(No Model.)

A. R. UPWARD.

DISINFECTING DEVICE.

No. 441,078. Patented Nov. 18, 1890.

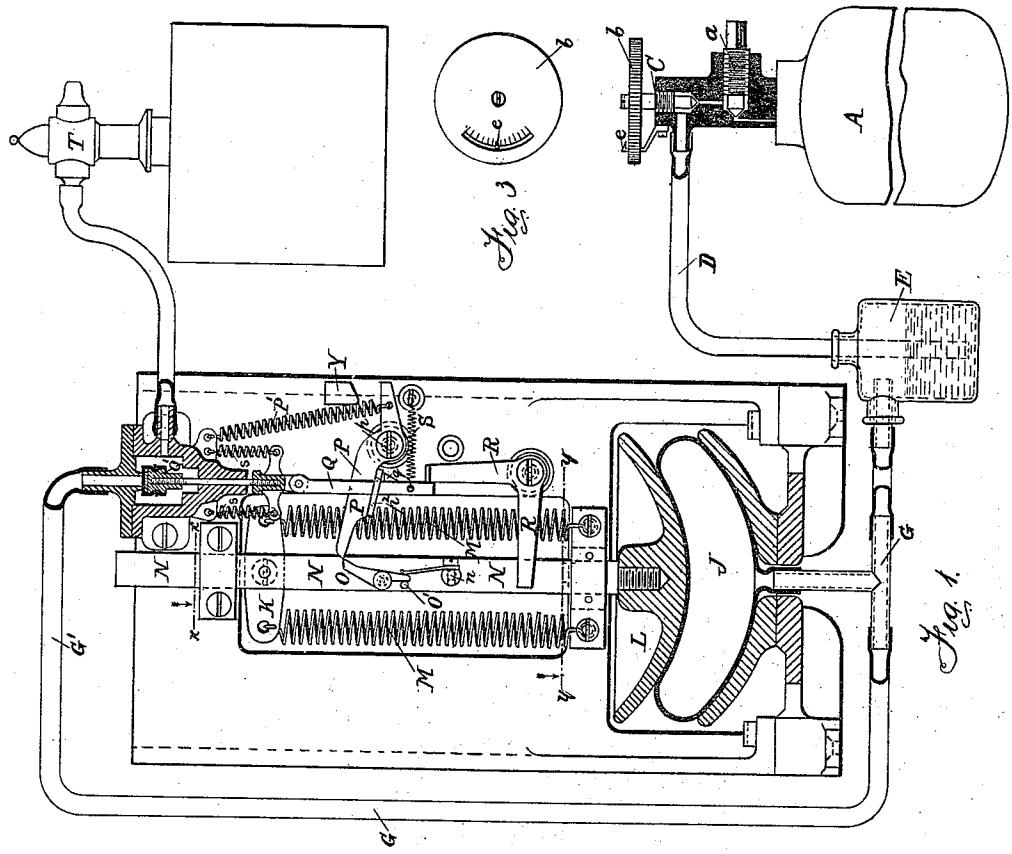


Fig. 1.

Fig. 3.

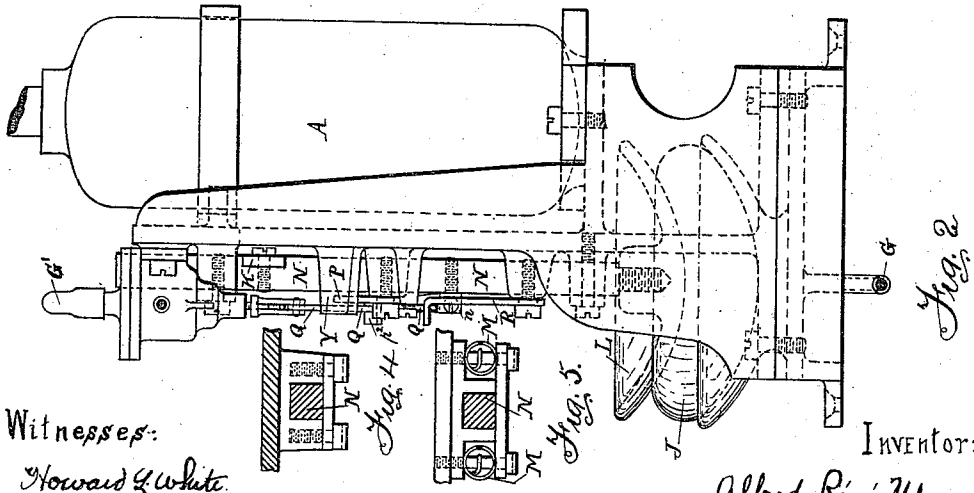


Fig. 2.

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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DISINFECTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 441,078, dated November 18, 1890.

Application filed August 21, 1889. Serial No. 321,508. (No model.) Patented in England July 9, 1888, No. 9,924, and in France May 7, 1889, No. 195,012.

To all whom it may concern:

Be it known that I, ALFRED RÉNÉ UPWARD, of London, England, a subject of the Queen of Great Britain and Ireland, have invented certain new and useful Apparatus for the Periodic Production of Sprays, (patented in England July 9, 1888, No. 9,924, and in France May 7, 1889, No. 195,012,) of which the following is a specification.

This invention consists of apparatus for utilizing or producing gaseous pressure fit to disperse any desired liquid in the form of sprays and acting automatically at defined periods between each spray by self-acting mechanism, rendering the operation of a constant regulated gaseous force periodically intermittent upon the spray-distributer. For the production of a constant pressure gas liquefied under pressure is stored in a comparatively small steel or other metallic store-vessel, the internal pressure within the store-vessel being in this case practically constant by reason of the gas being liquefied. The rate of discharge or volume passed in a given time will be thereby kept almost constant for any given setting of the regulating-valve, which governs or controls the discharge on the store or high-pressure vessel until nearly all the liquefied gas is expended. Compressed air or other gases which are compressed without liquefaction will actuate the apparatus, hereinafter described; but liquefied gas is preferable, for the reasons above given.

My apparatus therefore consists of a primary high-pressure storage-vessel, supplying a constant flow of air or other gas to a secondary apparatus, producing periodic intermittency in the discharge or exhaust of the said gas, by which a spray of disinfectant or other liquid may be effected by any ordinary known spray-nozzle.

In order that my invention may be the better understood, I now proceed to describe a convenient practical form of apparatus combining the high-pressure vessel, the secondary vessel, and special valve and sudden-release valve opening and closing mechanism, as hereinafter described, for carrying the same into effect, reference being had to the drawings hereunto annexed, and to the letters marked thereon.

Figure 1 is a front elevation of my apparatus with several parts in section. Fig. 2 is a side elevation with springs removed and the bottle A in position. Fig. 3 is a plan of the valve-regulator on the bottle A. Fig. 4 is a section on the line $x\ x$, looking in the direction of the arrow. Fig. 5 is a section on the line $y\ y$, looking in the direction of the arrow.

A is a steel or other metallic store-vessel, wherein a large volume of air or other gas is compressed or stored under a high pressure. Preferably, I employ liquefied gas—such as nitrous oxide—as the pressure in the vessel is thereby maintained practically constant as long as any liquefied gas remains in the vessel.

The vessel A is provided with two valves in series on the exit-passage to the tube D. One a is a plain screw-down valve. The other C is a delicately-adjustable screw-down valve made of non-corrodible metal—such as brass—and of much smaller dimensions than the valve a, so as not to be sensitive to changes of temperature. Thus by this valve C the flow of gas may be delicately regulated by a milled headed disk b, which is divided into degrees. This disk is slotted parallel to its circumference, and through the slot travels the pointer or index e, which, coming into contact with either end of the slot, acts as a stop-pin, and thus prevents the valve C from being opened too widely or from being screwed down too tightly.

After filling the store-vessel A both valves may be closed for transport, or the valve C may be adjusted to any required flow and the valve a closed. On putting the apparatus to work the valve a is opened, when the desired regulated flow is at once determined by the valve C, or the latter may be further adjusted, as desired. Therefore by the regulation of the valve C exact adjustment of the flow of gas or air through the exit-passage may be obtained, and this rate of flow or volume passed in a given time will determine the number of sprays produced in a given time. The gas passing through the tube D traverses

a bubble-indicator E. This indicator consists of a glass bottle and contains a small amount of oil or other liquid which does not readily evaporate and which has no effect upon the passing gas. This indicator, made of glass, is visible through a slot in the casing of the machine, so as to be easily seen by the user. The rate of flow of the bubbles visibly indicate the rapidity of the passage of the gas, and also show whether the apparatus is in use. The pipe D enters air-tight through one neck of the bubble-indicator E and plunges slightly below the surface of the liquid in the bubble-indicator E. From this bubble-indicator the air or gas enters the second vessel by an outlet-pipe G, fitted also air-tight into the bubble-indicator. This second vessel consists in this type of machine of an india-rubber or other flexible or elastic vessel J. As the flexible or elastic vessel J thus expands by the pressure of the gas so entering, it presses upward the cover L and the sliding bar N against the reaction of a spring or springs M, attached at one end to the cross-head K upon the sliding bar and at the other end to the frame. The said bar N is provided with a spring detent or catch O, having a stop-pin O′. As the detent or catch O rises with the bar N, it carries with it the point of the lever P, which pivots upon *p* and at the same time thereby extends the tail-spring P′, thus providing power for the sudden opening of the valve Q′. This lever P has a slotted shoulder p^2, through which passes the connecting-rod Q. *q* is a shoulder in this connecting-rod Q, upon which the slotted shoulder of the lever P descends as soon as it is suddenly released from the spring detent or catch O by the ascending motion of the bar N. By this means the connecting-rod Q is caused to descend and open this valve Q′ by the reaction of the tail-spring P′. The exhaust-valve Q′ is thus suddenly opened when the vessel J is full by the ascent of the bar N when the upward stroke has been completed, and the compressed gas is thus allowed to escape through the pipe G′ and exhaust-valve Q′ to the spray-nozzle T. The said exhaust-valve Q′ remains open for some time until the descending cover L and bar N cause the stud *n* to strike upon the horizontal arm of the right-angled lever R. The vertical arm of the lever R is thus caused to move and to press the end of the connecting-rod Q against the reaction of a spring S, so that the shoulder *q* is caused to disengage itself out of the slotted shoulder attached to the lever P. The shoulder *q* is thus pressed away from the end of the slot, and the springs *s s* once more close the exhaust-valve Q′, drawing the connecting-rod Q through the slot of the lever P. It will thus be seen that as the bar N descends, carrying with it the spring detent or catch O, this detent or catch O clicks over the point of the lever P, which is now in its lowest position, its tail end resting against the stop-block Y. Provision is thus made for the spring detent or catch O to re-engage with the point of the lever P on the next upstroke before the stud *n* comes into contact with the horizontal arm of the right-angled lever R. The apparatus is thus in normal position ready for the next operation. The blast or gaseous issue from this machine thus operates periodically any usual spray-nozzle T for the dispersion of the sprays of scent, water, or other liquid or disinfectant.

When no compressed charge can be obtained or no spare high-pressure vessel or compressing apparatus is to hand for recharging the first or high-pressure vessel in use when empty, the vessel may be recharged by means of a slow-combustion cartridge composed of a suitable material such as to give out a large volume of gas during its combustion, and which at the same time contains sufficient oxygen to support its own combustion. The cartridge-holder is screwed into an aperture in the vessel and made air-tight by an india-rubber washer.

It will be readily seen that the vessel J may be modified by being made entirely of metal or other rigid material having a small aperture over which is fitted air-tight an elastic membrane, in which case the vessel J itself will operate by the motion of the membrane the sudden-release-valve mechanism by the variation of gaseous pressure within the vessel instead of by its visible motion as a whole.

When the vessel J is made of rigid material, the elasticity necessary for the air-blast is supplied by the elasticity of the slightly-compressed gas itself within it.

The valve Q′ is rendered tight closing by cementing a small disk of india-rubber or caoutchouc to the face of the plunger of the valve Q′. To prevent corrosion or adhesion, oil-silk or other similar and suitable material is tied over the face of this india-rubber disk, as shown in the drawings.

As the high-pressure storage-vessel A and also the spray-nozzle and vessel T are ordinary articles of commerce, they do not need further description.

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. A self-acting apparatus consisting of a store vessel containing liquefied gas or compressed air fitted with a finely-adjustable issue-valve, in combination and connected with a bubble-indicator and with a second low-pressure vessel capable of expansion and contraction, and a suitable valve controlling a discharge orifice or conduit from the secondary vessel and connected with and operated by the movement of the latter and adapted to effect periodic discharge of the operating-gas or compressed air to actuate any known form of spray-nozzle, substantially as and for the purposes described.

2. The combination, with the second or low-

pressure vessel J, of a cover L and spring-pressed sliding bar N, carrying the detent O, the spring-pressed lever P, opening the valve Q′, and the release-lever R, disengaging the connecting-rod Q to permit the valve Q′ to close, substantially as described.

3. A vessel or chamber adapted to contain a gaseous motive fluid, and an elastic or expansible vessel connected therewith and accumulating a charge from the motive fluid and a sudden-release valve connected with said expansible vessel, in combination with a spray apparatus consisting of an exhaust-pipe from said release-valve, a vessel containing liquid to be sprayed, and an exit-pipe for said liquid, discharge and spraying being effected by pressure or induction of the periodical sudden exhaust of the said motive fluid from the said elastic or expansible vessel, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED RÉNÉ UPWARD.

Witnesses:
STANLEY CHEESWRIGHT,
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