(No Model.) 5 Sheets—Sheet 1.

J. E. LAGERMAN.

LUBRICATOR.

No. 515,590. Patented Feb. 27, 1894.

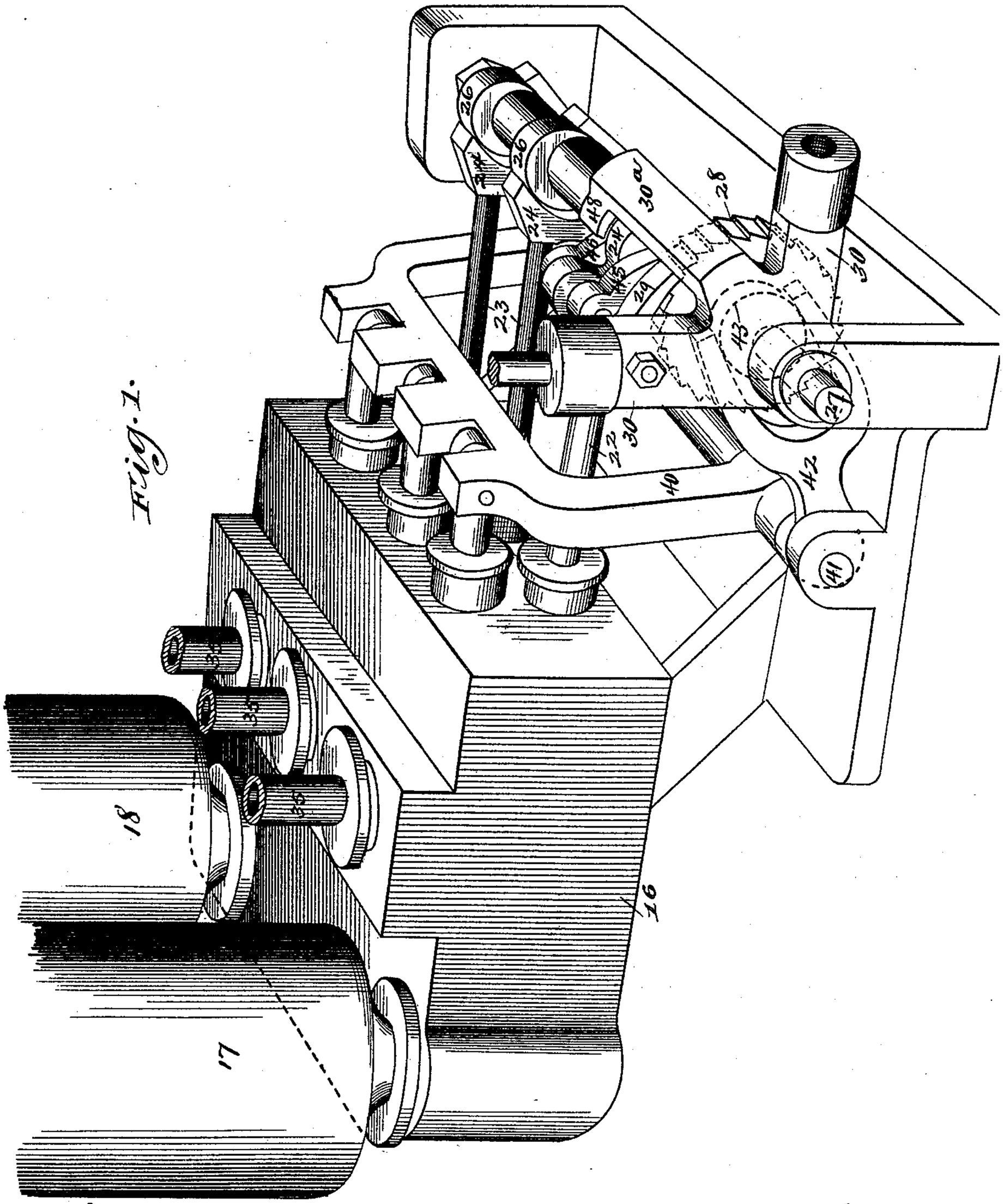

Fig. 1.

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Fig. 2.

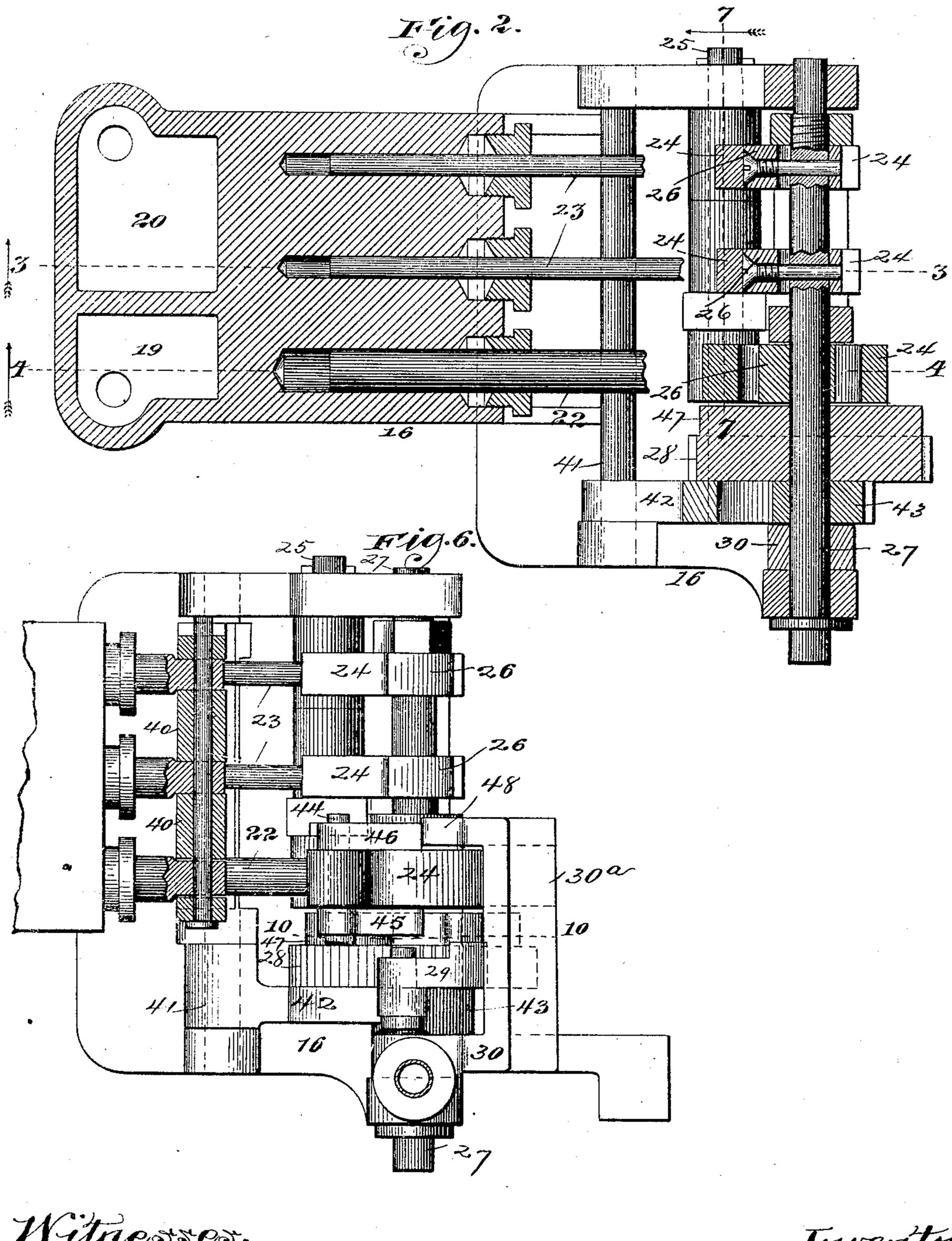

Fig. 6.

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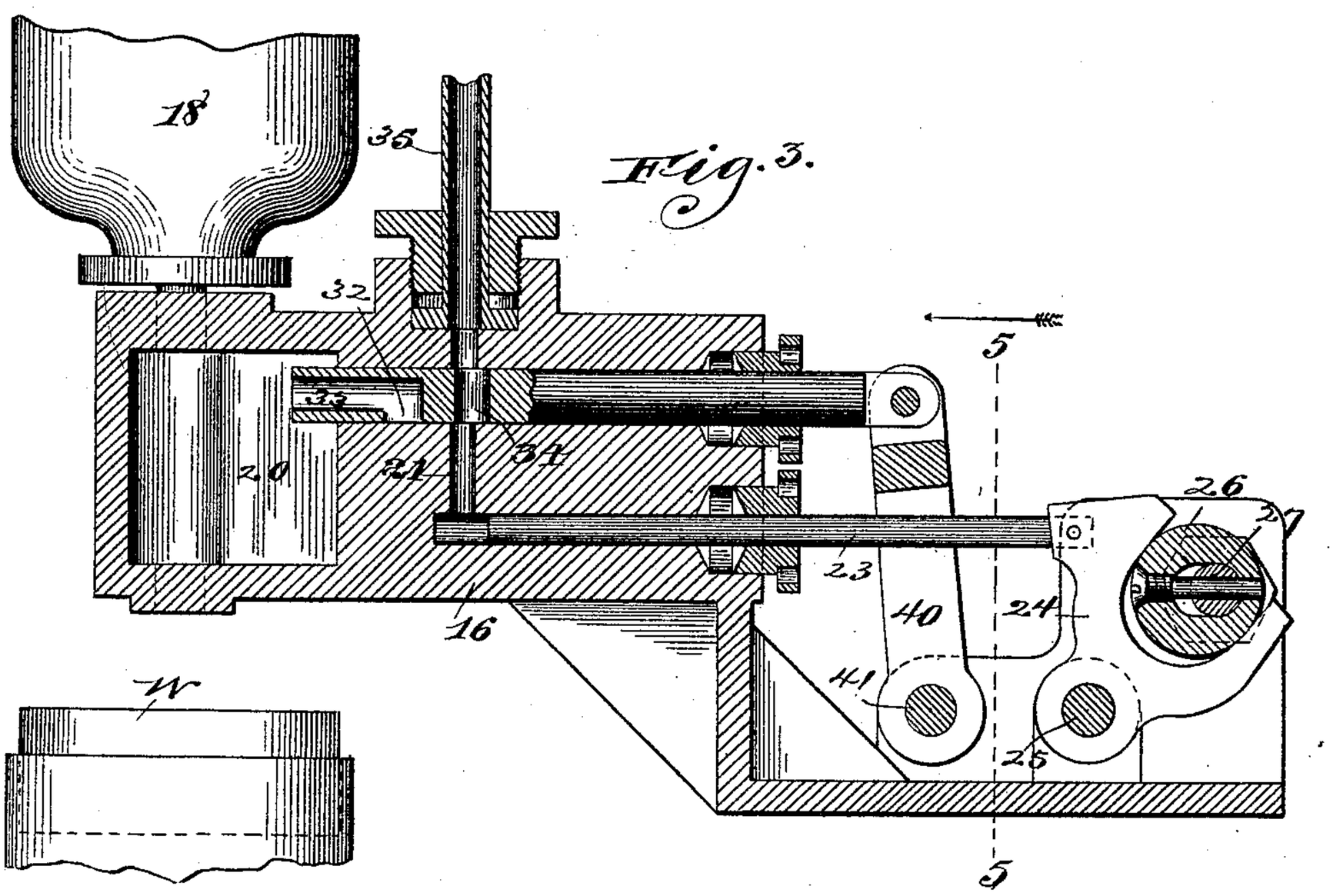

Fig. 3.

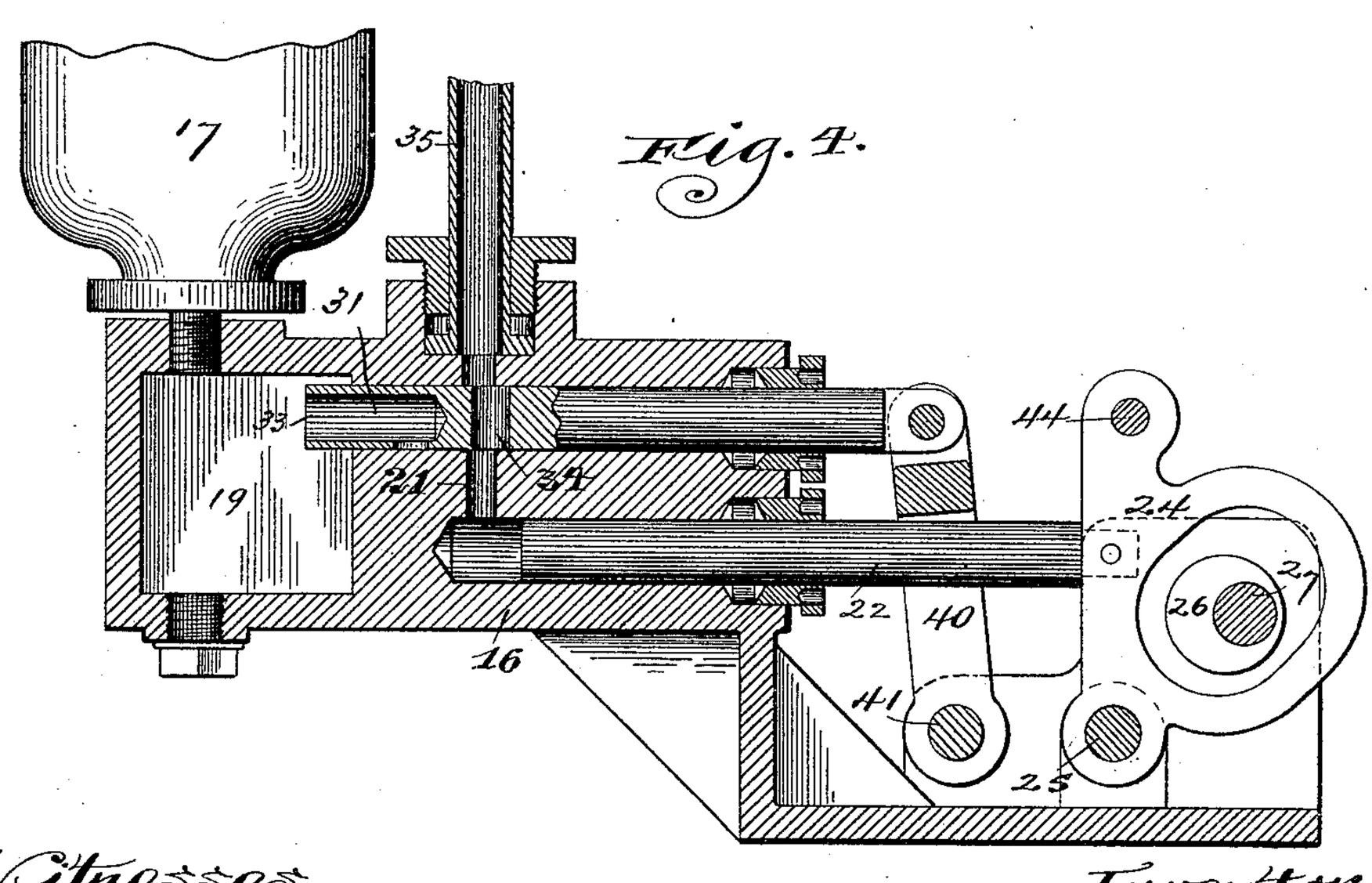

Fig. 4.

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Fig. 5.

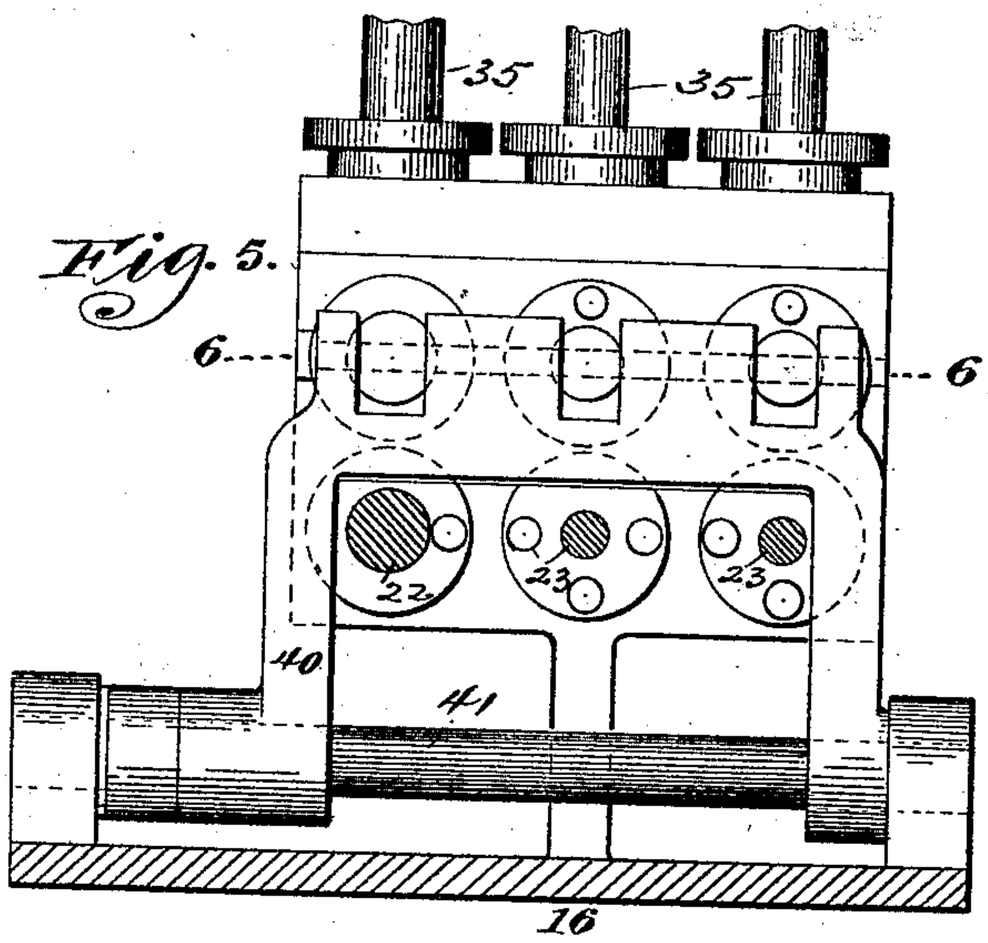


Fig. 7.

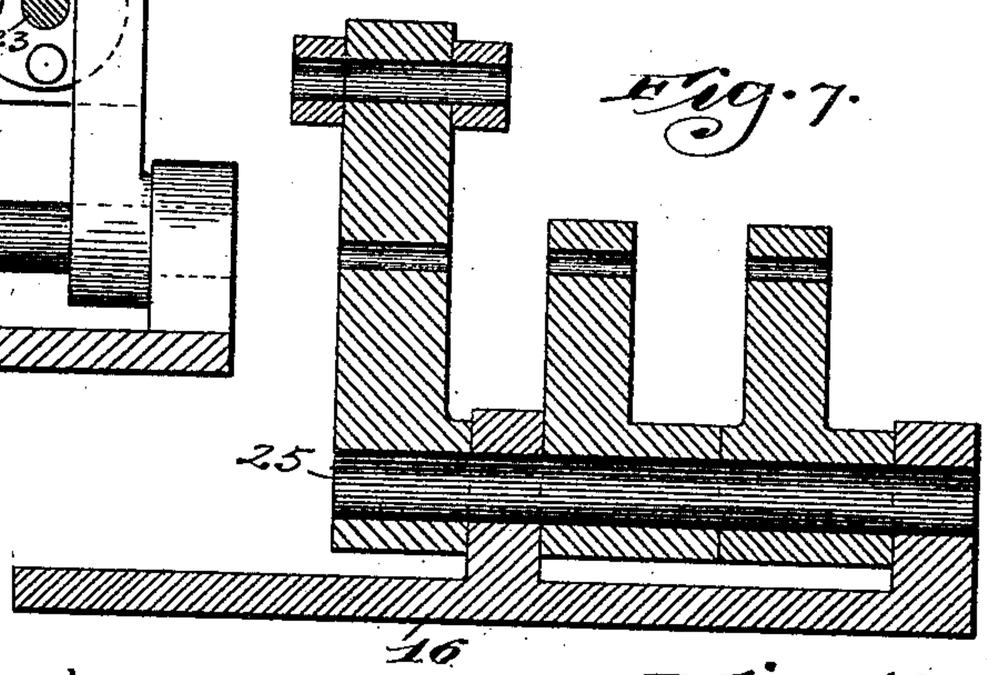


Fig. 8.

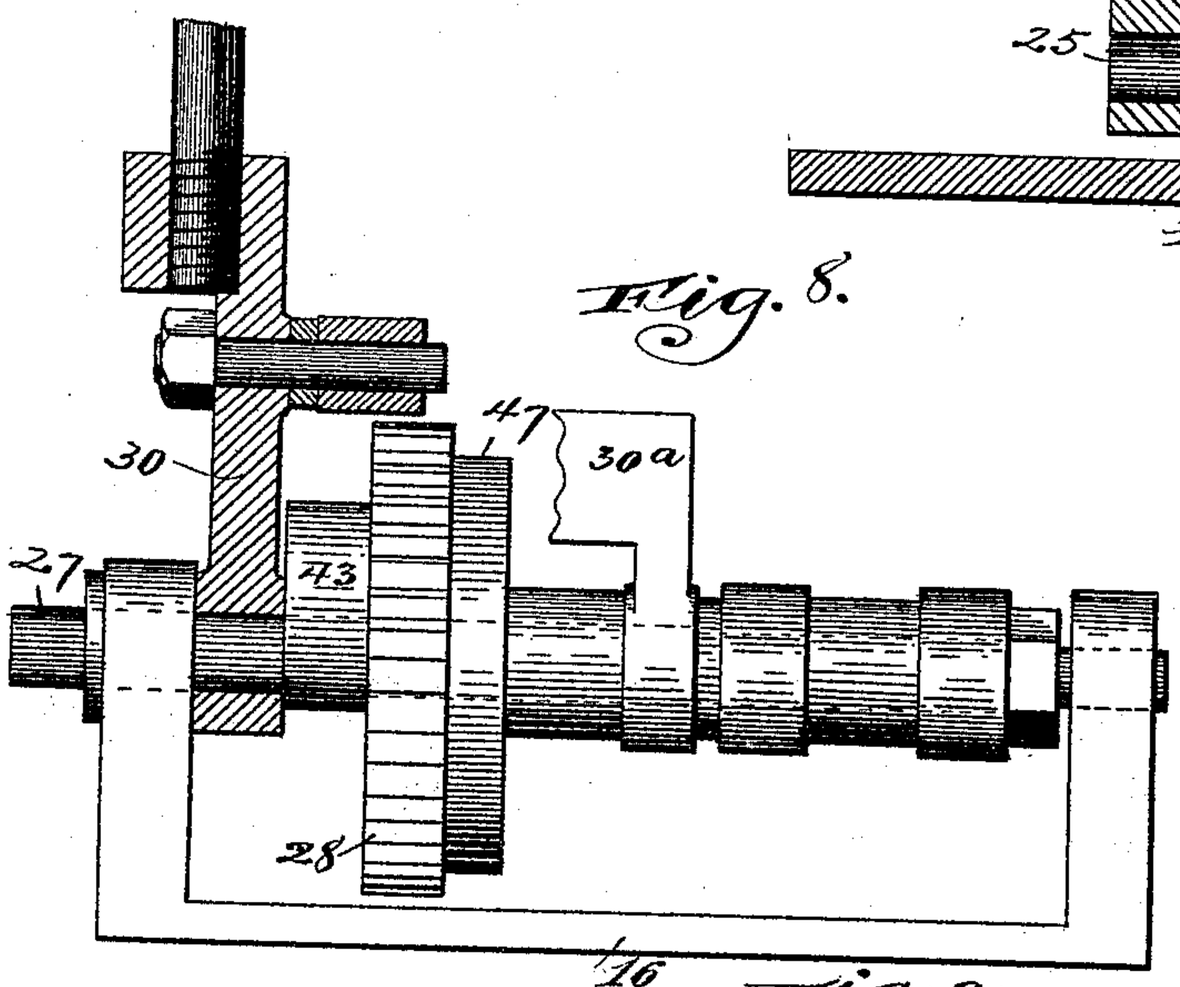


Fig. 10.

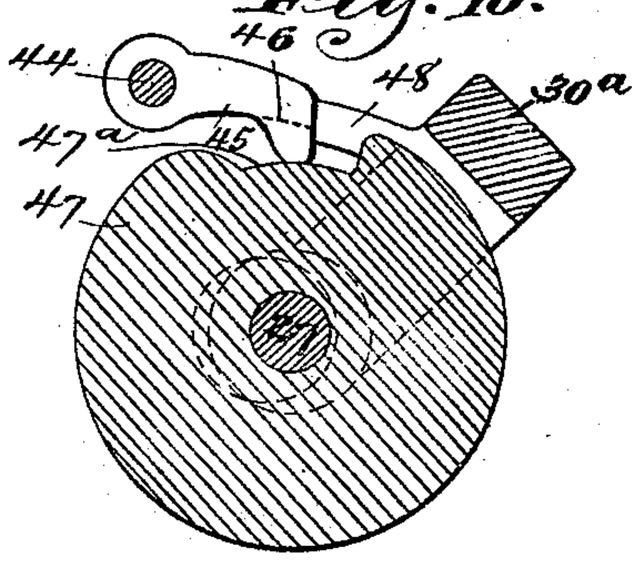
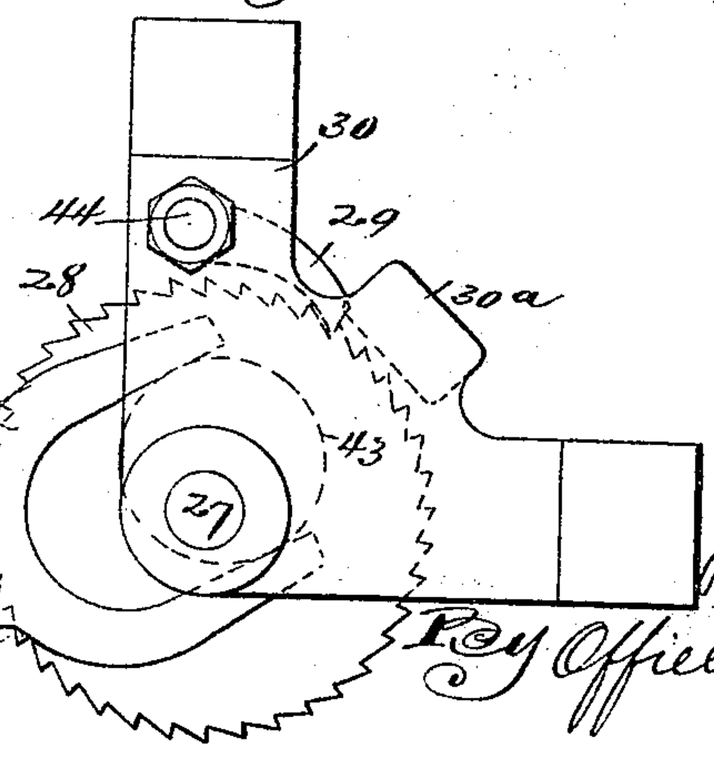


Fig. 9.



Witnesses;
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Fig. 11.

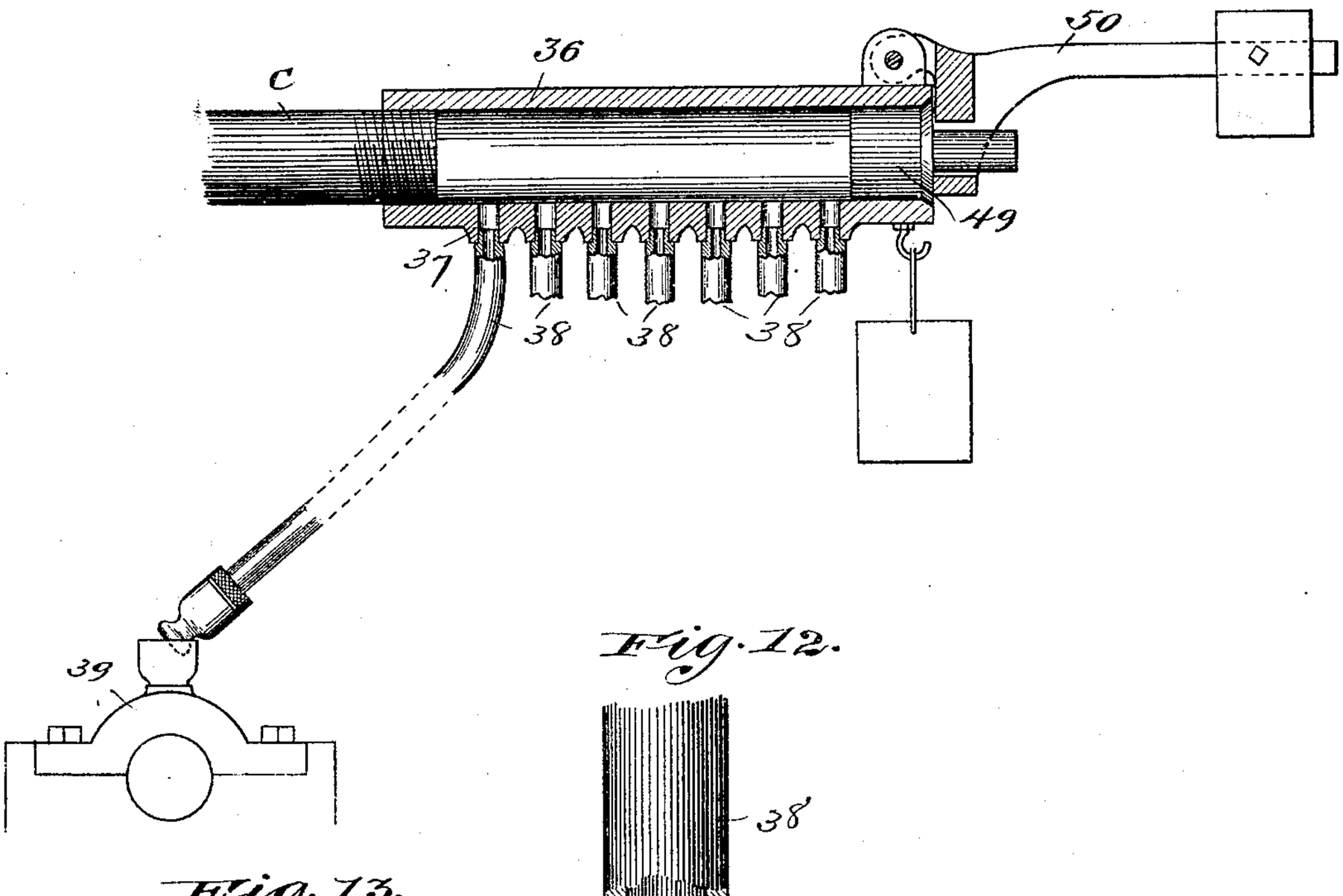


Fig. 12.

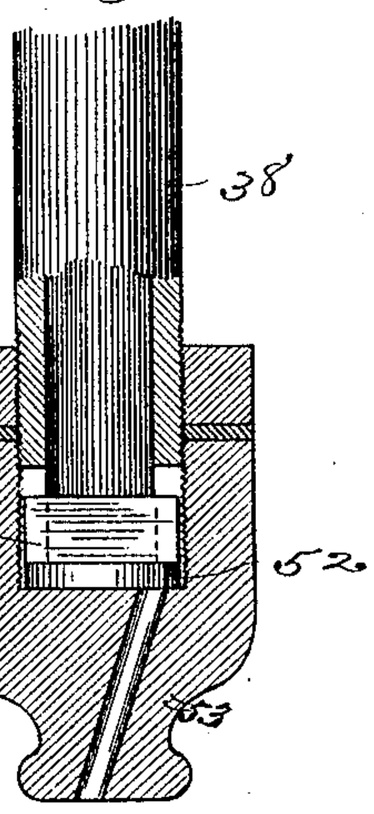


Fig. 13.

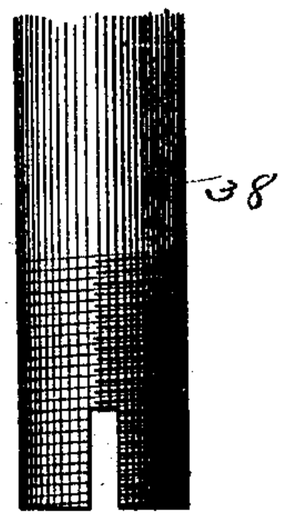


Fig. 14.

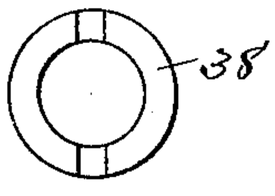


Fig. 15.

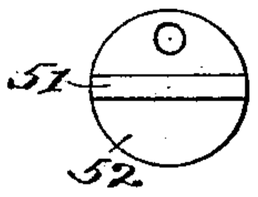
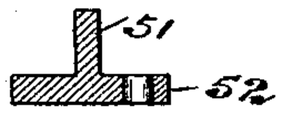


Fig. 16.



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UNITED STATES PATENT OFFICE.

JOHANNES EMANUEL LAGERMAN, OF HUSQVARNA, SWEDEN, ASSIGNOR TO ALEXANDER LAGERMAN, JR., OF NEW YORK, N. Y.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 515,590, dated February 27, 1894.

Application filed June 23, 1893. Serial No. 478,651. (No model.)

To all whom it may concern:

Be it known that I, JOHANNES EMANUEL LAGERMAN, a subject of the King of Sweden and Norway, residing at Husqvarna, Sweden, have invented certain new and useful Improvements in Apparatus for Distributing and Feeding Oil, of which the following is a specification.

This invention relates to an apparatus for distributing oil from a central point to a number of bearings located at separate points within practicable distance from the central reservoir; and the object of the invention is to provide an apparatus which is adapted to feed heavy as well as thin oils in regulated quantities and at suitable intervals of time to any desired number of bearings, as, for example, the apparatus may be adapted to the oiling of the cylinders of a locomotive and to the several bearings of the moving parts thereof, or it may be adapted to the oiling of the cylinder and crank bearings of a stationary engine and to the various journal boxes for the shafts driven by said engine.

The particular construction of the apparatus may be considerably varied, but I have shown in the accompanying drawings an apparatus which comprises an intermittently driven shaft, which is made to operate two sets of plungers, one set of which is utilized to withdraw oil from a reservoir into a pump chamber, and the second set of which is utilized to force oil from said chamber into a supply pipe or tube, said supply pipe or tube being adapted to deliver the oil thus fed into a header or main distributing pipe, from which branch pipes are run to the several bearings which are to be lubricated.

In the accompanying drawings, Figure 1 is a perspective view. Fig. 2 is a sectional plan view. Figs. 3 and 4 are sectional elevations on the line 3—3 and 4—4 respectively of Fig. 2. Fig. 5 is a sectional elevation on the line 5—5 of Fig. 3, looking in the direction of the arrow. Fig. 6 is a plan view, partly in section, on the line 6—6 of Fig. 5. Fig. 7 is a sectional detail on the line 7—7 of Fig. 2. Fig. 8 is an elevation with parts broken away, particularly intended to show a ratchet mechanism. Fig. 9 is a detail view of said ratchet mechanism. Fig. 10 is a sectional detail of an eccentric on the line 10—10 of Fig. 6. Fig. 11 is a diagrammatic view showing a header with branch pipe connections and one branch pipe partly broken away for supplying oil to a bearing shown in end elevation. Figs. 12 to 16 inclusive are detail views of a nozzle whereby a lubricant may be fed in regulable quantities.

In the drawings, 16 represents a base or bed which is chambered to provide oil receptacles, plunger openings, pump chambers and ports, and which serves also for supporting the shafts and other moving parts of the apparatus. Upon the front side of said bed are arranged the upright reservoirs 17, 18, which are in communication with the oil chambers 19, 20. The body of said casting is longitudinally bored providing chambers within which work plungers and valve stems as hereinafter described. Said bed piece is also vertically bored to provide pump chambers 21, which intersect the valve chambers and terminate in the plunger chambers.

By reference to Figs. 1 to 4 inclusive it will be seen that there are provided three plunger chambers, three valve chambers and a corresponding number of pump chambers. One of said valve chambers communicates with the oil chamber 19 and two of them communicate with the oil chamber 20. It will also be seen that the valve chamber and plunger chamber which are in communication with the oil chamber 19 are larger than those which are in communication with the oil chamber 20, and thereby the apparatus is adapted to feed different kinds of oil. To accelerate the flow of the oil a weight W (Fig. 4) may be employed.

22 refers to a plunger for feeding the oil from chamber 19, and 23 and 23 refer to plungers for feeding the oil from chamber 20. Said plungers are actuated from rocker boxes 24 which are eccentrically pivoted upon rock shaft 25 journaled in the sides of the bed. An intermittent motion is communicated to said rocker boxes through eccentrics 26 on a shaft 27. Said shaft 27 has a step by step rotative movement communicated to it through a ratchet wheel 28 carried thereon, said ratchet being advanced step by step through a pawl 29 carried upon a rock arm 30, the latter be-

ing oscillated in any convenient way, as, for example, by an eccentric or from a crank (not shown). The rocker boxes 24 and cams 26 are thus driven intermittently, a single actuation of the arm 30 advancing them through the arc of a circle corresponding to the length of the arc described by the stroke of the arm 30. The length of stroke of the plungers 22 and 23 may be varied by varying the connection to the arm or by varying the set of the eccentrics 26 the stroke of the plungers 23 may be varied independently.

Arranged above plunger 22 is a valve 31 and above the plungers 23, 23 are two valves 32 of similar construction, one of which is shown in Fig. 3 in side elevation. Said valves have the L-shaped passages 33, one end of which opens into the respective chambers 19 and 20, and the inner ends of which are adapted to register with the pump chambers 21. Each of the valves is also provided with a transverse port 34, and in one position of the valve said port will open communication between the two ends of the pump chamber 21. The delivery pipes 35 communicate with the upper ends of said chambers, and deliver to headers 36, one of which is shown in Fig. 11. Said headers may be provided with a series of nipples 37 to which are attached pipes 38 leading to separate bearings, such for example as the bearing 39 shown in said Fig. 11. It will be understood that these branch pipes 38 deliver oil to a steam cylinder or to a bearing of any form and at any distance to which it is practicable to carry the oil through a pipe and deliver it by the pulsations of a pump.

Referring again to the oil forcing mechanism shown in the first ten figures of the drawings, the valves are connected at their outer ends to vibrating arms 40, which are keyed at their lower ends upon a rock shaft 41, said rock shaft being rocked by a yoke 42 whose bifurcations embrace an eccentric 43 on the shaft 27. The box 24 to which piston 22 is secured has an upwardly projecting ear through which ear is pivotally secured a rock shaft 44, said rock shaft having rigidly secured to its projecting ends dogs 45 and 46. The dog 45 rides upon a cam 47 secured upon the side of the ratchet wheel 28 and when riding upon the high part of the cam elevates the dog 46 above the path of a striking block 48 upon a projection 30^a of the rock arm 30. When the dog 45 drops upon the low part 47^a of the cam 47 the dog 46 is lowered into the path of the striking block 48 and receives therefrom a blow equal to the full force of the stroke of the engine, thereby causing the plunger to make a complete outward stroke by a single impulse. Upon the following stroke of the rock arm 30, the dog 45 will have risen upon the high part of the cam 47 and the cam 26 on shaft 27 will rock the box 24 upon shaft 25 and withdraw the plunger to the outward limit of its stroke, preparatory for a repetition of the same action.

The plungers which force the oil fed from chamber 20 move alternately back and forth with each step of the pawl and ratchet thus providing a constant feed, while the plunger 22 operates only once during a complete revolution of the ratchet as the parts are arranged, thus making an intermitted feed.

Referring to Figs. 10 to 15 inclusive, attention is called to a safety valve 49 secured on the header 36 by the weighted lever 50; also to the particular construction of the nozzle of the pipe 38, said pipe being slotted to receive a wedge 51 of a perforated disk 52, said perforation being adjusted with the aperture in the screw threaded nipple 53, which nipple is adapted to turn upon the screw threaded end of pipe 38. The supply of oil may be regulated to any desired quantity at each of the several bearings, or cut off entirely by turning the nipple of the feed nozzle, thus regulating the quantity of oil used at each lubricating point and greatly reducing the waste of the lubricant.

While I have described my invention as adapted to the feeding of oil from two separate oil chambers, it is obvious that the principal features thereof may be applied to the feeding of oil from a single reservoir. The provision of separate reservoirs adapts the apparatus for feeding divers kinds of oil to the bearings to which they are respectively adapted, and the provision of two plungers receiving oil from the same or separate reservoirs but delivering it through separate pipes adapts the same apparatus for supplying oil to engines of diverse character, as, for example, one of said plungers may force oil to a high pressure and the other to a low pressure cylinder, thus properly lubricating them; whereas, if it were attempted to lubricate both of said cylinders by a single forcing apparatus, the low pressure cylinder would take all the oil.

The object in arranging one of the plungers so that it may be driven to the end of its chamber by a single impulse instead of being forced in slowly by a cam is that where the continuous feed is employed the bearings nearest the feeder will receive the most, if not all the oil, but where the oil is fed by the plunger having the quick, powerful stroke it is delivered to the several bearings, those most remote receiving a sufficient supply. The latter form of the apparatus is best adapted to a pipe system wherein large pipes are employed having bearings located at a distance from the feeder.

I claim—

1. In an apparatus for feeding oil, the combination with an oil chamber and a pump chamber, of a plunger working into said pump chamber, and a reciprocating valve working into the oil chamber and having a passage therein whereby communication may be established between the oil chamber and the pump chamber and a port through which the oil may pass from the pump chamber to a suitable outlet, substantially as described.

2. In an apparatus for feeding oil, the combination with an oil chamber and a reservoir for supplying oil thereto, a pump chamber, a plunger working into said pump chamber, a reciprocating valve having a passage to establish communication between the oil chamber and the pump chamber and a port through which the oil may be forced from the pump chamber to an outlet, a header to which the oil is delivered and distributing pipes from said header whereby oil may be supplied to a plurality of bearings, substantially as described.

3. In an apparatus for feeding oil, the combination with an oil chamber and a reservoir for supplying oil thereto, a pump chamber, a plunger working into said pump chamber, a reciprocating valve having a passage through which the oil may pass from the oil chamber to the pump chamber, and a port through which the oil may be forced from the pump chamber by the plunger, a plunger actuating cam and a rock shaft on which said cam is mounted, and a system of distributing pipes whereby oil may be supplied to a plurality of bearings, substantially as described.

4. In an apparatus for feeding oil, the combination with an oil chamber and a reservoir for supplying oil thereto, a pump chamber, a plunger working into said pump chamber, a reciprocating valve having a passage through which the oil may pass from the oil chamber to the pump chamber, and a port through which the oil may be forced from the pump chamber by the plunger, a plunger actuating cam and a rock shaft on which said cam is mounted, and a ratchet and pawl whereby the shaft is intermittently rotated thereby forcing the oil at regular intervals through a system of distributing pipes to a plurality of bearings, substantially as described.

5. In an oil feeding apparatus of the class described, the combination with a plurality of oil chambers, reservoirs, valves and plungers operating as set forth, of a rotatable shaft having cams, rocker boxes in which said cams work and to which the plungers are connected, a rock shaft having arms secured with the valve stems, and a bifurcated arm mounted on the rock shaft and the bifurcations of which arm embrace a cam on the rotatable shaft whereby to actuate the valves, substantially as described.

6. In an oil feeding apparatus of the class described, the combination with a plurality of oil chambers, reservoirs, valves and plungers and means for actuating said valves and plungers, of a shaft having a ratchet wheel secured thereto, a rock arm having a pawl adapted to engage the ratchet wheel whereby to intermittently rotate the shaft thereby actuating the valves and plungers, and a system of distributing pipes whereby to supply oil to a plurality of bearings, substantially as described.

7. In an oil feeding apparatus, the combination with an oil chamber, of pump chambers, a plunger working into said pump chamber and a reciprocating valve working into the oil chamber and having a passage therein whereby communication may be established between the oil chamber and the pump chamber and a port through which the oil may pass from the pump chamber to a suitable outlet, plunger actuating mechanism adapted at regular intervals to force the plunger to the end of its chamber by a single impulse and a series of distributing pipes communicating with the outlet, substantially as described.

8. In an oil feeding apparatus a delivery pipe having a threaded end and a perforated disk fitted to said end and secured against rotation, a screw threaded nipple applied to the threaded end of the delivery pipe over the disk and provided with a delivery aperture, the nipple being adapted for rotation in order to control the discharge of oil, substantially as described.

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