forcing the rolls together, of levers connected therewith, blocks hinged to the levers and bearing on the roll-bearings, a shifting device for the blocks, said device including suitable chains, and springs for returning the blocks to operative position, substantially as described.

11. In a calendering-machine, the combination with a pair of levers, of weights connected thereto, a second pair of levers, connections between the two pairs of levers, blocks interposed between said second pair of levers and the roll-bearings, an operating device, connections from said device to the weight-levers, and connections from said device to the blocks, whereby the operating device renders the weight-levers inoperative and shifts the blocks, substantially as described.

12. In a calendering-machine, the combination with means for separating the rolls, of a pair of levers, weights connected thereto, a second pair of levers, connections between the two pairs of levers, blocks interposed between said second pair of levers and the roll-bearings, an operating device, connections from said device to the weight-levers, and connections from said device to the blocks, whereby the operating device renders the weight-levers inoperative and shifts the blocks, substantially as described.

13. In a calendering-machine, the combination with means for separating the rolls, of a pair of levers, weights connected thereto, a second pair of levers, connections between the two pairs of levers, a block interposed between said second pair of levers and the roll-bearings, an operating device, connections from said device to the weight-levers, connections from said device to the blocks, whereby the operating device renders the weight-levers inoperative and shifts the blocks, and means for returning the blocks, substantially as described.

14. In a calendering-machine, the combination with means for separating the rolls, of a pair of levers, weights connected thereto, a second pair of levers, blocks interposed between said second pair of levers and the roll-

bearings, an operating device, connections from the operating device to the weight-levers, connections from said device to the blocks, and means controlled by the operating device for throwing the roll-separating means into operation, whereby the operating device renders the weight-levers inoperative, shifts the blocks and throws the roll-separating means into operation, substantially as described.

15. In a calendering-machine, the combination with means for separating the rolls, of a power device for forcing the rolls together, connections between said device and the rolls, an operating device, connections between the operating device and the power device, and means controlled by the operating device for throwing the separating means into operation, substantially as described.

16. In a calendering-machine, the combination with a lever, of a weight connected thereto, suitable connections whereby the weight forces the rolls together, a piston, connections from the piston to the rolls whereby the piston separates the rolls, a liquid-containing chamber in which the piston moves, an operating device, connections from the operating device to the weight-levers, and means controlled by the operating device for permitting the liquid to enter and escape from the chamber, substantially as described.

17. In a calendering-machine, the combination with a pair of levers, of weights connected with said levers, a second pair of levers, connections between the two pairs of levers, blocks between the second pair of levers and the roll-bearings, a shaft extending across the machine, connections between said shaft and the weight-levers, and connections between the blocks and the shaft, whereby the movement of the shaft raises the weight-levers and shifts the blocks, substantially as described.

18. In a calendering-machine, the combination with a pair of levers, of weights connected thereto, a second pair of levers, connections between the two pairs of levers, blocks interposed between the second pair of levers and the roll-bearings, a shaft extending across the machine, connections between the weight-levers and the shaft, connections between the blocks and the shaft, roll-separating means, and means controlled by the shaft for throwing the roll-separating means into and out of operation, whereby the movement of the shaft renders the weight-levers inoperative, shifts the blocks and throws the roll-separating means into and out of operation, substantially as described.

19. In a calendering-machine, the combination with a pair of levers, of weights connected thereto, means whereby said levers force the rolls together, pistons, connections from the pistons to the roll-bearings, liquid-containing chambers in which the pistons operate, a pipe connected to the chambers, a valve in said pipe, a shaft extending across the ma-

chine, operating connections between the shaft and the weight-levers, and means operated by the shaft for opening and closing the valve, substantially as described.

5 20. In a calendering-machine, the combination with a pair of levers, of weights connected thereto, a second pair of levers, connections between the two pairs of levers, blocks
10 between the second pair of levers and the roll-bearings, means for separating the rolls, a shaft extending across the machine, a pair of drums on the shaft, chains connecting each
of said drums with the weight-levers, a pair of arms loosely mounted on the shaft, chains
15 connecting the arms and the blocks, a pair of arms mounted on the shaft and arranged to operate the loosely-mounted arms, and operating connections between the shaft and the
loosely-mounted arms, substantially as described.
20

21. In a calendering-machine, the combination with a pair of levers, of weights connected thereto, a second pair of levers, connections
25 between the two pairs of levers, blocks between the second pair of levers and the roll-

bearings, pistons connected to the roll-bearings, liquid-containing chambers in which the pistons operate, a suitable pipe for permitting liquid to enter and escape from the chambers, a valve in the pipe, a shaft extending across the machine, a pair of drums
30 on the shaft, chains connecting each of said drums with the weight-levers, a pair of arms loosely mounted on the shaft, chains connecting the arms and the blocks, a pair of arms
35 mounted on the shaft and arranged to operate the loosely-mounted arms, and operating connections between the arms and the shaft and between the valve and the shaft, the arrangement being such that when the shaft is
40 rotated the weight-levers are first rendered inoperative, the blocks shifted and the valve in the pipe opened, substantially as described.

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

MYRON J. WHITLOCK.

Witnesses:

WALTER PERRY,

LAWRENCE K. BLACKMAN.