W. M. BYER.

DISINFECTING APPARATUS.

APPLICATION FILED AUG. 5, 1908.

940,921.

Patented Nov. 23, 1909.

Fig. 1.

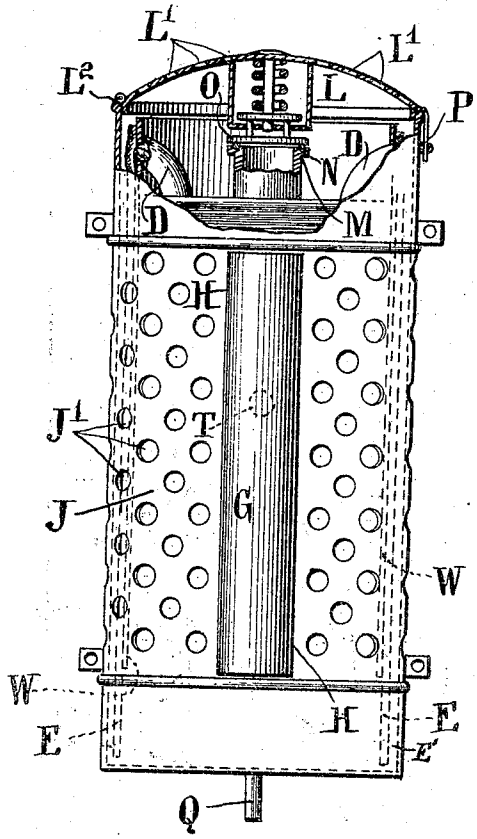


Fig. 2.

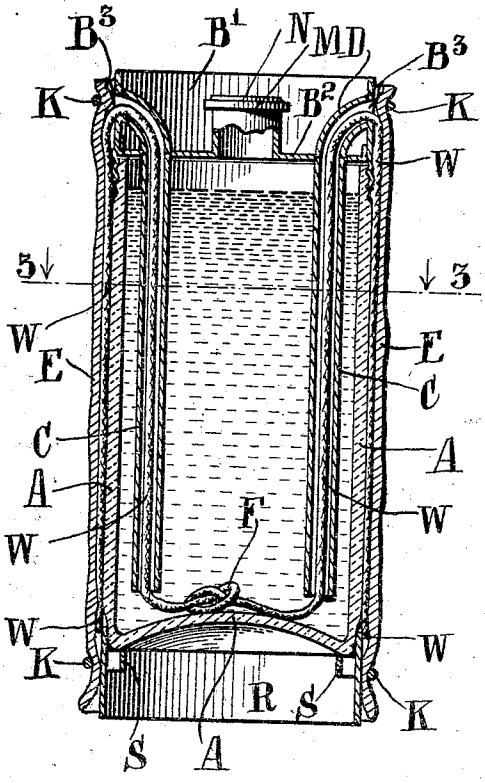


Fig. 3.

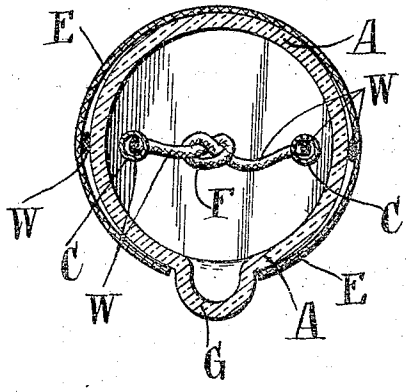
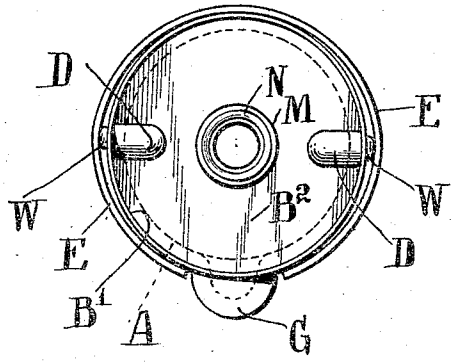


Fig. 4.



Attest:

E. Mitchell

Wm. J. Forbes Jr.

Inventor:

by William M. Byer

Philip Farnsworth Atty

UNITED STATES PATENT OFFICE.

WILLIAM M. BYER, OF JERSEY CITY, NEW JERSEY.

DISINFECTING APPARATUS.

940,921. Specification of Letters Patent. **Patented Nov. 23, 1909.**

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To all whom it may concern:

Be it known that I, WILLIAM M. BYER, a citizen of the United States of America, and a resident of Jersey City, New Jersey, have invented certain new and useful Improvements in Disinfecting Apparatus, the principles of which are set forth in the following specification and accompanying drawing, which disclose the form of the invention which I now consider to be the best of the various forms in which the principles of the invention may be embodied.

This invention relates to improvements in disinfecting or deodorizing apparatus, the object being to produce a compact, uniformly efficient device, which shall not be subject to injuries resulting from careless handling by unskilled attendants and in which the feed of the disinfecting liquid shall be uniform, irrespective of the liquid level in the reservoir.

The invention consists in the novel features hereinafter set forth.

Of the drawings, which are about one-half scale, Figure 1 is an elevation of the complete device, partly in section; Fig. 2 is a vertical section of the internal reservoir and associated parts; Fig. 3 is a horizontal section along the line 3—3 of Fig. 2; and Fig. 4 is a plan of the reservoir shown in section in Fig. 2.

The reservoir A (Fig. 2) is made of glass and has an integral glass bottom, but no glass top. A metallic top with a lateral wall B′ forms an auxiliary liquid-receptacle and serves to hermetically seal the top of reservoir A, so far as concerns the upper surface of the liquid therein. The liquid column in the reservoir A is maintained by the pressure of the outer atmosphere acting down through the metallic tubes C. The lower ends of these tubes C project down into the liquid in the reservoir A and their upper ends are secured in the bottom B^2 of the metallic top, and thereby communicate with the casing and outer atmosphere through passages formed by parts D. The bottom B^2 of the metallic top may be an ordinary screw cap for reservoir A, as shown, and the lateral wall B^1 may be a collar soldered to the bottom part B^2. Parts D may be formed of separate pieces of sheet metal and soldered to both the parts B^1 and B^2 in the position shown to form passages communicating with holes B^3 in the lateral wall B^1. The parts D not only provide passages, as stated, but permit part B to be used as an auxiliary liquid receptacle when desired.

A capillary feeding means such as an ordinary cotton wick W extends up through the tube C and down outside the reservoir nearly to the bottom as shown. An evaporation member or wick E, constituting a nearly complete cylinder, closely surrounds the reservoir A as by being wrapped around it and wick W, and is fed by the feed wick W, which distributes the liquid uniformly throughout the evaporation member, owing to the multiple character of the wick W, which may be the case even if only a single tube C be used. The feed wick W is located, as shown, between the wall of reservoir A and the evaporation member E, whereby it is protected from evaporation and from injurious effects, such as hardening, by air contact, the liquid being distributed by absorption throughout the total length of the evaporation member. The portion of the feed wick W which lies in the liquid in the bottom of the reservoir is provided with a part F, as by knotting, which is larger than the internal diameter of the tube C, such that an interfering attendant cannot withdraw the wick up through the tube. This knot F may be made after the parts B^2 and C are assembled and at the time when the wick is being inserted in the tube and before reservoir A is assembled with parts B^2 and C.

The glass reservoir A is blown with an enlarged part G (Figs. 3 and 4) which projects through a slot H in the metallic protecting casing J (Fig. 1), whereby the parts A and J are locked together and whereby the level of the liquid in the reservoir A can be determined by inspection without any necessity for opening the casing. The reservoir A is pressed forward so that its part G engages in the slot H, by means of a screw T (Fig. 1) operating through the back of the casing, the parts being thereby locked in a central position.

The parts D of auxiliary receptacle B prevent interference with the feed wick W by an attendant. The evaporation member E covers the entrances B^3 to the passages formed by parts D, and this also tends to prevent interference with the feed wick W. The evaporation member E may be secured in place around the reservoir by any suitable means such as wires K as shown. The side wall of casing J is perforated, as is shown in Fig. 1 at J^1 J^1 to permit free access of outer

air to the surface of evaporation member E, the latter being separated from the inner wall of casing J by an air space E^1. The casing-cover L is also perforated as shown in Fig. 1 at L^1 to permit evaporation from the auxiliary receptacle B when that is so employed. The casing-cover L may be hinged to the casing as is shown in Fig. 1 at L^2. The part B (Fig. 2) is provided with a liquid admission opening to the reservoir A. This consists of a hollow part M which may be integral with part H^2 and has a groove for an inset rubber gasket N. The casing-cover L (Fig. 1) carries a spring-pressed part O adapted to close the opening in part M, by pressing down on gasket N when the cover L is closed, and fastened as by part P. This seals the upper part of reservoir A. A lower metallic collar R may be employed as a supporting means for the reservoir A, the collar resting on the bottom of casing J and being provided with parts S on which reservoir A may rest. Or the reservoir A may stand directly on the bottom of the casing.

The operation is believed to be as follows: The tubes C are preferably not capillary tubes, but are of considerable size (such as about $\frac{3}{8}$ to $\frac{1}{2}$ inch internal diameter), so that when reservoir A is filled with the desired liquid (which may be of any suitable kind as commonly used), the liquid level will rise in tubes C as high as in the main part of the reservoir. This is for the purpose of permitting a much more rapid feed when the apparatus is started in operation in order to thoroughly impregnate the evaporation member E and produce a useful effect at once. The initial feed is much more rapid than the subsequent uniform and slow feed on account of the comparatively great length of the feed wick W which is at first immersed not only in the liquid in the main part of the reservoir, but in that in the tube C. Most of the liquid constituting the initial feed is taken from the tube C, and the liquid level in this tube is reduced very rapidly as compared with the subsequent reduction of level in the reservoir. In proportion as the level in the tube C falls, the space in the tube which is not filled by the liquid feeding up through the wick W, is filled with air from outside, the pressure of the atmosphere continuing to support the liquid column in the reservoir.

As soon as the liquid level in the tube has reached the bottom of the tube the feed becomes much slower, and constant and uniform, irrespective of the subsequent decrease of level in the reservoir. As the liquid is thereafter fed slowly up through the wick W, tending to form an air space just below the end of the tube, such air escapes in minute quantities up through the liquid in the reservoir to a space above the liquid therein, to fill the space which was occupied by the liquid which has been fed up the capillary feed W. The feed is now constant, because the immersion level of the wick W is kept constant, the liquid level as to the tube C being kept just at the bottom of that tube. The wick W is preferably not fitted tight in tube C, but as shown, a small space is left between it and the inner wall of the tube, or at least the wick is not very closely woven. This is for the purpose of tending to insure sufficiently free access of air in the tube. Preferably, also, and for the same reason, there are at least two or more tubes. While it is advantageous to have a plurality of feed wicks distributed around the evaporation member, yet this might be had with a single tube, but a plurality of tubes also helps to keep the liquid level constant at the bottom of the tubes by tending to insure free access of outer air, if not through one tube then at least through another, thus preventing a stoppage of air as by a liquid-soaked wick W in a single tube. The constant effect may be obtained with varying conditions in the tubes, as for example, it may be that sometimes all the incoming air may be passing down through one tube. Various modifications may be made within the spirit and scope of the invention. When simply a tube is claimed herein as an element, reference is had to one or more or any suitable number of tubes, to permit the action contemplated in the invention.

A drip escape Q may be employed, as shown in Fig. 1, from the casing J, and in such case the tubes C with suitable feed wicks W may be sufficient, when the tubes are of sufficient internal diameter to permit the same initial liquid level in the tubes as in the reservoir, to supply sufficient liquid not only to permit full evaporation from member E, but to provide a surplusage for the drip Q. This drip will be constant and uniform in amount, just as in the case of the evaporation member E and for the same reason. The advantage of the constant feed obtained by this apparatus is that a uniform quantity of liquid will be either evaporated or dripped or both, at all times, irrespective of the decreasing level in the reservoir.

I claim:

1. A liquid-feeding apparatus, which comprises a reservoir having a liquid inlet; a pendent tube inside the reservoir but independent of the liquid-inlet; said tube having an open end near the bottom of the reservoir and an upper opening communicating exteriorly of the reservoir near the upper part thereof; said tube also being sealed from the liquid in the reservoir except at its lower open end; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the exterior of

the reservoir; said reservoir being normally sealed from the atmosphere except by way of said tube.

2. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; an absorption-evaporation member exteriorly surrounding a substantial portion of the reservoir; a pendent tube inside the reservoir but independent of the liquid-inlet; said tube having an open end near the bottom of the reservoir and an upper opening communicating exteriorly of the reservoir with an upper portion of said absorption-evaporation member; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the evaporation member; said reservoir being normally sealed from the atmosphere except by way of said tube.

3. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; an evaporation member substantially surrounding said reservoir; a capillary feeding means extending from the interior of the reservoir to an upper part of said evaporation member; and a tube inside the reservoir but independent of said liquid-inlet, said tube being in communication with the outer atmosphere and containing said feeding means; said reservoir being normally sealed from the atmosphere except by way of said tube.

4. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; an evaporation member exterior to the reservoir; a tube inside the reservoir but independent of said liquid-inlet, said tube communicating exteriorly of the reservoir near the upper part thereof; said tube also being sealed from the liquid in the reservoir except at its lower open end; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the exterior of the reservoir; said reservoir being normally sealed from the atmosphere except by way of said tube.

5. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; a casing for said reservoir, the casing having its lateral wall separated from the reservoir to provide a space for the reception of an evaporation member, and being in communication with outer atmosphere to permit evaporation of the liquid, and a tube inside the reservoir but independent of said liquid-inlet, said tube being in communication with the upper portion of the space between the reservoir and casing and containing a capillary feeding means contacting with an upper portion of the evaporation member; said reservoir being normally sealed from the atmosphere except by way of said tube.

6. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; a pendent tube inside the reservoir but independent of the liquid-inlet; said tube having an open end near the bottom of the reservoir and an upper opening communicating exteriorly of the reservoir near the upper part thereof; said tube also being sealed from the liquid in the reservoir except at its lower open end; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the exterior of the reservoir; said reservoir being normally sealed from the atmosphere except by way of said tube and said tube being sufficiently large to permit the same liquid-level in it as in the reservoir when the liquid is put in the latter through its inlet.

7. A disinfecting apparatus, which comprises a glass reservoir for a disinfecting liquid; a casing for the reservoir, said casing being in communication with the outer atmosphere, having its lateral wall separated from that of the reservoir, and having a vertical slot; and means for feeding the liquid from the reservoir to the space between the casing and the reservoir; said glass reservoir being formed with a projecting portion adapted to engage in the slot in the casing; and said casing being provided with means for locking the reservoir in position with the projecting portion engaging in the slot.

8. A disinfecting apparatus, which comprises a reservoir for a disinfecting liquid; a casing for the reservoir, said casing being in communication with the outer atmosphere, and having its lateral wall separated from that of the reservoir; a cover for the reservoir, having a passage formed by walls incorporated with the cover and communicating with the space between the reservoir and the casing, but otherwise operatively sealed from the outer atmosphere; and a tube projecting into the reservoir and secured to the reservoir-cover adjacent to said passage-walls to form a continuous communication therewith.

9. A disinfecting apparatus, which comprises a reservoir for a disinfecting liquid; a casing for said reservoir, the casing being in communication with the outer atmosphere and being provided with a removable cover; a cover for the reservoir, said cover being provided with an opening for the introduction of the liquid, and with a passage communicating between the reservoir and the casing; a tube extending into the reservoir and communicating with the passage through the reservoir-cover; and means carried by the removable casing-cover to seal the opening in the reservoir cover when the casing-cover is closed.

10. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet;

a pendent tube inside the reservoir but independent of the liquid-inlet; said tube having an open end near the bottom of the reservoir and an upper opening communicating exteriorly of the reservoir near the upper part thereof; said tube also being sealed from the liquid in the reservoir except at its lower open end; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the exterior of the reservoir; said feeding means having a portion in the reservoir below said tube, which is larger than the tube-opening, and said reservoir being normally sealed from the atmosphere except by way of said tube.

11. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; a plurality of pendent tubes inside the reservoir but independent of the liquid-inlet; said tubes having open ends near the bottom of the reservoir and upper openings communicating exteriorly of the reservoir near the upper portion thereof; said tubes also being sealed from the liquid in the reservoir except at their lower open ends; and capillary feeding means inside said tubes and extending from the liquid in the reservoir up through said tubes and their upper openings to the exterior of the reservoir; said reservoir being normally sealed from the atmosphere except by way of said tubes.

12. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; a pendent tube inside the reservoir but independent of the liquid-inlet; said tube having an open end near the bottom of the reservoir and an upper opening communicating exteriorly of the reservoir near the upper part thereof; said tube also being sealed from the liquid in the reservoir except at its lower open end; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the exterior of the reservoir; said feeding means being provided with means to normally prevent its withdrawal through the tube, and said reservoir being normally sealed from the atmosphere except by way of said tube.

13. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; an evaporation wick wrapped around the outer part of the reservoir; and a pendent tube inside the reservoir but independent of the liquid-inlet; said tube having an open end near the bottom of the reservoir and an upper opening communicating exteriorly of the reservoir near the upper part thereof; said tube also being sealed from the liquid in the reservoir except at its lower open end; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the exterior of the reservoir; said reservoir being normally sealed from the atmosphere except by way of said tube.

14. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; a casing for said reservoir, the casing having its lateral wall separated from the reservoir to provide a space for the reception of an evaporation member, and being in connection with the outer atmosphere to permit evaporation of the liquid; said casing being also provided with a drip outlet; and a tube inside the reservoir but independent of the liquid-inlet, said tube being in communication with the space between the casing and reservoir, and containing a capillary feeding means for the evaporation member, the tube also being sufficiently large to permit the same initial liquid level in both the tube and the reservoir and to permit a feed of sufficient liquid for both the evaporation member and the drip outlet; the reservoir being sealed from the atmosphere except by way of said tube.

15. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; a casing for the reservoir in connection with the outer atmosphere; a pendent tube inside the reservoir but independent of the liquid-inlet; said tube having an open end near the bottom of the reservoir and an upper opening communicating exteriorly of the reservoir near the upper part thereof; said tube also being sealed from the liquid in the reservoir except at its lower open end; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the exterior of the reservoir; said reservoir being normally sealed from the atmosphere except by way of said tube.

16. A disinfecting apparatus, which comprises a reservoir for a disinfecting liquid; a casing for the reservoir, said casing being in communication with the outer atmosphere and having its lateral wall separated from that of the reservoir; an auxiliary liquid-receptacle secured to the top of the reservoir and having a passage formed by walls incorporated with said receptacle and communicating with the space between the reservoir and the casing, but otherwise operatively sealed from the outer atmosphere; and a tube projecting into the reservoir and secured to the auxiliary receptacle to communicate with the passage therein.

17. A disinfecting apparatus, which comprises a reservoir for a disinfecting liquid; a casing for the reservoir, said casing being in communication with the outer atmosphere and having its lateral wall separated from that of the reservoir; a cover for the reservoir, having a passage formed by walls incorporated with said cover and communicating with the space between the reservoir and casing, but otherwise operatively sealed

from the outer atmosphere; a tube projecting into the reservoir and secured to the reservoir-cover to communicate with the passage therein; a feed wick extending through said tube from the interior of the reservoir, and down the outside of the latter; and an evaporation member arranged around the outside of both the reservoir and the feed wick, in the space formed by the separation of the lateral wall of the reservoir and casing.

18. A disinfecting apparatus, which comprises a glass reservoir for a disinfecting liquid, a casing for said reservoir, the casing being in communication with the outer atmosphere and being provided with a slot, said reservoir being formed with an enlarged portion to lock in said slot, and capillary feeding means from the liquid in the reservoir to the interior of the casing.

19. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; an absorption-evaporation member exteriorly surrounding a substantial portion of the reservoir; a pendent tube inside the reservoir but independent of the liquid-inlet; said tube having an open end near the bottom of the reservoir and an upper opening communicating exteriorly of the reservoir near the upper part of said evaporation member; said tube also being sealed from the liquid in the reservoir except at its lower open end; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the exterior of the reservoir; said reservoir being normally sealed from the atmosphere except by way of said tube.

20. A liquid-feeding apparatus, which comprises a reservoir having a liquid-inlet; a perforated casing exteriorly surrounding a substantial portion of the reservoir and constructed and arranged to form a space between them; an exterior absorption-evaporation member in said space; a pendent tube inside the reservoir but independent of the liquid-inlet; said tube having an open end near the bottom of the reservoir and an upper opening communicating exteriorly of the reservoir near the upper part thereof; said tube also being sealed from the liquid in the reservoir except at its lower open end; and a capillary feeding means inside said tube and extending from the liquid in the reservoir up through said tube and its upper opening to the exterior of the reservoir; said reservoir being normally sealed from the atmosphere except by way of said tube.

WILLIAM M. BYER.

Witnesses:
CLARE EAGLES,
PHILIP FARNSWORTH.