

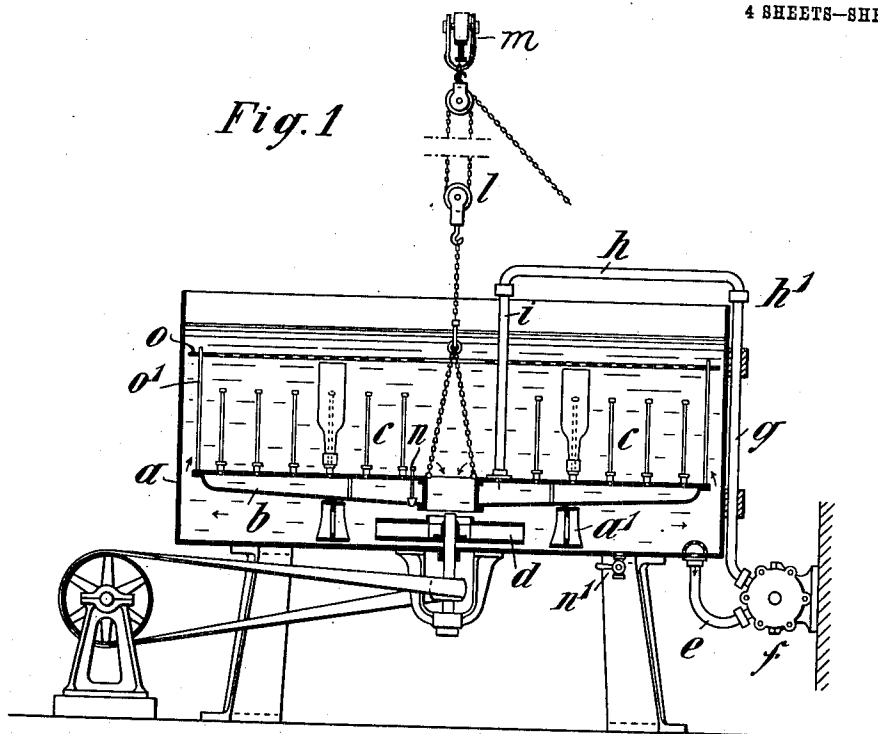
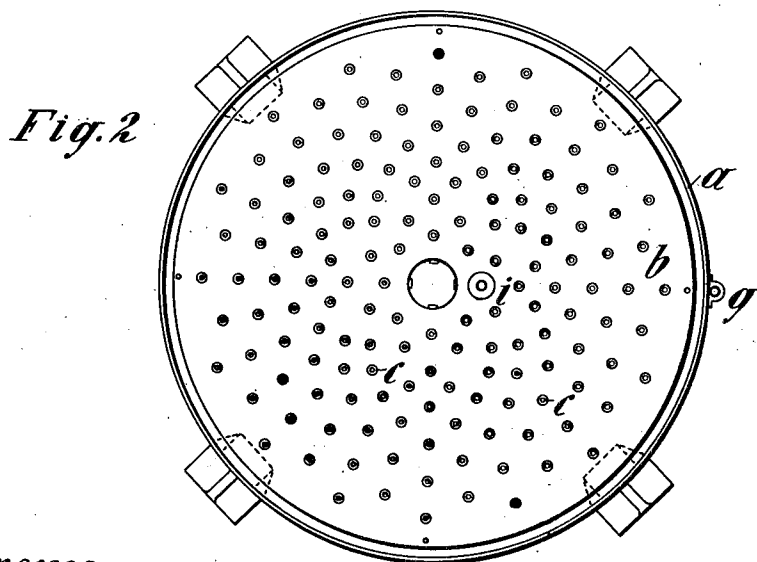
No. 843,423.

PATENTED FEB. 5, 1907.

E. WEYMAR.
APPARATUS FOR CLEANING BOTTLES AND SIMILAR VESSELS.

APPLICATION FILED SEPT. 12, 1905.

4 SHEETS—SHEET 1.



Witnesses:

H. M. Kiehl

John A. Fernald.

Inventor:

Emil Weymar

By *Rubens D. Smith*
Attorneys

No. 843,423.

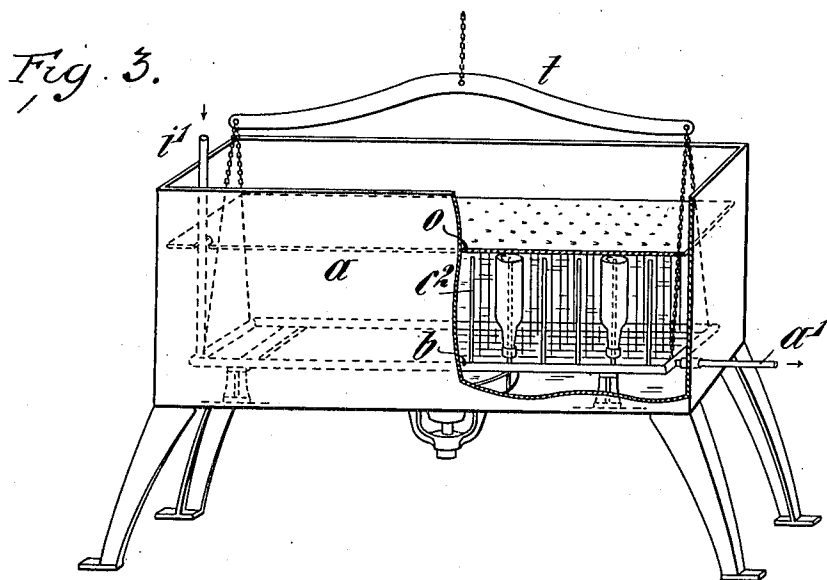
PATENTED FEB. 5, 1907.

E. WEYMAR.

APPARATUS FOR CLEANING BOTTLES AND SIMILAR VESSELS.

APPLICATION FILED SEPT. 12, 1905.

4 SHEETS—SHEET 2.



Witnesses:

Thos. Kuchue
John A. Percival.

Inventor:

Emil Weymar

By Richard L. McCormick

No. 843,423.

PATENTED FEB. 5, 1907.

E. WEYMAR.
APPARATUS FOR CLEANING BOTTLES AND SIMILAR VESSELS.

APPLICATION FILED SEPT. 12, 1905.

4 SHEETS—SHEET 3.

Fig. 6

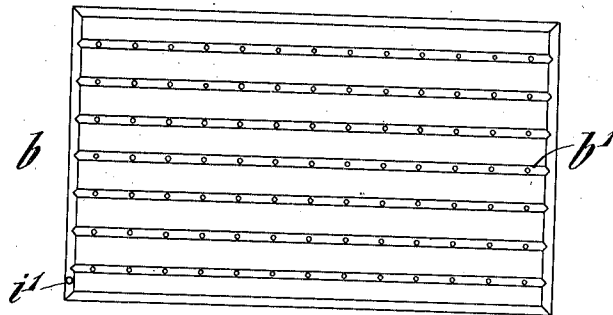


Fig. 7

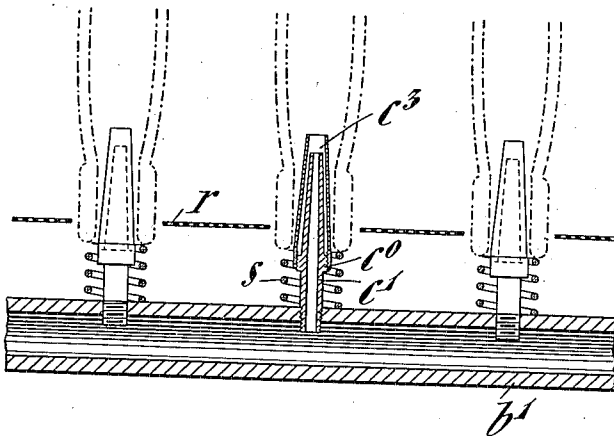
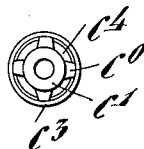


Fig. 8



Witnesses:

Karl Kuehn
John A. Kreival.

Inventor:

Emil Weymar
By Richard R.
Attorneys

No. 843,423.

PATENTED FEB. 5, 1907.

E. WEYMAR.

APPARATUS FOR CLEANING BOTTLES AND SIMILAR VESSELS.

APPLICATION FILED SEPT. 12, 1905.

4 SHEETS—SHEET 4.

Fig. 9

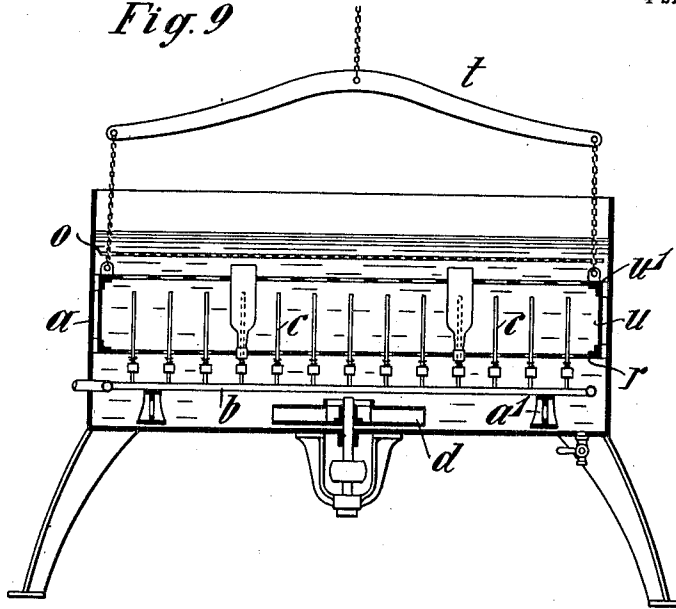


Fig. 10

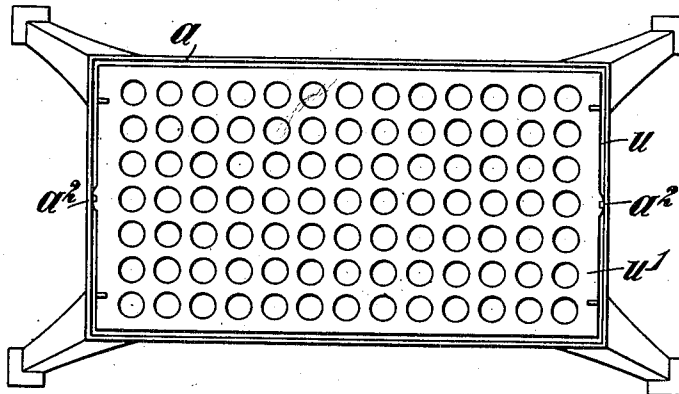


Fig. 11.

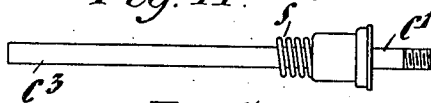


Fig. 13.

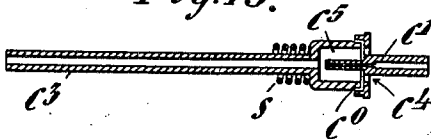
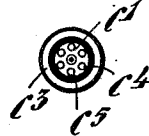


Fig. 12.



Witnesses:

N. M. Kuehne
John A. Percival

Inventor:

Emil Weymar
By Richards & Atys

UNITED STATES PATENT OFFICE.

EMIL WEYMAR, OF MÜLHAUSEN, GERMANY.

APPARATUS FOR CLEANING BOTTLES AND SIMILAR VESSELS.

No. 843,423.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed September 12, 1905. Serial No. 278,199.

To all whom it may concern:

Be it known that I, EMIL WEYMAR, a subject of Germany, residing at Mülhausen, in Thuringer, German Empire, have invented new and useful Improvements in Apparatus for Cleaning Bottles and Similar Vessels, of which the following is a specification.

In a prior application, filed by me on the 17th day of October, 1904, Serial No. 231,220, I have described and claimed a process of washing bottles and similar articles.

The present application is designed to cover the apparatus for carrying out said process.

An embodiment of my invention is shown in the accompanying drawings, together with certain modifications thereof.

In these drawings, Figure 1 is a vertical longitudinal section of a device for cleaning bottles, the liquid in the vessel being employed for washing out the bottles. Fig. 2 is a plan of the vessel and of the bottle-holder shown in Fig. 1. Fig. 3 is a device for washing bottles, compressed air being employed for the washing out of the same, said figure being a perspective view of the device, a part of the wall of which is broken away to show internal parts. Fig. 4 is a plan of the tube network employed in the apparatus shown in Fig. 3. Fig. 5 is a detail view of a bottle inserted on a part of the holder shown in Fig. 4. Fig. 6 is a plan of a tube network for use in a modified form of the device shown in Fig. 3, when using compressed air. Fig. 7 shows in part sectional side elevation the nozzle arrangement of a tube network according to Fig. 6. Fig. 8 is a plan of one of said nozzles. Fig. 9 is a vertical section of a modified form of the device shown in Fig. 3, with a fixed tube network and a movable auxiliary frame. Fig. 10 is a plan of the device shown in Fig. 9, some parts being removable. Figs. 11, 12, and 13 are an elevation, sectional end elevation, and a sectional side elevation, respectively, of the nozzle employed in connection with the device shown in Fig. 9.

In the case of the constructional forms shown in Figs. 1 and 2 the device consists of the suitably-constructed vessel *a* for the reception of the cleansing and washing liquid and of the holder *b*, which is, for example, constructed as an approximately flat closed vessel, which possesses on its upper surface mandrels which are in the form of

tubes, said mandrels being employed for holding the bottles. Said tubes are connected with the interior of the holder *b*. The vessel *a* possesses on its bottom a device—for example, the paddle-wheel *d*—in order to set the liquid in rapid motion or rotation. A central opening in the holder *b* corresponds with this paddle-wheel, the liquid above the holder being thereby enabled to flow to the paddle-wheel. From the bottom of the vessel *a* a suction or delivery tube *e*, provided with a strainer, leads to the pump *f*, and from the latter the pressure-tube *g* leads to the swinging tube *h*, which is revolvably mounted at *h'*. The holder *b* is suspended by means of chains or the like and can be raised or lowered by means of a pulley-block *l* and can be conveyed away by means of a crane or conveyer provided with the wheel *m*. The holder *b* is suspended in the reservoir either freely on its chains or it is set upon suitable blocks *a'*. *n* is a valve for discharging the holder, and *n'* is a cock for emptying the vessel *a*. *o* is a finely-perforated cover, which can be held over the holder *b* in a suitable manner—for example, by means of the rods *o'*. The holder *b*, after having been charged in the storeroom with the dirty bottles and having then been brought by means of the crane or conveyer to the washing-room, is let down into the liquid in the vessel *a*, and the perforated cover *o* is then placed upon the bottles in order to weigh down the same. The swinging tube *h* is hereupon connected with the tube *i*, and the paddle-wheel and the pump are set in action. The liquid in the vessel *a* is hereby set in rapid motion in the direction indicated by the arrows in Fig. 1 in order to cleanse the external surfaces of the bottles. The pump *f* simultaneously by its suction action draws the liquid from the vessel and drives the same into the holder *b* and through the tubes *c* directly into the individual bottles, and thereby washes out the latter. In consequence of the fact that the bottles are let down perpendicularly into the liquid and in consequence of their being weighed down by the cover *o*, the bottles remain filled with air, and the liquid which is forced in immediately runs back into the vessel *a*, whereupon it can be used once more.

The constructional form represented in Fig. 3 also corresponds to this arrangement;

but a tube network (see Fig. 4) is there employed as a holder *b*, said network consisting of the small air-admission pipes *b'* and of the larger air-outlet pipes *b''*. Both sets of pipes possess the mandrels determined for the support of the bottles, said mandrels each consisting of two small tubes *c'* and *c''* for each bottle, or (see Fig. 5) the bottle is placed on the air-supply tube *c''* (of thicker diameter) of the outlet system *b''*, which latter tube *c''* projects nearly to the bottom of the bottle, whereas close to this tube *c''* the air-admission system *b'*, by means of a branch *c'* of small diameter, projects a short way up into the bottle, the point of this branch pipe being slightly laterally bent in order to give to the air a circular motion through the liquid. The air-admission pipes *b'* are all connected with the pipe *i'*, through which compressed air is led to the holder *b*—that is, to its tubes *b'* and *c'*—whereas the air-outlet system opens in a pipe connection, which at the height of the mouth of the bottles is connected, by means of a piece of tubing, with the outlet-tube *a'*, situated laterally on the vessel *a*, so that the air can escape unimpeded and without counter-pressure. The kind and the action of the cleaning or washing out of the bottles in the case of this form corresponds, essentially, with that described in Fig. 1. Nevertheless, it is to be noticed that in this case in consequence of the air-outlet tubes *c''* projecting into the bottles nearly to their bottoms the bottles become full when they are placed with the holder *b* in the liquid. After starting the device compressed air enters through the tube *c'* into each bottle, bubbles vigorously through the liquid in the bottles, so that it serves to supply the force for moving the liquid in the bottles, and thereby cleanse the bottles and leaves again at the air-outlet *a'*. In the case of comparatively small plants, one vessel *a* for cleansing the bottles will be sufficient, and the liquid with which the cleaning is to be carried out will always be let into this one vessel. In the case of larger installations, a special vessel *a* (with the special connections to the means providing the motive power for moving the liquid) is provided for each liquid—for example, one vessel is provided for soda solution, one for hot water, and one for cold water—into which the holders with their bottles are inserted, one after the other, without changing the liquid. The holders, with the bottles to be cleaned, are first let into the soda solution, and after a few minutes, during which the cleaning action takes place, they are drawn out and lowered into the adjoining vessel, filled with hot water, and once more cleaned, and then let into the third vessel, having cold water. On being taken out of this the bottles are once more treated with pure water for a short time, and then the holders are brought into the filling-room by means of the crane or the

like. The cleaning of the bottles requires only a few minutes, it not being necessary for the bottles to leave their holder from the time they are placed on the same in the bottle-storeroom to the time when they are taken off in the bottle-filling room. The liquids in the corresponding vessels in which the washing of the bottles take place can in a suitable manner—for example, by means of steam—be brought up to the necessary temperature.

The holder *b* in the case of the embodiment shown in Fig. 3 is adapted to be removed from the vessel *a* in the same manner as in the constructional form shown in Fig. 1, this being effected in a suitable manner by means of the chain of a carrier *t* or the like of the pulley-block, which chain can be hooked on to the tube network after the piece of pipe leading to the exit-tube *a'* has been taken off. The holder *b* can nevertheless, also, in both constructional forms, remain united with the vessel *a*, and a special auxiliary holder can be employed for the insertion and taking out, as well as the carrying away of the bottles, as will be described below with reference to Figs. 9 and 10.

The above-mentioned holder *b* in the case of the device according to Fig. 1 can also be constructed as a tube network with simple tubes for operation with pumps or the like, and vice versa. The holder *b*, according to Fig. 3, for operation with compressed air can be formed in the form of a vessel, as shown in Fig. 1, with a double hollow body—namely, with one department for the admission and one department for the outlet of the air. In the case of the first constructional form with the small tube for each body the air may also be formed by the motive force and the force moving the liquid, especially as the air draws in or sucks the liquid to be used for washing out the bottles and drives it like an injector into the bottle to be cleaned. It is then consequently necessary in the latter case to have a tube projecting only a short distance into the bottle, said tube having a suitable device for drawing in or sucking up the liquid, and the arrangement being such that the compressed air while drawing in or sucking up the liquid flows out of said tube, said liquid mixed with air being driven round in the bottle for the purpose of cleaning the same. The liquid and the expanded air then flow out below out of the bottle-mouths in contradistinction with the second constructional form, Fig. 3, in which the air flows out of the air-outlet tube at the bottom of the bottle. In the following description this use of air as a driving force and as the force moving the cleaning liquid will be elucidated in detail, and likewise a special suitable constructional form of the device adapted to this purpose will be described. The modification of the process consists accordingly, essentially, in the bottles or

other vessels, open at one end and placed on a common tube network, being dipped into the cleaning liquid of the reservoir *a*, whereupon air is conducted or forced by means of the tube network into the separate bottles, which air mixes with the cleaning liquid, and hereby brings about the washing out of the bottles in their interior simultaneously, also, however, with the cleansing of the bottles outside on account of the motion or circulation of the liquid in the reservoir *a*, which is produced by said air, so that no special means are required any longer exclusively for the latter purpose, although such may be added in order to influence the action. Accordingly, the device serving to carry out this further evolved process as well as the vessel *a* for holding the cleaning or washing liquid consists of a holder *b*, which, in contrast with the constructional form shown in Fig. 4, is formed as a simple tube network, which possesses a suitable number of air-nozzles, on which the bottles can be set. These nozzles are so arranged that the compressed air on passing out acts as a driving force driving the liquid in the vessel *a* into the interior of the bottles, and so effects the washing out of the latter. This compressed air then, however, immediately leaves the bottles again through the liquid in which the bottles stand immersed, bubbles upward, and thereby causes the cleansing of the stopper devices and of the outside surfaces of the bottles.

The holder *b* (represented in Fig. 6) is in the form of a tube network with the air-distribution pipes *b'* and the tube *i'* for the admission of the compressed air. The small air-tubes *c'*, Fig. 7, are arranged or screwed on the air-pipes *b'*, said tubes *c'* possessing a screw-thread *c°*, on which a second small tube *c³* is screwed. On the tube *c'* or in the screw-thread *c°* channels or incisions *c°* (compare Fig. 8) are provided, which lead into the interior of the outer tube *c³*. These nozzles serve for the setting on of the bottles, and, indeed, it is advantageous for the channels *c°*, serving for the conduction of the liquid into the nozzle, to be removed a sufficient distance from the bottle-mouth. This is effected by means of a spiral spring *s* or the like placed over each nozzle, on which the bottle-head is adapted to sit, so that the bottles come accordingly between these springs and the cover *o* into a position in which they are not able to be displaced. Over the whole of the tube network *b* a moderately fine wire-gauze sheet *i* is stretched in a suitable manner, through which the nozzles project and in which and around each nozzle an opening of such size is provided that the head of the bottle can be brought through this holder onto the spiral spring, the stopper devices resting on the wire-gauze *r*.

If the holder *b*, as described above, is brought into the reservoir *a* with the cleaning

liquid, the compressed air is led into the tube network by means of the air-pipe *i'*. The nozzles then perform their work, the air leaving through the tube *c'*, and carrying with itself the liquid through the channels *c°* enters through the tube *c³* into the interior of the bottle, out of which the liquid and air passes through the bottle-mouth back into the reservoir and here set the liquid in violent motion or pass upward, cleaning the outside surfaces of the bottles and their stop devices. Impurities, particularly labels, which come loose during the washing of the bottles, are thereby kept away by the wire-gauze *r* from the bottle-mouths and nozzles, so that they are not drawn in by the latter. These impurities remain on the gauze after the holder has been taken out and can afterward be easily removed before the holder is recharged.

A tube network with air-nozzles, as above described, can also be constructed in the form according to Figs. 9 and 10. In this case, however, the tube network *b* is not removable; but it remains resting continuously on blocks *a'* in the passage *a*. A special auxiliary holder serves for the insertion, removal, and carriage of the bottles, said auxiliary holder consisting, essentially, of a movable frame *u*, adapted to be attached to the pulley-block and to be moved by means of the crane, which frame may consist of metal sheet or have one or more sheets, which latter sheets possess a number of openings or holes corresponding in number and position to the nozzle *c c' c²*, respectively. In Figs. 9 and 10 the frame *u* is connected below the sheet *r* and above with the sheet *u'*, both of which, as can be seen, have the above-mentioned openings or holes. In or upon these openings of the auxiliary frame the bottles are placed upside down. The auxiliary frame guided on the fixed guide *a²* is hereupon let into the vessel *a*, and the bottles without further trouble fit on their respective nozzles—that is to say, the latter penetrate through the openings of the sheet *r* of the frame into the bottles and support the latter, while the auxiliary frame sinks downward toward the frame *b*. The bottles are also here held firmly in the liquid by means of the perforated sheet *o*, which after the auxiliary frame has been charged can be immediately laid on the latter and transported with the same. The nozzles, Fig. 11, here shown correspond in their arrangement with the nozzles explained with reference to Figs. 7 and 8; but nevertheless the tube *c³* in this case possesses at its bottom end or foot an extension for the formation of a mixing-chamber *c⁵* for the air streaming in through *c'* with the water entering through *c⁴*. This extension simultaneously serves also as an abutment for the spring *s*.

Having now particularly described and ascertained the nature of my said invention

and in what manner the same is to be performed, I declare that what I claim is—

1. In an apparatus for cleaning bottles and the like, the combination of a vessel containing washing liquid, means for supporting a plurality of bottles immersed in the liquid in said vessel in the same horizontal plane, and means for driving washing liquid into said bottles, substantially as described and for the purpose set forth.

2. In an apparatus for cleaning bottles and the like, the combination of a vessel containing washing liquid, means for letting down a plurality of bottles into the washing liquid and for lifting the same out of said liquid, means for supporting said bottles in the same horizontal plane immersed in the liquid, in said vessel, and means for driving washing liquid into said bottles, substantially as described and for the purpose set forth.

3. In an apparatus for cleaning bottles and the like, the combination of a vessel containing washing liquid, a holder having a plurality of vertical supports arranged in the same horizontal plane and over which a plurality of bottles can be placed upside down, said holder supporting said bottles immersed in the liquid, and means for driving washing liquid into said bottles, substantially as described and for the purpose set forth.

4. In an apparatus for cleaning bottles and the like, the combination of a vessel containing washing liquid, a holder having a plurality of vertical tubes for supporting a plurality of bottles arranged upside down, said holder supporting said bottles immersed in the liquid in said vessel, means for driving washing liquid from the vessel containing the same through said tubes and into the bottles, and out into said vessel again, and means for setting the liquid outside the bottles, in a state of rapid motion substantially as described and for the purpose set forth.

5. In an apparatus for cleaning bottles and the like, the combination of a vessel containing washing liquid, a holder consisting of a hollow vessel provided with a plurality of vertical tubes communicating with the interior of said holder, said tubes being adapted to support a plurality of bottles arranged upside down immersed in the washing liquid, a pump, a suction-pipe leading from the vessel containing the washing liquid to the pump, and a delivery-pipe leading from the pump to the interior of the holder, said pump being adapted to drive washing liquid from the vessel containing the same, through said tube, and into the bottle and out into the vessel again, substantially as described and for the purpose set forth.

6. In an apparatus for cleaning bottles and the like, the combination of a vessel contain-

ing washing liquid, means for supporting a plurality of bottles in the same horizontal plane and immersed in the liquid in said vessel, and means for setting the liquid outside the bottles, in a state of rapid motion, substantially as described and for the purpose set forth.

7. In an apparatus for cleaning bottles and the like, the combination of a vessel containing washing liquid, a holder consisting of a horizontally-disposed ring-shaped hollow vessel having a central opening and provided with a plurality of vertical tubes communicating with the interior of said holder, said tubes being adapted to support a plurality of bottles arranged upside down immersed in the washing liquid, a pump, a suction-pipe leading from the vessel containing the washing fluid to the pump, a delivery-pipe leading from the pump to the interior of the holder, said pump being adapted to drive washing liquid from the vessel containing the same, through the said tubes and into the bottles and out into the vessel again, substantially as described and for the purpose set forth.

8. In an apparatus for cleaning bottles and the like, the combination of a vessel containing washing liquid, a holder consisting of a hollow vessel provided with a plurality of vertical tubes communicating with the interior of said holder, said tubes being adapted to support a plurality of bottles arranged upside down immersed in the washing liquid, a pump, a suction-pipe leading from the vessel containing the washing liquid, to the pump, a delivery-pipe, consisting of the fixed vertical tube *g*, a swinging tube *h* and the vertical tube *i* connected with the interior of the holder, said pump being adapted to drive washing liquid from the vessel containing the same, through the tubes on the holder, to the bottles and out into the vessel again, substantially as described and for the purpose set forth.

9. In an apparatus for cleaning bottles, and the like, the combination of a vessel containing washing liquid, a holder having a plurality of vertical tubes for supporting a plurality of bottles arranged upside down immersed in the liquid, supporting-rods *c'* mounted on said holder, a perforated cover *o* engaging on said rods and resting upon the bottoms of the bottles, means for driving washing liquid from the vessel containing the same, through said tubes and into the bottles and out into the vessel again, substantially as described and for the purpose set forth.

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

EMIL WEYMAR.

Witnesses:

PAUL ERKE,
KURT HABER.