(No Model.) 5 Sheets—Sheet 1.

T. J. BLAGG.

PUMP OPERATING MECHANISM.

No. 592,581. Patented Oct. 26, 1897.

Fig. 1.

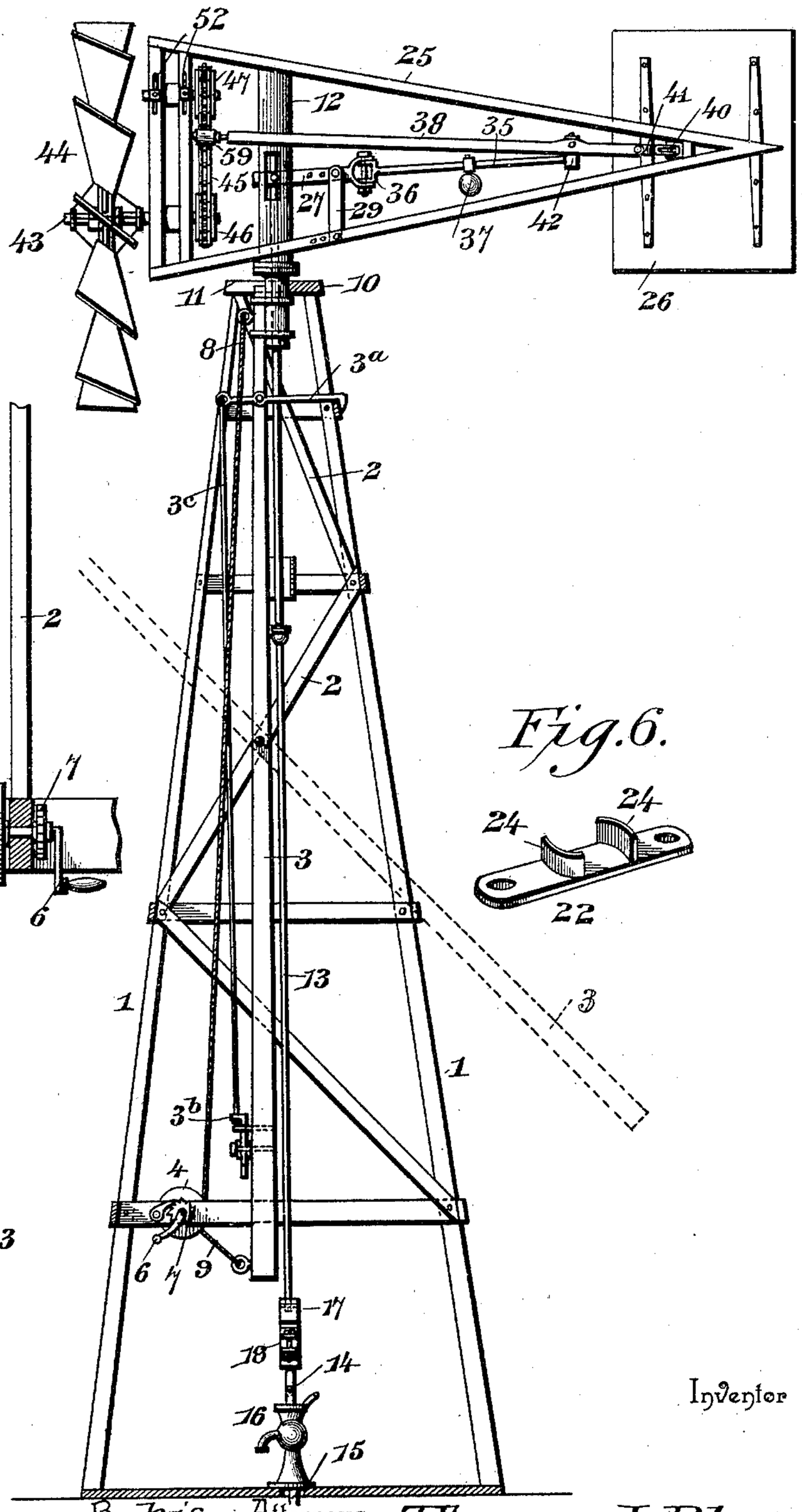


Fig. 3.

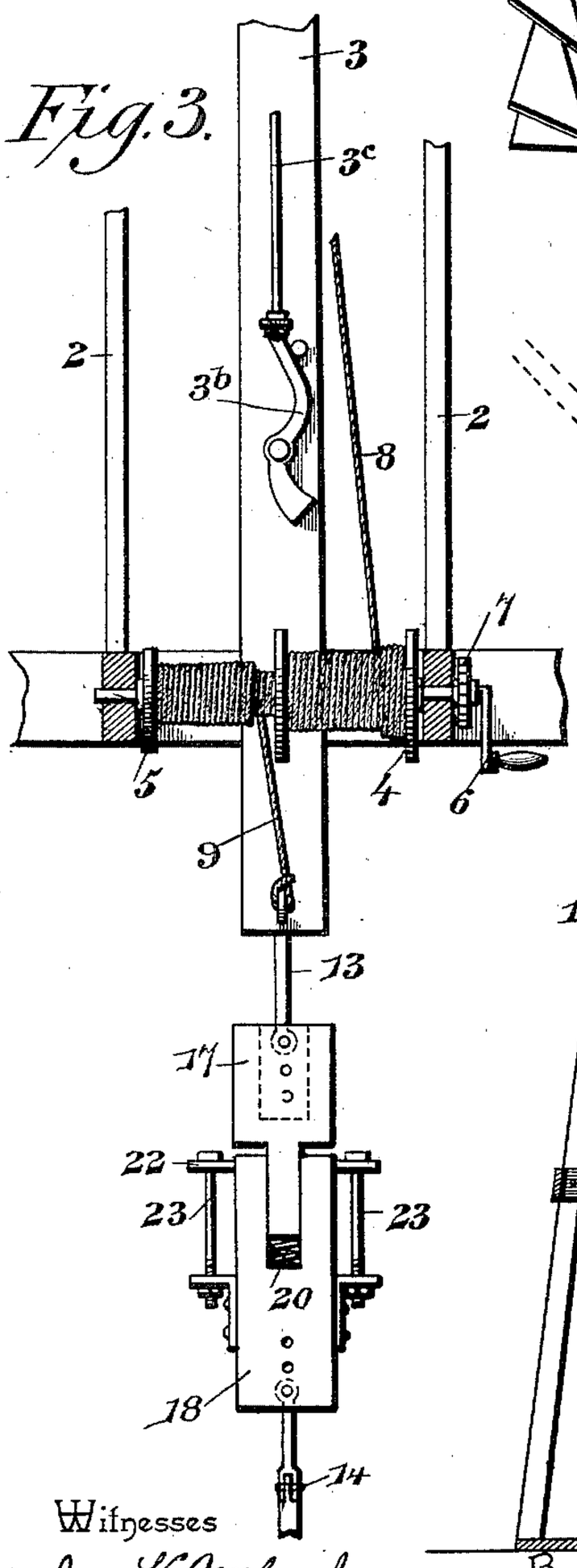


Fig. 6.

Witnesses

Jas. K. McCathran

D. E. Hoyle

Inventor

By his Attorneys,

Thomas J. Blagg

Church & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 5 Sheets—Sheet 2.

T. J. BLAGG.

PUMP OPERATING MECHANISM.

No. 592,581. Patented Oct. 26, 1897.

Fig. 2.

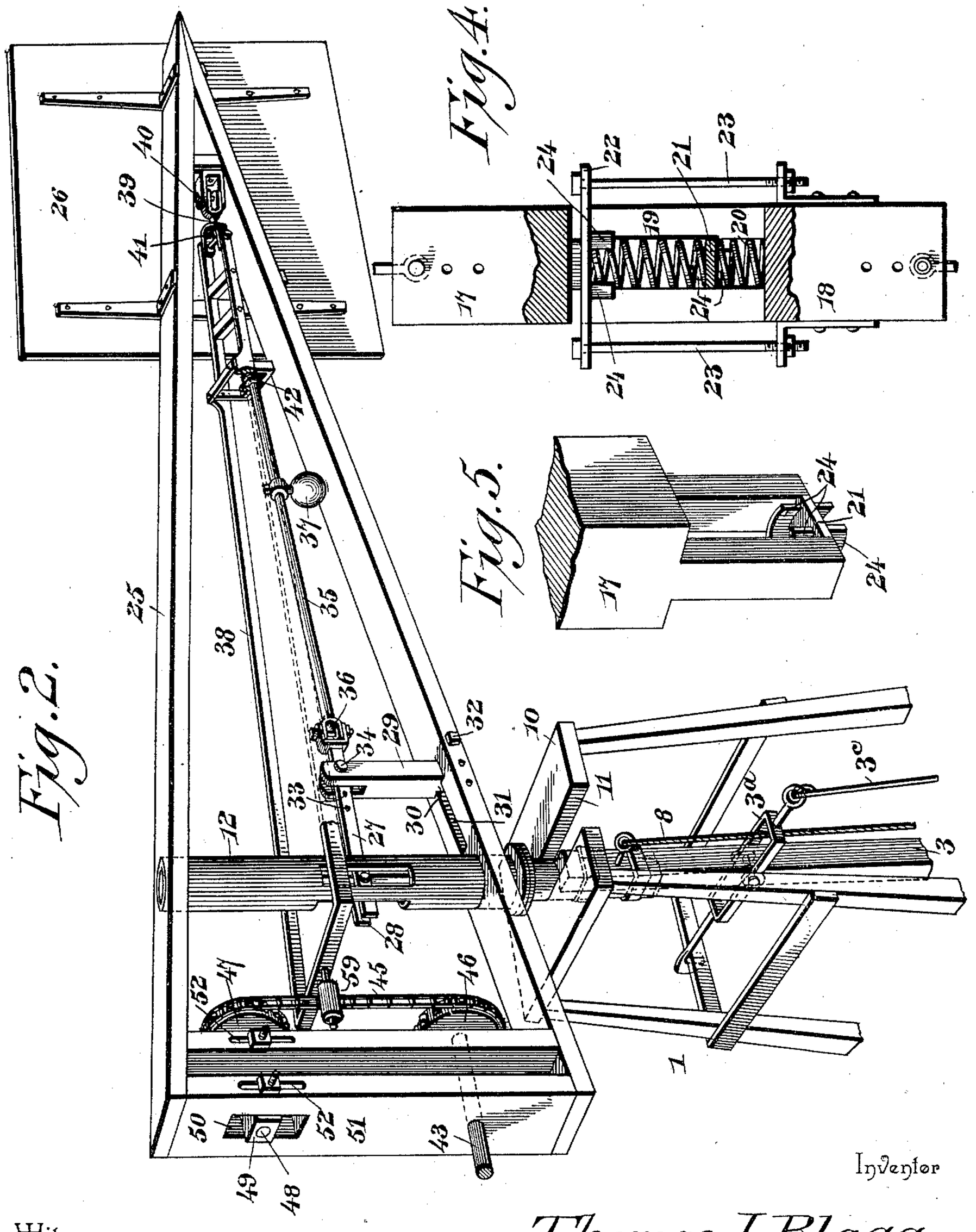


Fig. 4.

Fig. 5.

Inventor

Witnesses
Jas. K. McCathran
C. E. Foote

By his Attorneys,
Thomas J. Blagg
Church & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 5 Sheets—Sheet 3.

T. J. BLAGG.

PUMP OPERATING MECHANISM.

No. 592,581. Patented Oct. 26, 1897.

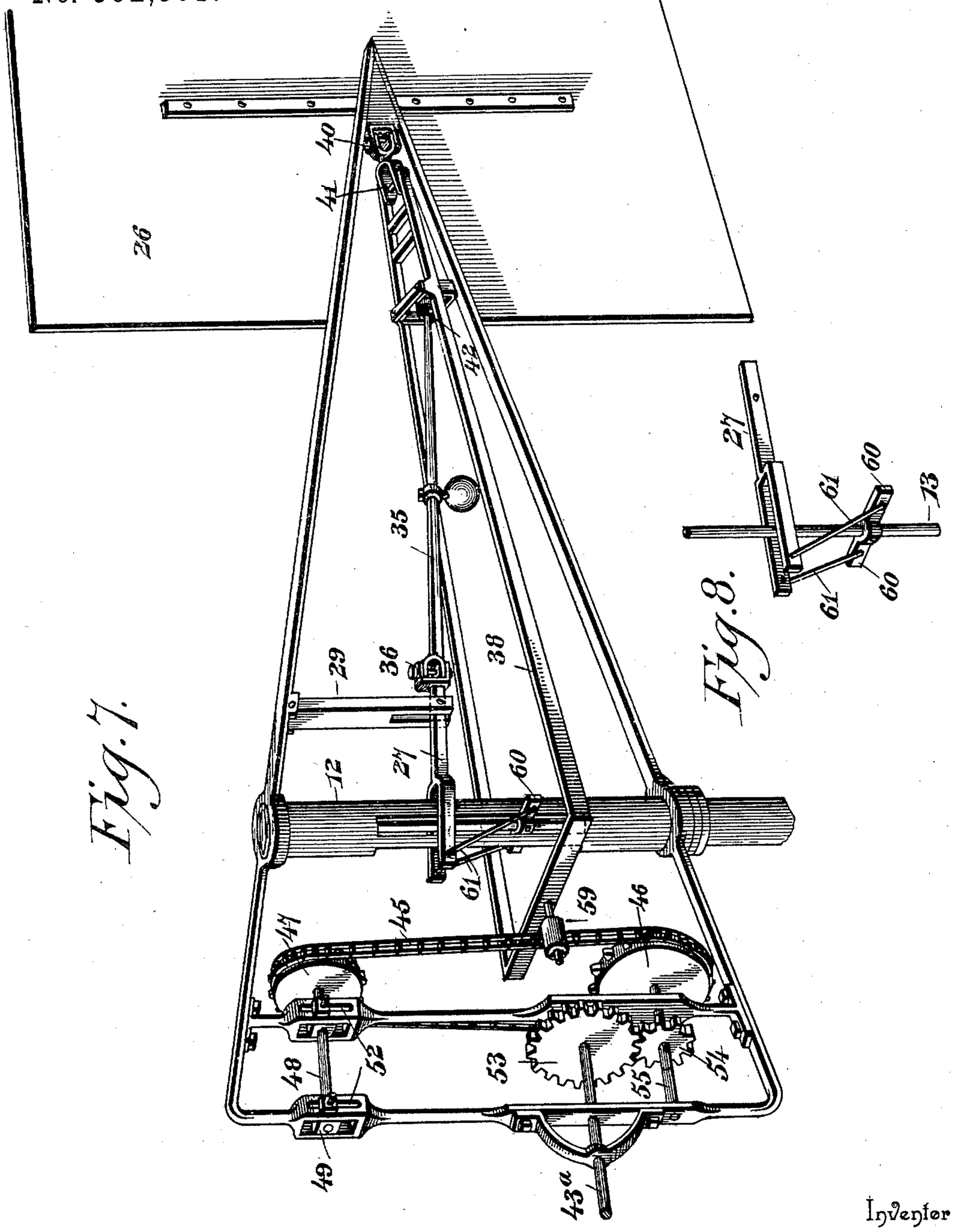


Fig. 1.

Fig. 8.

Witnesses
Jas. K. McCathran
O. E. Coyle

Inventor
Thomas J. Blagg
By his Attorneys,
Church & Co.

THE NORRIS PETERS CO., PHOTO-LITH., WASHINGTON, D. C.

(No Model.) 5 Sheets—Sheet 4.

T. J. BLAGG.

PUMP OPERATING MECHANISM.

No. 592,581. Patented Oct. 26, 1897.

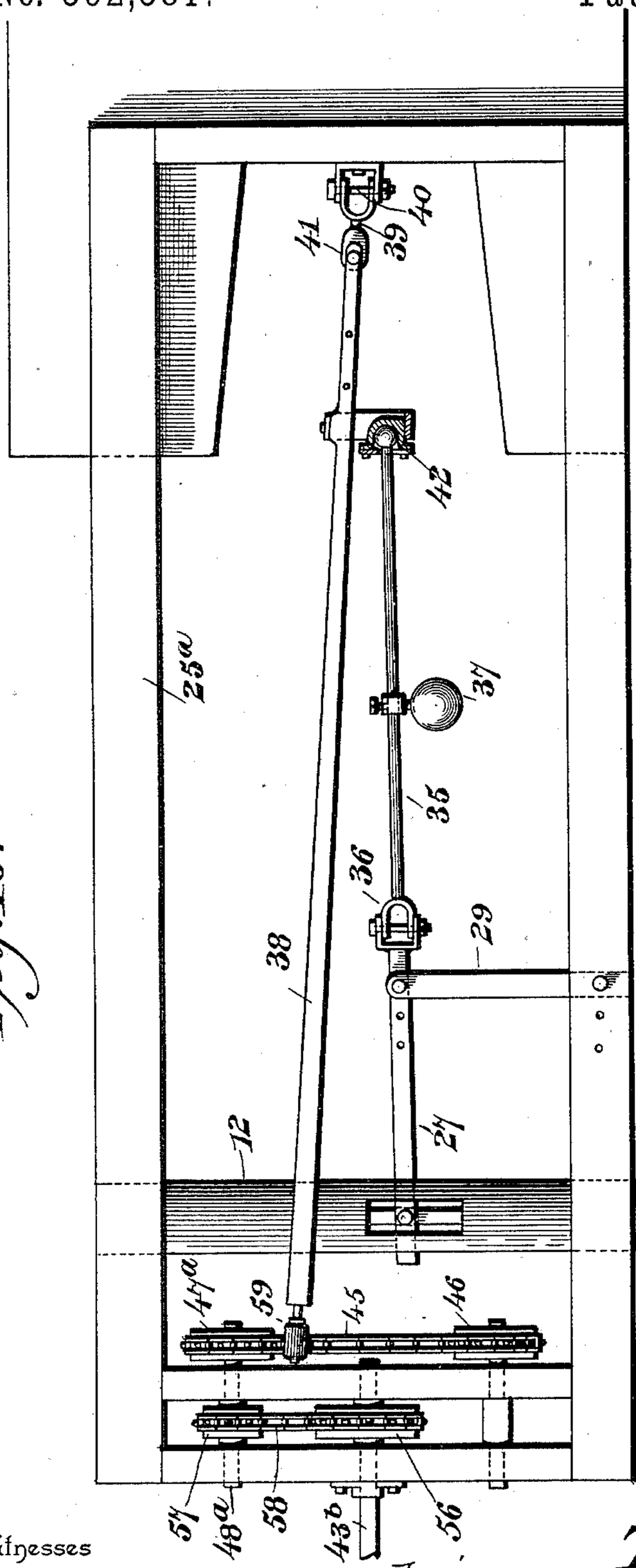


Fig. 10.

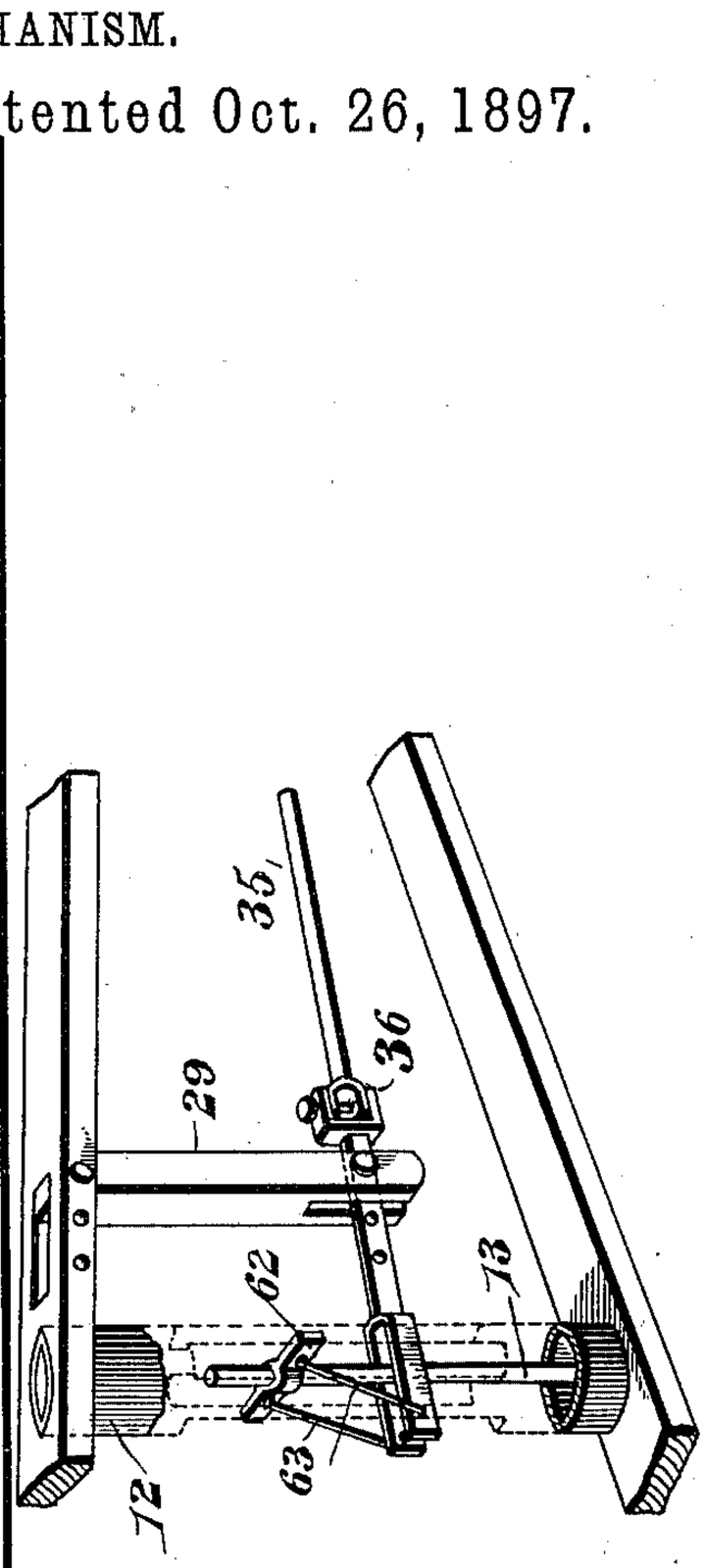


Fig. 9.

Witnesses

Jas. K. McCathran

D. C. Bayle

Inventor

Thomas J. Blagg

By his Attorneys,

Cushman & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 5 Sheets—Sheet 5.

T. J. BLAGG.

PUMP OPERATING MECHANISM.

No. 592,581 Patented Oct. 26, 1897.

Fig. 11.

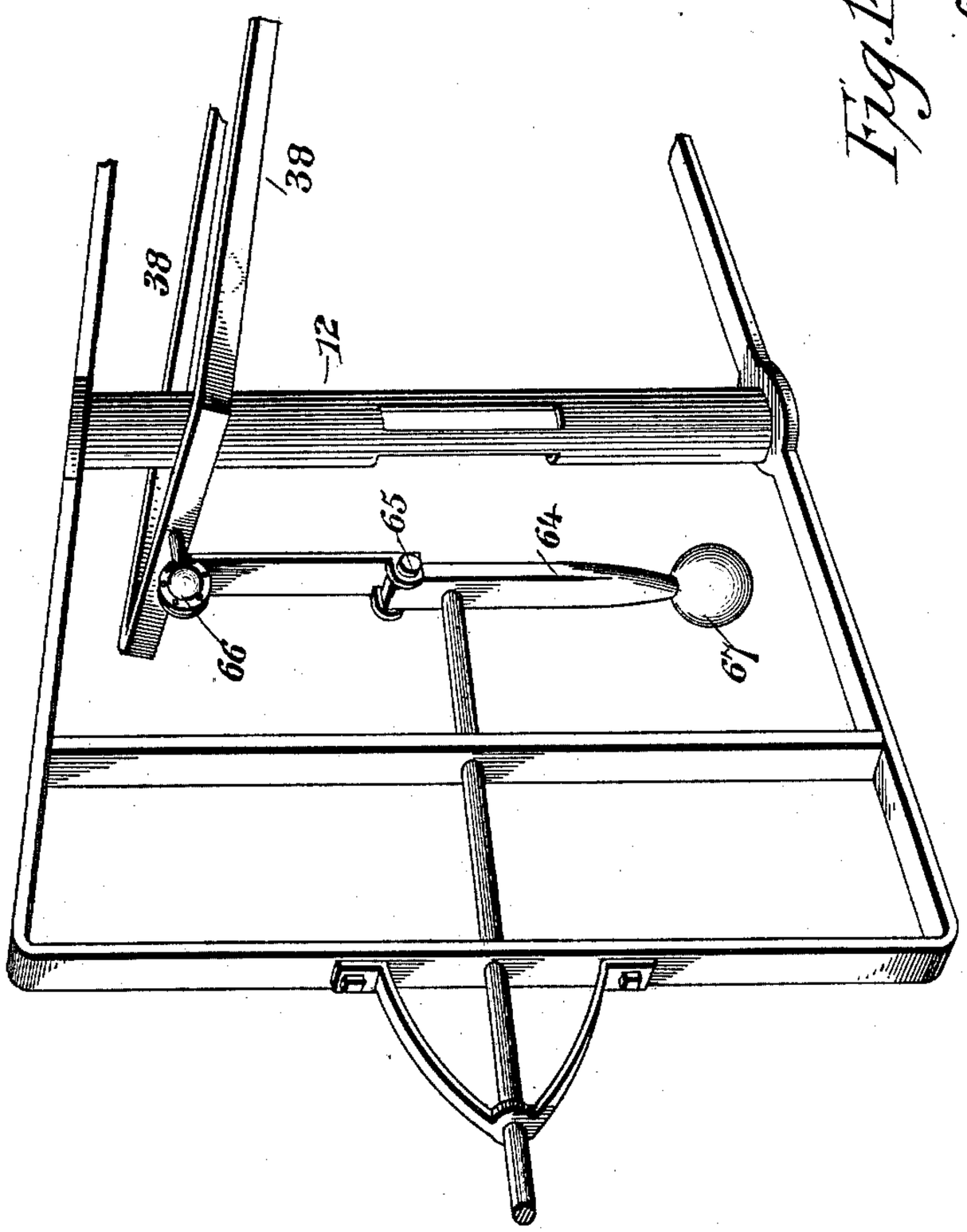


Fig. 12.

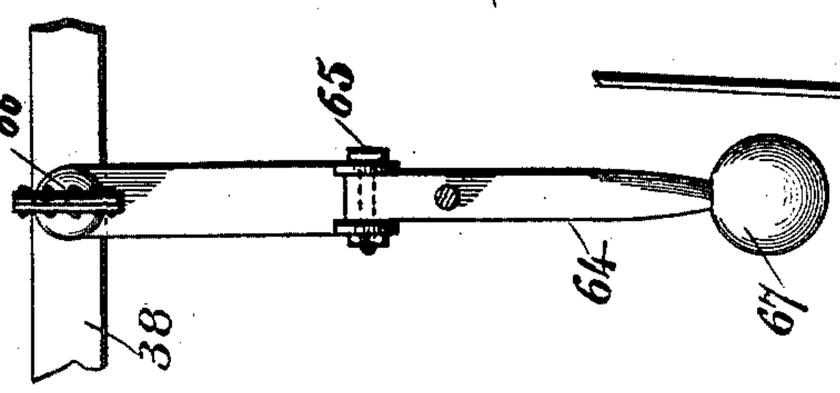


Fig. 13.

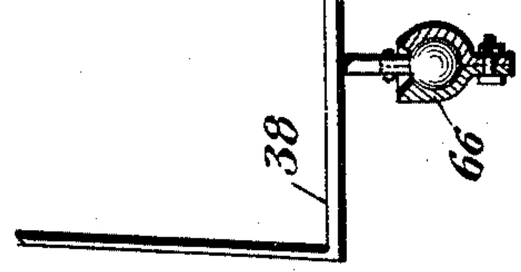


Fig. 14.

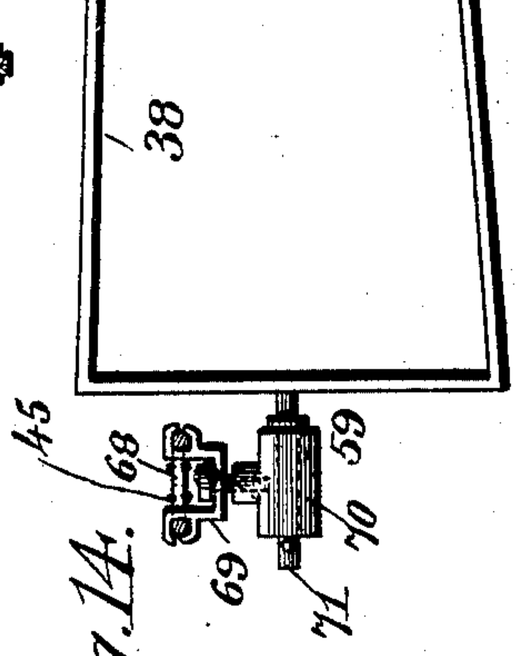


Fig. 15.

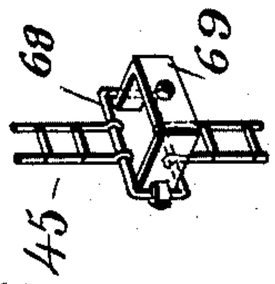
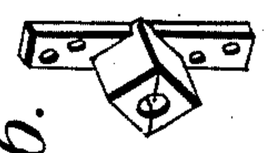


Fig. 16.



Witnesses
Jas. K. McCathran
C. E. Hoyle

Inventor
Thomas J. Blagg
By his Attorneys,
Church & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THOMAS J. BLAGG, OF WAVERLY, NEBRASKA, ASSIGNOR OF ONE-FOURTH TO J. S. STURDEVANT, OF SAME PLACE.

PUMP-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 592,581, dated October 26, 1897.

Application filed April 17, 1897. Serial No. 632,655. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. BLAGG, a citizen of the United States, residing at Waverly, in the county of Lancaster and State of Nebraska, have invented a new and useful Pump-Operating Mechanism, of which the following is a specification.

My invention relates to pump mechanism adapted to be actuated by an air-motor; and the object in view is to provide a simple and efficient construction and arrangement of levers and coöperating parts, whereby the rotary motion of a driving-shaft is converted into a reciprocatory movement of an intermediate connection to oscillate a system of levers by which motion is communicated to a pump-rod.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a view of a pump-operating mechanism constructed in accordance with my invention. Fig. 2 is a detail view in perspective of the pump-levers and connections. Fig. 3 is a detail front view of the mechanism for adjusting the beam, whereby the frame of the mechanism may be lowered and also showing the cushioning devices for the pump-rod. Fig. 4 is a detail sectional view of the cushioning device for the pump-rod. Fig. 5 is a detail view in perspective of one of the members of the cushioning device detached. Fig. 6 is a detail view of the follower-plate forming a part of the cushioning devices inverted. Fig. 7 is a detail view in perspective of the operating mechanism, showing speed-multiplying devices for communicating motion from the driving-shaft to the carrier. Fig. 8 is a detail view in perspective of the means shown in Fig. 6 for connecting the pump-lever with the pump-rod. Fig. 9 shows a modification of said connection between the pump-lever and the pump-rod. Fig. 10 is a side view showing a modified construction of frame and also including a different construction of speed-multiplying devices. Fig. 11 is a perspective view of a portion of another improved form of the apparatus, in which a counterbalanced lever is used as the means of communicating motion to the operating-lever from the driving-shaft. Fig. 12 is detail side view of the lever. Fig. 13 is a horizontal section of the joint. Fig. 14 is a plan view of the form of connection between the lever and chain shown in Fig. 1. Fig. 15 is a detail view in perspective of a portion of the same. Fig. 16 is a detail view of a preferred form of bearing-box.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

In carrying out my invention, which is designed especially for use in connection with pumps for deep wells and for irrigating purposes, I preferably employ a tower 1, to an intermediate bar 2 of which is fulcrumed a tilting beam 3, the cross bars or braces of the tower at its front and rear sides being omitted, respectively at the top and bottom, to allow said beam to be inclined, as indicated by the dotted lines in Fig. 1, to bring the upper end of the beam to a point contiguous to the ground, whereby the mechanism supported by said beam may be adjusted and repaired without ascending the tower. The means which I employ for accomplishing this tilting of the beam is illustrated in the drawings as consisting of a double drum comprising coaxial drums 4 and 5 of respectively large and small diameter mounted for actuation by a common crank 6 and held at the desired adjustment by means of ratchet mechanism 7, cables 8 and 9, extending, respectively, from the upper and lower extremities of the beam 3 to the large and small drums and being reeled in opposite directions thereon, whereby when the operating-crank 6 is rotated in one direction the beam is tilted to bring its upper end toward the ground, while with an opposite rotation the beam is returned to its normal or upright position. The platform 10 at the top of the tower is cut away to form an opening 11, in which the head 12 of the mechanism is adapted to fit, said head being carried by the beam. To lock the beam in its upright position, I employ a latch 3^a, fulcrumed upon the beam and

adapted to engage one of the cross-bars of the tower, and this latch may be disengaged from a point near the ground by means of a lever 3^b, which is connected with the latch by a rod 3^c.

The head may be of the tubular construction illustrated in the drawings to receive the upper end of the pump-rod 13, which is detachably connected, as at 14, to the piston-rod 15 of the pump, a pump of the ordinary construction being illustrated at 16. The cushioning device is introduced in the pump-rod to relieve the upward and downward jars thereof, said device consisting of upper and lower members 17 and 18, which are bifurcated to interlock at their contiguous extremities and are cut away to receive cushioning-springs 19 and 20, which are arranged, respectively, on opposite sides of a pressure-plate 21, carried by the upper member 17. The upper end of the spring 19 bears against a follower-plate 22, which extends through the bifurcation of the upper member and is secured to the lower member by means of tension-rods 23. The extremities of the springs fit in sockets 24, formed, respectively, on the pressure-plate 21 and the follower-plate 22. (See Fig. 6.)

The interlocking extremities of the pump-rod sections, which are respectively reduced and bifurcated to form the interlocking joint, are slotted in a plane transverse to the bifurcation to form a guide for the follower-plate, the pressure-plate being secured to the extremity of the reduced portion or tongue of the reduced member, and hence being guided by the bifurcation of the other member, and therefore when the opposing springs are arranged with their contiguous ends seated upon opposite sides of the pressure-plate and their remote ends seated, respectively, upon the follower-plate and the inner end of the bifurcation they are housed and protected from contact with contiguous members and at the same time are held from lateral deflection when strained axially.

Carried by the head is a frame 25, to which is attached a vane 26, and mounted within the frame is a pump-lever 27, which is preferably bifurcated, as shown at 28, and is connected to the portion of the pump-rod within the head, said lever being fulcrumed upon a suitable bracket 29, which, as illustrated in Figs. 1 and 2, is adjustably mounted upon the frame to enable its distance from the head to be varied, the adjusting devices consisting of a tongue or extension 30 on the bracket fitted in a slot 31 in the frame and secured by means of a bolt 32. The lever is also provided with a plurality of perforations 33 for engagement by the pivot-bolt 34 on the bracket to enable the relative lengths of the arms of the lever to be varied to give greater or less leverage and throw.

The pump-lever is provided with a laterally-swinging arm 35, connected with the body portion of the lever by a joint 36, having a vertical pivot, said laterally-swinging arm 35 being fitted with an adjustable weight 37 to counterbalance the weight of the pump-rod, and connected with this laterally-swinging arm of the pump-lever is an operating-lever 38 of the second order, which is terminally mounted by means of a universal joint upon the frame. In the construction illustrated this universal joint includes an intermediate section 39 between the body portion of the operating-lever and the frame, said section being connected with the frame by means of a vertical pivot 40 and with the body portion of the lever by means of a horizontal pivot 41; also, the connection between the operating and the pump levers consists of a universal joint, preferably of ball-and-socket construction, as shown at 42, this joint being illustrated in section in Fig. 10.

43 designates a driving-shaft, which may be actuated by any suitable means, such as a wind-wheel 44, and mounted for operation by this shaft is an endless carrier 45, in the construction illustrated said carrier consisting of a chain extending around a chain-wheel 46 on the driving-shaft and an idle chain-wheel 47, of which the spindle 48 is mounted in bearing-blocks 49, adjustably mounted in the frame. These bearing-blocks are preferably fitted in slots 50 in parallel end bars 51 of the frame and are secured at the desired adjustment to maintain the carrier at the desired tension by means of securing-bolts 52 and engaging nuts.

In Fig. 7 a slightly-modified arrangement is shown, wherein the driving-shaft 43^a is connected by intermediate gearing 53 and 54 of the speed-multiplying type with the spindle 55 of the carrier-wheel 46, and in Fig. 10 the driving-wheel 43^b is connected by speed-multiplying devices, consisting of chain-wheels 56 and 57 and a chain 58, with the spindle 48^a of the upper carrier-wheel 47^a.

The function of the carrier 45 is to communicate oscillatory motion to the operating-lever 38, the connection between the carrier and the operating-lever consisting of a swivel 59, which is secured to the carrier and is jointed to the lever, whereby as the carrier traverses the wheels the operating-lever receives a combined vertical and lateral oscillatory movement, which, however, does not affect the true vertical oscillation of the main or body portion of the pump-lever 27, by reason of the universal joint 42, by which the operating-lever is connected with the laterally-movable arm of the pump-lever and the laterally-yielding joint 36, by which the arm 35 of the pump-lever is connected with the body portion 27 thereof.

Various means may be employed for connecting the pump-lever to the pump-rod in addition to the direct pivot illustrated in Figs. 1 and 2, and of such modified means I have illustrated one in Figs. 7 and 8, wherein the

bifurcated end of the pump-lever is connected with a cross-head 60 on the pump-rod by means of downwardly-extending rods 61, and another in Fig. 9 consisting of a cross-head 62, connected by similar upwardly-extending rods 63; also, in Fig. 10 I have illustrated a rotary rectangular frame 25^a, carried by the head 12, instead of the tapered or triangular frame illustrated in Figs. 1 and 2, and, furthermore, in Fig. 7 I have illustrated a frame constructed of metal and consisting of a rod instead of the wood frames illustrated in the other figures.

In Figs. 11 to 13, inclusive, I have illustrated another modified construction of the apparatus embodying my invention. In this form, instead of the carrier consisting of an endless chain 45, I employ a carrier consisting of a lever 64 for communicating motion from the driving-shaft to the operating-lever 38. Said carrier-lever 64 is of sectional construction, jointed at 65, one of the members being secured rigidly to the driving-shaft and having a counterbalancing-weight 67, while the other member, which is jointed, as described, to said first-named member, is connected by a universal joint 66 with the contiguous extremity of the operating-lever 38. Obviously when the driving-shaft rotates it communicates motion through the lever 64 to the operating-lever 38, the pivoted section of said lever 64 serving to allow said communication of motion without straining or binding, while the weight 67 serves to counterbalance to a certain extent the weight of the contiguous end of the operating-lever. In Fig. 11 I have shown only a portion of the apparatus—namely, the counterbalanced lever 64, portions of the driving-shaft and the frame, and a portion of the free end of the operating-lever 38—to illustrate the means for communicating motion from the driving-shaft to the operating-lever.

In Fig. 15 is shown a detail view of the preferred form of connection between the operating-lever and the chain 45 used in the construction of the apparatus illustrated in Figs. 1 to 10, inclusive. Said chain is provided at the proper point with an enlarged link 68, to which is attached a clasp 69, having ears or lugs which are bent toward each other over the ends of the link and in a bearing 70, at the center of which clasp is mounted the stem 71, rigid with the looped end of the operating-lever. (See Figs. 1, 2, 7, and 10.)

It will be understood, furthermore, that the function of the weight 37 is to counterbalance the pump-rods and a portion of the resistance caused by the suction of the pump, whereby the resistance of the wheel is equalized and the latter is caused to rotate at a uniform speed.

It will be understood, furthermore, that while in the drawings I have not shown any specific form of bearings for the several shafts suitable bearings may be employed, such as that illustrated in Fig. 16.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. In a pump-operating mechanism, the combination with a pump-lever mounted to oscillate in a plane parallel with a pump-rod, of an oscillatory operating-lever connected with the pump-lever and capable of universal movement at its free end, and a carrier connected with the operating-lever and capable of continuous movement in a uniform direction to oscillate the operating-lever, substantially as specified.

2. In a pump-opefating mechanism, the combination with a pump-lever adapted to oscillate in a plane parallel with the pump-rod, of an endless carrier adapted to receive continuous motion in a uniform direction, and an operating-lever actuated by the carrier and connected with one arm of the pump-lever, substantially as specified.

3. In a pump-operating mechanism, the combination of a pump-lever having a jointed arm adapted to swing in a plane transverse to that of the body portion of the lever, an endless carrier adapted to receive continuous motion in a uniform direction, and an operating-lever connected at a point remote from its fulcrum to said carrier to follow the path thereof and connected by a universal joint with the swinging arm of the pump-lever, substantially as specified.

4. In a pump-operating mechanism, the combination of a pump-lever having a jointed arm adapted to swing in a direction transverse to that of the body portion of the lever, a driving-shaft, an endless carrier operatively connected with the driving-shaft for continuous motion in a uniform direction, an operating-lever having a universal fulcrum and connected by a universal joint with the swinging arm of the pump-lever, and a connection between the operating-lever and a fixed point of the carrier, whereby the contiguous end of the operating-lever follows the path of the carrier, substantially as specified.

5. In a pump-operating mechanism, the combination with a pump-lever, of a driving-shaft, an endless carrier traversing a chain-wheel actuated by the driving-shaft, adjusting devices for varying the tension of the carrier, and an operating-lever having a swivel connection with a fixed point of the carrier and operatively connected with one arm of the pump-lever, substantially as specified.

6. In a pump-operating mechanism, the combination with a supporting-frame, of a bracket adjustably mounted upon said frame, a pump-lever having its body portion fulcrumed at an intermediate point upon said bracket, the fulcrum-point being adjustable to vary the relative lengths of the arms of the pump-lever, and the long arm of said lever

being jointed to swing in a plane transverse to that of the body portion of the lever, an operating-lever of the second order having a universal fulcrum and connected at an intermediate point by a universal joint with the extremity of the long arm of the pump-lever, and means for communicating a continuous oscillatory movement in an endless path to the free end of the operating-lever, substantially as specified.

7. In a pump-operating mechanism, the combination of a pump-lever having its long arm jointed to swing in a plane transverse to the body portion of the lever and fitted with an adjustable counterbalancing-weight, an operating-lever of the second order having a universal fulcrum and connected at an intermediate point by a universal joint with the long arm of the pump-lever, and means for communicating continuous oscillatory movement to the operating-lever, to cause the contiguous end of the latter to operate in an endless path, substantially as specified.

8. In a pump-operating mechanism, the combination with a tower, of an intermediately-fulcrumed tilting beam, a hollow head carried by said beam, a pump-rod extending at its upper end into said head, operating mechanism including a pump-lever connected to the pump-rod, and means for tilting said beam, including a windlass having a double drum provided with actuating and locking devices, and cables connecting opposite extremities of the beam with the drum, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

THOMAS J. BLAGG.

Witnesses:
L. J. LODER,
WM. COOK.