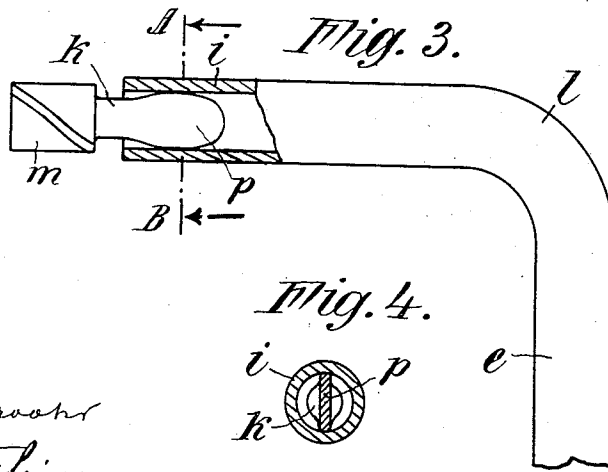
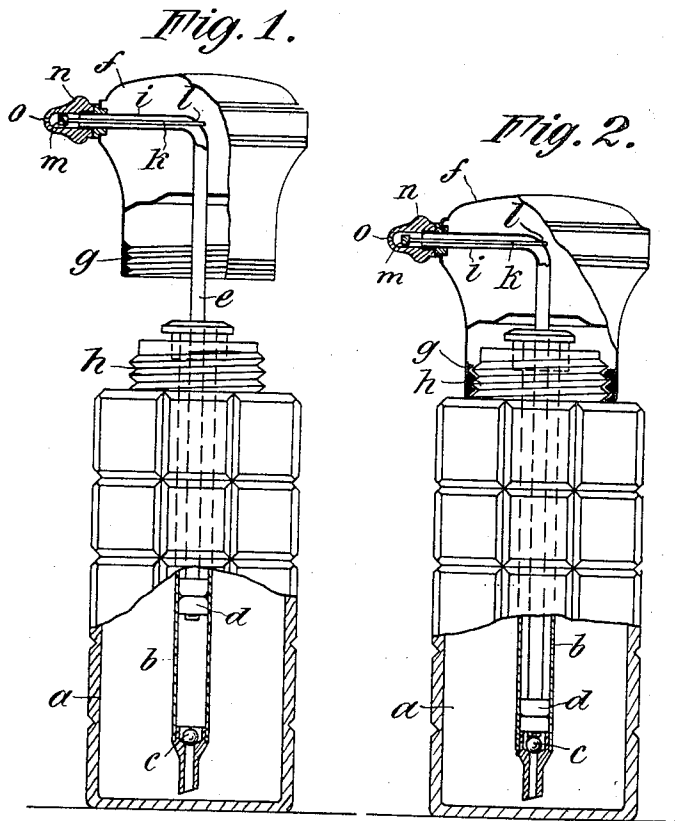


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 ATOMIZER.
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1,057,982.

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ATOMIZER.

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Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed January 23, 1912. Serial No. 672,904.

To all whom it may concern:

Be it known that I, HEINRICH RACHMANN, a subject of the Emperor of Austria-Hungary, residing at Haida, Bohemia, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in and Relating to Atomizers, of which the following is a specification.

The present invention has for its object a pump atomizer combined with a liquid reservoir. The known pump atomizers of this kind present the defect that when the apparatus is horizontal the liquid is able to escape from the opening provided for the passage of the piston rod from the liquid reservoir and also from the atomizing aperture. Consequently the known devices are not suitable for traveling, more especially as the vibration and shaking arising in transport tends to cause the piston rod to protrude so that it is liable to become deformed and injured.

In accordance with the present invention the said defects are avoided owing to the fact that the piston rod is retained in its depressed position by an obturator closing the aperture through which the rod leaves the reservoir. Owing to the fact that the opening through which the rod leaves the liquid reservoir is closed, not only is the piston rod prevented from protruding inopportunely but even when the liquid is in communication with the atomizing aperture the escape of liquid from this aperture is prevented because, as is known, it is impossible for liquid to escape from a receptacle with a single narrow opening unless there is an air inlet at another place.

A particularly advantageous arrangement is one in which the fixing of the piston rod simultaneously secures the suction valve in its closed position. This not only produces a double obturation by the fixing means and the suction valve but the latter acts directly as a firmly inserted stopper so that in an atomizer of this kind sensitive and volatile perfumes and the like can be kept for a long time as well as in a tightly stoppered bottle. This renders it possible for perfumers to market their products directly in atomizers, which has not hitherto been the case.

In a preferred embodiment of the invention the means for retaining the piston rod in its depressed position and obturating the aperture through which it passes is constituted by a screw cap fixed directly to the

atomizing head. With this construction, when the piston rod is fixed the atomizing head constitutes a single rigid whole with the liquid reservoir and the screw cap relieves the piston rod from all bending strains due to lateral shocks. In the older forms of atomizers accidental escape of liquid from the atomizing aperture is further facilitated owing to the fact that the valves of such atomizers which are manufactured in very large quantities cannot permanently form a liquid tight joint. In accordance with the invention this defect is obviated by capillary action. If, in endeavoring to follow this idea, it were attempted to form the spraying tube as an ordinary capillary tube, the desired result would not be attained as in this case the spraying tube would present too small a free cross section to permit of the discharge of a sufficient quantity of liquid during the delivery stroke of the piston. In accordance with the invention this difficulty is overcome by inserting a long wire in the spraying tube which is not excessively narrow so that an annular passage of great length is formed in the spraying tube, the total cross section of which is sufficiently large to permit of the discharge of the necessary quantity of liquid during the delivery stroke of the piston but which on the other hand is so narrow that it is impossible for liquid to issue automatically in opposition to the capillary action. The surprising fact has been noticed that an atomizer comprising this wire insertion does not require a delivery valve at all because the cross section of the piston relatively to the cross section of the annular passage existing around the inserted wire is so preponderating that the liquid passes far more speedily through the suction valve than the outer air through the long annular passage, so that, notwithstanding the absence of a delivery valve, a perfectly satisfactory suction of liquid takes place. By this means the cost of manufacture is largely reduced.

It is advantageous to utilize the wire insertion as a support for the atomizing plate or atomizing cylinder. As is known, it frequently happens with atomizers of this kind that the atomizing aperture becomes stopped. In this case it is necessary to unscrew the cap covering the atomizing cylinder or atomizing plate and containing the discharge aperture, in order to prick the latter and

clean the atomizing cylinder. In effecting this the fact that the atomizing plate constitutes a separate part loose in the cap or detachably connected therewith is very troublesome. The atomizing cylinder may readily be lost and even when this does not happen it is very difficult to manipulate such a small round body as this cylinder. In accordance with the invention this defect is obviated owing to the fact that the wire insertion in the spraying tube carries the atomizing plate at its extremity; if the cap is unscrewed the cylinder cannot be lost as it is fixed to the wire and it can readily be cleaned on all sides owing to its connection with the conveniently handled and stable body of the atomizer.

Two embodiments of the invention are illustrated by way of example in the accompanying drawing, in which:—

Figure 1 shows the atomizer ready for use. Fig. 2 shows it closed. Fig. 3 shows the front part of the spraying tube of a second constructional form of the atomizer to a larger scale. Fig. 4 is a section on the line A—B of Fig. 3.

Referring to Figs. 1 and 2 *a* is the liquid reservoir, *b* the pump cylinder in the reservoir and having at its lower end a suction valve *c*, preferably in the form of a ball valve, as shown, and *d* is the piston in the pump cylinder. The piston *d* is displaceable in the cylinder *b* by means of the hollow piston rod *e* serving as the spraying tube and which at its upper end carries the atomizer head *f*. At its lower end this head forms a screw cap *g* which fits the screw socket on the reservoir *a*. If the piston *d* is depressed and the cap *g* screwed onto the socket *h* the opening through which the piston rod leaves the reservoir *a* is closed by the screw thread on the parts *g* and *h*. Finally the piston *d* or a projection therefrom bears on the suction valve *c* and presses it firmly on its seat so that a two-fold security is afforded against the escape of liquid, as already mentioned. Fig. 2 shows that in the closed position of the device there illustrated any lateral strains or shocks are taken entirely by the atomizer head *f* and the cap *g* the slender piston rod *e* being completely protected. The piston rod *e* is bent over at its upper part and in the horizontal length *i* formed by this bending a wire *k* of corresponding length is inserted: This wire can be soldered at *l* for example. Between the wire *k* and the inner wall of the length of tube *i* a narrow annular passage therefore remains free through which the liquid forced up in the piston rod *e* is able to pass. Contrary to what is the case in all known forms of atomizer no delivery valve need be provided. The spirally channeled atomizer cylinder *m* is fixed to the end of the wire *k* by soldering for example. Accordingly if the

cap *n* which contains the discharge aperture *o* is unscrewed the cylinder *m* cannot become lost and is accessible on all sides for cleaning.

The construction illustrated in Figs. 3 and 4 differs from that shown in Figs. 1 and 2 owing to the fact that the wire *k* is rigidly but detachably connected with the tube *i*. With this object the wire *k* comprises at the end a tapering plate *p* which is tightly clamped in the tube *i*. The liquid is able to flow past both sides of the plate *p* and then, as in the first construction, through the annular passage remaining between the wire and the tube.

If any deposit forms in the tube *e* which may take place especially at the bend at *l*, by means of a pair of pincers or the like the wire *k* carrying the atomizing cylinder *m* can be withdrawn from the tube *i* and the latter conveniently cleaned.

Obviously instead of a wire a tube might be inserted in the spraying tube as the only result to be attained is the formation of a long narrow passage which, however, as a whole must present an adequate cross section.

Any suitable kind of atomizing plate or cylinder can be employed.

What I claim and desire to secure by Letters Patent of the United States is:—

1. An atomizer, comprising a liquid reservoir having a reduced and externally threaded projection at its upper end and an opening leading through said projection, a pump cylinder in the reservoir, an internally threaded cap adapted to screw on the said projection of the reservoir to close the opening thereof, a piston in the pump cylinder and having its piston rod extending out through the projection of the reservoir into the cap and secured in an opening therein, and an atomizer head on the cap at the opening thereof.

2. An atomizer, comprising a reservoir having an opening in its top, a pump cylinder in the reservoir and having a suction valve at its lower end, a piston in the cylinder and having its piston rod extending out through the opening of the reservoir, an apertured cap having a screw-threaded connection with the reservoir and into the opening of which the end of the piston rod is secured, and an atomizer head on the cap at the opening thereof, whereby when the cap is screwed onto the reservoir the opening thereof will be tightly closed and the valve of the pump held to its seat.

3. An atomizer, comprising a reservoir, an atomizing pump in the reservoir and having its piston rod projecting out through the top of the same, an apertured cap for closing the reservoir and into the opening of which the upper end of the piston rod is secured, a wire in the end of the piston rod

and provided with an atomizing plate at its outer end, and an apertured cap inclosing said plate.

4. A liquid atomizer comprising a liquid
5 reservoir, an atomizing pump arranged in
the reservoir and having its piston rod pro-
jecting therefrom, an atomizer head, and a
screw cap combined with the atomizer head
for holding the piston rod in its depressed
10 position and simultaneously closing the aper-
ture through which the rod leaves the reser-
voir and holding the suction valve of the
pump in its closed position.

5. A liquid atomizer, comprising a liquid
15 reservoir, an atomizing pump arranged
therein, a spraying tube, a long wire secured
against rotation in the spraying tube and
forming a long annular passage, and an
atomizing plate secured to the extremity of
20 the wire.

6. An atomizer, comprising a reservoir,
an atomizing pump in the reservoir and hav-
ing its piston rod projecting out through
the top of the same, the outer end of the pis-
ton rod being bent approximately at right 25
angles, a cap for closing the reservoir hav-
ing a lateral opening into which the bent end
of the piston rod projects, a wire secured
in the angular portion of the piston rod and
provided at its outer end with an atomizing 30
plate, and an apertured cap detachably se-
cured to the cap of the reservoir and into
which the plate of the wire projects.

In testimony whereof I affix my signature
in presence of two witnesses.

HEINRICH RACHMANN.

Witnesses:

FRANZ SIMON,
JOSEPH PAUL BURG.