

No. 755,618.

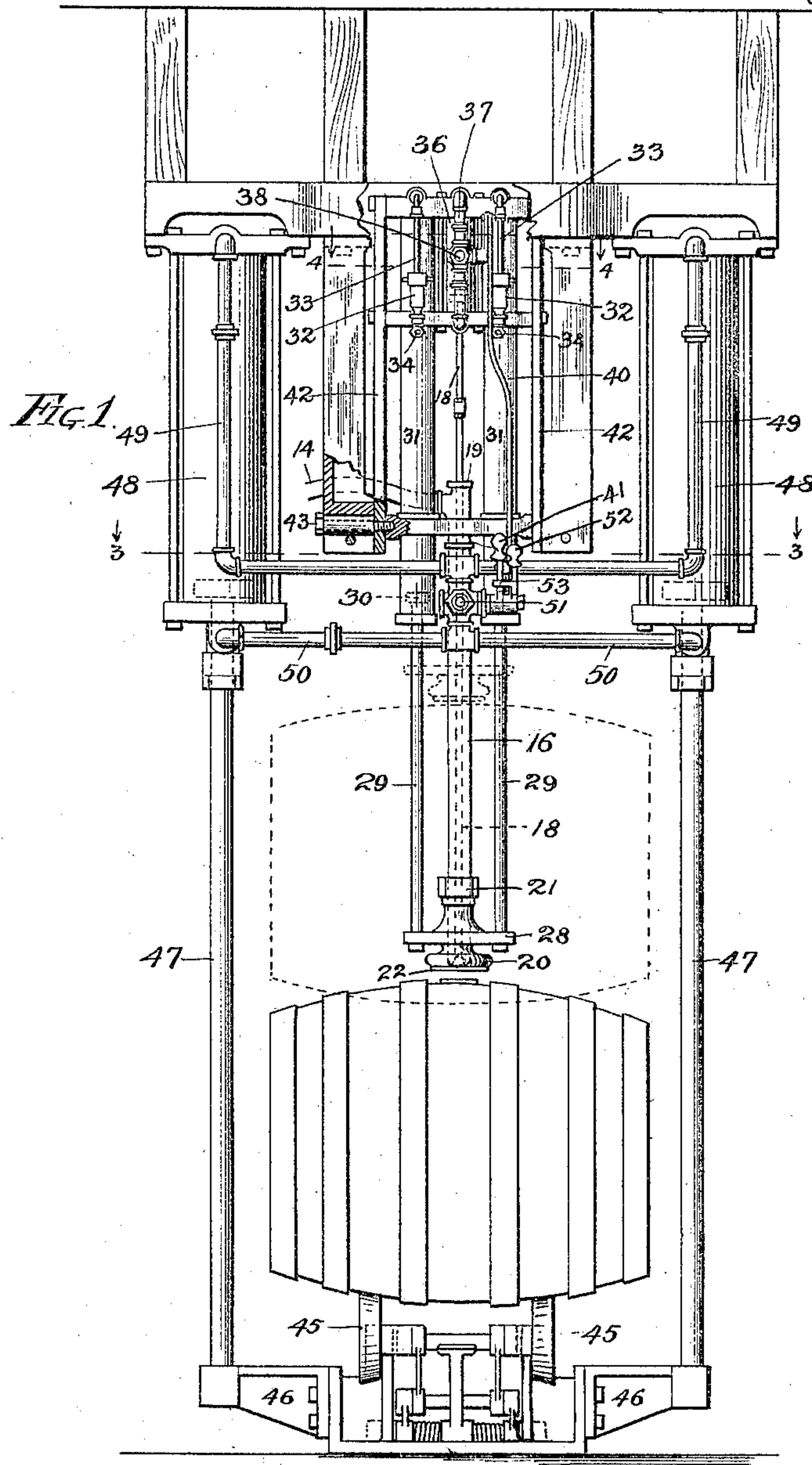
PATENTED MAR. 29, 1904.

H. W. COLBY.
APPARATUS FOR RACKING BEER.

APPLICATION FILED JAN. 2, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



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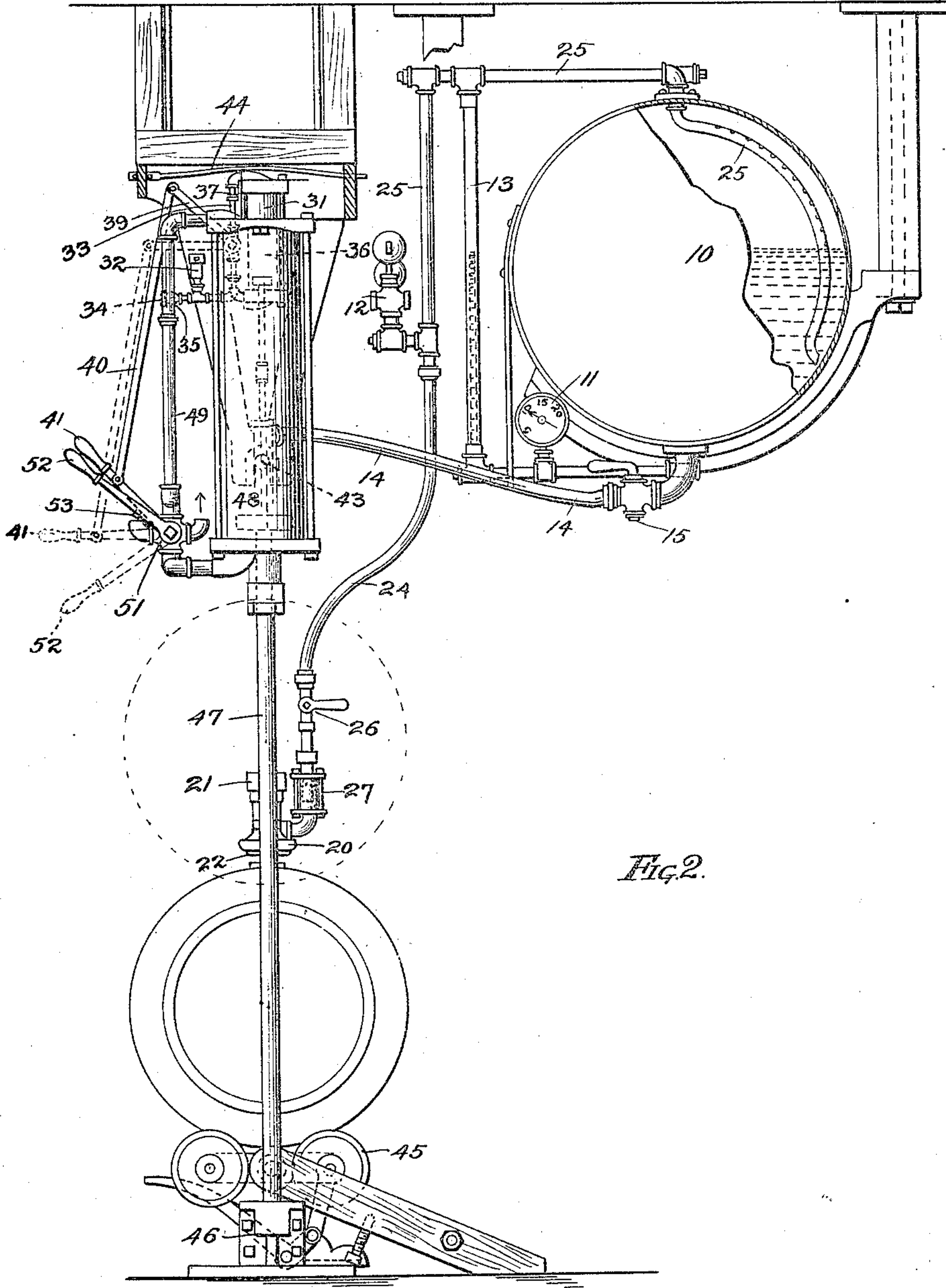


Fig. 2.

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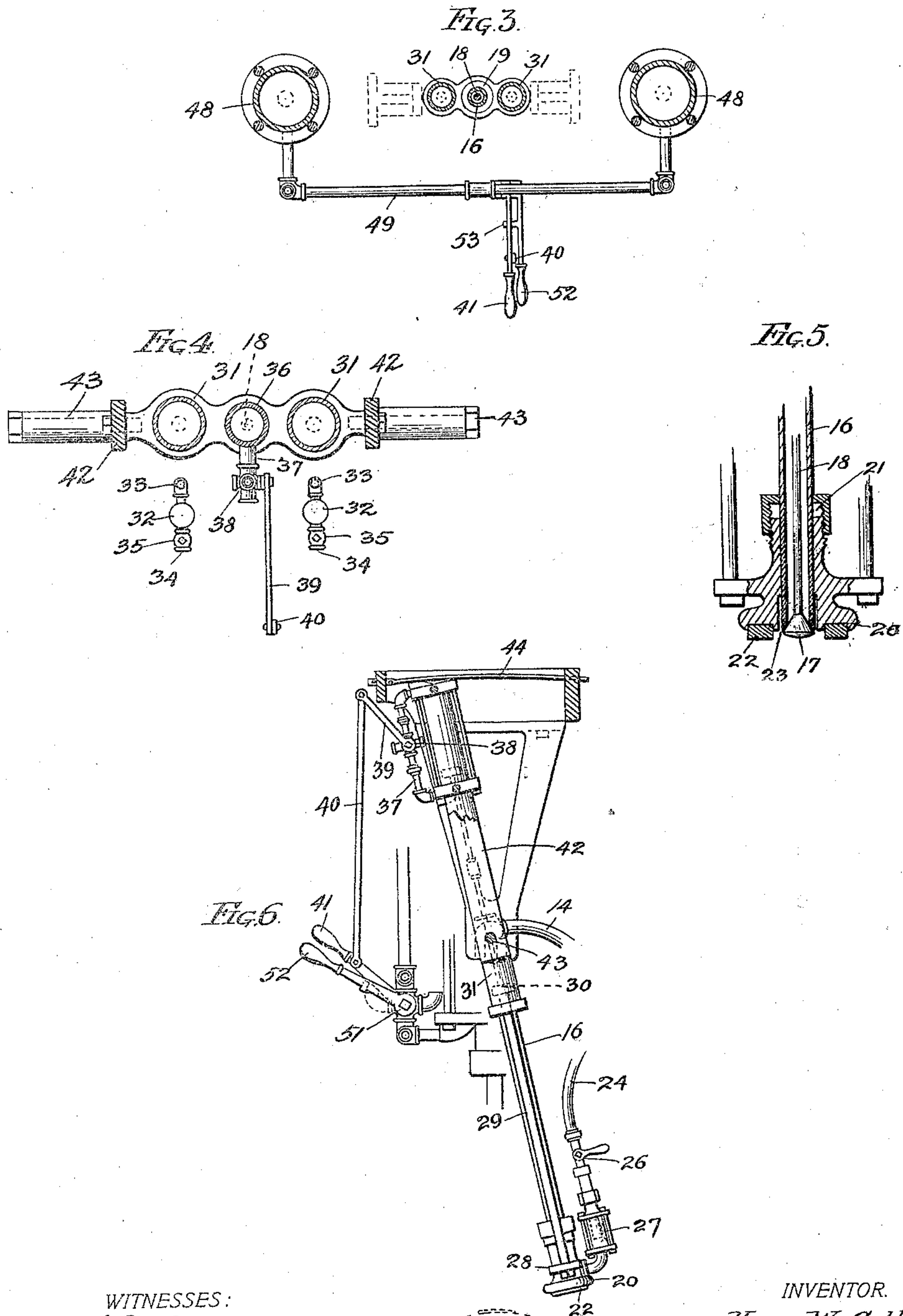
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

HARRY WILMONT COLBY, OF CHICAGO, ILLINOIS, ASSIGNOR TO
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APPARATUS FOR RACKING BEER.

SPECIFICATION forming part of Letters Patent No. 755,618, dated March 29, 1904.

Application filed January 2, 1902. Serial No. 88,170. (No model.)

To all whom it may concern:

Be it known that I, HARRY WILMONT COLBY, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Apparatus for Racking Beer, of which the following is a specification.

My invention relates to improvements in apparatus for racking beer, and more particularly to improvements upon the invention or apparatus shown and described in prior patents granted to me—as, for example, in my prior patent of the United States, No. 651,651, dated June 12, 1900.

The prime object of all my inventions relating to this art has been a means for racking the beer from the storage-casks into an intermediate reservoir and from thence into the shipping packages or barrels in such manner and by such means that the beer will not be disturbed, shaken, or stirred and the contained carbonic-acid gas released and foam produced and the beer caused to become “wild.” If the beer, charged with its gas, can be led quietly and without dashing or falling violently on its passage from the reservoir to the package and delivered at or near the bottom of the package, no foam or release of gas will take place, provided the atmospheric pressure in the package is equal or approximately equal to the atmospheric pressure in the intermediate reservoir containing the beer, and, moreover, the beer when thus delivered to the package will remain in this quiescent state for an appreciable length of time after the pressure has been released from the package and long enough so that a bung can be driven by hand with the package standing in the open air and this, too, with a full package and without the loss of any beer or creating any foam, thus dispensing with the necessity for complicated apparatus for driving the bung while the package remains sealed and under pressure.

In the apparatus which constitutes the subject-matter of the present invention the above-stated principle is followed out; and the invention consists in certain improvements in

construction and arrangement whereby the apparatus is somewhat simplified, cheapened, rendered more convenient in operation, and more conveniently applied in ordinary breweries, and especially those breweries where the overhead space from floor to ceiling is not great, and whereby also a better result as to the racking operation is obtained.

The design is to lift the barrel or shipping-package bodily upward into contact with a movable sealing-head and to continue this upward movement thereafter for a distance equal to that portion of the length of the filling-tube which is to be inserted in the barrel by pushing the movable sealing-head upward to slide on said filling-tube. This arrangement diminishes the height of the apparatus required and enables it to be put into breweries where the ceilings are low, and it also diminishes the vertical distance between the beer-reservoir and the bottom of the barrel being filled, through which distance the beer must descend in filling, and hence lessens the disturbance of the gas contained in the beer due to the flow, and in the present apparatus the barrel is lifted by a hydraulic engine, the sealing-tube held to its seal by compressed air, and the valve of the filling-tube operated by an air-engine, all as will be more fully described.

In the accompanying drawings, which form a part of this specification, Figure 1 is a face or front elevation of the improved apparatus. Fig. 2 is a side elevation of the same. Fig. 3 is a horizontal cross-section on the line 3 3 of Fig. 1. Fig. 4 is a horizontal section on the line 4 4 of Fig. 1, the same being, however, upon a larger scale than said Fig. 1. Fig. 5 is an enlarged sectional view of the sealing-head and the lower end of the filling-tube, showing the valve in the latter. Fig. 6 is a side elevation, partly in section, of the sealing-head and filling-tube, showing the same swung away from the barrel, as when the bung is to be driven.

In the accompanying drawings, 10 is the intermediate reservoir, into which the beer is first conveyed from the storage-casks by

means of a pipe or pipes not shown in the drawings. If the beer is to be filtered, the filter should be placed, preferably, between the storage-casks and this reservoir. In the reservoir 10 there is maintained by any suitable means above the beer an air-pressure which should be preferably constant and unvarying and sufficient at all times to hold the carbonic-acid gas in the beer. This air-pressure in amount must be determined by the quality and temperature of the beer being racked, and will usually range from five to fifteen pounds per square inch above atmosphere, and this pressure may be created by an air-pump, which is not shown in the drawings. It is indicated by a pressure-gage 11 and may be kept from rising too high by a safety-valve 12, located in the piping at some point which communicates with the interior of the reservoir above the beer. In order to indicate to the eye of the operator the level of the beer in the reservoir, a vertical sight-glass 13 is provided, its upper end communicating with the air above the beer and its lower end communicating with the beer in the reservoir. Connected to the lower part of the reservoir, so that the beer may flow into it from the reservoir, is the flexible beer-pipe 14, provided with a stop-cock 15 for letting the beer into the pipe or cutting it off therefrom. The other end of this pipe 14 is connected to the upper end of the filling-tube 16, which filling-tube is itself stationary except for the capability of swinging laterally along with the other parts connected to it for the purpose of getting it out of the way, so as to drive the bung by hand, as will presently be described. The connection of the pipe 14, as shown in the drawings, is slightly above the center of oscillation upon which the parts are swung; but the flexibility of said pipe 14 will accommodate this slight movement. At the lower end of the filling-tube is a valve 17, which may, as shown, consist of a conical plug seating against the lower end of said tube. Connected to the valve 17 is a slender valve-stem or valve-operating rod 18, which passes up through the entire length of the filling-tube and out at the top thereof through the cap or head 19 of said filling-tube, which is provided with a stuffing box or gland (not shown) and located in said cap 19 to prevent the beer from leaking upward around the valve-rod and out of the filling-tube at this point, but leaving the valve-rod free to be moved up and down to open and close the valve 17 at the bottom of the filling-tube. The means for operating this valve will presently be described. Fitted to slide on the outside of said filling-tube 16 and capable of being freely moved up and down thereon is the sealing-head 20, furnished with the stuffing-box 21, so that the fit between the sealing-head and the filling-tube shall be so close that air cannot escape or pass between the two. On the lower sur-

face of the sealing-head is a rubber packing-ring 22 for setting against the outside of the barrel around the bung-hole to form an air-tight connection or seal between the sealing-head and the barrel. In its lower part and immediately around the filling-tube this sealing-head is chambered out to form the chamber 23, which chamber when the sealing-head is in contact with the barrel is in direct communication with said barrel through the bung-hole. Attached to this sealing-head and in open communication with the chamber 23 is the flexible pipe 24, which, through piping 25, communicates with the upper portion of the reservoir 10 above the beer contained therein. The lower portion of the pipe 24 is provided with a stop-cock 26 and a sight-glass or glass chamber 27, the object of the latter being to indicate to the eye of the operator whether air or beer is passing through the flexible pipe 24 and to provide room for a sufficient quantity of beer to compensate for the beer displaced by the filling-tube when the latter is removed from the barrel, and having a movable pipe or tube extending into it for the purpose of adjusting a predetermined quantity of beer for various-sized barrels or packages. The sealing-head 20 is carried by the cross-arm 28, to which are connected the two piston-rods 29 29, the upper ends of which are provided with pistons 30 within the air-cylinders 31, the whole being so contrived that when the sealing-head is forced up the pistons at the upper ends of rods 29 will act to compress the air in said cylinders 31 31 more and more as the sealing-head is forced farther and farther up. The purpose of this arrangement is so that when the barrel is lifted vertically upward in contact with the sealing-head in the manner presently to be described said sealing-head will be held against the barrel as the latter rises, with a constantly-increasing pressure, until a maximum is reached. This maximum should be sufficient to insure a perfectly air-tight joint between the sealing-head and the barrel to prevent any leakage of air from the barrel at the seal. A pressure in the neighborhood of sixty to eighty pounds per square inch will be amply sufficient. To predetermine and regulate the amount of this pressure, a relief-valve 32 is provided for each of the cylinders 31 communicating with the upper part of said cylinders. A single relief-valve for the two cylinders open to the atmosphere might be employed, but two are preferable as a means of independent adjustment. The interior construction of these relief-valves is not shown on the drawings; but it will be understood that any ordinary pressure-regulating and adjustable safety-valve can be employed, and such a valve is intended. These relief-valves, it will be noticed, are connected to the pipes 33 33, which enter the cylinders 31 at the upper end thereof, and to the outer ends 34 of the said

pipe are to be connected pipes leading to the air-pump or compressed-air supply. In said pipes 33 and on the outer side of the relief-valve are check-valves 35, which permit air to enter the cylinders 31 from the air-pressure supply or pump, but prevent its egress. Now the operation of these cylinders 31 is as follows: When the sealing-head is pressed upward, compressing the air in said cylinders above the pistons, if a greater pressure than is required shall be attained the relief-valve 32 will open and the air will blow out, maintaining the predetermined pressure at which the relief-valves are set. When the barrel or shipping-package is lowered, the compressed air in the upper ends of the cylinders 31 by its expansion will force the sealing-head down and cause it to follow the barrel in its descent, but with a gradually-diminishing pressure until its lower position is reached. If the sealing-head should stick from any cause on its way or if the pressure of the contained air is not sufficient by its own elasticity to carry the head down, the air from the air-pump or air-supply will enter through the check-valves and force the head down. It will thus be seen that the cylinders 31 in their operation act like a spring, which is, however, perfectly regulable and adjustable and always certain in action.

Between the cylinders 31 is placed the small air-cylinder 36, the piston of which is directly connected to the valve-operating rod or stem 18 and operates the valve 17 at the bottom of the cylinder. Connected to the top and the bottom of the small cylinder 36 is a pipe 37, in which is a four-way cock or valve 38, connected at one side to the top of the cylinder, at another side to the bottom of the cylinder, at another side to the air-pump or compressed-air supply, and at the fourth or last side to the open air. On this valve is the lever 39. The valve itself is so adjusted that when the lever 39 is lifted upward the air-supply will be admitted underneath the piston and the exhaust above the piston opened, which will cause the valve at the bottom of the filling-tube to be closed, and when the lever 39 is pulled downward the air will be admitted above the piston and the exhaust opened below it, which will cause the piston to force the valve-operating rod or stem 18 downward and open the valve 17 at the lower end of the cylinder. Connected to the outer end of the valve-operating lever 39 by means of the pivoted rod 40 is the hand-lever 41, which is loosely journaled on the valve-stem of the valve which controls the operation of the barrel-lifting cylinders, presently to be described, the object of this being to bring the handles for operating the filling-tube valve and the barrel-raising valve close together for convenience. The parts above described, consisting of the sealing-head, its cylinders 31, the filling-tube, and the cylinder 36 for operating the valve at

the bottom of the filling-tube, are all connected together and supported in a frame 42, provided with trunnions 43, by which it is pivoted to the stationary framework of the machine in such manner that it may be swung back into the position shown in Fig. 6 to permit the bung to be driven in the barrel. On the stationary frame of the machine above this oscillating frame is a flat spring 44, which comes into contact with some part of the oscillating devices and by its frictional pressure holds the oscillating frame in whatever position it may be placed by the hand of the operator.

The barrel or package to be filled is placed on the barrel-support 45, which is or may be of the usual construction and requires no description. The barrel-support is itself mounted on a cross-head or platform 46, to which are attached the piston-rods 47 47, connected to the pistons of the two hydraulic cylinders 48 48. These cylinders 48 are connected at top and bottom, respectively, by pipes 49 and 50 to a four-way valve or cock 51, one port or way of which is connected to the top of the cylinders, one to the bottom of the cylinders, one to the pump, accumulator, or water-supply, and one to the waste or outflow. To this four-way valve or cock 51 is rigidly connected the operating-handle 52, and the valve is so positioned that when this handle is pulled downward the water or liquid is admitted from the water-supply to the cylinders beneath the piston and the waste or outflow opened from above the piston, so that the hydraulic pressure shall operate to lift the support upon which the barrel rests and carry it upward against the sealing-head, lifting the barrel up until the lower portion of the interior of the barrel will be at or nearly at the lower end of the filling-tube, which as the barrel is lifted enters the interior thereof through the bung-hole, and when the handle 52 is lifted upward a reverse of this operation takes place, the barrel is lowered to its lowest position, being withdrawn from the filling-tube and finally out of contact with the sealing-head. On the operating-lever 52 is a tang or projection 53, which sets out under the lever or handle 41, which latter handle, it will be remembered, is loosely journaled on the valve-stem to which the handle 52 is rigidly connected. The purpose of this arrangement is that when the handle 52 is lifted up to cause the barrel to be lowered the handle 41 will also be raised thereby to cause the valve at the lower end of the filling-tube to be closed, and thus stop the flow of beer to the barrel while the latter is being lowered.

The operation is as follows: The reservoir being supplied with beer and the apparatus in the position shown in full lines in Figs. 1 and 2, a barrel to be filled is rolled up on the barrel-support, as indicated in said figures, and with its bung-hole positioned directly un-

der the sealing-head. The cock 15 being open, so that there is free communication between the lower part of the reservoir and the upper end of the filling-tube, the lever 52 is pulled down, which causes the hydraulic cylinder to lift the barrel up into contact with the sealing-head and to carry it up thereafter until the lower portion of the interior of the barrel is at or nearly at the lower end of the filling-tube. The sealing-head, by reason of the compression of the air in the cylinders against which it has been lifted by the rise of the barrel, will now be held firmly down against the outside of the barrel around the bung-hole, creating an air and liquid tight joint. As soon as the sealing is effected the cock 26, which is in the pipe leading from the upper part of the reservoir to the chamber in the sealing-head, is opened, and the compressed air above the beer in the reservoir passes through the sealing-head to the barrel until the pressure in the barrel is equal or nearly equal to the pressure in the reservoir. It is not necessary to wait until the barrel is in its uppermost position before opening this cock 26, as the sealing will usually be perfect before this height has been reached. When the barrel is in its uppermost position, and the pressure equalized, the hand-lever 41 is pulled down and the valve 17, at the lower end of the filling-tube, thus opened, and the beer begins to flow from the filling-tube, which being in open communication with the reservoir is constantly full of beer. The beer flows from the bottom of the filling-tube, which is in close juxtaposition to the bottom of the package, and hence flows quietly and without any agitation into the package, the bottom of which, it will be remembered, is only a little more than the height of the package below the bottom of the reservoir. The beer continues to flow quietly into the package without any release of gas and without any foam, filling the package by rising up until the package is absolutely full and until the beer continuing to rise into the chamber in the sealing-head has reached and filled the sight-glass 27, which the operator observes. At this juncture as soon as he sees that the sight-glass is full of beer the operator lifts up the handle 52, which carries with it the handle 41, and thus simultaneously closes the valve in the bottom of the filling-tube and starts the barrel downward by the combined action of the air and hydraulic cylinders. As the barrel descends and the filling-tube is thereby withdrawn the cock 26 remains open, so that the equalized pressure may be maintained while the barrel is descending, and the beer in the sight-glass is thus forced or flows down to take the place occupied by the filling-tube, so that when the latter is completely withdrawn the barrel is absolutely full of beer up to the bung-hole. As the barrel continues to lower the sealing-head parts contact with the surface

of the barrel and leaves the barrel open to the air. Just before the sealing-head has parted contact with the barrel the operator closes the cock 26, so that none of the pressure from the reservoir will be lost. When the barrel is thus left open to the air after being filled in this manner completely full, there is an appreciable interval of time during which no ebullition of gas will occur, though if left too long the beer will begin to foam out of the bung-hole. During this quiescent interval the operator swings back the oscillating sealing-head and tube into the position indicated in Fig. 6, in which position it is held by the friction spring-detent 44, so that he will have both hands free. He now takes a bung and drives it into the bung-hole, rolls the barrel out of its position, and the operation is completed. It may be noted that if from inadvertence or carelessness the attendant permits the beer to flow into the barrel too long, so that the sight-glass is filled and the beer passes on up into the pipe connected therewith, this will do no great harm, because the beer in any case will only rise in this pipe until it reaches the level of the beer in the reservoir, and the pipe being relatively small in diameter the amount of beer which will be left in the pipe will not be great and may be compensated for by adjusting the tube inside of sight-glass 27. This beer if allowed to remain in the pipe will be forced by the air-pressure above it down through the chamber 23 into the next barrel, but will in so doing drop through the depth of the barrel, spraying the liquid through the air and causing it to foam, and thus producing some foam in the barrel. The amount of this foam will be small, it is true; but for the benefit of the beer in the package and its keeping quality it is better that this small amount should not be permitted to flow in this manner into the barrel, which can readily be prevented by blowing out the pipe before the next barrel is filled by opening the cock 26 momentarily when the sealing-head is not on the barrel. Of course such inadvertent or careless overfilling or adjustment of tube in sight-glass 27 should always be avoided, if possible.

Having thus described the invention, what is claimed is—

1. In a machine for filling packages with liquid containing gas, the combination of a reservoir for containing the liquid under pressure, a filling-tube connected to the reservoir, and having a valve at its lower end, a chambered sealing-head sliding on said filling-tube, the chamber of which is connected to the reservoir to equalize the pressure between the reservoir and the package, means for lifting the package up against the sealing-head and causing the latter to slide on the filling-tube until the lower end of the filling-tube with its valve is at or near the bottom

of the package, and means for operating the valve in the filling-tube, substantially as specified.

2. In a machine for filling packages with liquid containing gas, the combination of a reservoir for containing the liquid under pressure, a filling-tube connected to the reservoir and having a valve at its lower end, a chambered sealing-head sliding on said filling-tube, the chamber of which is connected to the reservoir, to equalize the pressure between the reservoir and the package, a hydraulic cylinder and piston for lifting the package up against the sealing-head, and causing the latter to slide on the filling-tube until the lower end of the filling-tube with its valve is at or near the bottom of the package, and means for operating the valve in the filling-tube, substantially as specified.

3. In a machine for filling packages with liquid containing gas, the combination of a reservoir for containing the liquid under pressure, a filling-tube connected to the reservoir, and having a valve at its lower end, a chambered sealing-head sliding on said filling-tube, the chamber of which is connected to the reservoir to equalize the pressure between the reservoir and the package, means for lifting the package up against the sealing-head and causing the latter to slide on the filling-tube until the lower end of the filling-tube with its valve is at or near the bottom of the package, and means for operating the valve in the filling-tube, the said sealing-head being connected to an air-compression device so that in its rise the sealing-head works against an increasing air-pressure, which operates as a spring to hold the sealing-head against the package, and to return said sealing-head when the package is lowered, substantially as specified.

4. In a machine for filling packages with liquid containing gas, the combination of a reservoir for containing the liquid under pressure, a filling-tube connected to the reservoir, and having a valve at its lower end, a chambered sealing-head sliding on said filling-tube, the chamber of which is connected to the reservoir to equalize the pressure between the reservoir and the package, means for lifting the package up against the sealing-head and causing the latter to slide on the filling-tube until the lower end of the filling-tube with its valve is at or near the bottom of the package, and means for operating the valve in the filling-tube, the said sealing-head being connected to an air-compression device so that in its rise the sealing-head works against an increasing air-pressure, which operates as a spring to hold the sealing-head against the package, and to return said sealing-head when the package is lowered, said air-compression device being provided with a regulable relief-valve, and an automatic check-valve which may be connected

to a compressed-air supply, whereby a predetermined pressure may be maintained, substantially as specified.

5. In a machine for filling packages with liquid containing gas, the combination of a reservoir for containing the liquid under pressure, a filling-tube connected to the reservoir and having a valve at its lower end with means for operating the same, a chambered sealing-head sliding on said filling-tube, the chamber of which is connected to the reservoir to equalize the pressure between the reservoir and the package, and a hydraulic cylinder and piston for lifting the package up against the sealing-head and causing the latter to slide on the filling-tube until the lower end of the filling-tube with its valve is at or near the bottom of the package; and an air-compression device connected to the sealing-head so that in its rise the sealing-head works against the increasing air-pressure which operates as a spring to hold the sealing-head against the package, and to return said sealing-head when the package is lowered, substantially as specified.

6. In a filling-machine for filling packages with liquid containing gas, the combination of a reservoir for containing the liquid under pressure, a filling-tube which when in operation extends substantially to the bottom of the package to be filled, a sealing-head sliding on the filling-tube and having a communication with said reservoir independent of the filling-tube, means for bringing the bottom of the package where the liquid is delivered and the said reservoir more nearly to the same horizontal level and thus diminishing the tendency of the beer to foam and at the same time causing the said filling-tube to extend to the bottom of the package, a foam-preventing valve for closing the filling-tube arranged at the lower end of said tube and operated by the bottom of the package, and means which causes the package and reservoir to approach said level and also opens said valve, substantially as set forth.

7. In a filling-machine for filling packages with liquid containing gas, the combination of a relatively stationary reservoir, a filling-tube also relatively stationary and adapted to extend when in operation substantially to the bottom of the package, a foam-preventing valve arranged at the lower end of the filling-tube, and means for raising the package to bring the bottom thereof where the liquid is delivered more nearly to the same horizontal level with the said reservoir and thus diminish the tendency of the beer to foam, said means also acting to operate the foam-preventing valve, substantially as set forth.

8. In a machine for filling packages with liquid containing gas, the combination of a package-support, hydraulic cylinders for lifting the package-support, a sealing-head lifted by the package, a pneumatic compression device against the pressure of which the sealing-head

is lifted, a filling-tube having a valve at its delivery end, and an air-cylinder the piston of which is connected to the valve at the delivery end of the filling-tube for opening and closing the same, substantially as specified.

9. In a filling-machine, the combination of a stationary cylinder containing its piston for raising and lowering the package to be filled, a swinging frame having mounted thereon a cylinder and piston for operating the sealing-head, a movable sealing-head to be operated by said piston, and a filling-tube having no vertical movement, substantially as specified.

10. In a filling-machine, the combination of a stationary cylinder containing its piston for raising and lowering the package to be filled, a swinging frame having mounted thereon a cylinder and piston for operating the sealing-head, a movable sealing-head to be operated by said piston, and a filling-tube having no vertical movement, said filling-tube having a valve at its lower end, substantially as specified.

11. In a filling-machine the combination of a stationary cylinder containing its piston for raising and lowering the package to be filled, a swinging frame having a cylinder and piston mounted upon it for operating the chambered sealing-head and a filling-tube having no vertical movement, and also mounted upon said swinging frame, and a chambered movable sealing device also mounted on said swinging frame, substantially as specified.

12. In a filling-machine the combination of a stationary cylinder containing its piston for raising and lowering the support of the package to be filled, a swinging frame having a cylinder and piston mounted upon it, and a filling-tube having no vertical movement, and also mounted upon said swinging frame, and a barrel-support adapted to be raised and lowered, and means for sealing the package when the filling-tube is inserted therein, substantially as specified.

13. The combination of a stationary cylinder containing its piston for raising and lowering the package to be filled, a swinging frame, a cylinder and piston mounted on said swinging frame for operating the chambered sealing-head, a filling-tube having no vertical adjustment and having a valve at its lower end,

with means for operating the same and a chambered movable sealing device, substantially as specified.

14. The combination of a stationary cylinder containing its piston for raising and lowering the package to be filled, a swinging frame, a cylinder and piston mounted on said swinging frame for operating the sealing-head, a filling-tube having no vertical adjustment and having a valve at its lower end, with means for operating the same and a chambered sealing device, and a reservoir for containing the liquid under pressure, substantially as specified.

15. The combination of a stationary cylinder containing its piston for raising and lowering the package to be filled, a swinging frame, a cylinder and piston mounted on said swinging frame for operating the chambered sealing-head, a filling-tube having no vertical adjustment and having a valve at its lower end with means for operating the same, a chambered movable sealing device, and a reservoir for containing the liquid under pressure, and a pipe or hollow tube connecting the chambered sealing-head with the upper portion of the reservoir.

16. The combination of a stationary cylinder containing its piston for raising and lowering the package to be filled, a swinging frame, a cylinder and piston mounted on said swinging frame for operating the chambered sealing-head, a filling-tube having no vertical adjustment and having a valve at its lower end with means for operating the same, a chambered movable sealing device, a reservoir for containing the liquid under pressure, a pipe or hollow tube connecting the chambered sealing-head with the upper portion of the reservoir, a pipe or hollow tube connecting the upper end of the stationary filling-tube and the lower portion of the reservoir, a sight-glass in the tube to the upper portion of the reservoir, and an adjustable section in this pipe passing through a stuffing-box into the sight-glass, substantially as specified.

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