No. 808,941. PATENTED JAN. 2, 1906.

H. G. MILLER & G. R. LAWRENCE.

RACKING APPARATUS.

APPLICATION FILED FEB. 27, 1905.

3 SHEETS—SHEET 1.

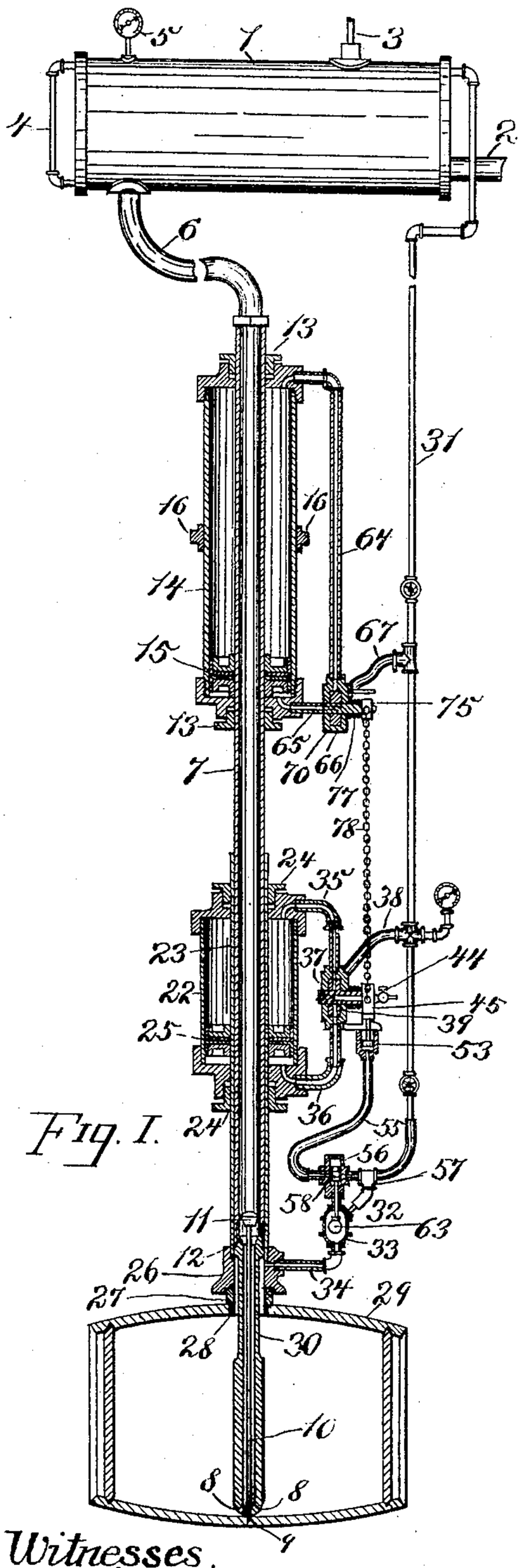

Fig. I.

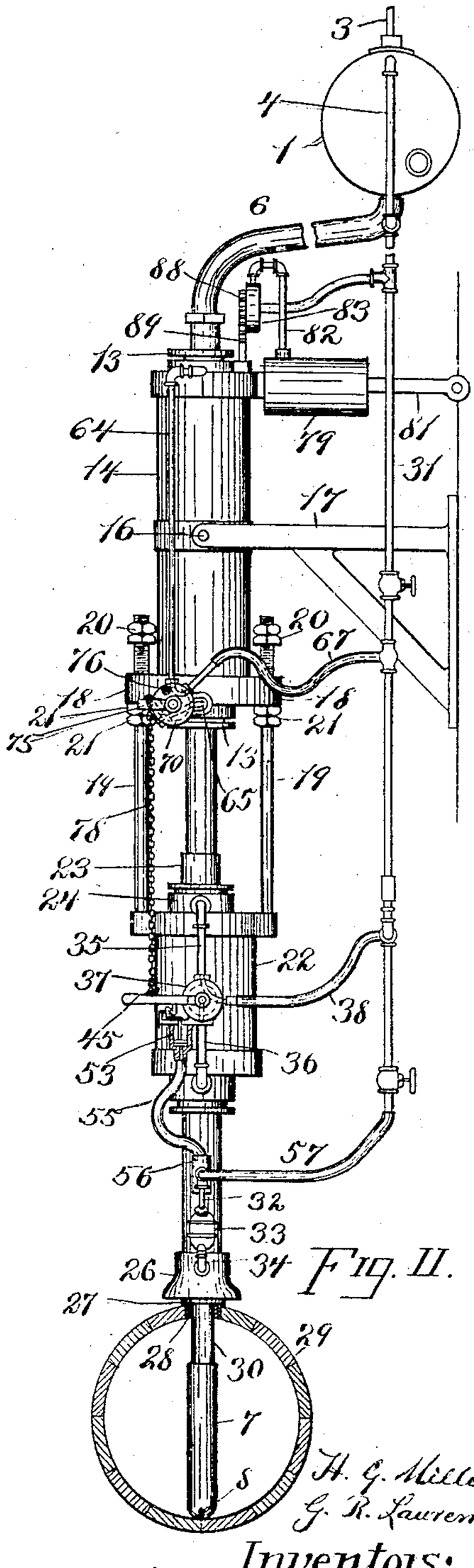

Fig. II.

Witnesses.
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C. E. Johnson, Jr.

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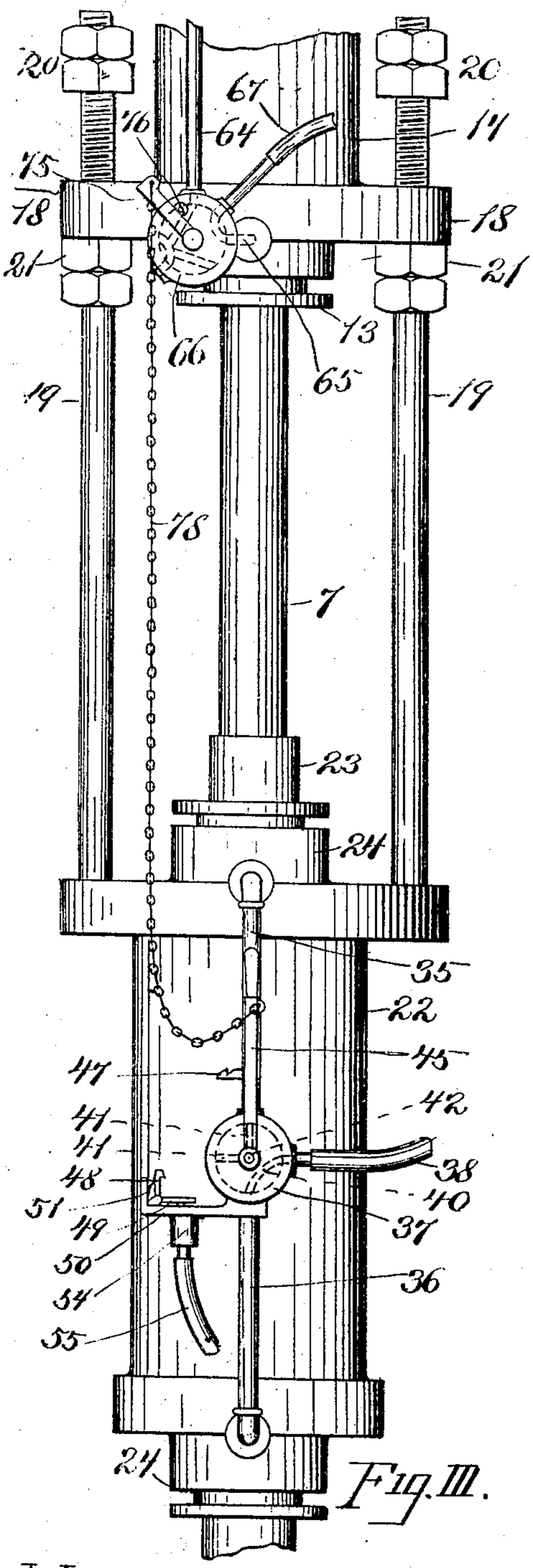

Fig. III.

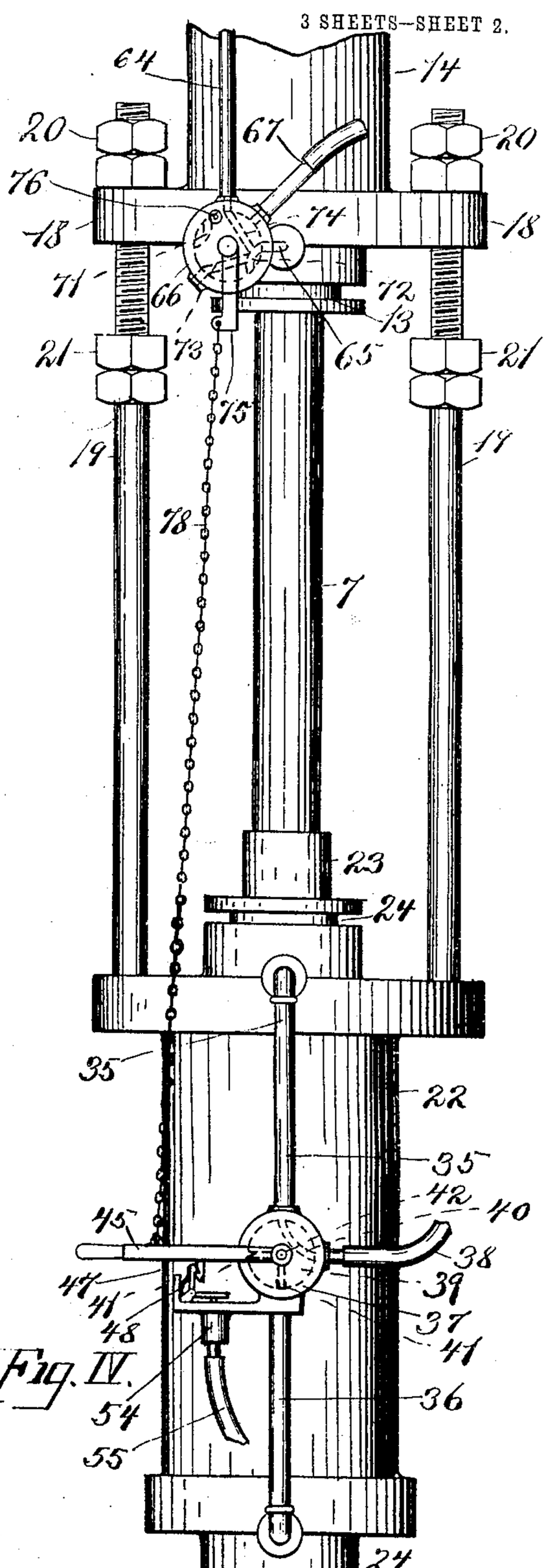

Fig. IV.

WITNESSES.

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3 SHEETS—SHEET 3.

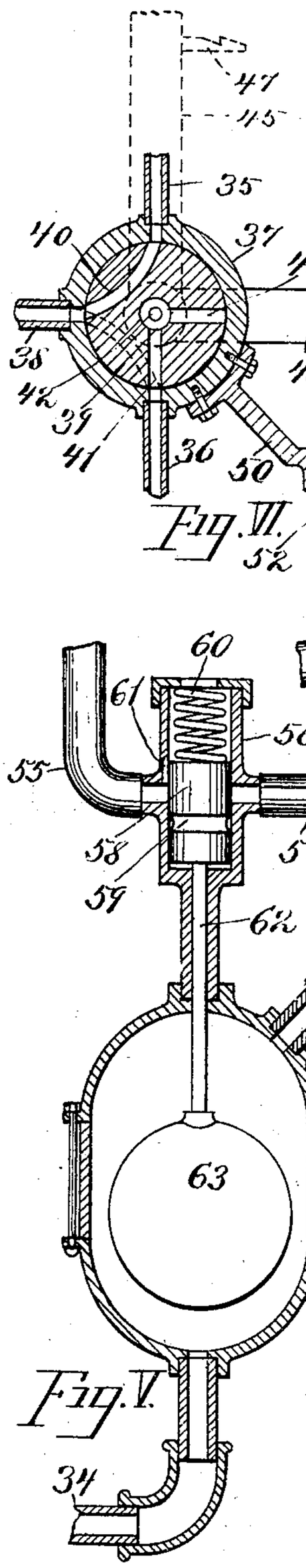

Fig. VI.

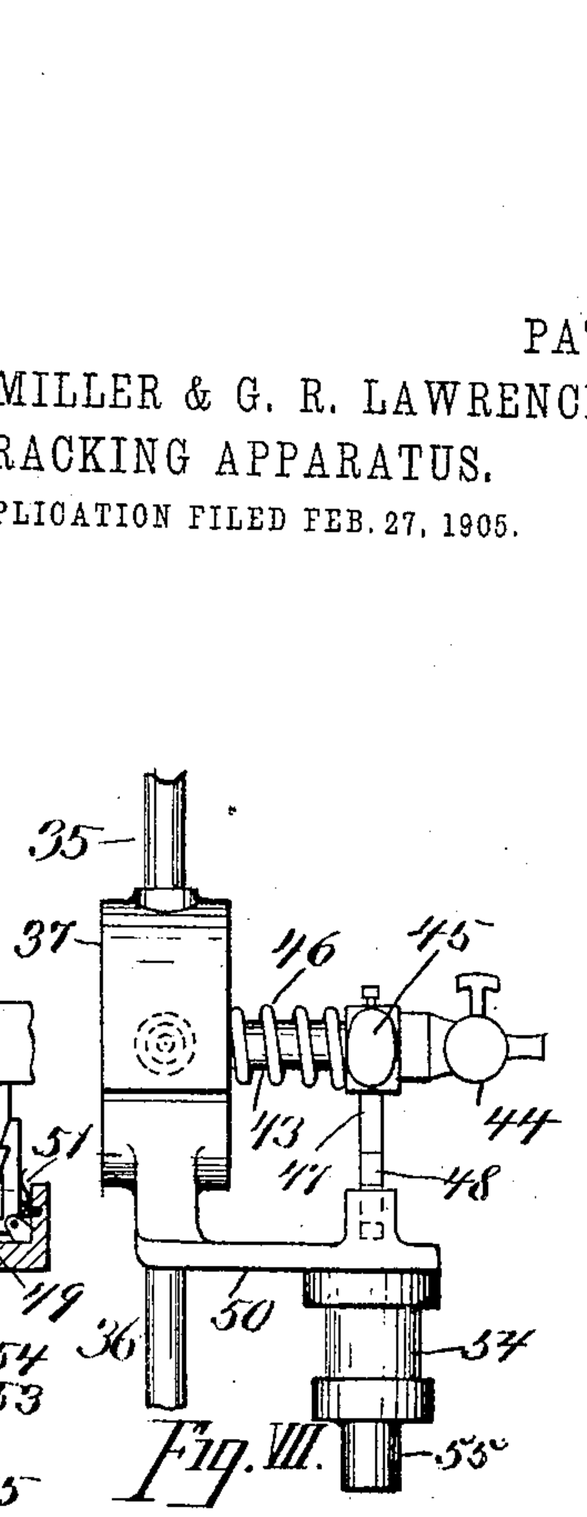

Fig. VIII.

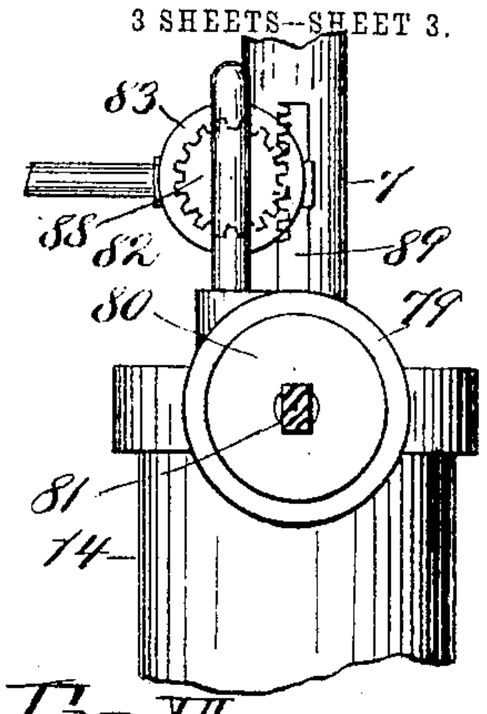

Fig. XII.

Fig. V.

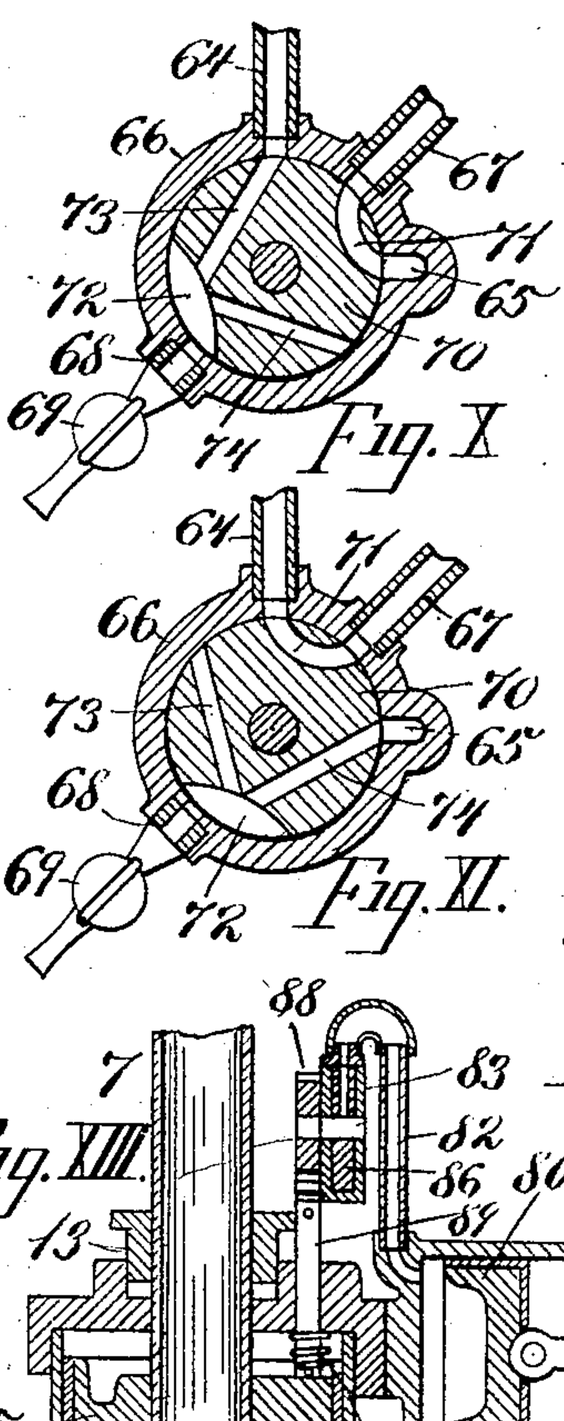

Fig. X.

Fig. XI.

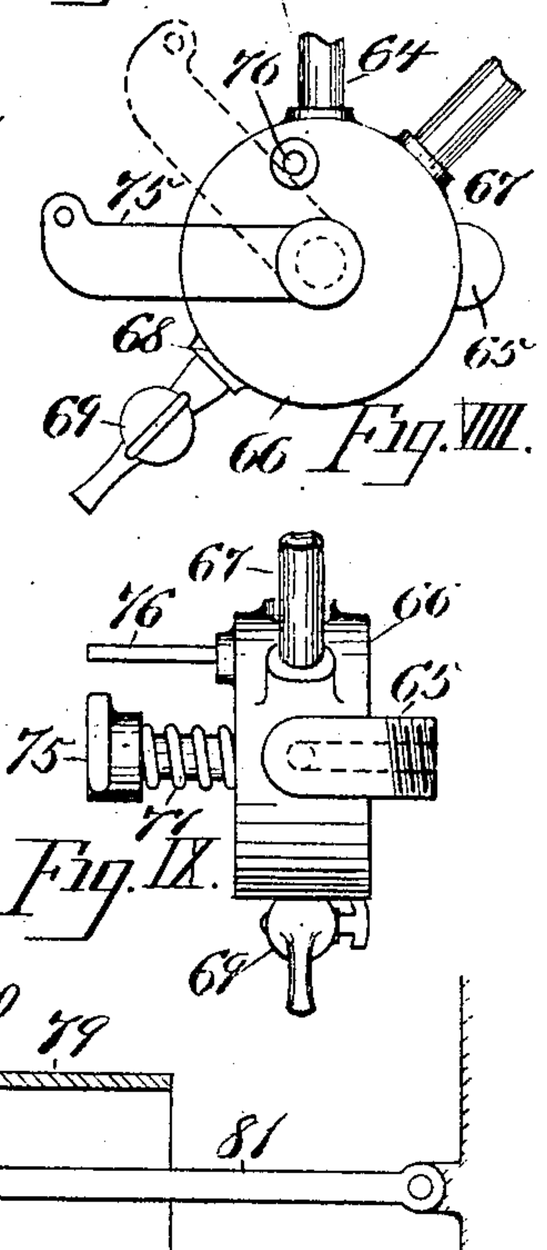

Fig. VIII.

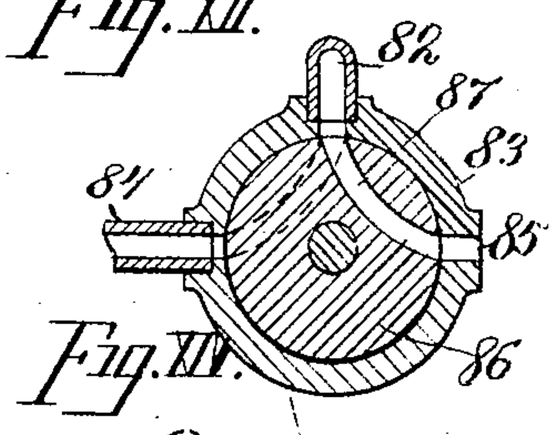

Fig. XIV.

Fig. IX.

Fig. XIII.

WITNESSES.

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UNITED STATES PATENT OFFICE.

HENRY G. MILLER AND GEORGE R. LAWRENCE, OF CLEVELAND, OHIO.

RACKING APPARATUS.

No. 808,941. Specification of Letters Patent. Patented Jan. 2, 1906.

Application filed February 27, 1905. Serial No. 247,446.

To all whom it may concern:

Be it known that we, HENRY G. MILLER and GEORGE R. LAWRENCE, citizens of the United States, and residents of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Racking Apparatus, of which the following is a specification, the principle of the invention being herein explained and the best mode in which we have contemplated applying that principle, so as to distinguish it from other inventions.

The annexed drawings and the following description set forth in detail one mechanical form embodying the invention, such detail construction being but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure I represents an axial section of our improved racking apparatus, showing it in position as filling a cask; Fig. II, a side view of the same; Fig. III, a front elevation of the lower end of the upper cylinder and of the lower cylinder, showing the latter raised as when it rests upon the cask and showing the valves in position to withdraw the tubes; Fig. IV, a front elevation of the same parts, showing the lower cylinder dropped and the hand-lever depressed to start the operation, the upper valve being shown in dotted lines in the position for connecting both ends of the upper cylinder to the exhaust; Fig. V, an axial section of the float-chamber and of the hook-releasing valve-chamber and valve; Fig. VI, a sectional detail view of the lower valve and its controlling parts; Fig. VII, an edge view of this valve-casing and parts; Fig. VIII, a face view of the upper valve-casing and parts; Fig. IX, an edge view of the same; Fig. X, a sectional view of the valve-casing and valve, showing the valve in position to admit live air to the lower end of the cylinder and exhaust from the upper end; Fig. XI, a similar section showing the valve rotated to reverse this action; Fig. XII, a detail view of the upper end of the upper cylinder, the horizontal tilting cylinder, and the controlling parts therefor; Fig. XIII, a sectional detail view of said parts, and Fig. XIV a sectional view of the valve and casing controlling the tilting cylinder.

A tank 1 is suitably supported to receive beer from the filter or storage-vat through a pipe 2 and to receive air under pressure sufficient to counteract the internal carbonic-acid pressure of the beer through a pipe 3 in its top. The tank is preferably provided with a gage-glass 4 and a pressure-gage 5. A flexible hose 6 leads from the bottom of the tank to the upper end of a tube 7, which extends the entire height of the apparatus. The lower end of this tube is rounded and has a number of openings 8 and a central opening 9, through which a valve-rod 10, having a valve 11 at its upper end, has play. Said valve fits upon a seat 12 within the tube when the end of the valve-rod projects out through the opening in the rod, so that when the tube touches the bottom of the cask to be filled the valve is raised from its seat. The upper portion of the tube slides through stuffing-boxes 13 in the heads of an air-cylinder 14 and has a piston 15 secured upon it to slide in the cylinder. The cylinder has trunnions 16 at about its middle, and said trunnions are journaled in brackets 17 upon a suitable upright support, so that the apparatus may swing in a vertical plane. The lower head of the cylinder has two laterally-projecting perforated ears 18, through which slide two rods 19, having adjustable stops 20 and 21, such as nuts threaded upon the rods, above and below the ears. These rods are secured at their lower ends to the upper head of an air-cylinder 22, having a tube 23 sliding in stuffing-boxes 24 in the heads of the cylinder. This tube has the filling-tube 7 sliding within it and has a piston 25 secured upon it to slide in the cylinder. This tube 23 has a sealing-head 26 at its lower end provided with a yielding seal or packing 27 in its under side, which seal may bear and tightly fit against the edges of the bung-bushing 28 of the cask 29. About the point and some distance below the point where the filling-tube fits in the sealing-head when the former is depressed into the cask, as at 30, the filling-tube is of less external diameter than at the remainder of its length, so that a chamber is formed around the tube and in the head. An air-pipe 31 extends from the top of the reservoir or tank and has a branch pipe 32 at its lower end, which enters a float-chamber 33, from the bottom of which a pipe 34 leads into the interior of the sealing-head and into the annular chamber around the filling-pipe, so that air under pressure is admitted into the cask to counteract the internal-gas pressure of the beer and to thus permit the cask to be filled with beer without foaming of the latter.

The lower or sealing cylinder has a distrib-

uting-pipe 35 leading to its upper end and a distributing-pipe 36 leading to its lower end, and said pipes extend from diametrically opposite points of a flat cylindrical valve-casing 37, having an air-pipe 38, leading from the main air-pipe, entering it at a port at right angles to the two distributing-ports. A flat cylindrical valve 39 fits to rotate in the casing and has a curved passage 40 for distributing live air and extending between two points in its periphery at a right angle to each other. At two points of ninety degrees from the ports of the curved passage are two radial exhaust-ports 41, which lead into an axial bore 42, which extends out through the spindle 43 of the valve and has a petcock 44 at its outer end. A hand-lever 45 is secured upon the spindle to turn the valve and projects upward when the upper distributing-port of the casing registers with a radial exhaust-port in the valve This hand-lever is normally thrown into this position by a spring 46, coiled around the spindle and secured to the lever-arm and to the valve-casing. A hook 47 projects from the hand-lever and may be engaged by a hook 48 when the hand-lever is tilted into a horizontal position. Said latter hook is formed upon one arm of a bell-crank 49, which is pivoted upon a bracket 50, projecting from the valve-casing, and has a spring 51, which forces the hook into engagement with the hook on the hand-lever. The rod 52 of a piston 53 bears from below against the horizontal arm of the bell-crank, so as to disengage the hook when the piston is moved upward. The piston slides in a cylinder 54 upon the bracket. An air-tube 55 enters the lower end of the cylinder, and this air-tube extends from one side of a cylindrical valve-casing 56, which is supported by a neck from the upper end of the float-chamber. An air-tube 57 enters the valve-casing diametrically opposite the first-mentioned air-tube, and a valve 58, having a circumferential groove 59, slides in the valve-casing and may connect the ports of the air-tubes when the valve is raised. A spring 60 normally depresses the valve. A small leak-passage 61 extends from the distributing-port to a point above the depressed valve, so as to admit of the air beneath the hook-releasing piston exhausting when the valve is depressed by the spring. The valve has a downwardly-extending stem 62, which passes through the neck, and has a float 63 at its lower end. This float is within the float-chamber, and beer entering and rising in the chamber may raise the float and the valve, and thus admit air to the cylinder to rock the hook and release the hand-lever. Distributing-pipes 64 and 65 extend from the sides of a flat cylindrical valve-casing 66 at an angle of ninety degrees from each other and respectively to the upper and lower end of the upper cylinder. An air-pipe 67 leads from the supply-pipe and enters the valve-casing between the distributing-ports and at an angle of forty-five degrees to the same. An exhaust 68 is provided diametrically opposite the inlet and has a petcock 69 for controlling the exhaust. A flat cylindrical valve 70 fits to turn in the valve-casing and has a curved live-air passage 71 extending from points in the circumference of the valve at an angle of forty-five degrees from each other. A recess 72, forming a segment of forty-five degrees, is formed in the circumference of the valve at a point diametrically opposed to the live-air passage and forms an exhaust port or recess. Two passages 73 and 74 extend at right angles to each other from the middle of the recess and open in the circumference of the valve at diametrically opposite points. By a quarter-turn of this valve either distributing-port may be put in communication with the inlet-port and the opposite distributing-port in communication with the exhaust. By about a half-turn of the valve the passage 74 will register with the upper distributing port and channel, the passage 73 with the exhaust-port, and the segmental recess with the lower distributing port and channel, so that both ends of the upper cylinder will be in communication with the atmosphere. The valve-spindle has an arm 75, which bears against a stop 76 upon the valve-casing when the valve is rotated to connect the lower end of the cylinder to the live air. A spring 77 is coiled around the valve-spindle and is secured to the arm and the valve-casing, so as to swing the arm upward against the stop. A chain 78 or similar flexible connection is secured to the end of the arm and to the hand-lever on the valve-spindle for the lower cylinder, and this chain is of such length as to draw the arm into a horizontal position when the hand-lever is thrown into a horizontal position and held there by the hook and when the sealing-cylinder is in its raised position with the lower nuts upon its rods resting against the ears upon the upper cylinder. When the sealing-cylinder is in its lowered position and the hand-lever is thrown into its horizontal position, the chain will draw the valve-arm to a vertical or nearly vertical position, so that the valve will be set to open both ends of the upper cylinder to the outer air.

A cylinder 79 is secured to extend horizontally from the upper end of the upper cylinder and has a piston 80, the pitman 81 of which is pivoted to the upright support of the device. The closed end of this horizontal cylinder has a distributing-channel 82 entering it from the upper side of a flat cylindrical valve-casing 83, which casing has an inlet 84 from the air-supply pipe and an exhaust 85, one on each side of the casing and at an angle of ninety degrees to the distributing-port. A flat cylindrical valve 86 fits to

rotate in the casing and has a passage 87, opening at points of its circumference at an angle of ninety degrees, so that a quarter-turn of the valve in either direction will put the distributing-port in connection with either the live-air port or the exhaust-port. A pinion 88 is secured upon the spindle of this valve, and a rack-bar 89, having its smooth lower end sliding in the upper head of the upper cylinder, meshes with the pinion. This rack-bar has a spring 90 at its lower end inside of the cylinder, which draws the bar down to rotate the valve to open the horizontal cylinder to the exhaust. When the piston in the upper cylinder reaches the upper end of its throw, it engages and pushes upward the rack-bar, so as to rotate the valve a quarter-turn and open the horizontal cylinder to the live air, forcing the piston outward, and thereby tilting the entire device.

The reduced portion of the filling-tube permits the counterpressing air to pass through the sealing-head into the cask, and as the sealing-head will remain in position some time after the air is admitted to the lower end of the sealing-cylinder and is exhausted from the upper end of the same the counter-pressure will remain upon the beer in the cask until the filling-tube has been raised and cuts off the air-supply through the sealing-head, when both parts are withdrawn and the cask is quickly bunged before the beer has opportunity to foam. For the purpose of accomplishing the slower movement of the sealing-piston and the quicker movement of the piston on the filling-tube, both in placing and in withdrawing the apparatus, the petcocks are provided on the exhaust from both cylinders, so that the exhaust from the lower cylinder may be choked to a greater degree than from the upper cylinder and the movement of its piston be proportionately retarded.

To describe the operation of the device, we will assume that the device is tilted to admit of a cask being rolled into place to be filled and the sealing-piston and the filling-tube piston being both raised, which implies that both the hand-lever and the valve-arm are in their uptilted positions. When the cask is in position, the hand-lever is tilted down to be caught by the hook and to tilt the valve-arm in its downtilted position, the sealing piston and head will begin to slowly descend, the exhaust being restricted by the petcock, and the gravity of the upper piston and filling-tube, together with the friction of the sealing-tube and the expansion of the spring of the rack-bar, as well as the down pressure of the beer in the closed tube, will cause the upper piston, both faces of which are exposed to the atmosphere, to descend sufficiently to allow the rack-bar to descend and turn the controlling-valve of the horizontal cylinder to exhaust the air from the same, so that the apparatus swings into a vertical position. When the sealing-head is now directly over the bung-hole of the cask, the head descends upon the bung-hole and seals the same, whereupon the air-pressure above the sealing-piston will raise the cylinder so as to slacken the chains sufficiently to allow the valve-arm to return to its horizontal position. This will turn the upper valve to admit live air above the filling-tube piston and force the tube down into the cask until it strikes the bottom of the same, raising the rod or stem of the outlet-valve. The beer will now flow into the cask and air will bear on top of it, flowing from the air-supply and through the space surrounding the reduced portion of the filling-tube, so that the pressure of internal gas is counteracted by this air and foaming is avoided. When the cask is full, the beer will rise in the space around the reduced portion of the filling-tube into the float-chamber, raising the float and the valve controlled by the float. This will admit air under the hook-releasing piston and release the hand-lever, which will swing upward, allowing the valve-arm to also swing upward, and thus admitting air into the lower ends of both cylinders and raising the filling-tube and the sealing-head. The beer in the float-chamber will flow down and fill the space which was occupied by the filling-tube, so that the cask is completely filled. When the piston of the filling-tube arrives at the upper end of its stroke, it engages and raises the rack-bar, turning the valve and admitting air into the horizontal tilting cylinder, which will thus swing the apparatus out of the way and permit the cask to be bunged and rolled away and a new cask to be put in its place. The flow of beer through the filling-tube is stopped as soon as the latter is raised off the bottom of the cask by the valve dropping back to its seat. It will thus be seen that all operations of the apparatus are automatic excepting the start and that perfect and swift racking of beer may be done under counter-pressure and with certain assurance that only the required amount of beer is filled into each cask without the need of relying upon the attendant. All the attendant has to do is to bung and remove the filled casks, replace them by empty casks, and start the apparatus at each fresh cask. The air-pressure required for operating the device is the pressure used for counteracting the internal gas-pressure in the beer. By having petcocks on the exhaust from both cylinders the speed of descent and ascent may be regulated by choking the exhaust or opening the same. The air-pressure is exerted upon the surface of the beer in the cask or package until the filling is complete and the filling-tube is withdrawn, so that there is only very slight opportunity for the beer to effervesce and foam until after the sealing-head is removed, and the bung can immediately be driven.

Other modes of applying the principle of our invention may be employed for the mode herein explained. Change may therefore be made as regards the mechanism thus disclosed, provided the principles of construction set forth, respectively, in the following claims are employed.

We therefore particularly point out and distinctly claim as our invention—

1. In a racking apparatus, the combination of a sealing tube and head, a filling-tube sliding within said tube, means for raising and lowering each of said tubes, and controlling means for actuating said raising and lowering means and connected to be positively operated to first actuate the sealing-tube-lowering means and then the filling-tube-lowering means and a chamber communicating with the sealing-head to receive the overflow from the filled package, and a float device in said chamber and connected to actuate both raising means when lifted by the overflow.

2. In a racking apparatus, the combination with a liquid-supply receptacle having a counter-pressure supply above the liquid, of a filling-tube entering the package, a counter-pressure-supply tube communicating to the package above the liquid-level, and means for cutting off the liquid-supply before the counter-pressure supply and for withdrawing the filling-tube before the supply-tube, whereby the liquid is held under counter-pressure until immediately preceding the closing of the package.

3. In a racking apparatus, the combination of a sealing tube and head, a filling-tube sliding within said tube and provided with means for opening it by contact with the bottom of the package and for closing it by withdrawal from the same, fluid-pressure cylinders and pistons connected to said tubes to raise and lower the same, valves for admitting and exhausting the fluid-pressure at the opposite ends of said cylinders and having means for automatically actuating them into the raising positions and said valves connected to be moved together into their lowering positions, a handle for moving one of said valves into the lowering position, a catch for retaining said handle in such position, and a float actuated by the rising of the liquid in the package and connected to said catch to release the same when maximum level is attained in the package.

4. In a racking apparatus, the combination with a filling-tube and a sealing tube and head having suitable fluid-counter-pressure supply and means for independently raising and lowering each of said tubes, the structure composed of said elements being suspended to swing in a vertical plane, of fluid-pressure actuating means connected to said structure to swing the same and having its controlling means connected to be actuated by the raising means at the end of their operative movements.

5. In a racking apparatus, the combination with a filling-tube and a sealing tube and head having suitable fluid-counter-pressure supply and means for independently raising and lowering each of said tubes, the structure composed of said elements being suspended to swing in a vertical plane, of means connected to said structure to swing the same, controlling means for actuating said raising and lowering means and connected to be positively operated to first actuate the sealing-tube-lowering means and then the filling-tube-lowering means and to be automatically operated by the filling of the package to actuate both raising means, and controlling means for the tilting device and connected to be operated from the filling-tube-raising means at the extreme raised position of said tube to actuate the swinging means to tilt the structure out of operative position and to be operated by the positive lowering-controlling means to swing the structure into operative position.

6. In a racking apparatus, the combination of a sealing tube and head, a filling-tube sliding within said tube, fluid-pressure cylinders and pistons connected to said tubes to raise and lower the same, valves for admitting and exhausting the fluid-pressure at the opposite ends of said cylinders and having means for automatically actuating them into the raising positions and said valves connected to be moved together into their lowering positions, a handle for moving one of said valves into the lowering position, a catch for retaining said handle in such position, a float actuated by the rising of the liquid in the package and connected to said catch to release the same when maximum level is attained in the package, a fluid-pressure cylinder connected to tilt the foregoing structure into and out of operative position, and a valve for admitting and exhausting fluid-pressure into said cylinder and having operative means projecting into the filling-tube-actuating cylinder to be operated by the piston in the same.

7. In a racking apparatus, the combination with a sealing tube and head, a filling-tube, and fluid-pressure means for raising and lowering the same, of valve mechanism controlling the fluid-pressure for such means, a hand-lever actuating such controlling mechanism, a detent for retaining said lever in its position for lowering the tubes, a float-chamber and float connected to the sealing-head, and means connected to be actuated by the rising of said float and connected to the detent to release the same by such rising of the float.

8. In a racking apparatus, the combination of a sealing tube and head, a filling-tube

sliding within said tube and head, a cylinder and piston connected to the sealing-tube to raise and lower the same, a cylinder and piston above said other cylinder and connected to the filling-tube to raise and lower the same, pivotal support for said filling-tube cylinder, a horizontal cylinder and piston connected to said latter cylinder to swing it in a vertical plane, a valve for controlling inlet and exhaust of motive fluid into and out of said horizontal cylinder, a stem projecting into the filling-tube cylinder to be engaged and moved by the rising piston in the same and having means for forcing it against such piston and connected to the valve to operate the same, an extensible and contractible connection between the sealing-tube cylinder and the filling-tube cylinder and having stops for limiting the longitudinal movement of the former in its relation to the latter, a valve controlling the inlet and exhaust from both ends of the sealing-tube cylinder, a hand-lever for said valve and connected to the same to place it in position to admit motive fluid to the upper end of the cylinder when moved into a horizontal position, means for retaining said lever in such position, a valve-controlling inlet and exhaust of motive fluid into and out of both ends of the filling-tube cylinder, an arm connected to operate said valve and to place the valve in position to admit motive fluid to the lower end of the cylinder when in its uppermost position and to admit motive fluid into the upper end of the cylinder when in its middle position and to connect both ends to the exhaust when in its lowermost position, and a flexible connection between the hand-lever and said arm.

9. In a racking apparatus, the combination of a sealing tube and head, a piston upon said tube, a cylinder surrounding said tube and having the piston sliding within it, a filling-tube sliding within the sealing-tube and having a piston, a cylinder surrounding the filling-tube and having its piston sliding within it and provided with lateral trunnions, supports for said trunnions, a horizontal cylinder and piston connected to the upper end of the filling-tube cylinder to tilt the same in a vertical plane, a valve controlling admission and exhaust of motive fluid to and from said horizontal cylinder, a bar sliding in the upper end of the filling-tube cylinder to be slid by the piston at the upper extreme of its stroke and having a spring forcing it against said piston and connected to the valve of the horizontal cylinder, the valve 39 for the sealing-tube cylinder and having the hand-lever 45, detent mechanism for said hand-lever, the float 63 and chamber 33 connected to the sealing-head, the releasing means actuated by the rising of said float and connected to the detent, the rods 19 having the stops 20 and 21 and sliding in the ears 18, the valve-casing 66 having the distributing ports and passages 64 and 65 and inlet and outlet 68, the valve 70 having the passage 71 and recess 72 and passages 73 and 74, the stop 76, the valve-arm 75, and the chain 78 attached to said valve-arm and to the hand-lever.

In testimony that we claim the foregoing to be our invention we have hereunto set our hands this 8th day of September, A. D. 1904.

HENRY G. MILLER.
GEORGE R. LAWRENCE.

Witnesses:
WM. SECHER,
C. E. JOHNSON, Jr.