

No. 855,036.

PATENTED MAY 28, 1907.

J. R. AMACKER.  
BOTTLE WASHING MACHINE.

APPLICATION FILED FEB. 8, 1904.

5 SHEETS—SHEET 1.

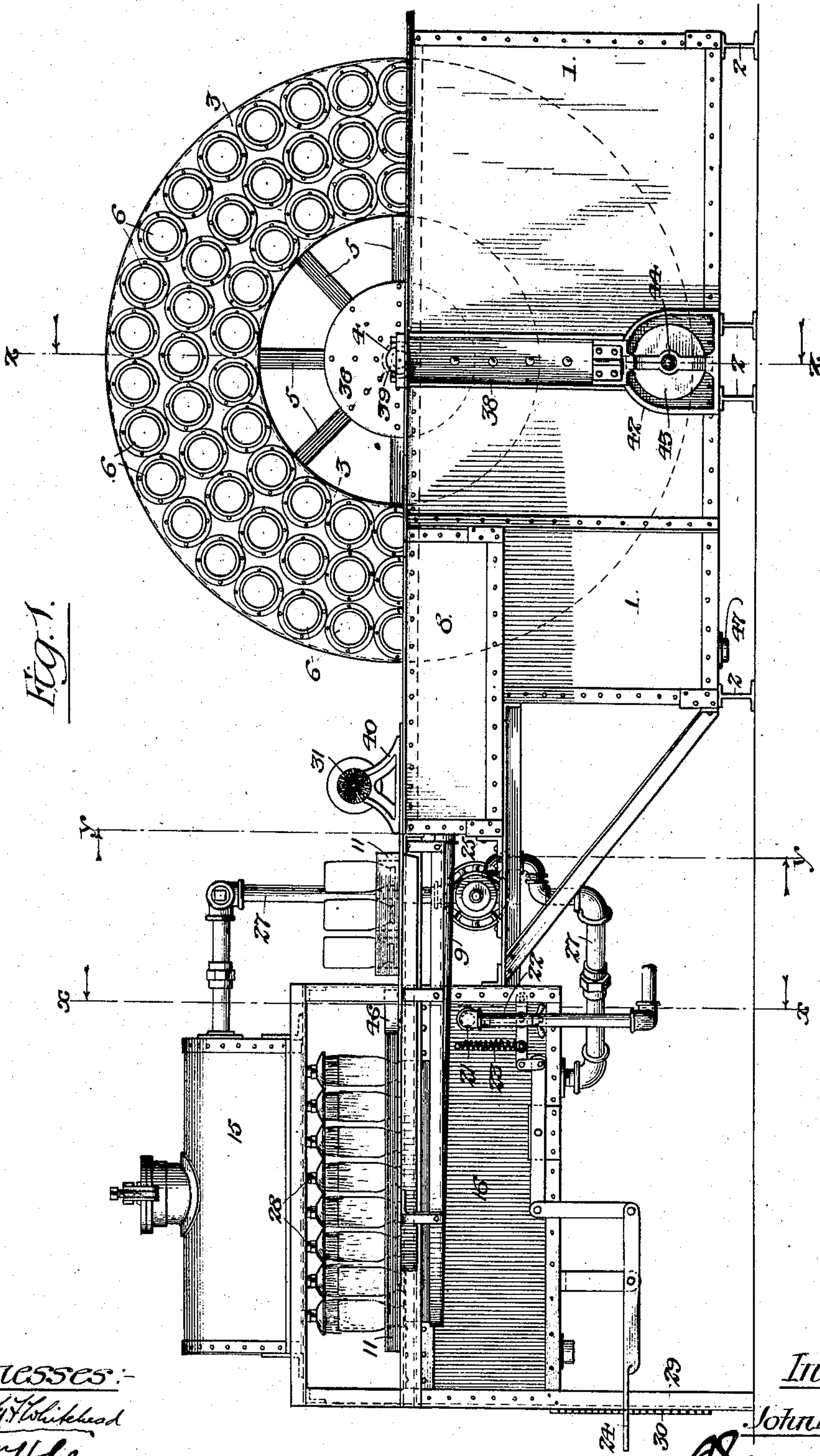


Fig. 1.

Witnesses:-

Louis M. Whitehead  
Wm. H. Clarke

Inventor:-

John R. Amacker

by: *C. H. Hawley*  
his Atty:-



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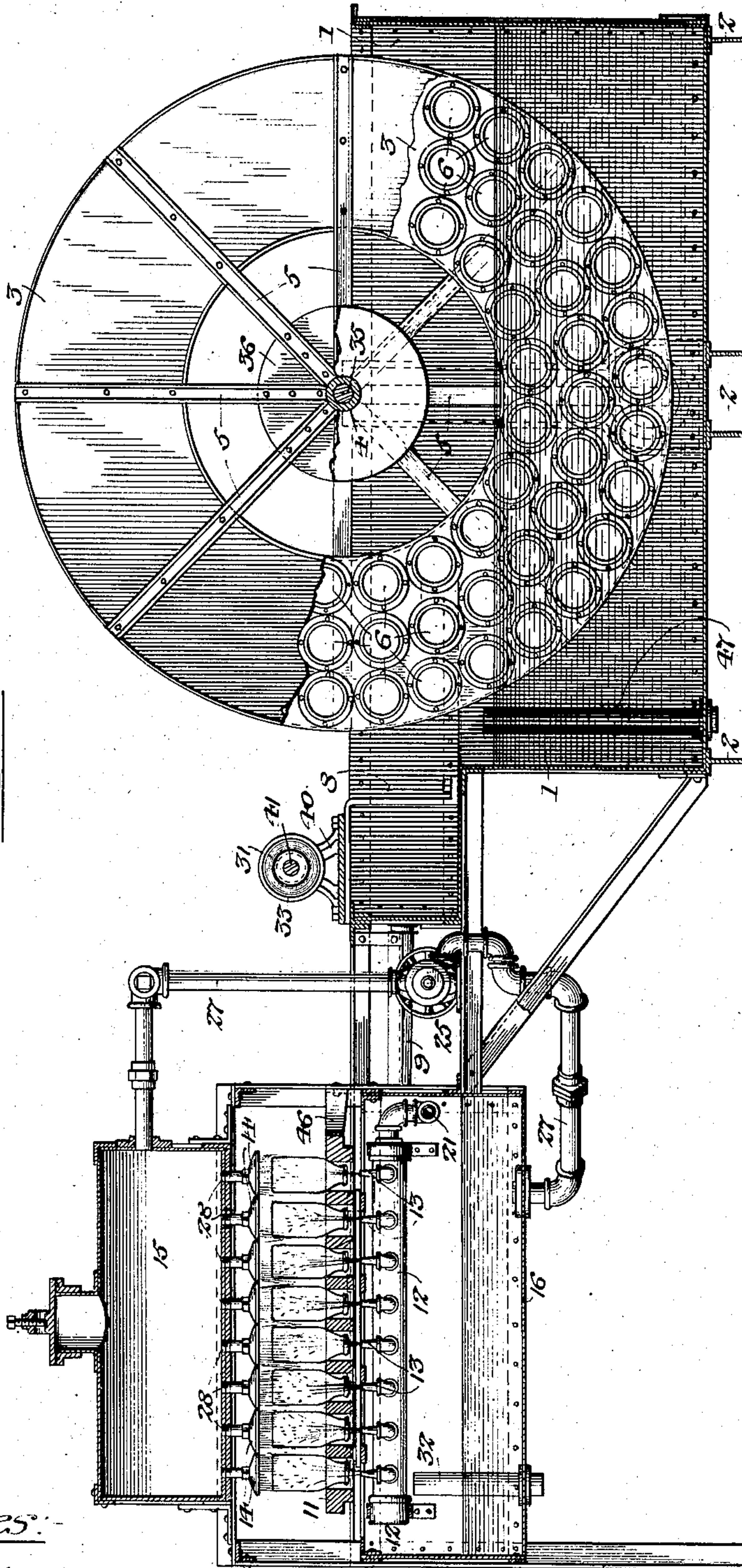
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5 SHEETS—SHEET 2.

*Fig. 2.*



*Witnesses:*

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*Wm. H. Lewis*

*Inventor:*

*John R. Amacker*

*65°*

*C. Hawley*  
*his atty.*

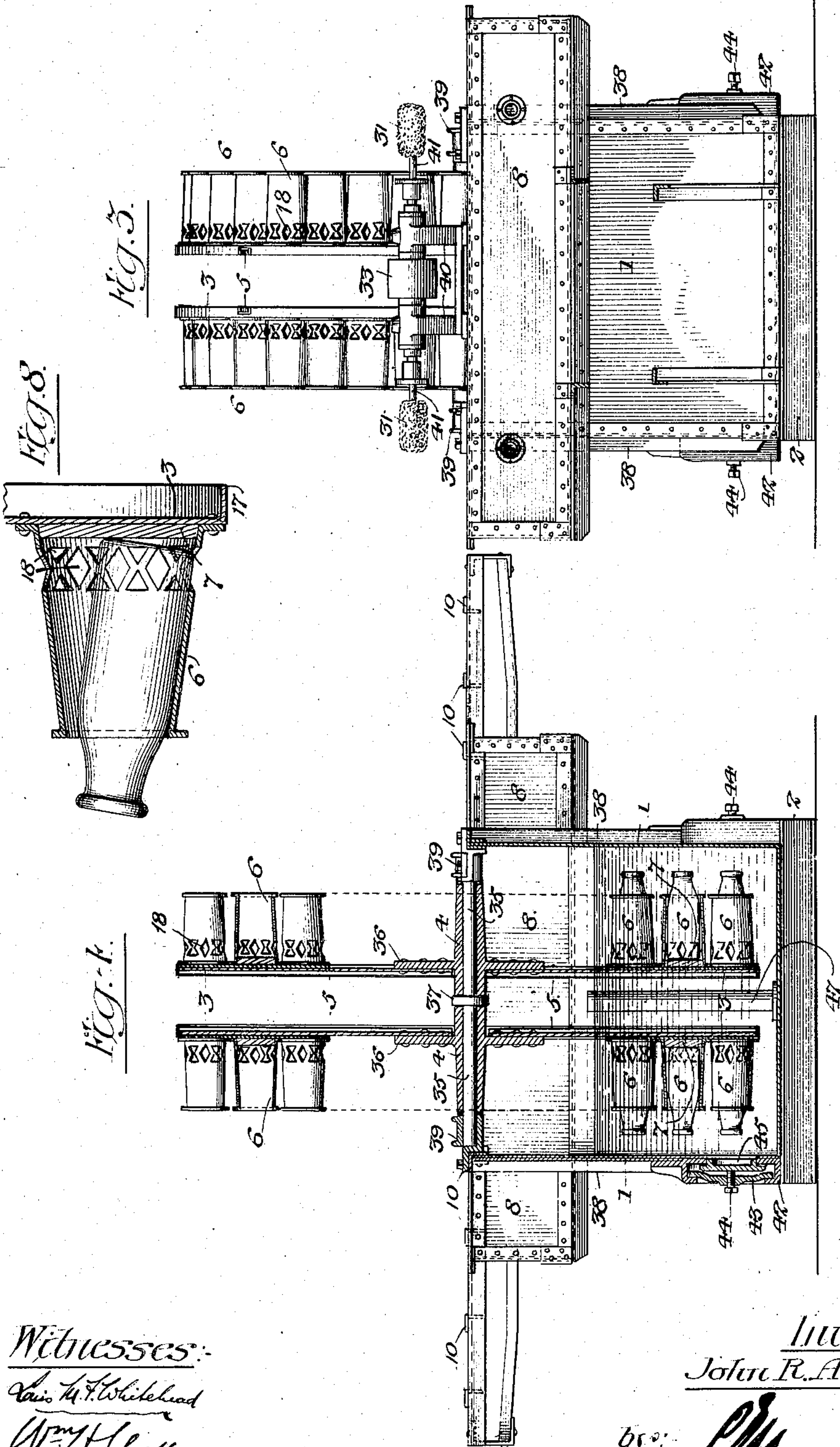
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5 SHEETS—SHEET 3.



Witnesses:

Wm. H. Whitehead

Wm. H. Whitehead

Inventor:  
John R. Amacker

by: *C. Hawley*  
his atty.



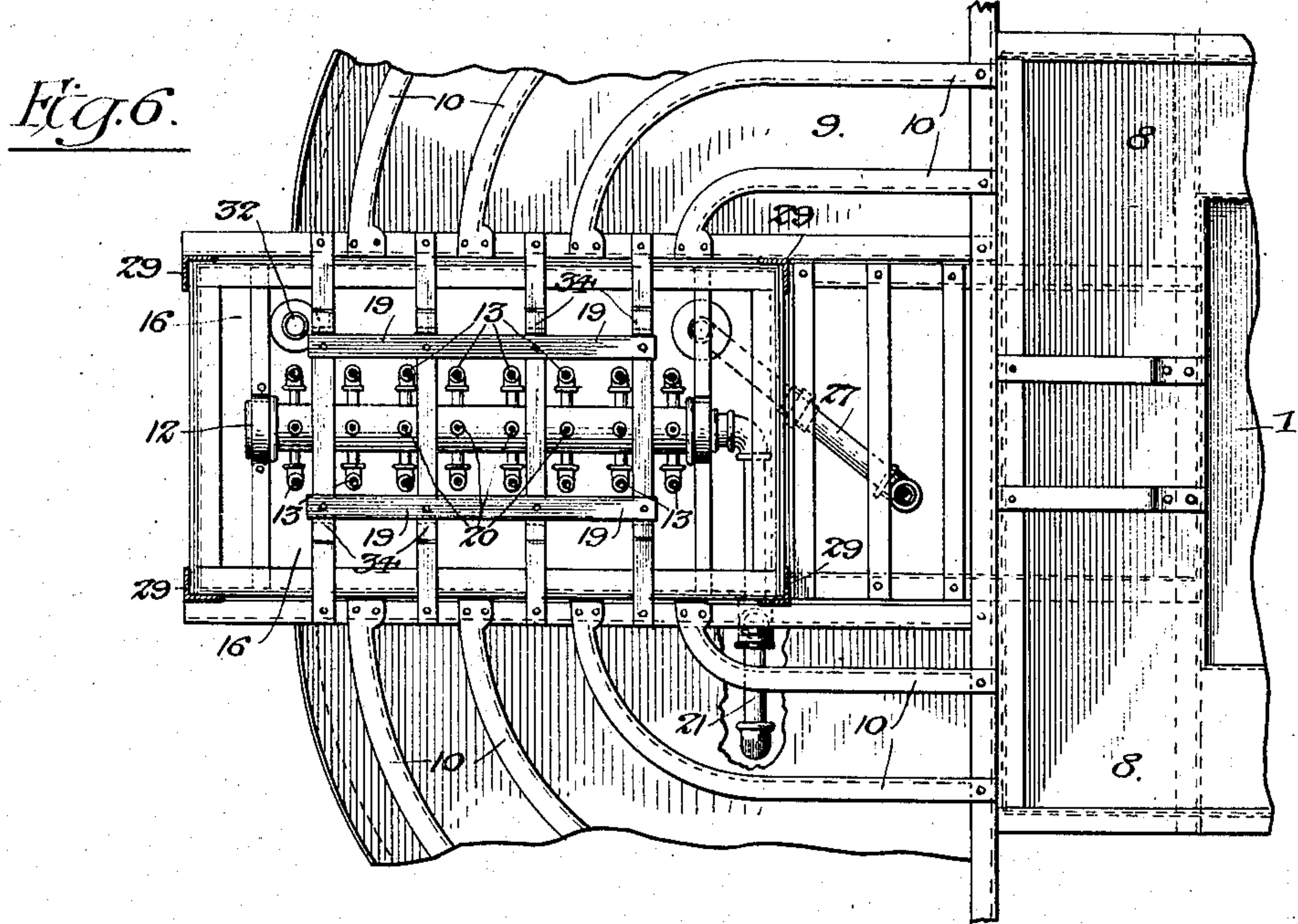
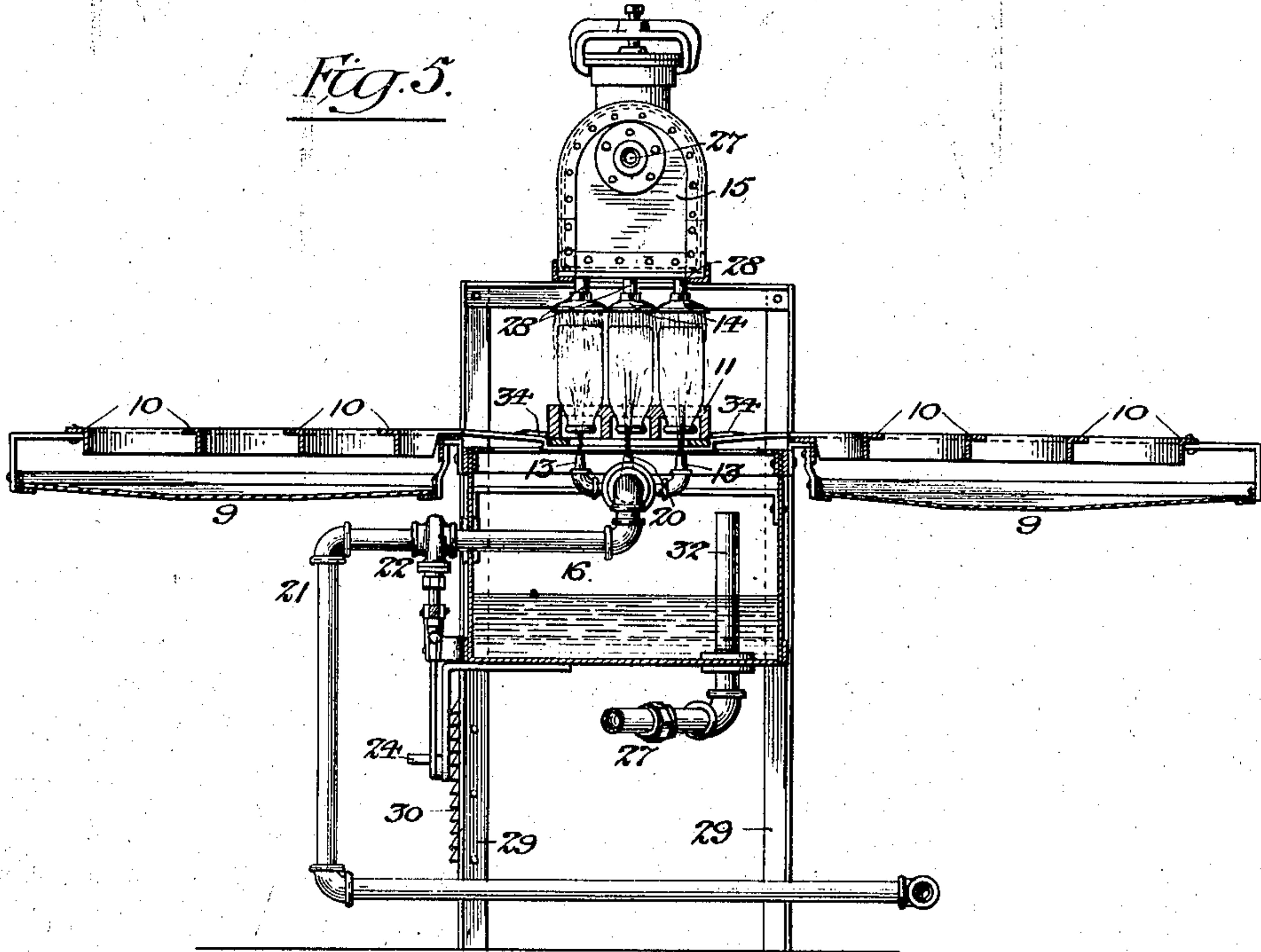
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5 SHEETS—SHEET 4.



Witnesses:

*Wm. H. Whitehead*  
*Wm. H. Barker*

Inventor:

*John R. Amacker*

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*O. Hawley*  
*his Att'y*

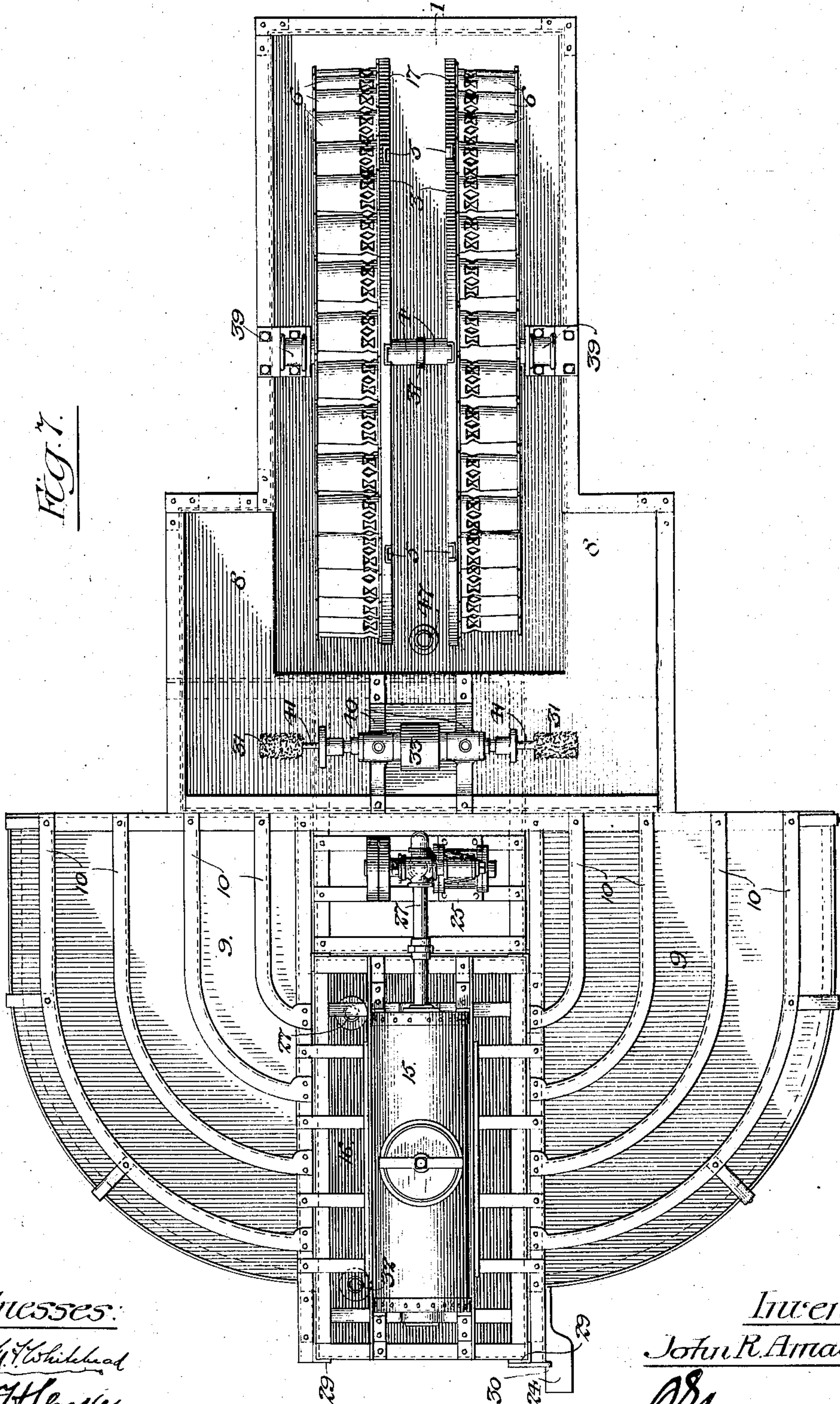
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5 SHEETS—SHEET 5.



Witnesses:

Wm. H. Whitehead  
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Inventor:

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by: *J. Hawley*  
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# UNITED STATES PATENT OFFICE.

JOHN R. AMACKER, OF OAK PARK, ILLINOIS, ASSIGNOR TO THE CREAMERY PACKAGE MFG. COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## BOTTLE-WASHING MACHINE.

No. 855,036.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed February 8, 1904. Serial No. 192,498.

*To all whom it may concern:*

Be it known that I, JOHN R. AMACKER, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a certain new, useful, and Improved Bottle-Washing Machine, of which the following is a specification.

My invention relates to machines for washing bottles, and has particular reference to a machine wherein bottles such as are used for milk and cream may be soaked in lye, then scrubbed, then permitted to drain, and then thoroughly rinsed.

I conceive that time and labor may be saved in the cleaning of bottles, provided a single machine is devised wherein the operations described shall take place, beginning with the receipt of the dirty bottles and ending with the storage of the clean bottles; and that, by providing for the proper distribution of the work in such a machine, fewer operators will be required.

The object of my invention is to provide a machine that shall be as nearly as possible automatic, requiring, however, the constant attention and labor of one or more operators, with the attendant assurance of careful inspection of every bottle that passes through the machine.

Another object of my invention is to provide a bottle-washing machine that shall be extremely economical in operation, requiring little power for the actuation of its parts, and which shall be so constructed that practically no part of the washing fluid shall be lost, but shall, on the other hand, be constantly available for the soaking and scrubbing processes.

Still another object of my invention is to provide a washing-machine wherein the bottles shall be drained without requiring special attention or expenditure of time on the part of the operator; and further, to provide a machine at which two washers or operators may work at the same time, making alternate use of the rinsing apparatus.

A final object of my invention is to provide a machine of great capacity and which shall require little effort of the operator in its operation; in other words, a machine that shall, itself, perform so many of the functions described as to render the necessary work of the operators easy and light.

With these objects in view, my invention

consists, generally, in a bottle-washing machine comprising a soaking-tank, in combination with one or more conveyers operable therein and provided with a plurality of bottle-holding pockets wherein the bottles are continuously presented with their necks uppermost, so that they may be completely filled with the soaking fluid, in order that they may emerge therefrom partly filled with water, the pockets being so constructed that the water, when escaping therefrom, holds the bottles therein; another element of my invention is a scrubbing device which with the scrubbing tank is so constructed and arranged that the loss of washing fluid is avoided. And further, my invention consists in various constructions and combinations of parts for safely handling the bottles; for saving the washing or soaking fluid, and for economizing the time of the operators; all as hereinafter described and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which:—

Figure 1, represents a side elevation of my improved bottle-washing machine; Fig. 2, is a vertical section through the center of the machine, showing the lower part of one wheel broken away; Fig. 3, is a section on the line  $y-y$  of Fig. 1; Fig. 4, is a section on the line  $z-z$  of Fig. 1; Fig. 5, is a section on the line  $x-x$  of Fig. 1; Fig. 6, is a plan-view of Fig. 5, with the spraying-tank and bottle-rack removed; Fig. 7, is a general plan view of the entire machine; and Fig. 8, is an enlarged sectional view of one of my improved bottle-holding pockets, with a bottle therein.

As shown in the drawings, 1 is the tank, supported on the I-beams 2 and containing the washing fluid in which the bottles are soaked. A saponifying solution of any kind may be employed; but I prefer to use a solution of water and any of the well-known washing-powders. Two large wheels, 3, operate in this tank, each being equipped with a large number of bottle-holding pockets, 6, of such shape as to continuously present the necks of the bottles uppermost, regardless of the changing position of the pockets during the rotation of the wheel. The wheels may be positively driven, if desired,



but the use of power for this purpose is unnecessary, for the reason that the weight of the bottles in the pockets at one side of the wheel will naturally produce the necessary rotation. The rotary movement of the wheel thus occasioned finally presents a number of bottles, partially filled with fluid, at the opposite side of the wheel; and at this point and over an extension of the washing-tank, the machine is provided with a bottle-scrubbing device consisting of brushes, 31, on which each bottle is placed as it is removed from the large, self-operating conveyor or wheel. Adjacent to the brushes is the drain-stand, 11, upon which the bottles are deposited in an inverted position, when taken from the brush; and beneath the drain-stand is a drip-pan, 9, which empties into the washing-tank, 1; so that the liquid remaining in the bottles after brushing is not lost, as each bottle remains in constant communication with the tank, 1, until it is completely emptied. As shown, I prefer to use two of the conveyor-wheels in the tank, and two brushes, with corresponding drain-stands. Between the drain-stands I arrange the rinsing portion of the machine. This comprises means for jetting fresh water into the bottles and then using the polluted water for rinsing the outsides of the bottles.

In operating the machine, one operator stands at the receiving side of the conveyor wheels, and, as rapidly as possible, fills the downwardly moving pockets with dirty bottles. Each bottle placed on the wheel tends to continue the rotation thereof and to furnish sufficient force to submerge the bottles previously placed in the pockets. When a sufficient number of bottles have been so inserted in the pockets, the conveyor wheel will have revolved sufficiently to bring the first bottles to the surface of the liquid on the other side of the tank, viz: that nearest the brushes, 31, at which point the bottles are removed from the conveyor pockets by the operator and held on or against one of the brushes, which are rapidly rotated, preferably by belt, from any convenient source of power. They may thus be thoroughly scrubbed, inside or out. The operator then places them, mouth downward, in the drain-stand, 11; and during the time required to fill this stand with the bottles, one by one, they are allowed to drain off the liquid remaining in or upon them, which falls into the drip-pan, 9, and passes thence to the washing-tank, 1. When the drain-stand is filled, it is moved over the slides, 10, and shoved into position on the spraying or rinsing-pan, 19, where jets of water are forced upward into the interior of the bottles and run therefrom into the tank, 16. From this tank the water is pumped into tank 15, and showered over the outside of

the bottles. The drain-stand is then drawn off the spraying or rinsing-pan, and the bottles removed therefrom to some convenient point for drying or sterilizing.

Having thus briefly outlined the construction, use and operation of my improved bottle-washing machine, I will now proceed to define and describe the machine in detail.

The soaking and washing-tank, 1, is of rectangular shape and is supported on the I-beams, 2. It is composed of plates riveted together at the edges, and is stiffened at the center by the panels, 38. At the lower end of one of these panels, 38, is the casting, 42, containing an opening, 45, through which the tank is cleaned out when necessary, and which is closed by the cap, 43, operated by the nut, 44. An overflow pipe, 47, is placed in the tank, 1, and determines the maximum level of the soaking liquid therein. This pipe is removably jointed at the bottom of the tank, so that it may be drawn out when it is desired to drain the tank, preparatory to cleaning it. Secured in the top of the panels, 38, are the sockets, 39, for the ends of the rod, 35. The hubs, 4, of the conveyor-wheels, 6, encircle this rod, 35, and the wheels are therefore supported, and turn thereon. A collar or collars, 37, separates the hubs, 4. The two wheels, 3, are entirely independent of each other and revolve freely about the rod, 35, when impelled by the weight of the bottles placed in the bottle-holding pockets, 6. Each wheel is composed of the hubs, 4, webs, 36, and spokes, 5, supporting the disks, 17. The bottle-holding pockets, 6, are riveted to the outer sides of the disks, 17, and are hollow, truncated cones, having their bases next the wheel and their axes perpendicular to the plane of the disk, 17. By reason of their shape, the bottles placed therein are at all times held in an upwardly inclined position, so that not only is the liquid enabled to reach all parts of the interior and exterior surfaces of the bottles, but they also emerge from the liquid, as the wheels revolve, on the side of tank, 1, nearest the brushes, 31, partially filled with the liquid. This liquid so retained in each bottle is thus immediately available for the scrubbing process, during which such of the liquid as may escape from the bottles falls into the extension, 8, and runs thence back into the washing-tank, 1. It is obvious that the quantity of liquid extracted from the tank, 1, by each bottle, as above described, would soon materially reduce the supply in the tank and render it necessary to frequently replenish the same, were it not saved in some such manner as above described.

It is, of course, possible that the brushing or scrubbing of the bottles might be automatically performed, but I prefer that this operation should have the constant attention of the



operator, for the following reason: After the milk is used from an ordinary milk-bottle, the latter is often allowed to remain for an indefinite period exposed to the atmosphere, the result being that the residue of the contents of the bottle becomes caked thereon to a greater or less degree, according to the length of such period. Hence, when the bottle is scrubbed, more or less time and effort is necessary to properly clean it. It is, therefore, evident that the judgment of the operator must be depended on to properly cleanse each bottle, and that the operation could not be economically and suitably performed by an automatic scrubbing device, interposed at this point.

Each of the pockets, 6, is provided, at its inner end, with a cushioning disk, 7 (Fig. 8) preferably of wood, which serves to deaden the impact of the bottle when placed in the pocket and thus prevent the cracking or breaking of the glass, or other brittle material of which the bottle is made. The ports, 18, in the sides of the pocket, permit the escape of liquid from the interior of the pocket as it emerges above the surface. The combined area of the perforations, 18, in each pocket exceeds that of the mouth thereof; hence, the liquid runs off more rapidly at the rear of the pocket than at its front. The escaping liquid, therefore, holds the bottle in the pocket instead of carrying it out. The tank, 1, is extended on one side by the shallow, widened basin, 8, into which, as heretofore stated, the liquid drains from the bottles during the scrubbing process. It will be seen that the position of the extension or basin, 8, affords the operators at the brushes ample room for the removal of the bottles from the conveyer-wheels, 3, as they come to the surface of the liquid, and greatly facilitates their transfer from the wheels to the scrubbing brushes, 31. The drip-pan, 9, together with the basin, 8, serves to return any of the liquid draining from the bottles, during their progress from the scrubbing to the spraying mechanism, to tank 1.

Mounted over the central portion of the basin, 8, is the brush-frame, 40, in which the brushes, 31, are journaled on a common spindle, 41, operated by a pulley, 33. These brushes may be used by two operators, one on each side of the basin, 8, at which point it will be seen that either can readily remove the bottles from the wheels, scrub them on the brushes, 31, and deposit them in the drain-stand, 11, adjacent to the brushes. Two of these drain-stands are shown in Fig. 1—one at the above mentioned point, for receiving the scrubbed bottles, and one upon the spraying-stand, 19. In the receiving position, the drain-stand rests upon the slides, 10, which serve as guides therefor as it is pushed around in either direction to the

spraying-stand. As shown, the spraying-pans are each provided with twenty-four openings, in eight rows of three each. The spraying-pan, 19, is provided with a sprayer-pipe, 12, having eight central orifices, 20, in its upper segment, and eight upwardly curved nozzles, 13, on each side. These orifices are arranged to coincide with the openings in the drain-stand, 9, so that the water jets projected upward through the orifices or nozzles, will pass directly into the necks of the inverted bottles, and spray or rinse them out. The sprayer-pipe, 12, is supplied with water through the connection, 21, to which water is admitted under pressure from a reservoir (not shown) located at any convenient point. The spraying-pan, 19, is provided with shoulders, 34, which serve to hold the drain-stand in the proper position; so that the mouths of the bottles in the stand will exactly coincide with the orifices, 13 and 20. The tank, 15, is mounted directly above the spraying-pan, 19, and communicates, by the ports, 28, with the various spraying-heads, 14, by which the water is distributed over each inverted bottle, runs down the outside of the same and finally flows into the tank, 16. The heads, 14, are provided with a number of perforations arranged in annular grooves on the under side of the heads, from which the water is showered over the exterior surface of each bottle. The tank, 16, also receives the drainage from the interior of the bottles. The pump, 25, draws its supply from the tank, 16, and discharges into the tank, 15, by means of the connecting pipes, 27. This pump is of any suitable type and may be operated in any convenient manner. An overflow, 32, maintains the proper maximum level in the tank, 16. One of the supports, 29 for the sprayer end of the machine carries the ratchet, 30, for the treadle, 24, by which the valve, 22, is operated through the system of levers shown.

It will be seen from this description that the water used in rinsing the interior of the bottles on the sprayer-stand, 19, is subsequently spread over the outside of the bottles. While it would, of course, be possible to use fresh water in both operations, the economy involved in this re-use of the water would be found a valuable feature in many instances. Furthermore, it will be seen that the water is constantly changed, although much less is used by my improved method than would be the case with other methods.

In the operation of my improved bottle-washing machine, the tank, 1, having been filled with the desired washing compound, the bottles to be washed are placed in the pockets at the outer end of the wheels, 3. Two operators may work at this point, one at each wheel, if desired. As soon as a few of the bottles have been inserted in the pock-



ets, their weight causes the wheel to rotate until they are carried to the lower part of the tank. As more pockets are inserted into the following pockets, the wheel will be still further rotated until the first bottles come to the surface on the opposite end of the tank, namely, that next the brushes, 31. During their slow progress through the tank, the bottles have been free to partially revolve in the pockets, as actuated by gravity; and during this journey it will be seen that each bottle is upwardly inclined at all times. This prevents the pocketing of a small portion of air at any point on the interior surface of the bottles, and enables the liquid to reach all points of the exterior and interior thereof. Furthermore, owing to the position in which they are held by the conical shape of the pockets, the bottles emerge on the side of the tank nearest the brushes partially filled with the liquid from the tank. At this point they are withdrawn from the pockets by the operators, and held, one by one, upon the brushes, which at that time are revolving with some degree of rapidity. The bottles are then placed, neck downward, in the drain-stand, 11, and when the latter is filled, it is pushed around upon the slides, 10, and shoved between the shoulders, 34, over the spraying-pan, 19, and against the stop, 46, it being then at the exact point where the mouths of the bottles coincide with the openings and nozzles, 24 and 13, in the sprayer-pipe, 12.

It will be noted that an operator, standing at the point where the bottles are scrubbed upon the brushes, 31, can, without changing his position, remove the bottles from the wheel, scrub them upon the brush nearest to him, and deposit them upon the spraying-stand. Also, if two operators are employed at the brushes, the drain-stand may be simultaneously filled and the spraying-stand alternately used by each, much time being saved thereby.

When the drain-stand is in position upon the spraying-rack, 19, the treadle, 24, is depressed by the sprayer operator, and the valve, 22, is opened against the force of the retractile spring, 23, and may be held open by engaging the treadle with the ratchet, 30. Pressure is thus admitted to the sprayer-pipe, 12, and the water is projected into the interior of the bottles on the stand with considerable force, from the openings and nozzles, 24 and 13. The water thence flows from the bottles into the tank, 16, from which pump 25 forces it through pipe 27, into the tank, 15. From this tank it is showered over the exterior of the bottles by the heads, 14, to which it is communicated by the ports, 28. The spraying or rinsing of the bottles is thus accomplished. The water from the exterior of the bottles also drains into tank, 16, and is thus repeatedly utilized. An abnor-

mal rise of liquid in tank, 16, is prevented by overflow pipe, 32, which may be of any desired height. This tank may be drained in a manner similar to that described in connection with tank 1, viz., by lifting pipe 32 out of its socket at the bottom of the tank. After the spraying process is finished, the drain-stand and bottles are transferred to any suitable point, for drying or sterilizing.

It is apparent from the foregoing that the complete immersion of the bottles, and the access of the liquid in the tank 1 to the entire interior and exterior surface of each bottle, together with the retention of a considerable portion of the liquid in each, as it emerges, is accomplished through the instrumentality of the conical pockets; and it is further evident that in order to fully meet the end in view, it is necessary that the bottles be loosely held in these conical pockets. A holder of this nature enables the bottle to be easily inserted and withdrawn, thus economizing the time of the operators and facilitating their work, and also automatically retains the bottle during its entire trip through the liquid. The simplicity of construction of these pockets; the ease with which they can be attached to the wheels, and the economy in the use of the liquid employed in the soaking and scrubbing processes, of the water used in the spraying process, and of the time and labor of the operators, constitute important features of my invention.

In the actual practice of my invention, the water may, if desired, be pumped directly from the tank 16 to the heads, 14, without the interposition of tank 15, and may thus be discharged, under pressure, upon the outside of the bottles. The drain-stand may, of course, be constructed to hold any convenient number of bottles, the groups of sprayer nozzles above and below the rack being arranged accordingly.

From the foregoing description it will be readily seen that it is highly advantageous to operate the spraying jets vertically, as shown, for the reason that no difficulty is thereby encountered in readily collecting the water falling from the bottles; the space occupied by the apparatus is comparatively small; the spattering of the water over the operators or surrounding objects is avoided, and the maximum rinsing effect of the water on the inside and outside of the bottles is secured. The undesirable and wasteful features mentioned would be inherent in any system of horizontal spraying that might be devised.

As the reservoir, 15, is air-tight, the upper part thereof becomes a compression-chamber when the pump, 25, is operated, the capacity of the pump being greater than that of the combined area of the ports, 28. The result is that the water is discharged from the heads, 14, with a considerable degree of force.



It is obvious that numerous modifications of my invention will readily suggest themselves to one skilled in the art, and I therefore do not confine my invention to the specific constructions herein shown and described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a bottle-washing machine, a tank, a wheel mounted for rotation therein, a plurality of bottle-pockets provided upon the side of said wheel, each consisting of a hollow, truncated cone, the axis of which is normal to the plane of the wheel and suitable perforations provided in said pockets, to cause a backward flow of the fluid therein, substantially as and for the purpose specified.

2. In a bottle-washing machine, a soaking-tank, in combination with a conveyer-wheel having a horizontal axis and dipping into said tank, and a plurality of cone-like bottle-holders having their axes perpendicular to the side of said wheel, and provided with openings in their small ends to receive bottles, substantially as described.

3. In a bottle washing machine, a disk-like rotary member, in combination with a hollow, truncated cone-shaped pocket projecting from the side of said member, said pocket having an opening at its small end to receive a bottle, and provided with a perforated but otherwise closed base, substantially as described.

4. In a bottle washing machine, a bottle-holder, shaped as a truncated, hollow cone, closed at its large end and open at its small end, to receive the base of a bottle, the large

end of said pocket containing perforations and having a cushion, and a pocket carrier for causing the immersion and emersion of said holder, substantially as described.

5. In a bottle washing machine, the combination, with the conveyer wheel, of a plurality of cone-shaped bottle pockets open at their small ends, cushions provided in the large ends or bottoms of said pockets, and the large ends of said pockets having drain holes, substantially as described.

6. In a bottle-washing machine, a tank, a wheel mounted for rotation therein, a plurality of bottle-pockets, each formed as a hollow, truncated cone having a base flange secured to the side of said wheel and carrying a bottle entirely upon one side of the wheel, substantially as described.

7. In a bottle washing and soaking machine, a tank, in combination with a conveyer wheel mounted therein, cone-like bottle holders mounted with their axes substantially perpendicular to the face of said wheel and being so constructed that a bottle placed therein will remain at an angle to the horizontal at all positions of the conveyer wheel, and said holders having drain holes at their inner or large ends, substantially as described.

In testimony whereof, I have hereunto set my hand this 29th day of January, A. D. 1904, at Chicago, Illinois, in the presence of two witnesses.

JOHN R. AMACKER.

Witnesses:

C. G. HAWLEY,  
Wm. H. CLARKE.