

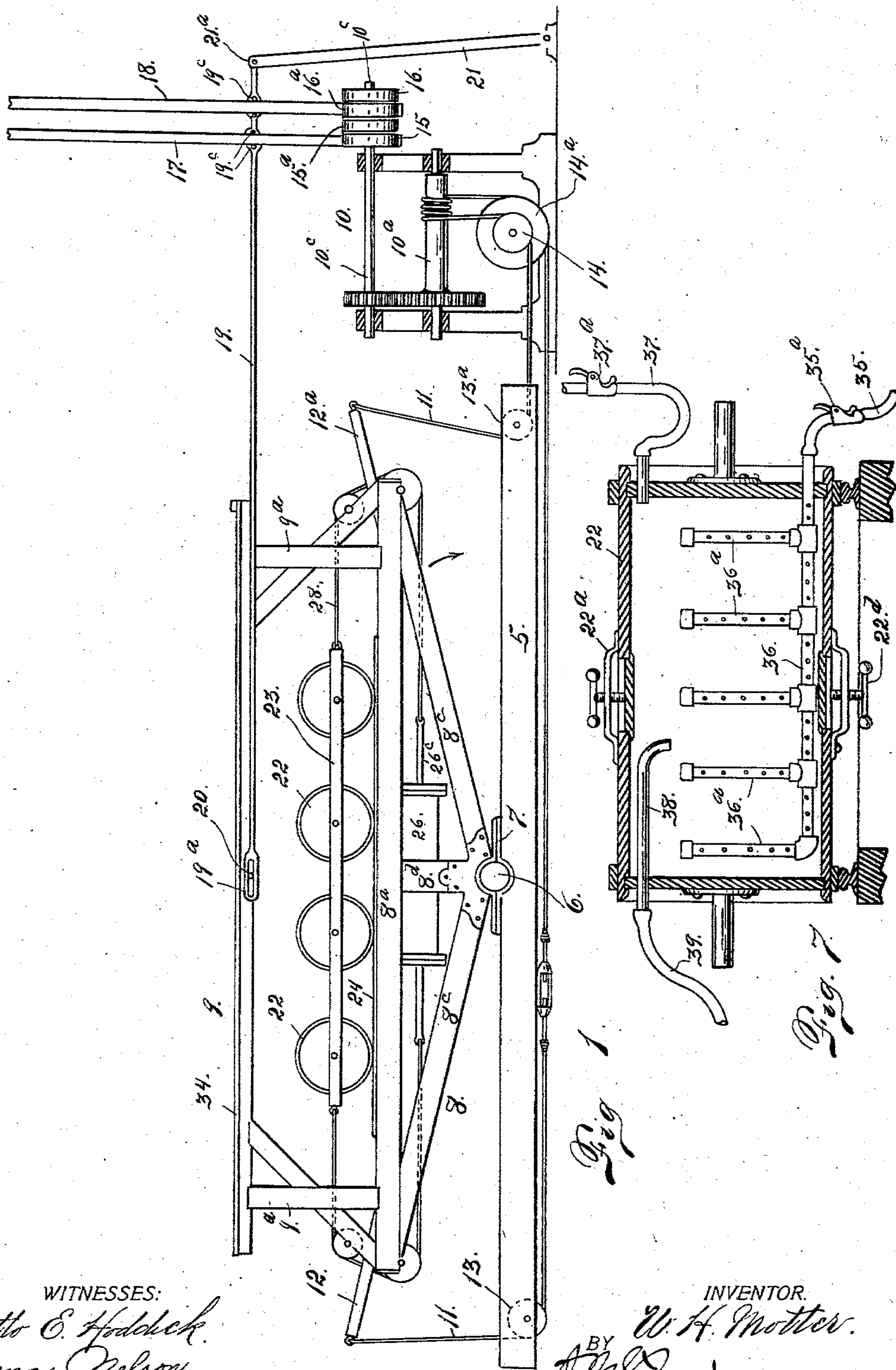
No. 730,384.

PATENTED JUNE 9, 1903.

W. H. MOTTER.
AGITATING APPARATUS.
APPLICATION FILED AUG. 18, 1902.

NO MODEL.

4 SHEETS—SHEET 1.



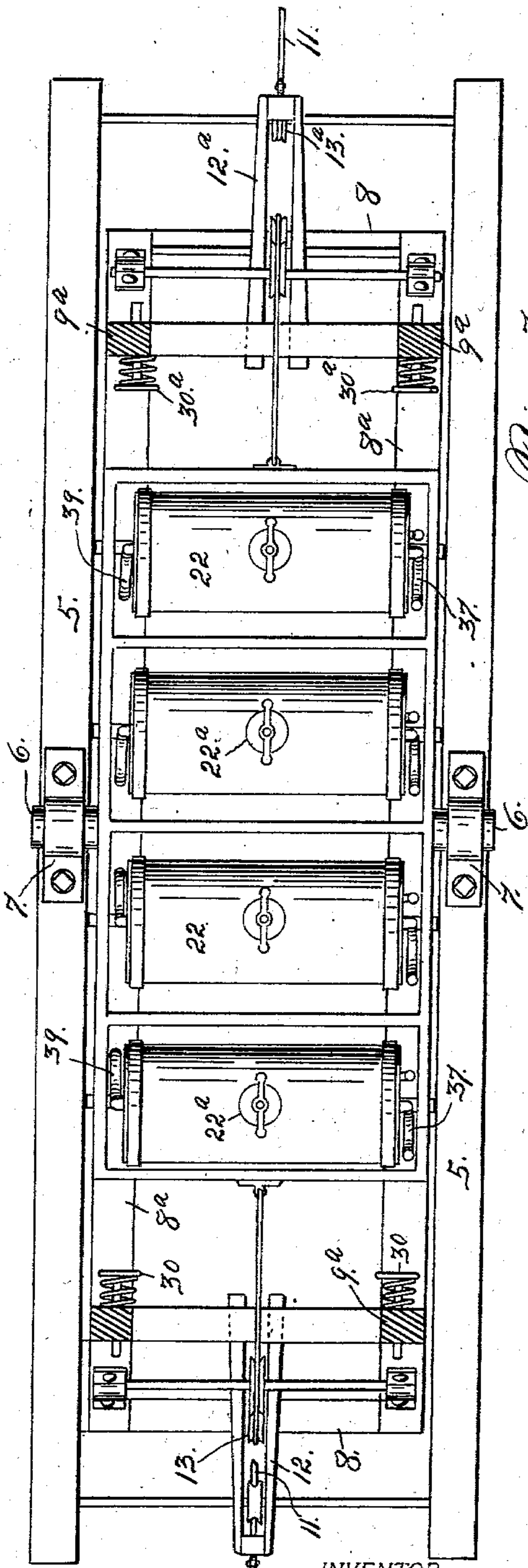
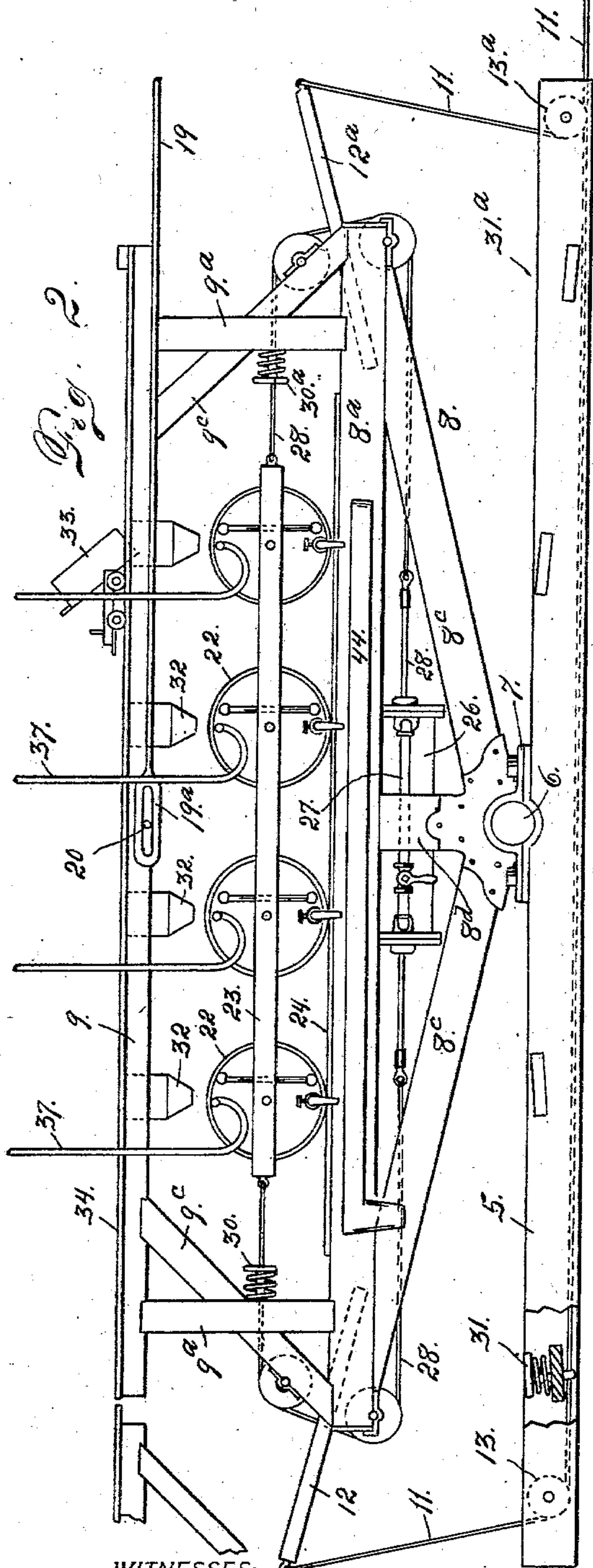
WITNESSES:
Otto E. Haddock
Dena Nelson

INVENTOR.
W. H. Motter
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

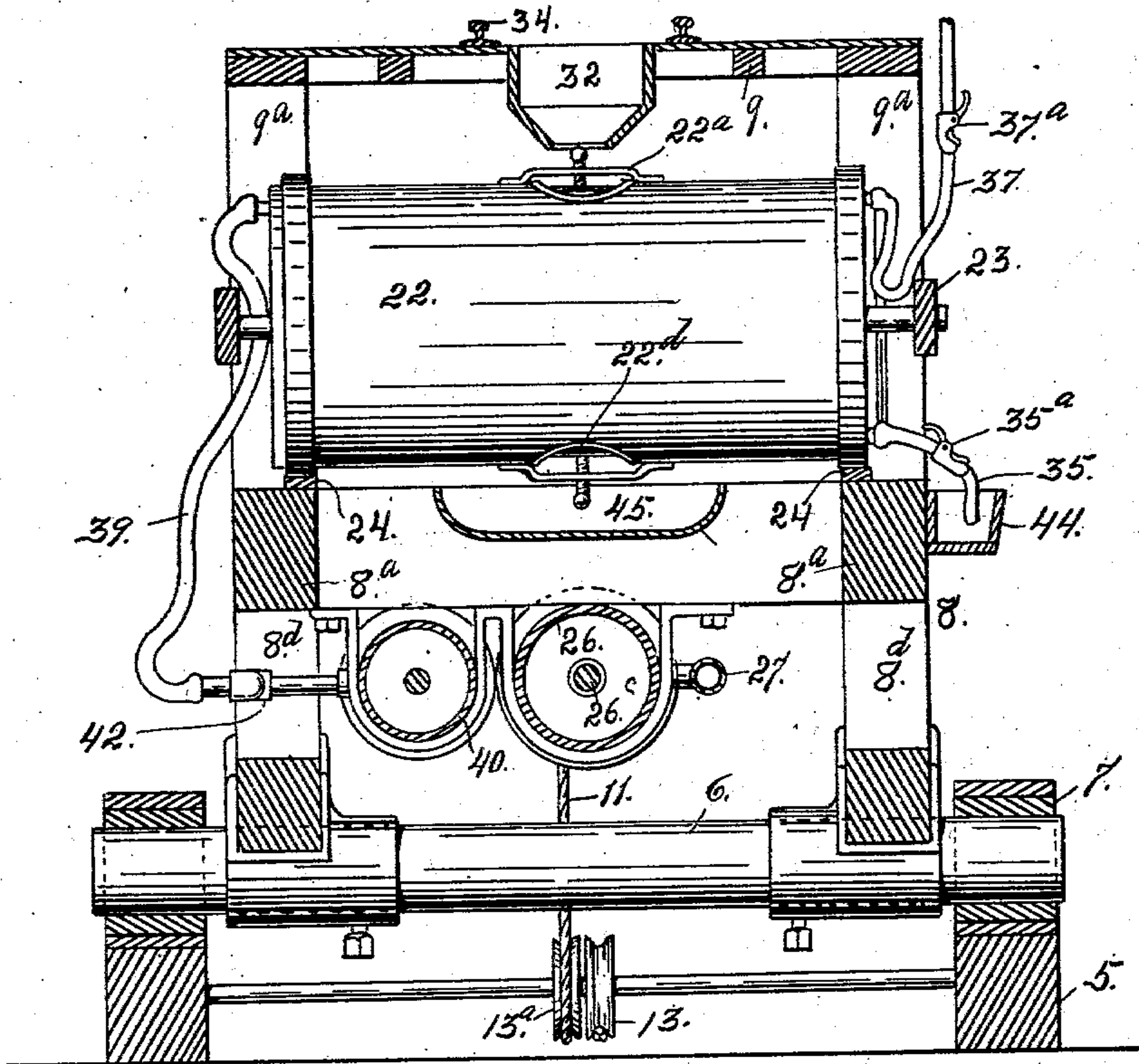
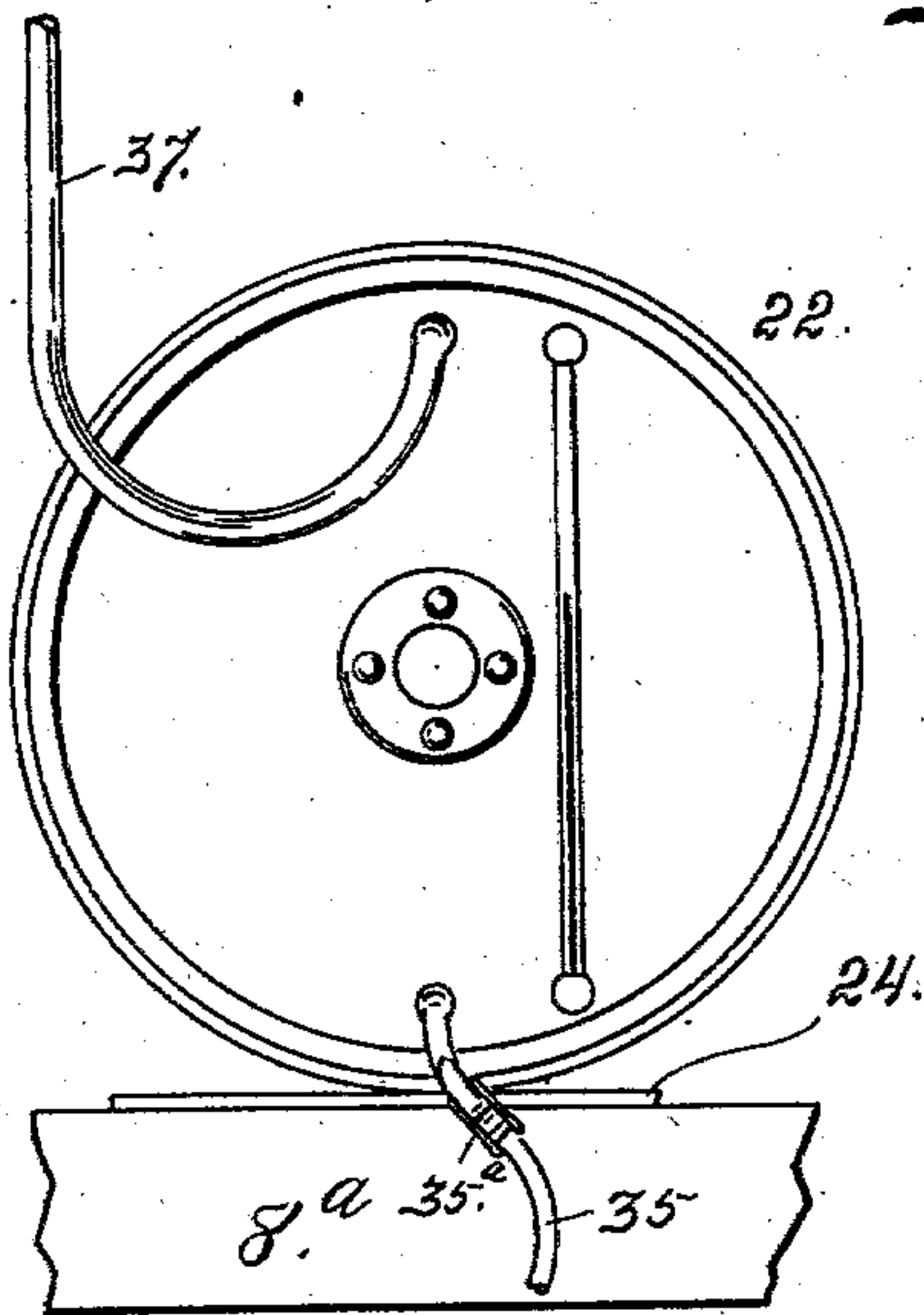


Fig. 4.



WITNESSES: *Fig. 5*
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Dena Nelson.

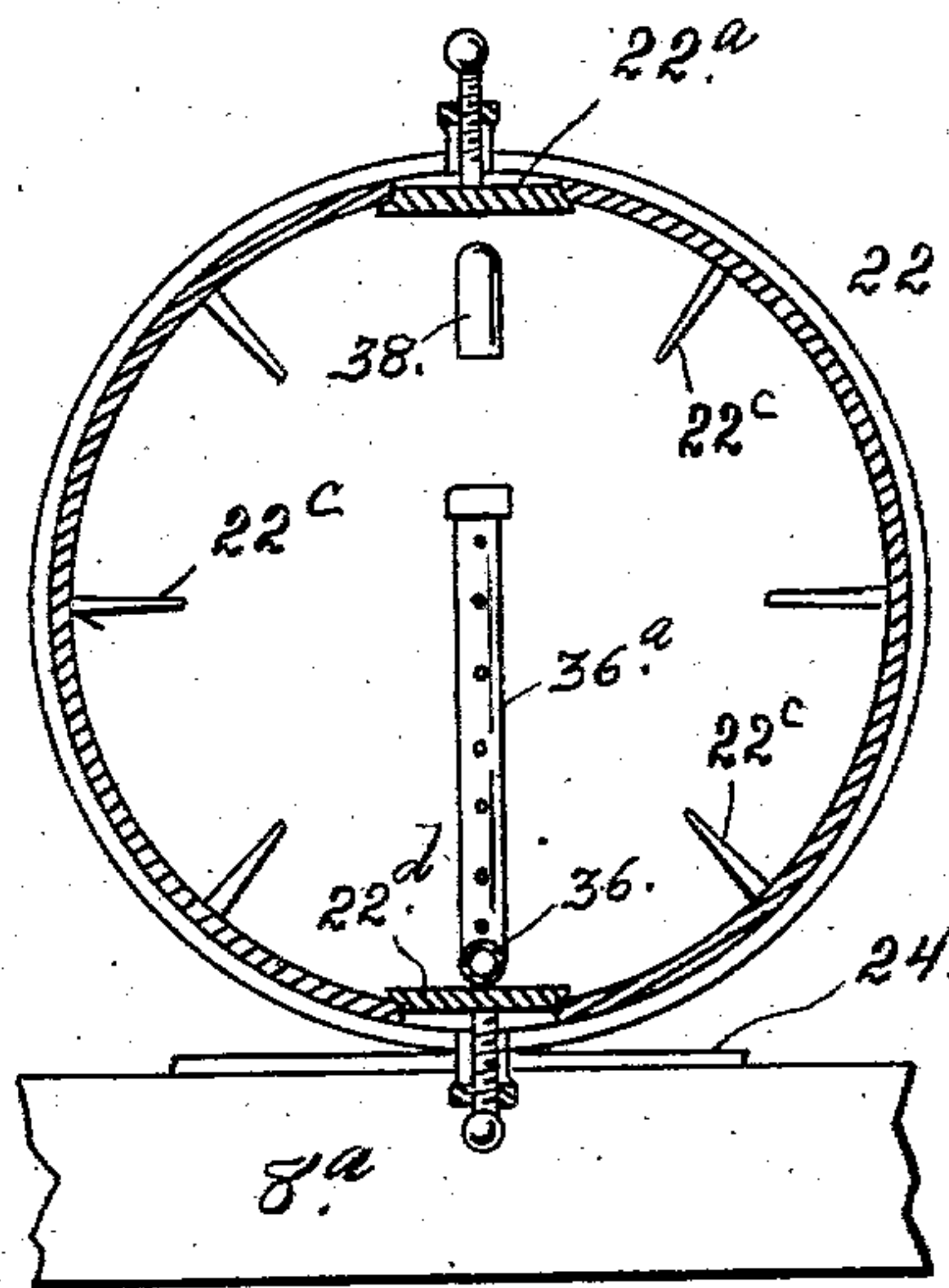


Fig. 6. INVENTOR.
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4 SHEETS—SHEET 4.

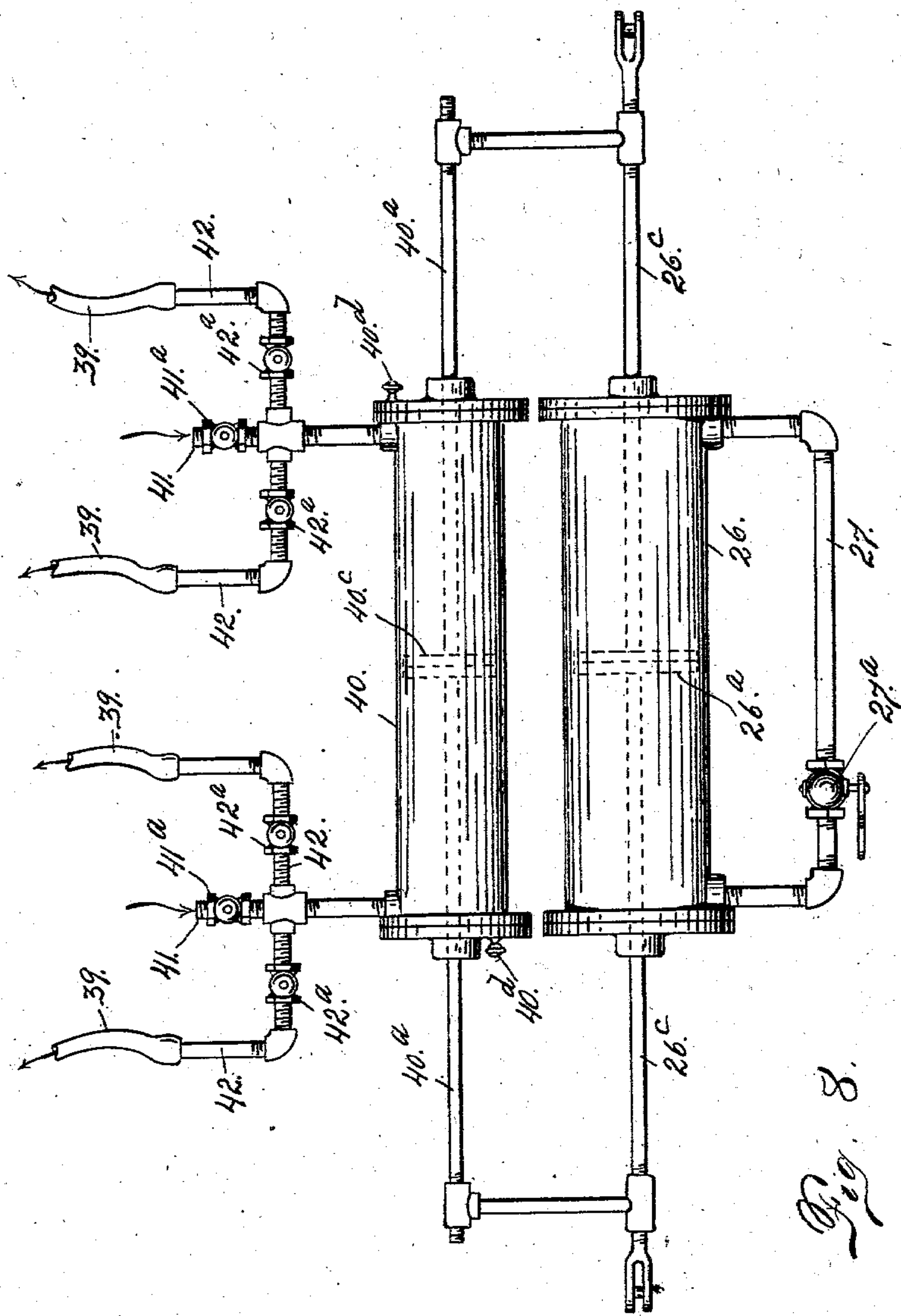


Fig. 8.

WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM H. MOTTER, OF DENVER, COLORADO.

AGITATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 730,384, dated June 9, 1903.

Application filed August 18, 1902. Serial No. 120,090. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. MOTTER, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Agitating Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in ore-agitators, and more particularly to a device for the agitating and leaching of crushed ore-pulp in the treatment of ores by the cyanid process. Its object is to produce a device with which large quantities of ore-pulp may be agitated and otherwise treated, requiring little motive power. Means are provided for the ready and convenient handling of the ore-pulp as it is fed into the machine for treatment and removed after treatment and in which a thorough agitation and mixing of the ore-pulp with the leaching liquid is effected.

To this end it consists in the arrangement of a series of specially-devised cylindrical or other shaped retorts or vats mounted on a pivoted or rocking platform in such a manner as to give a reciprocating revolving motion to the vats, said motion being controlled by the travel of the rocking platform.

The invention further consists in the details of its construction and combinations of its operative parts, all of which I will now proceed to definitely describe and then point out in the claims that which I believe to be novel.

In the drawings, Figure 1 is a general view, inside elevation, of my improved device, showing its connection with its operating-winch. Fig. 2 is a detail view of the agitator shown in side elevation. Fig. 3 is a top plan view of the same with the top platform cut away. Fig. 4 is an enlarged vertical cross-section of the same. Fig. 5 is an end view of one of the cylindrical vats or retorts. Fig. 6 is a cross-section of the same. Fig. 7 is a central longitudinal section of one of the vats. Fig.

8 is a detail plan view of a combined air-pump and travel-regulator employed.

Referring to the drawings, similar reference characters indicate similar parts throughout the several views, in which—

5 indicates the bed or stationary frame. Centrally mounted in this frame is the rock-shaft 6, journaled in the bearings 7. Rigidly mounted on the rock-shaft 6 is the rocking or pivoted platform 8, consisting of the parallel beams 8^a 8^a and supporting-beams 8^c and 8^d, as shown in the drawings. These beams and supports are all made of heavy timbers, securely bound and bolted together, as the invention is especially adapted for the handling of large quantities of ore-pulp. Over the platform 8 is constructed a second platform 9, supported by the beams 9^a and 9^c. This platform is arranged for the convenient supply of ore-pulp to the vats, as will be hereinafter described. A reciprocating rocking motion is given to the platform 8 by the winch 10, (see Fig. 1,) which is connected to the platform by the cable 11, one end of which is secured to the boom or pole 12, projecting from one end of the platform and the other end secured to the boom or pole 12^a, projecting from the opposite end of the platform. It will be seen that the cable 11 passes over the sheaves 13 and 13^a in the frame 5 and sheaves 14 and 14^a of the winch, also that it passes around the drum 10^a of the winch. Motion is communicated to the winch through the tight pulleys 15 and 16, operated by the belts 17 and 18, connected with the same line-shaft. (Not shown.) Mounted on the power-shaft 10^c of the winch with the tight pulleys 15 and 16 are two loose pulleys 15^a and 16^a, over which the belts 17 and 18 are alternately shifted by the motion of the rocking platform, as will now be described. The belt 18 is crossed, imparting a reverse motion to its pulleys on the winch to that imparted by the belt 17. A belt-shifter 19 is slotted at its forward end, as shown at 19^a, and connected to the rocking frame, the part 19^a being fitted over a pin 20 in the frame. The rear end of the belt-shifter is pivoted on the rocking arm 21 at 21^a. It will be seen that the pin 20 will engage the belt-shifter 19 at the end of the slotted part 19^a just before the rocking frame

reaches its limit of travel in either direction, and guide-pins 19^c on the shifter engaging the belts 17 and 18 will shift them from left to right or right to left, according to the direction of travel of the rocking platform. The pulleys 15, 16, 15^a, and 16^a are disposed on the shaft 10^c, as shown in the drawings, so as to have the belt 17 engage its tight pulley while the belt 18 engages its loose pulley, the belt 17 being shifted to its loose pulley as the belt 18 is shifted to its tight pulley, and vice versa as the belts are shifted in the opposite directions, thus automatically imparting a continuous rocking motion to the platform 8.

Resting on the rocking platform 8 are the four cylindrical vats or retorts 22. These vats 22 are pivoted at equal distances apart in a reciprocating frame 23 and are caused to travel over tracks 24, secured to the beams 8^a by their own gravity as the platform is tilted from one side to the other. In practice it is proposed that each vat may contain about twenty-five tons of ore-pulp, thus treating one hundred tons of ore-pulp in one operation, and as the vats are pivoted in a common frame they will travel in unison. To regulate and retard the travel of these vats, which are caused to roll from right to left and left to right by their own gravity over the alternating incline given to the rocking platform, I have provided the hydraulic regulating-cylinder 26. (See Fig. 8.) This cylinder is provided with the piston-head 26^a, a piston-rod 26^c, protruding through each end of the cylinder, and a pipe 27, connecting the cylinder, provided with a regulating-valve 27^a. By means of this pipe 27 the opposite ends of the cylinder 26 are in communication with each other. This cylinder 26 is secured in the rocking platform 8 (see Figs. 1 and 2) and has secured to the protruding ends of its piston-rod 26^c the cables 28. The opposite ends of these cables are in turn secured to the opposite extremity of the reciprocating frame 23, thus forming a continuous circuit through the piston-rod 26^c, cables 28, and frame 23. As the platform is tilted in either direction the gravity of the rolling vats will cause the piston-head 26^a to travel in its cylinder, forcing the oil or other liquid from one end of the cylinder to the other through the passage 27, and as the flow of oil through the passage is regulated by the valve 27^a the travel of the piston-rod and its connections is likewise retarded and controlled. Spring-bumpers 30 and 30^a, mounted in the supports 9^a, are arranged to receive the impact of the rolling vats as they reach the end of travel in either direction, and similar spring-bumpers 31 and 31^a are mounted in the bed 5 to receive the impact of the rocking platform as it reaches the end of its travel in either direction. The tension of these spring-bumpers also acts to relieve the dead-weight to be overcome in reversing the action of the automatic winch.

Arranged in the platform 9 is a series of hoppers 32, which are centrally disposed over the vats 22 when the platform 8 is in a horizontal position, as shown in the drawings. Through these hoppers 32 the pulverized ore is supplied to the vats. The ore is being carried to the platform 9 in ore-cars 33, running over tracks 34, from which it may readily be dumped into any of the hoppers 32.

The vats 22 are preferably constructed as shown in detail in Figs. 5, 6, and 7. As shown in these views, each vat consists of a cylindrical vessel, preferably made of wood or other non-corrosive material and provided with the manhole 22^a for the introduction of the ore. The treating liquid is introduced to and removed from the vats through the hose 35, which communicates with the perforated pipe 36, (see Fig. 7,) having the branch pipes 36^a, thus thoroughly distributing the liquid through the pulverized ore, in which the perforated pipes are embedded. A compression-clip 35^a is employed for closing the hose-pipe 35.

A relief vent or pipe 37 is connected to the vat 22, as seen in the drawings, for carrying off the fumes during the process of treating the pulp. This pipe 37 also consists of a flexible hose and is closed by the compression-clip 37^a. In the opposite end of the vat (see Fig. 7) is introduced the air-pipe 38. This air-pipe extends to a point near the center of the vat and projects downwardly, so as to introduce the air below the liquid-level of the vat in the process of treatment. To provide the air-pressure supplied to these pipes 38, I have arranged an air-pump 40, which is mounted in the rocking platform 8, parallel with the cylinder 26 and provided with a double piston-rod 40^a, which is secured at each end to the piston-rod 26^a of the cylinder 26, as seen in Fig. 8. It will be observed that as the piston-head 40^c in the cylinder 40 is carried back and forth the suction formed in the opposite ends of the cylinder will alternately cause the air to be drawn through the check-valves 41^a and pipes 41 and force the air through the pipes 42 and check-valves 42^a on its return stroke, and these pipes 42 communicate with the pipes 38 of the vats by the hose connections 39. When sufficient air has been forced into the vats to perform the desired function in the treatment of the ore-pulp, small relief-cocks 40^d, arranged at each end of the cylinder 40, may be opened. The check-valves 42^a prevent the return of air from the vats. Hence the pressure in the latter may be maintained.

To thoroughly agitate and mix the wet ore-pulp as it is tumbled in the rolling vat, I provide a number of inwardly-projecting arms or prongs 22^c, (see Fig. 6,) which separate and break up the rolling mass and accelerate its thorough agitation. After the ore-pulp has been thoroughly agitated and subjected to the liquid introduced through the perforated pipes 36 and 36^a the rocking platform is again

brought to the position shown in Fig. 2 and the liquid chemicals containing the dissolved metals drawn off through the same perforated passages. To remove the tailings or remaining gangue, I have provided the manhole 22^d diametrically opposite the manhole 22^a and in the bottom of the vats when in the position shown in the drawings. Arranged between the beams 8^a 8^a (see Fig. 4) and extending the length of the platform 8 is the trough or sluice 44, and when it is desired to remove the solid matter from the vats the platform is slightly tilted, the manholes 22^d opened, and the pulp permitted to fall into the trough 45. Water may be introduced into the vats for the purpose of thoroughly cleansing them. The slush passes off through the manholes 22^d and is carried off with the gangue or tailings over the trough 45. Any form of extension (not shown) may be attached to the lower end of the trough 45, so as to conduct the tailings away from the machine.

In place of the track 42, over which the vats 22 roll, a rack-bar (not shown) might be employed, having its teeth engage toothed wheels or bands (not shown) mounted on the vats, thus insuring the relative position of the vats upon the platform and with each other; but in most instances the frame 23 will accomplish this purpose.

The combinations with the various parts are operated as above described; but the order of their individual functions may be varied according to the character of the ore to be treated. In place of the winch 10 other means might be employed for operating the platform 8, or the rolling vats 22 may be manipulated by a separate motive power.

Other minor changes within the scope of the following claims may be resorted to without departing from the spirit of my invention.

Having thus described my invention, what I claim is—

1. In an agitator, the combination with a suitable support, of a frame mounted to reciprocate above the support, and a cylindrical vat connected with the frame, whereby as the latter reciprocates the vat will be subjected to a rolling movement in reverse directions.

2. The combination with a suitable support, of a frame mounted to reciprocate above the support, a number of cylindrical vats pivotally mounted on the frame and engaging the support, and means for reciprocating the frame, to impart to the vats a rolling movement in reverse directions, substantially as described.

3. In an agitator, the combination with a suitable support, of a frame mounted to reciprocate adjacent the support, a number of cylindrical tanks or vats trunnioned on the frame, and adapted to roll on the support in reverse directions as the frame is reciprocated, and suitable means for reciprocating the frame.

4. In an agitator, the combination of a rocking platform, means for operating the same,

and a cylindrical tank mounted to roll back and forth on the platform as the latter is tilted in opposite directions.

5. The combination of a rocking platform, a tank mounted on the platform and relatively movable, and means for operating the platform, whereby the liquid contents of the tank, are agitated, substantially as described.

6. The combination of a rocking platform, a frame mounted to reciprocate adjacent the platform, a number of cylindrical tanks engaging the platform and trunnioned on the frame, a suitable device connecting the opposite ends of the frame, and guides engaged by said device, whereby as the rocking platform is operated, the frame and tank move back and forth by gravity, substantially as described.

7. The combination of a rocking platform, a frame mounted to reciprocate on the platform, cylindrical tanks or vats mounted on the platform and trunnioned on the frame, flexible devices connected with the opposite ends of the frame, guides engaged by said flexible devices, and means connected with said flexible devices for regulating the reciprocating movement of the frame and tanks, substantially as described.

8. The combination of a rocking platform, means for operating the same, a frame mounted to reciprocate adjacent the platform, cylindrical tanks or vats trunnioned on the frame, and engaging the platform, flexible devices connected with the opposite extremities of the frame, guides therefor, a liquid-containing tank, a piston therein, stems protruding from the opposite extremities of the tank, and a valve-controlled conduit connecting the opposite extremities of the tank, the flexible devices of the frame being connected with the piston-stems, substantially as described.

9. In an agitator, the combination of a support, a frame mounted to reciprocate, cylindrical tanks trunnioned on the frame, and resting on the support, yielding buffers mounted on the support in the path of the frame at the opposite ends of the support, and means for reciprocating the frame, substantially as described.

10. The combination of a rocking platform, tanks mounted thereon, a connection between the tanks whereby their relative position is maintained during the rocking motion of the platform, a cable whose extremities are connected with the opposite extremities of the platform, a drum, for operating the cable, and means controlled by the movement of the platform, for imparting a rotary movement to the drum in reverse directions, substantially as described.

11. The combination of a rocking platform, a cable whose extremities are connected with the opposite extremities of the platform, a drum for operating the cable, two fast pulleys in operative connection with the drum, loose pulleys mounted adjacent the fast pulleys, belts connected with the pulleys and ar-

ranged to turn the drum in opposite directions, and a belt-shifting device operated by the movement of the platform, whereby each belt is alternately shifted from its fast to its loose pulley, and a connection between the belt-shifting device and the rocking platform, whereby the belt-shifting device is automatically operated from the platform, substantially as described.

10 12. In an agitator, the combination of a rocking platform, a number of cylindrical tanks mounted thereon, a frame connecting the tanks to cause them to maintain their proper relative position, cables connected with the
15 opposite extremities of the frame, suitable

guides engaged by the cables, a suitable connection between the extremities of the cable remote from the reciprocating frame, a pump connected in operative relation for discharging fluid into the tanks, and a suitable operating connection between the pump and the cables, whereby the pump is automatically actuated as the reciprocating frame moves back and forth.

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

WILLIAM H. MOTTER.

Witnesses:

A. J. O'BRIEN,
DENA NELSON.