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PATENTED JAN. 1, 1907.

C. H. LOEW.

MECHANISM FOR RINSING, SPRAYING, AND BRUSHING BOTTLES.

APPLICATION FILED APR. 17, 1903.

2 SHEETS—SHEET 1.

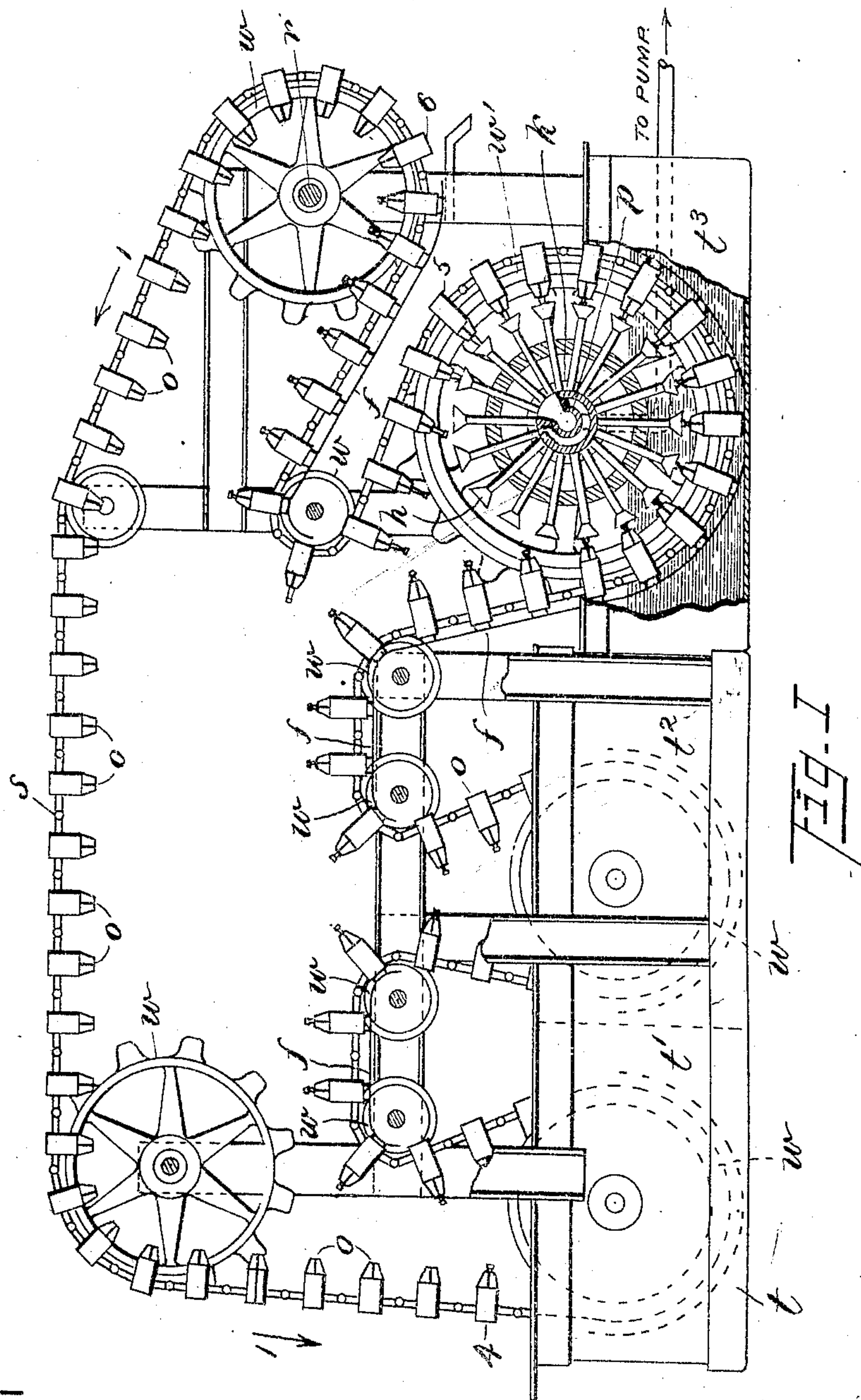


FIG. 1

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Inventor:
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his Attorney

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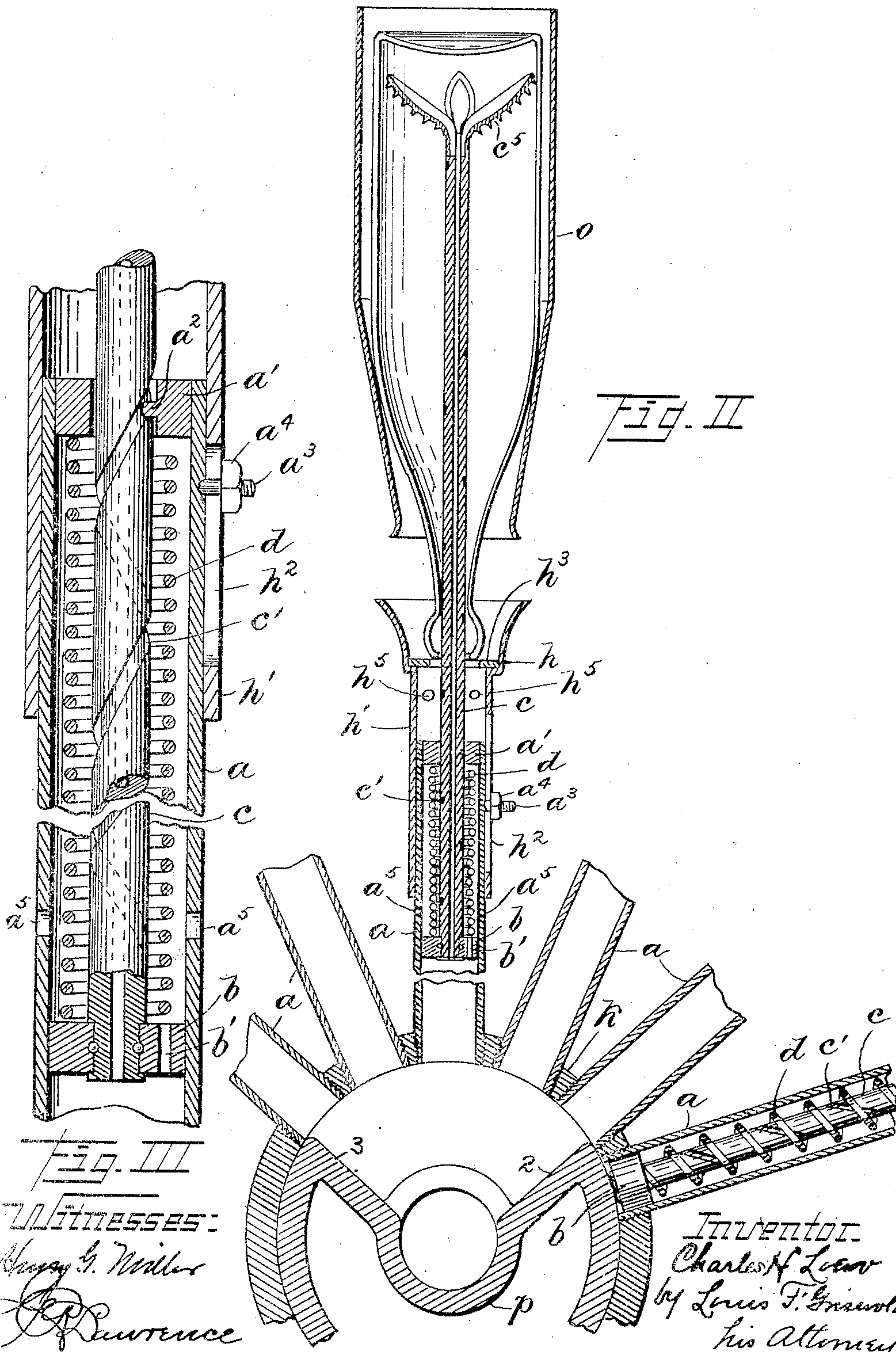
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2 SHEETS—SHEET 2.



WITNESSES:

Henry S. Miller
Lawrence

INVENTOR:
Charles H. Loew
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UNITED STATES PATENT OFFICE

CHARLES H. LOEW, OF CLEVELAND, OHIO.

MECHANISM FOR RINSING, SPRAYING, AND BRUSHING BOTTLES.

No. 839,864.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed April 17, 1903. Serial No. 153,053.

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 and State of Ohio, have invented certain new and useful Improvements in Mechanism for Rinsing, Spraying, and Brushing Bottles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which illustrate the preferred embodiment thereof, and in which—

Figure I is a longitudinal vertical section of a bottle-cleaning machine embracing my present improvements therein. Fig. II is an enlarged sectional view of a portion of the rinsing mechanism detached, showing a slightly-different form thereof from that illustrated in Fig. I; and Fig. III is a still further enlarged section of a part of one of the stems illustrated in Fig. II.

Similar characters of reference designate similar parts in all the views.

In a general way the present invention may be said to relate to apparatuses or machines for cleaning or sterilizing bottles.

In a copending application filed by me March 23, 1903, and serially numbered 149,197, I have shown, described, and claimed a bottle cleaning or sterilizing apparatus having several features common to it, and the apparatus illustrated in the accompanying drawings. In my said application, Serial No. 149,197, there is shown one embodiment of an apparatus wherein the bottles after being slowly conveyed through a soaking liquid for cleaning or sterilizing the same are automatically conducted to mechanism for further cleaning the same and said mechanism comprises a rinsing-wheel, which in many respects is similar to that selected for illustration in the present case.

In the present embodiment of the invention the relation of the conveying mechanism—that is to say, of the mechanism which conveys the bottles while they are being subjected to the soaking step of the cleaning operation—is changed from that of my other case, in that in the present case the bottles while being acted upon by the rinsing means are carried at least partly by said conveying mechanism, and this constitutes one of the distinguishing and claimed features of the present invention. Again, while the present embodiment of my invention preferably utilizes the rinsing means shown, described, and claimed in my said copending application,

Serial No. 149,197, the reciprocatory stems thereof in the present embodiment are provided with brushes and means are preferably employed to cause them to rotate during 60 their reciprocations. These features with respect to the stems and brushes constitute other distinguishing and claimed parts of the present invention.

It will thus be understood that one of the principal objects of the present invention is to provide improved means for cleansing the bottles (rinsing, brushing, or scrubbing the same) while they are in motion, and more particularly to simplify the means by which the bottles are conveyed to the cleaning mechanism and are held while being acted upon by said cleaning mechanism and after they have been subjected to a preliminary soaking operation, and that another of the important objects of the invention is to provide simple and effective means for automatically spraying and brushing the interiors of the bottles with clear water or other suitable rinsing liquid after they have passed through the liquid in which they are soaked.

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

t designates a tank adapted to contain the soaking or sterilizing solution. For carrying the bottles through said tank there is employed a suitable conveying mechanism, which is preferably of the construction now to be described.

w w w w designate sprocket and traction wheels mounted in pairs in transverse shafts which are journaled in the sides of the tank *t* and in suitable housing above said tank, respectively, and *s* is one of the pair of chain belts which pass around the several mentioned sprocket and traction wheels and are adapted to travel in the direction of arrows *1* when power is applied to the shaft *z*. Inwardly-extending bottle receptacles or cages *o* are arranged in a series of transverse rows between the chain belts and are carried thereby, each individual cage being adapted to receive a bottle and automatically to discharge the same when their open ends are downward and the bottles are not otherwise held therein.

The means illustrated for cleaning the bottles of the soaking solution comprise a cylin-

der or hub k , which is mounted on and movable relatively to a pipe p . In the form shown the pipe p is fixed and the cylinder or hub k is revoluble and connected with sprocket-wheels w' . The pipe p passes transversely through the tank or rinsing-compartment thereof and is connected with a suitable liquid-pressure apparatus, preferably a pump. (Not shown.) The hub k is provided with transverse rows of cups h , adapted to engage the necks of the bottles, and it is within these cups h that the spraying or rinsing of the bottles takes place. A description of one of the devices on the hub will suffice for all, as they are or may be identical construction. Therefore referring particularly to Fig. II, it will be seen that a is a cylinder, one end of which (called for convenience the "inner" end) is connected with the hub. Within said cylinder there is mounted a piston b , which is provided with a hollow stem c , the interior of which is in open communication with the interior of said cylinder and the outer end of which passes freely through an opening in the cylinder-head a' .

A portion of the pipe p is formed with a discharge opening or aperture which extends transversely thereof throughout a predetermined portion or arc of its circumference—as, for example, from 2 to 3. As the inner open ends of the cylinders in their travel around the pipe come to this opening the liquid under pressure will enter the said open ends of the cylinders and force the pistons therein forward, thus advancing the hollow stems toward the bottles, and said liquid will also flow through said stems and be discharged therefrom against the bottles. As said inner ends of the cylinders pass beyond said opening in the pipe p the pressure which advanced them is cut off. For retracting said pistons and the stems carried thereby when the pressure which advanced them is cut off any suitable provision may be made. The means shown for said purpose consist of springs d , which encircle said stems and are arranged between and preferably engage said pistons and the heads a' of the cylinders a . The cylinders are provided with vent or outlet holes e for the escape of the water below the pistons in the returning movements of the latter.

As thus far described, the rinsing device is identical with the one shown, described, and claimed in my before-mentioned copending application, Serial No. 149,197, and hence is not, as thus far described, in and of itself alone made the subject-matter of any claims herein.

The cup h may be an integral part of the cylinder, as shown in Fig. I, and in my before-mentioned application, Serial No. 149,197; but to adapt the mechanism to bottles of different lengths it is preferable to make the cylinder telescopic, as shown in

Fig. II, in which the cup h^a is attached to a sleeve h' , which fits over the exterior of the cylinder a , said sleeve being provided with a slot h^b , into which passes a screw a^3 , which projects from said cylinder and is provided with a nut a^4 , which holds the sleeve at any desired height within the limits of its adjustment. The cup h or h^a is also preferably provided with a ring or cushion h^3 .

According to the present invention means are provided whereby said stems have rotary as well as reciprocatory motion. This is most conveniently accomplished by forming each stem with one or more spiral grooves c' and providing each cylinder-head a' with one or more tongues a^3 to engage said groove or grooves, whereby each stem is turned axially while moving longitudinally. This constitutes one of the novel features distinguishing the present invention from the one hereinbefore mentioned. Again, in the present invention brushes are provided and said brushes (designated c^3) have reciprocatory and rotary movement and are shown as carried by said stems whereby the said movements are imparted to them. They are flexible, so that they close together as the stems are withdrawn into the necks of the bottles or from the bottles and remain so until they have been projected into other bottles, when they open out and assume substantially the horizontal position shown in Fig. II.

Each stem c preferably is adapted to revolve freely in the piston b with which it is connected, ball-bearings being preferably provided, as shown.

Any suitable hydraulic pressure may be used in connection with the mechanism hereinbefore set forth; but the best results will be obtained by using a pump and having the pulsations of said pump so timed that the piston will be forced forward and partially returned several times during the transit of the cylinder over the discharge-opening in the supply-pipe p , thus insuring a thorough rinsing and brushing of the interiors of the bottles.

Reference has heretofore been made to the fact that one of the important features of the present apparatus consists in retaining the bottles at least partially in the conveying mechanism by which they are carried through the soaking portion of the tank until after they have been subjected to the subsequent cleaning operation of the rinsing, brushing, or scrubbing mechanism. To this end said conveying mechanism extends to, around, and off from said cleaning means and the bottle-cups of the latter correspond in number and position with the cages o of said conveying mechanism, so as to register therewith.

In operation the bottles are loaded into the cages o at a convenient place, such as 4, at the front end of the machine. Power applied to

the shaft *r* causes the conveyer and the rinsing and brushing mechanism to travel in unison with each other. The bottles are carried by the conveyer first through a suitable
 5 cleansing solution in the compartment *t'* of the tank *t*, thence upward and out of said solution, draining as they pass to the first set of small traction-wheels, thence over said wheels and preferably down into another solution in a compartment *t''* of said tank,
 10 thence upward over the second set of small traction-wheels, and down again to the large sprocket-wheels *w'*, which are mounted on the hub *h* and cause the bottles to be carried
 15 through the fresh water in the tank or compartment *t''*. As the cages containing the bottles enter the path of the cups *h* or *h''*, they register therewith, and the necks of the bottles enter said cups and travel around to a
 20 point 5, where, if free to fall, the bottles drop until they rest on the cushions *h''* in said cups without wholly leaving the cages in which they have been conveyed through the soaking portion of the apparatus. As the cylinders *a* respectively pass over the discharge-
 25 openings in the supply-pipe *p* the spraying-stems and brushes are revolved and advance to within the interiors of the bottles, as hereinbefore explained. When said discharge-
 30 opening has been passed, the supply of water is cut off, the spraying and brushing means are retracted from within the bottles, and the bottles are carried around a small traction-wheel and to the place 6 at which they are
 35 discharged automatically onto any suitable receiver. Guards *f* are provided where necessary to prevent the bottles from being prematurely discharged in their travel through the apparatus.

40 It will be understood that the construction herein shown and described is merely exemplary of what I regard as the best means for carrying into effect the several new and advantageous features of the invention and
 45 that the invention is not restricted to said detail construction, elements of which may be altered or omitted without departing from the scope or spirit of the invention.

Therefore what I claim is—

50 1. A bottle-cleaning means, comprising a movable bottle-carrier, movable cleaning devices, and means controlled by the pressure of the cleansing fluid for moving said cleaning devices rotatively relatively to the bottles at
 55 predetermined places in the travel of the carrier.

2. A bottle-cleaning means, comprising a movable bottle-carrier, movable cleaning devices, having a fluid-discharge stem, and
 60 means controlled by the pressure of the cleaning fluid for causing said stem to move rotatively relatively to the bottle at predetermined places in the travel of the carrier.

3. A traveling bottle-cleaning means, comprising fluid-discharge stems, bottle-brush-

ing devices, and means controlled by the pressure of the cleaning fluid for causing said stems and brushes to move relatively to the bottles at predetermined places in the travel
 of the parts.

4. A bottle-cleaning means, comprising means for carrying the bottles, movable cleaning devices, and means controlled by the pressure of the cleaning fluid for advancing and retracting said cleaning devices rotatively
 70 75 relatively to the bottles at predetermined places in the travel of the parts.

5. A bottle-cleaning mechanism comprising, in combination, a bottle-holding means, a means for the supply of cleaning fluid, and
 80 a means for the discharge of said fluid, said discharge means having intermittent communication with the supply means and provided with a reciprocatory and rotatable discharge-stem and means whereby said stem is
 85 reciprocated and rotated under the control of said fluid.

6. A bottle-cleaning means, comprising movable means for carrying the bottles, movable cleaning devices, having a discharge-
 90 stem and a brush carried thereby, and means controlled by the pressure of the cleaning fluid for advancing and retracting said stem and brush rotatively at predetermined places in the travel of the carrier.

7. A bottle-cleaning means, comprising a traveling means for carrying the bottles, a fluid-discharge stem movable therewith, a pipe having a fluid-discharge opening with
 95 100 which said stem has intermittent communication, said stem having means for causing it to advance toward the bottle when it is in communication with said discharge-opening, means for causing said stem to rotate during its said movement, and means for causing it
 105 to return when its communication with said discharge-opening is cut off.

8. A bottle-cleaning means, comprising a traveling means for carrying the bottles, a brush movable therewith, carrying means
 110 115 for said brush, a pipe having a fluid-discharge opening with which said brush-carrying means has intermittent communication, said carrying means having means whereby it is advanced toward the bottle when it is in communication with said discharge-opening, means for causing said carrying means to rotate during its said movement, and means for causing it to return when its communication with said discharge-opening is cut off.

9. A bottle-cleaning means, comprising a traveling means for carrying the bottles, a hollow fluid-discharge stem movable therewith, a brush carried by said stem, a pipe
 120 125 having a fluid-discharge opening with which the interior of said stem has intermittent communication, said stem having means for causing it and said brush to advance toward the bottle when the stem is in communication with said discharge-opening, means for

causing the same to rotate during their said movement, and means for causing the same to be retracted when the communication of the stem with the discharge-opening is cut off.

5 10. A bottle-cleaning means, comprising a traveling series of bottle-engaging cups; cylinders carrying the same; a pipe having a discharge-opening with which the interiors of said cylinders successively communicate;
10 longitudinally-movable hollow stems mounted in said cylinders and provided with pistons which are exposed to the pressure of fluid from said discharge-opening when said cylinders are in communication with the latter,
15 said pistons having openings from which said stems project; and means whereby the longitudinal movements of said stems also cause the same to rotate.

11. A bottle-cleaning means, comprising a
20 traveling series of bottle-engaging cups, cylinders carrying said cups and provided interiorly with longitudinally-movable and rotative hollow stems, said stems having pistons and means whereby they are rotated while
25 being moved longitudinally, and said pistons having openings from which said stems project, brushes carried by said stems, and a pipe having a discharge-opening with which the interiors of said cylinders successively
30 communicate.

12. A bottle-cleaning apparatus, comprising a traveling conveyer and a cleaning means having a traveling series of cups to engage the necks of adjacent bottles in said
35 conveyer, said cleaning means also having cleaning devices for acting on the bottles engaged with said cups and means for moving said devices relatively to the cups at predetermined places in the movement of the
40 parts.

13. A bottle-cleaning means, comprising a traveling conveyer adapted to convey the bottles through a soaking liquid, and a traveling means for cleaning the bottles after they
45 have been soaked, comprising a series of cups which travel with said conveyer and engage the necks of adjacent bottles in said conveyer, brushes which move with said cups, and means having connection with said
50 brushes for causing the same to move relatively to the cups and bottles.

14. A bottle-cleaning means, comprising a traveling conveyer adapted to convey the bottles through a soaking liquid, and a traveling
55 means for cleaning the bottles after they have been soaked, comprising a series of cups which travel with said conveyer and engage the necks of adjacent bottles in said conveyer, fluid-discharge stems and brushes
60 which move with said cups, and devices for causing said stems and brushes to move relatively to the cups and bottles during the travel of the same.

15. A bottle-cleaning apparatus, comprising
65 the following elements, namely: a fluid-

discharge stem which is movable relatively to the bottle and is provided with flexible brushes, said stem and brushes being adapted to be inserted into the bottle; a device for conveying movement to said stem relatively
70 to said bottle; a traveling bottle-engaging means which holds the bottle while it is being acted upon by said brushes and the fluid; and means through which said stem is supplied with the fluid.

16. A bottle-cleaning means, comprising a
75 traveling bottle-conveyer, a series of cups which travel with said conveyer and engage the necks of adjacent bottles in the same, cylinders carrying said cups, a pipe having a
80 discharge-aperture with which the open inner ends of said cylinders successively communicate, and cleaning devices movably mounted in said cylinders and having pistons whereby they are pressed forward by the
85 fluid issuing from said discharge-aperture, and means by which said cleaning devices are moved rearward.

17. A bottle-cleaning means, comprising a
90 traveling series of bottle-engaging cups, cylinders carrying the same, a pipe having a discharge-aperture with which the open inner ends of said cylinders successively communicate, cleaning devices in said cylinders comprising fluid-discharge stems having pistons
95 pressed forward by the pressure of the liquid issuing from said aperture, brushes carried by said stems, retracting means for said stems, pistons and brushes, and means for causing said pistons, brushes and stems to
100 rotate while being advanced and retracted, and a bottle-carrier, which conveys the bottles to said cups and holds the same until after they have been acted upon in said cups by said cleaning devices.

18. In a bottle-cleaning apparatus, the combination of a cylinder, a piston arranged within said cylinder and provided with a fluid-discharge stem which is hollow and interiorly communicates with the interior of
110 the cylinder, said stem having a spiral groove and said cylinder having a projection to engage said groove, and means through which liquid under pressure is supplied to the interior of said cylinder.

19. In a bottle-cleaning apparatus, the combination of a hub or wheel having a series of radiating cylinders the outer ends of which are adapted to receive the necks of the bottles, longitudinally-movable pistons
120 mounted within said cylinders and having hollow fluid-discharge stems the interiors of which have communication with the interiors of said cylinders, brushes carried by said stems, means through which liquid under
125 pressure is supplied to said cylinders and means for revolving said stems and brushes during their longitudinal movements.

20. A bottle-washing apparatus comprising
130 a bottle-conveyer; cleaning means acting

on the bottles while they are in said conveyer, said cleaning means comprising a plurality of cleaning devices and a rotatively-mounted carrier for said devices; and means for rotating said conveyer and carrier.

21. A bottle soaking and rinsing apparatus, comprising a soaking-tank, a traveling conveyer for carrying the bottles through said tank, a movable rinsing means arranged contiguous to a portion of said conveyer and acting upon the bottles while they are in said conveyer and after they have been soaked, and mechanism for moving said conveyer and rinsing means.

22. A bottle-washing apparatus comprising a bottle-conveyer, a rinsing-wheel provided with means for discharging rinsing fluid against the bottles in said conveyer, and means for rotating said rinsing-wheel and conveyer.

23. A bottle-washing apparatus, comprising a soaking-tank, a bottle-conveyer which travels through said soaking-tank, a rinsing-wheel arranged contiguous to a portion of said conveyer and provided with means by which it discharges jets of rinsing fluid against the previously-soaked bottles in said conveyer, and means for rotating said rinsing-wheel and conveyer in unison with each other.

24. A bottle-washing apparatus comprising a conveyer and a rotating rinsing means around which said conveyer extends, said rinsing means being adapted to discharge rinsing fluid against the bottles in said conveyer.

25. A bottle-washing apparatus comprising a conveyer and a rotating rinsing means around which said conveyer extends, said rinsing means being adapted to discharge rinsing fluid against the bottles in said conveyer, and comprising a wheel having cylinders provided with means through which the fluid is discharged against the bottles in said conveyer, and fluid-supply means with which said cylinders are successively brought into and out of communication at predetermined places in the travel of the wheel.

26. A bottle-washing apparatus comprising a conveyer and a rotating rinsing means around which said conveyer extends, said rinsing means being adapted to discharge rinsing fluid against the bottles in said conveyer and comprising a wheel having a hub and cups to engage the necks of the adjacent bottles in said conveyer, a supply-pipe around which said wheel rotates and means by which the bottles engaged with said cups are automatically supplied with rinsing fluid from said supply-pipe at predetermined place in the travel of the wheel.

27. A bottle-washing apparatus comprising a rotating rinsing-wheel, a bottle-conveyer passing around said wheel and off from the latter, said wheel having means to en-

gage the necks of contiguous bottles in the conveyer and comprising means by which under the control of its rotation it communicates with a source of rinsing-fluid supply under pressure, and permits said fluid to issue against the bottles, and said conveyer having bottle-cages from which the bottles are automatically discharged after leaving said wheel.

28. A bottle-washing apparatus comprising a rotating rinsing-wheel, a bottle-conveyer extending around said wheel and off from the latter to a place of discharge of the bottles and having open cages adapted to discharge the bottles automatically, said wheel having cups to engage the necks of contiguous bottles in the conveyer and comprising an apertured hub, and a supply-pipe upon which said hub is mounted, said supply-pipe having a discharge-aperture with which the aperture in the hub is successively brought into and out of communication in the rotation of the wheel.

29. A bottle-washing apparatus comprising a rotatably-mounted bottle-rinsing means having a plurality of fluid-discharge devices which travel therewith, and a conveyer which travels with said rinsing means and carries the bottles to and around the same and conveys said bottles therefrom and discharges them after they have been rinsed.

30. A bottle-washing apparatus comprising a rotatably-mounted bottle-rinsing means having a plurality of fluid-discharge devices which by the rotation of said rinsing means are intermittently brought into communication with their source of supply, and a conveyer which travels with said rinsing means and extends to and around the same and is adapted to cause the bottles to be engaged with the rinsing means while they are being rinsed and then to carry said bottles out of engagement with the rinsing means and to conduct them away from the same in inverted position and finally to automatically discharge them.

31. A bottle-washing apparatus having means for soaking the bottles and means for cleaning them after they have been soaked, said means for soaking the bottles comprising a traveling conveyer for the bottles and said means for cleaning the bottles after they have been soaked comprising a rinsing-wheel arranged contiguous to a portion of said conveyer and provided with devices for discharging rinsing fluid against the bottles while the same are in said conveyer and a fluid-supply pipe upon which said wheel rotates, said pipe having a discharge-aperture with which the fluid-discharging devices are each successively brought into and out of communication in the rotation of said wheel; and means for rotating said conveyer and wheel.

32. A bottle-washing apparatus, comprising

ing means for soaking the bottles and mechanism for cleaning them after they have been soaked, said soaking means comprising a traveling conveyer for the bottles and said
5 cleaning mechanism being rotatively mounted and having means for the supply of rinsing fluid thereto under the control of its rotation and provided with fluid-discharge stems which are moved to and from the bottles in said conveyer under the control of
10 said fluid.

33. A bottle-washing apparatus comprising means for soaking the bottles and mechanism for cleaning them after they have been
15 soaked, said soaking means comprising a

traveling conveyer for the bottles, and said cleaning mechanism comprising a rotatively mounted means having means for the supply of rinsing fluid thereto under the control of its rotation and provided with fluid-discharge
20 stems and brushes which are moved rotatively to and from the bottles in said conveyer by the pressure of said fluid.

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

CHARLES H. LOEW.

Witnesses:

L. F. GRISWOLD,
DANIEL LOEW.