No. 813,100. PATENTED FEB. 20, 1906.

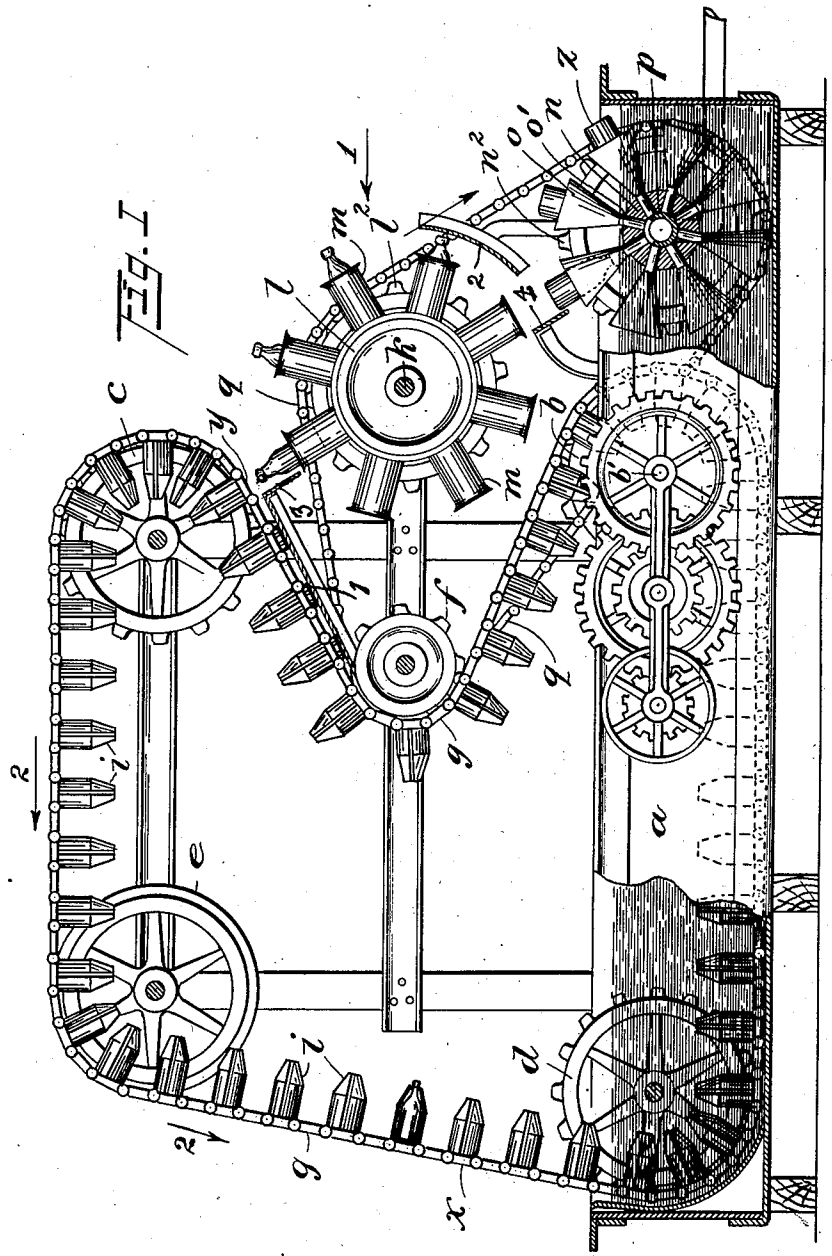
C. H. LOEW.

BOTTLE CLEANING MACHINE.

APPLICATION FILED MAR. 23, 1903.

4 SHEETS—SHEET 1.

Fig. 1



Witnesses:
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G. R. Lawrence

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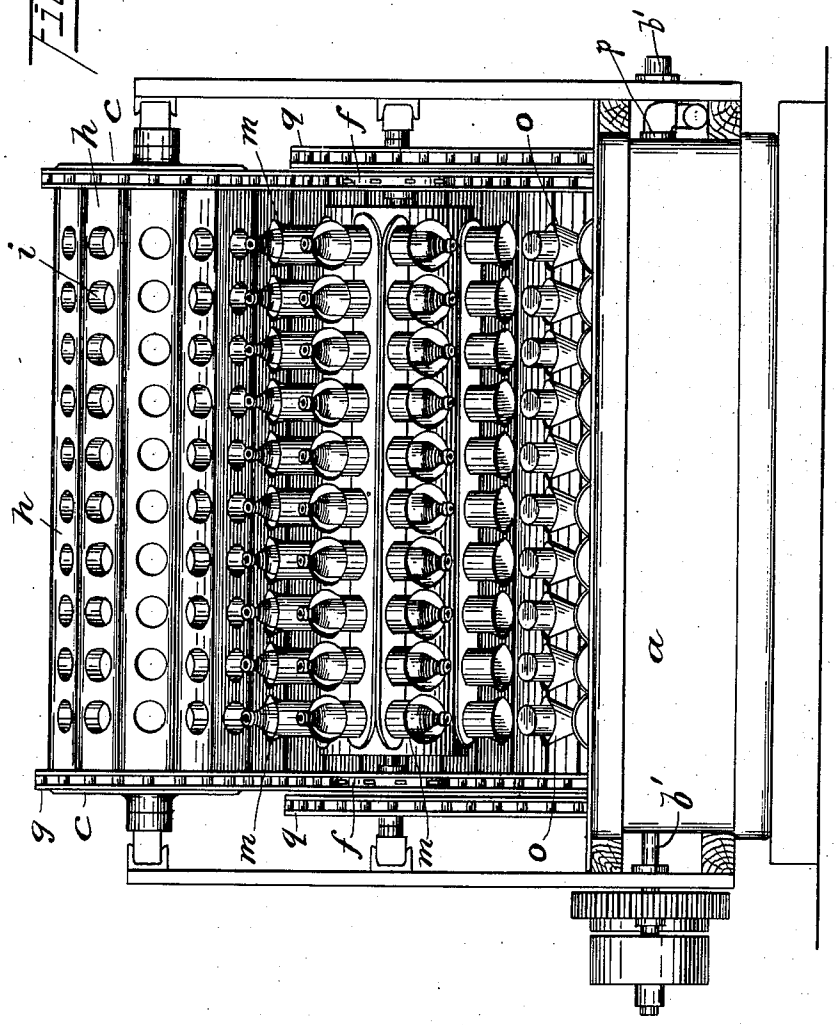
4 SHEETS—SHEET 2.

Fig. II



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4 SHEETS—SHEET 3.

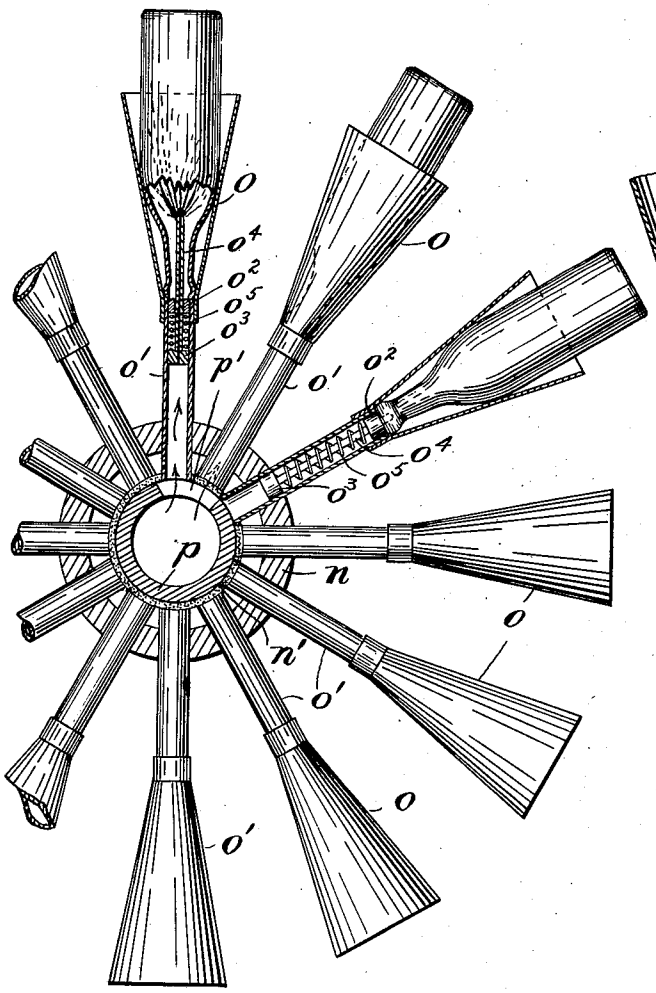

Fig. III

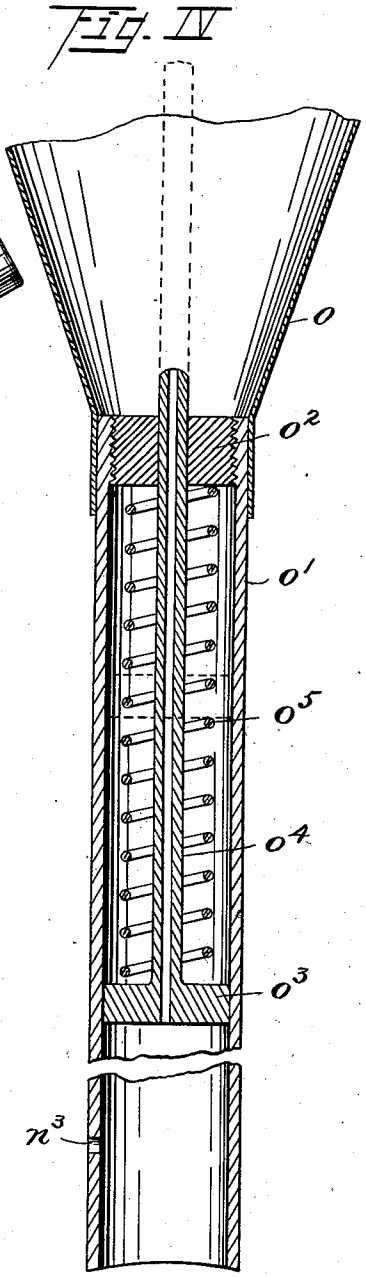

Fig. IV

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4 SHEETS—SHEET 4.

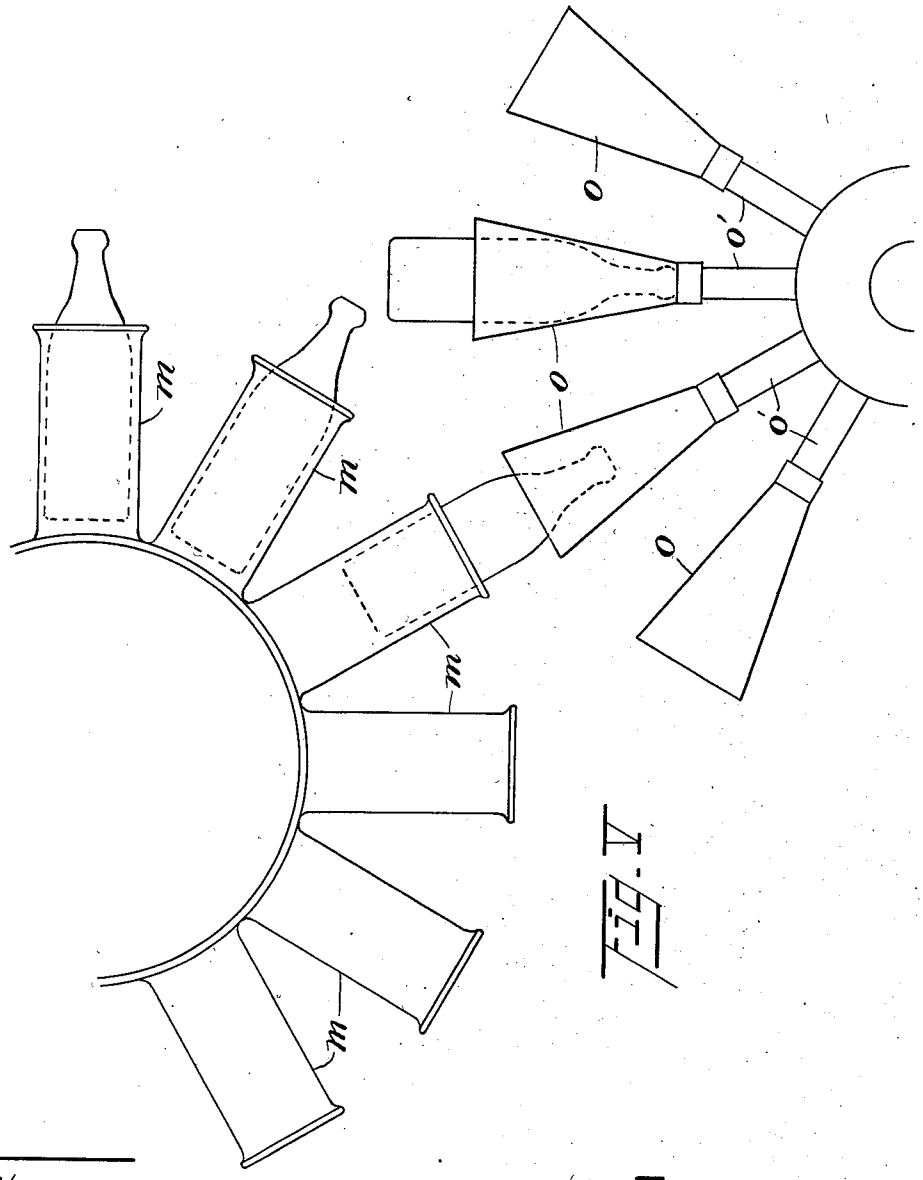

Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES H. LOEW, OF CLEVELAND, OHIO.

BOTTLE-CLEANING MACHINE.

No. 813,100. Specification of Letters Patent. Patented Feb. 20, 1906.

Application filed March 23, 1903. Serial No. 149,197.

To all whom it may concern:

Be it known that I, CHARLES H. LOEW, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Bottle-Cleaning Machines, of which the following is a full, clear, and complete description.

This invention has for one of its important objects the provision of an apparatus for cleaning or sterilizing bottles, having instrumentalities by which the bottles may be effectively soaked and rinsed without intermediate handling thereof and in the most economical manner.

Other objects of the invention are to provide a bottle-transferring means of simple and practical construction which is adapted to receive the bottles from a conveyer which carries them while they are being soaked and to invert them and deliver them to other mechanism for further cleaning the same and to provide a rinsing means of simple and durable construction capable of effectively rinsing a maximum number of bottles in a minimum space of time.

To these several ends the invention consists in certain novel combinations of parts and in certain peculiarities in the construction and arrangement of elements, substantially as hereinafter described, and particularly pointed out in the subjoined claims.

In the following specification and the accompanying drawings, forming a part thereof, similiar characters of reference designate similar parts

Referring to the said drawings, Figure I is a condensed longitudinal vertical section of the machine, showing a portion of the tank and the driving mechanism in side elevation and also showing one of the bottle-cages in section to disclose a bottle therein. Fig. II is an end elevation of the machine in direction of arrow 1, Fig. I, with the guards removed. Fig. III is an enlarged detail view, partially in section, of that portion of the machine where the bottles are rinsed. Fig. IV is a further enlarged vertical section of the stem of one of the rinsing-cups, and Fig. V is a diagrammatic view showing the preferable relative location of the intermediate discharge-cups and the rinsing-cups.

a designates a tank which contains the liquid in which the bottles are soaked for the purpose of loosening the foreign matter or for sterilizing purposes. It has been deemed sufficient to show in the accompanying drawings a form of tank which, considered in connection with the particular arrangement of gearing and other instrumentalities shown, is more especially adapted for the use of water as the soaking medium; but it will be obvious that the invention is not restricted thereto. Within this tank *a* travels a suitably-driven endless carrier or conveyer by means of which the bottles are carried slowly through the soaking liquid in said tank. In the accompanying drawings I have shown a well-known construction of bottle-conveying mechanism which is preferred for the reason that it is especially well adapted for use in connection with the other instrumentalities of the apparatus. This mechanism comprises a pair of sprocket-chain belts *g g*, which are connected with each other by transversely-placed plates or slats *h*, arranged at intervals and each provided with a series of inwardly-extending open pockets or cages *i*, which are adapted to receive the bottles and automatically to discharge the same at the place provided for such discharge. These chains are carried upon and driven by sprocket-wheels which are arranged in suitable positions. For the particular embodiment of the invention herein shown a suitable driving and carrying mechanism for the chains *g* comprises a driving-shaft *b'*, extending across the tank *a* and provided with a pair of fixed sprockets *b*, a second shaft *d'*, extending across said tank and similarly provided with a pair of sprockets *d*, which are fixed thereon, and a plurality of pairs of sprockets *c* and *f* and plain wheels *e*, which are mounted on transversely-extending shafts journaled in suitable housings extending above the tank *a*. The sprockets *f* are arranged between and rearward of the vertical plane of the sprockets *b* and *c*, whereby the conveyer-chains in their passage between said sprockets *b* and *c* make a turn which inverts the cages *i* and the bottles in said cages for the purpose of permitting the liquid in said bottles to drain back into the tank. Each sprocket *f* is preferably double—that is to say, each has a pair of sets of teeth, of which the inner set engages the contiguous conveyer-chain *g*, while the outer set of teeth are for a purpose which will hereinafter ap-

pear. After the bottles have been carried through the soaking liquid they are subjected to a further cleaning operation, and they are automatically transferred from the conveyer to the means for subjecting them to such further cleaning operation by a rotative bottle transferring and reversing means which comprises a series of bottle cups or receptacles *m*, which are adapted to receive the bottles discharged base downward from the conveyer and to deliver said bottles neck downward to said means for further cleaning the same. Said reversing means is preferably of wheel-like form and fixed upon a rotatable shaft *k* and by its rotative movement inverts the bottles. Its cups or receptacles *m* are arranged in a series of transverse rows on the periphery of a cylinder *l*, which is fixed to said shaft *k*, and the number and relative position of said cups or receptacles in each row agree with the number and relative position of the bottle pockets or cages *i* on each plate *h* of the endless conveying mechanism. Thus a row of said cups or receptacles registers with a row of said pockets or cages at the place of discharge from the latter.

The means shown in the accompanying drawings for cleaning the bottles after they have been soaked comprises a rinsing-wheel which is mounted to rotate on a fluid-discharge pipe *p*, which has communication with a source of supply of rinsing fluid under pressure and is provided with a discharge-aperture *p'*, and said wheel comprises a hub *n*, having hollow stems or tubes *o'*, which radiate therefrom and are provided with cups or receptacles *o*, which engage the bottles. Said stems or tubes have open inner ends to provide inlet-apertures thereto, and in operation the said inlet-apertures of the rows of stems or tubes are successively brought into registration with said discharge-aperture *p'* to admit the rinsing fluid to the interior of said stems, from whence said fluid flows to the bottles, and then by the continued movement of the wheel said inlet-apertures are carried out of registration with said discharge-aperture *p'*, thus automatically cutting off the supply of fluid to said stems until the latter have been again registered with said aperture to admit fluid to another series of bottles, which meanwhile have taken the place of the former series in the cups *o*. The discharge-aperture *p'* is preferably of such size as to register simultaneously with a plurality of rows of stems *o'*, as indicated in Fig. 2. In practice the number of cups *o* in each row corresponds with the number of cages or pockets *i* on each of the plates. Some advantages are derived from the projection of the rinsing fluid into the interiors of the bottles by means of fluid-discharge stems which during the rinsing operation move into the bottles engaged with the cups or receptacles *o* and at the end of said operation are retracted from within said bottles and which accomplish their reciprocations under the control of the movement of the rinsing-wheel or under the control of the pressure of the rinsing fluid, which in turn is shown as controlled by said movement of the wheel, and the rinsing-wheel herein shown contains such stems, (designated by the reference characters o^4.) Each is mounted in a tube or stem *o'* and comprises a rod which is hollow and has at its inner end a head or piston o^3, provided with an opening, so as to not interfere with the flow of rinsing fluid into said stem o^4. Each stem o^4 extends through a fixed plug o^2, which guides it in its reciprocations, and in the form herein shown there is mounted on said stem between said plug and head a spring o^5, which acts to retract the stem when the pressure which advanced it ceases. Each of the tubes or stems *o'* has a vent-opening n^3 near its inner terminal for the exit of the water during retraction of the stem o^4.

In the particular arrangement of the instrumentalities shown in the accompanying drawings the bottle reversing and transferring mechanism delivers the bottles from the endless carrier to said rinsing-wheel and said rinsing-wheel carries the bottles during the rinsing operation, its cups or receptacles *o* being adapted to constitute such carriers. Said cups or receptacles *o* are in the form of open pockets.

In the particular embodiment of the invention herein shown the rinsing-wheel and the bottle transferring and reversing wheel are driven by means of a pair of chain belts *q q*, which engage sprocket-wheels l^2 and n^2, which are respectively connected with the cylinder *l* and hub *n*, and said chain belts also engage the outer sets of teeth of the double sprockets *f f*, hereinbefore referred to.

Having now described in detail one form of construction of my improved machine, I will proceed to explain the operation thereof. The tank *a* is filled to the desired level with a suitable liquid for soaking or both soaking and sterilizing bottles. The mechanism is set in motion in the direction of arrows 2, Fig. I. The cages *i* are loaded with bottles at some convenient place at the front end of the machine, as at *x*, Fig. I. The bottles are then carried down through the liquid in the tank, up around the sprockets *f*, and to a predetermined desired point *y*, where they are discharged into corresponding cups *m* on the cylinder *l* with the base of the bottle down. They are then carried partially around the cylinder *l* and are discharged with the neck downward into cups *o* on the hub *n*. As the inner open ends of the stems of the cups *o* pass over the slot *p'* the water-pressure forces the piston o^3 upward against the resistance of the spring o^6, thereby protruding the rod o^4 into the bottle. The clean water passing through

the opening in the rod o^4 thoroughly rinses the interior of the bottle. After the stem has passed through the arc of the opening in the pipe the water-pressure is released and the resiliency of the spring o^5 forces the piston back to its seat. The several transverse series of bottle-receptacles on the chain-belt conveyers, the cylinder l, and the hub n are so arranged and the relative position of the shafts with their coöperative action (the several sprocket-wheels having the same number of teeth) is such that the bottles will drop from the chain-belt conveyers to the intermediate receptacles and from thence to the rinsing-cups uninterrupted, suitable guards 1 and 2 and guides 3 and 4 being provided to prevent the premature discharge of the bottles and to assure their reception by the proper cups. The bottles after having been sprayed are removed at the point z. The amount of spraying or rinsing of the bottles can be regulated by the speed of the machine or by the circumferential distance of the slot in the pipe p.

I have shown and described a simple means for operating the piston and spraying the interior of the bottles after they have been discharged into the rinsing-cups; but I do not wish to be confined to this particular construction, as there are various ways in which the automatic rinsing may be accomplished from the water-pressure, embodying substantially the same method of admitting and shutting off the supply of water. In fact, various changes in the detailed construction and arrangement of the parts of the machine may be made in practice without departing from the nature and scope of the invention.

The present application is one of several copending and interrelated applications filed by me, as follows: Serial No. 151,457, allowed July 21, 1905; Serial No. 153,058, filed April 17, 1903; Serial No. 198,613, filed March 17, 1904, and Serial No. 215,421, filed July 5, 1904. Said applications contain subjects-matter which are also embraced either generically or specifically in the present application. All claims for subject-matter either generic or specific common to the present application and any one or more of my said copending applications have been embodied in this the earliest filed of my said copending cases.

It will be understood that my present invention is not restricted to the particular detail embodiment thereof herein shown and described and that said detail embodiment is merely selected to exemplify one of many suitable means for carrying the novel features of the invention into practice and which are within the scope and spirit of the claims.

Having thus set forth a suitable embodiment of my invention, what I believe to be new, and desire to secure by Letters Patent, is—

1. A bottle-cleaning apparatus comprising the following instrumentalities: a bottle-soaking means having a conveyer which carries the bottles being soaked; a bottle-rinsing means comprising a series of bottle-receptacles and means for admitting the rinsing liquid to the interior of the bottles in said receptacles; and a series of moving receptacles arranged intermediate of the discharge-place of said conveyer and the first-mentioned receptacles and adapted to receive the bottles from said conveyer and deliver the same to the receptacles of the rinsing means.

2. A bottle-cleansing apparatus comprising the following instrumentalities: a bottle-soaking mechanism provided with bottle-conveying means; a movable rinsing mechanism having bottle-carriers; and a movable reversing means having bottle-receptacles which in one position of the movement of said means receive the bottles from said conveying means and in another position thereof deliver the same to said rinsing mechanism.

3. A bottle-cleansing apparatus comprising the following instrumentalities: a bottle-soaking mechanism provided with an endless carrier having open pockets which receive the bottles in one place in the travel thereof and automatically discharge the same at another place in said travel; a movable reversing means having bottle-pockets which at one place in its travel receive the bottles discharged from said carrier and automatically discharge the same at another place in its travel; and a movable rinsing mechanism having bottle-carriers which receive the bottles discharged from said reversing means.

4. A bottle-cleansing apparatus comprising the following instrumentalities: a bottle-soaking mechanism provided with bottle-conveying means; a rotative bottle-rinsing mechanism having a series of bottle-receptacles and means controlled by the rotation of said mechanism for supplying water to the interior of the bottles in said receptacles; and means for delivering the bottles from the bottle-conveying means to the receptacles of the bottle-rinsing means.

5. A bottle-cleaning apparatus comprising the following instrumentalities: a bottle-soaking mechanism provided with bottle-conveying means; a rinsing mechanism, comprising a traveling bottle-carrier, fluid-discharge stems partaking of the movement of said carrier and also movable toward and from the bottles in said carrier, said stems having means subject to the pressure of the rinsing liquid, whereby they are moved relatively to said bottles, means by which the supply of said rinsing liquid is controlled by the movement of said carrier, and means for operating said stems in a direction opposite that in which they are adjusted by said liquid; and means for delivering the bottles to the rinsing means from the soaking means.

6. A bottle-cleaning apparatus, comprising the following instrumentalities: a bottle-soaking mechanism provided with bottle conveying and discharging means; a rotative rinsing mechanism comprising a bottle-carrier provided with fluid-discharge stems which are moved toward and from the bottles in said carrier automatically under the control of the pressure of the rinsing fluid, said carrier also having means by which said pressure is controlled by the rotation of the carrier; and bottle-reversing means arranged intermediate of said conveyer and carrier for delivering to the latter the bottles discharged from the former.

7. A bottle-cleaning apparatus, comprising the following instrumentalities: a bottle-soaking mechanism provided with bottle conveying and discharging means; a rotative rinsing mechanism comprising a bottle-carrier provided with fluid-discharge stems having means subject to the pressure of the rinsing liquid whereby they are moved relatively to the bottles, means by which the supply of said rinsing liquid is controlled by the rotation of said carrier and means for moving said stems in a direction opposite that in which they are moved by said liquid-pressure; and bottle-reversing means arranged intermediate of said carrier and conveyer for delivering to said carrier the bottles discharged from said conveyer.

8. A bottle soaking and rinsing machine comprising a tank for a soaking solution, means for carrying the bottles therethrough and for discharging the bottles when the same have been soaked, a traveling rinsing means comprising bottle-carriers and means for automatically controlling the supply of rinsing fluid, and means for automatically delivering the soaked bottles from the first-mentioned bottle-carrying means to the carrier of the rinsing means.

9. A bottle-cleaning machine comprising a series of bottle-receptacles adapted automatically to discharge the bottles at a predetermined place, a bottle-soaking means having devices for conveying the soaked bottles to said receptacles, and a bottle-rinsing means, comprising a revoluble series of receptacles for receiving the bottles from the first-mentioned receptacles, a stationary liquid-supply pipe having a horizontal slot for the escape of its liquid, a series of tubes movable with said receptacles and into which the liquid from said supply-pipe enters as they successively pass over said slot; pistons in said tubes having openings and provided with hollow fluid-discharge stems, and retracting means for said pistons and stems.

10. A bottle-cleaning machine comprising a series of bottle-receptacles adapted automatically to discharge the bottles at a predetermined place, a bottle-soaking means having devices for conveying the soaked bottles to said receptacles, and a bottle-rinsing means comprising a revoluble series of receptacles for receiving the bottles from the first-mentioned receptacles, a stationary liquid-supply pipe having a horizontal slot for the escape of the liquid, a series of tubes carrying said receptacles and provided with vent-openings, and having open inner ends bearing upon said supply-pipe, a plug at the opposite end of each tube, pistons in said tubes having openings and provided with hollow fluid-discharge stems which extend through said plugs, and retracting-springs for said pistons and stems.

11. A machine of the class described, comprising a bottle-carrier, a wheel having means for receiving the bottles and means through which liquid under pressure is ejected against the bottles, and a bottle transferring and reversing wheel arranged intermediate of said carrier and wheel and adapted to transfer the bottles from the carrier to said wheel.

12. A machine of the class described, comprising a bottle-carrying mechanism, a wheel having means for engaging the bottles and means through which liquid under pressure is ejected against the bottles, said carrying mechanism being adapted to discharge the bottles at a place which is higher than said wheel, a bottle transferring and reversing mechanism arranged between said discharge-place and wheel and adapted to receive the bottles from said carrying mechanism and to discharge them at a place which is higher than said wheel, and guards controlling the discharge of said bottles from said carrying and transferring and reversing mechanisms.

13. A machine of the class described, comprising a flexible bottle-carrier having pockets which open downward at one place in the travel thereof and are adapted to discharge the bottles at said place, a bottle reversing and transferring wheel which receives the bottles at said place, a wheel having means to engage the bottles and means through which fluid under pressure is ejected against the bottles, and a guard arranged between said wheels and controlling the passage of the bottles from the former and guiding them to the latter.

14. A machine of the class described comprising a bottle-soaking means having a conveyer which travels a path whereby the bottles are inverted and emptied and means whereby the bottles are retained in said conveyer until after they have been emptied, a rinsing-wheel having bottle-engaging devices, and a bottle transferring and reversing wheel arranged between said conveyer and rinsing-wheel and adapted to receive the soaked bottles from the former, reverse them and deliver them to the rinsing-wheel.

15. A bottle soaking and rinsing apparatus, comprising, in combination, bottle-soaking means, a bottle-rinsing means which com-

prises a series of traveling receptacles for the soaked bottles and means for ejecting rinsing fluid under pressure against the bottles in said receptacles, and means by which the soaked bottles are conducted automatically from the soaking means to the rinsing means.

16. A bottle soaking and rinsing apparatus, comprising, in combination, bottle-soaking means, a bottle-rinsing means which comprises a series of traveling receptacles for the soaked bottles and is provided with reciprocatory discharge-stems and devices adapted to cause the reciprocations of said stems to occur automatically, and means by which the soaked bottles are conducted automatically from the soaking means to the rinsing means.

17. A bottle soaking and rinsing apparatus comprising, in combination, means for soaking the bottles; a bottle-rinsing means which comprises a series of traveling receptacles for the soaked bottles, fluid-discharge stems having heads subject to the pressure of the rinsing fluid whereby they are advanced into the bottles, means for supplying said heads and the interiors of the stems with rinsing fluid under pressure at a predetermined place in the travel of the parts, and means for retracting said stems and head when the supply of rinsing fluid is cut off; and means by which the soaked bottles are conducted automatically from the soaking means to the rinsing means.

18. A traveling bottle carrying and rinsing means having fluid-discharge devices which are advanced toward the bottles by the pressure of the rinsing fluid, means by which the supply of said fluid is automatically controlled by the movement of the bottle-carrying means, and means for retracting said discharge devices automatically when the supply of rinsing fluid is cut off.

19. A bottle-rinsing means comprising devices for holding the bottles, reciprocatory fluid-discharge stems and means whereby the reciprocations of said stems toward and from the bottles are controlled by the pressure of the rinsing fluid.

20. A bottle-rinsing means comprising traveling devices for holding the bottles, fluid-discharge stems, and means controlled by the pressure of the rinsing fluid for advancing and retracting said stems toward and from the bottles at predetermined places in the travel of the bottle-holding devices.

21. A bottle-rinsing means, comprising a rotatable bottle-carrier, a rinsing-stem partaking of the rotating movement of said carrier and means for advancing and retracting said rinsing-stem toward and from the bottle at predetermined places in the travel of said carrier.

22. A bottle-rinsing means, having a rotative wheel provided with reciprocatory fluid-discharge stems and devices by which the reciprocations of said stems are controlled by the pressure of the rinsing fluid, said rinsing means also having means by which said pressure is controlled automatically by the movement of said wheel.

23. A bottle-rinsing wheel comprising means for receiving the bottles and means for introducing into the interior of the bottles jets of water, comprising a hollow hub supplied with water under pressure, fluid-discharge means radiating therefrom and communicating therewith, said fluid-discharge means having reciprocatory discharge-stems and devices by which said stems are projected into and withdrawn from the bottles.

24. A bottle-rinsing wheel comprising means for receiving the bottles, and means for introducing into the interior of the bottles jets of water, comprising a hollow hub supplied with water under pressure, fluid-discharge stems radiating therefrom and communicating therewith, pistons adapted to be forced forward by the pressure of the water for projecting the stems into the bottles and means for pushing the stems and pistons into place after use.

25. A bottle-rinsing wheel having means for receiving the necks of the bottles, and also having reciprocatory fluid-discharge stems and devices whereby the reciprocations of said stems are controlled by the movement of the wheel.

26. A bottle-rinsing wheel comprising means for receiving the bottles, fluid-discharge stems movable with said wheel and provided with heads, means controlled by the movement of the wheel for supplying rinsing fluid under pressure to said heads and the interiors of said stems, to thereby advance the same and introduce jets of water into the bottles, and means by which the heads and stems are retracted.

27. A bottle-rinsing wheel comprising means for receiving the bottles, fluid-discharge stems movable with said wheel and provided with heads, means controlled by the movement of the wheel for supplying rinsing fluid under pressure to said heads and the interiors of said stems, to thereby advance the same and introduce jets of water into the bottles, and springs for retracting said pistons and stems when the supply of said water ceases.

28. A bottle-rinsing wheel comprising means for receiving the bottles, hollow carriers for said means, hollow fluid-discharge stems mounted to reciprocate in said carriers and provided with heads having an opening to adapt the interiors of the stems to receive rinsing fluid, a pipe around which said wheel rotates, said pipe having a discharge-aperture with which the interiors of the hollow carriers successively register, and means for supplying said pipe with rinsing fluid under pressure.

29. A bottle-rinsing wheel comprising open pockets for receiving the bottles neck downward, hollow carriers for said pockets, hollow fluid-discharge stems mounted to reciprocate in said carriers and provided with heads having openings to adapt the interiors of the stems to receive rinsing fluid, a supply-pipe around which said wheel rotates, said pipe having a discharge-aperture with which the interiors of the hollow carriers successively register, and means for supplying said pipe with rinsing fluid under pressure.

30. A bottle-rinsing wheel comprising means for receiving the bottles, hollow carriers for said means, spring-pressed hollow fluid-discharge stems mounted to reciprocate in said carriers and provided with heads having openings to adapt the interiors of the stems to receive rinsing fluid, a supply-pipe around which said wheel rotates, said pipe having a discharge-aperture with which the interiors of the hollow carriers successively register, and means for supplying said pipe with rinsing fluid under pressure.

31. A bottle-rinsing means comprising a fluid-discharge pipe having an exit-aperture, a hub mounted to rotate on said pipe, and hollow stems radiating from said hub and having bottle-engaging cups at their outer ends, said stems having inlet-apertures at their inner ends and being successively brought into and out of registration with said exit-aperture of the supply-pipe by the rotation of said hub on the latter.

32. A bottle-cleaning apparatus comprising a washing-tank, a rinsing means having a fluid-discharge pipe provided with an exit-aperture and a hub mounted to rotate on said pipe and provided with hollow stems having cups at their outer ends and inlet-apertures at their inner ends, which inlet-apertures are successively carried into and out of registration with said exit-aperture of the discharge-pipe by the rotation of said hub on the latter, means for carrying the bottles through said tank and conducting the same to said cups and means for moving the parts in unison with each other.

33. A bottle-cleaning apparatus, comprising a washing-tank, means for ejecting rinsing fluid against the washed bottles, means for conveying the bottles through said washing-tank, said means being adapted to discharge the bottles at a predetermined place, and bottle transferring and reversing means traveling with said conveyer and receiving the bottles discharged by the latter and conducting the same to the rinsing means and discharging them in reverse position.

34. A bottle-cleaning apparatus, comprising a washing-tank, means for ejecting rinsing fluid against the washed bottles, means for conveying the bottles through said washing-tank, said means being adapted to discharge the bottles at a predetermined place, a rotatable bottle transferring and reversing wheel mounted between said discharge-place and rinsing means and provided with pockets to receive the bottles discharged from said conveyer, and means for rotating said wheel in unison with the travel of said conveyer.

35. A bottle-cleaning apparatus, comprising a washing-tank, means for conveying the bottles through said washing-tank, a rinsing means having a fluid-discharge pipe provided with an exit-aperture, and a hub mounted to rotate on said pipe and provided with hollow stems having cups at their outer ends and inlet-apertures at their inner ends, which inlet-apertures are successively carried into and out of registration with said exit-aperture of the discharge-pipe by the rotation of said hub around the latter, means for conveying the bottles through said tank, adapted to discharge the same at a predetermined place, and bottle transferring and reversing means traveling with said conveyer and rinsing means for receiving the bottles discharged by the conveyer and delivering the same to the rinsing means.

36. A bottle-cleaning apparatus having a tank and means for subjecting the bottles successively to a plurality of cleaning operations, the first of said means comprising an endless flexible conveyer which travels within said tank and also outside of the same and through a path which causes the bottles to be emptied before they reach the second cleaning means, and a rotatable bottle-transferring device which is arranged entirely outside of said tank and between said conveyer and second cleaning means and is adapted to receive the bottles from the former, invert them and deliver them to said second cleaning means.

37. A bottle-cleaning apparatus having a tank and means therein for subjecting the bottles successively to a plurality of cleaning operations, the first of said means comprising an endless flexible conveyer which travels within said tank and also outside of the same and through a path which causes the bottles to be emptied before they reach the second cleaning means, and the second of said means comprising a rotatable rinsing-wheel, and a rotatable bottle-transferring device which is arranged entirely outside of said tank and between said conveyer and rinsing-wheel and is adapted to receive the bottles from the conveyer, invert them and deliver them to said rinsing-wheel.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

CHARLES H. LOEW.

Witnesses:
E. L. HARMON,
HENRY G. MILLER.