E. J. WORST.

ATOMIZER.

APPLICATION FILED APR. 8, 1908.

915,646.

Patented Mar. 16, 1909.

Fig. 1.

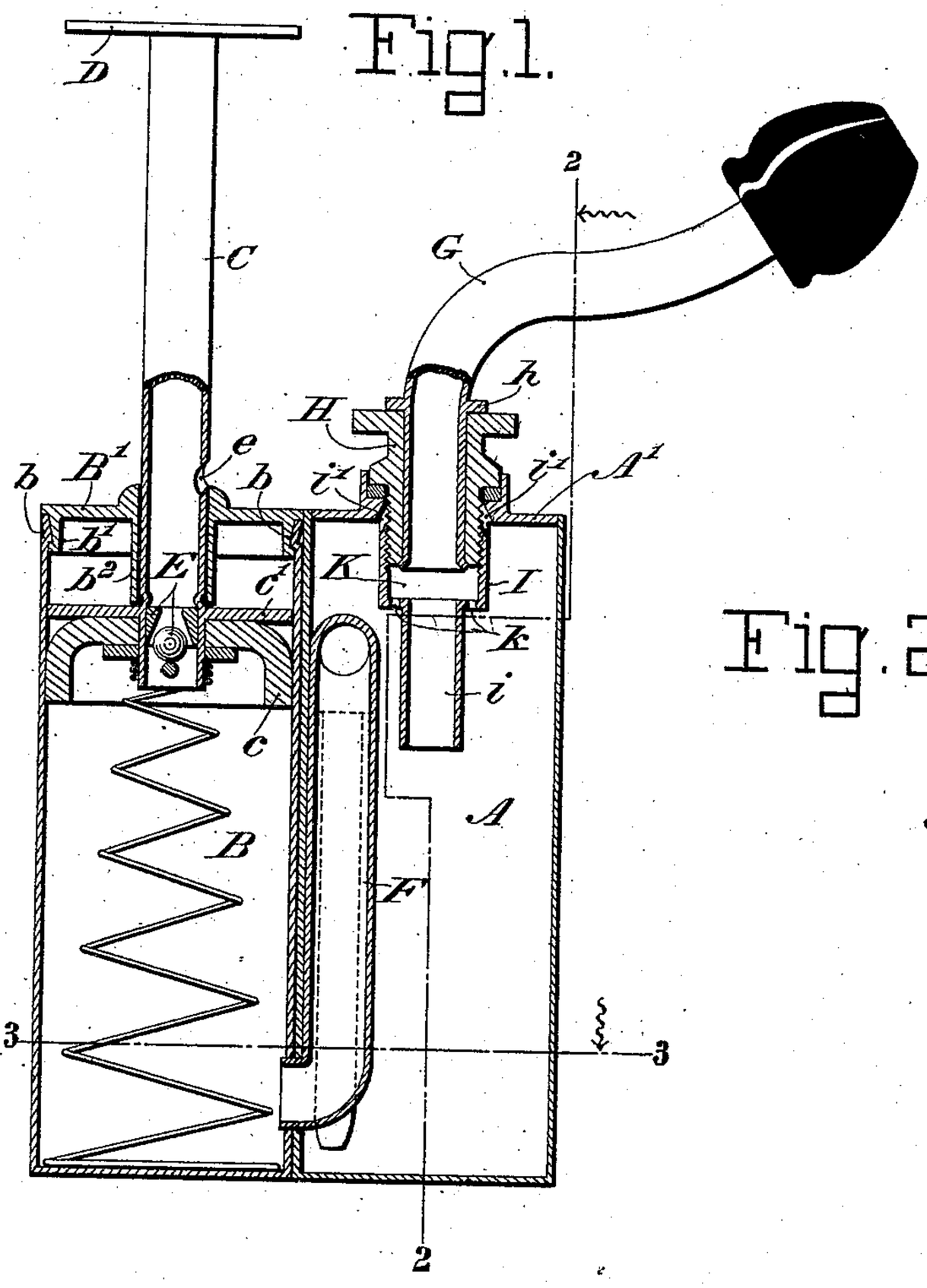


Fig. 2.

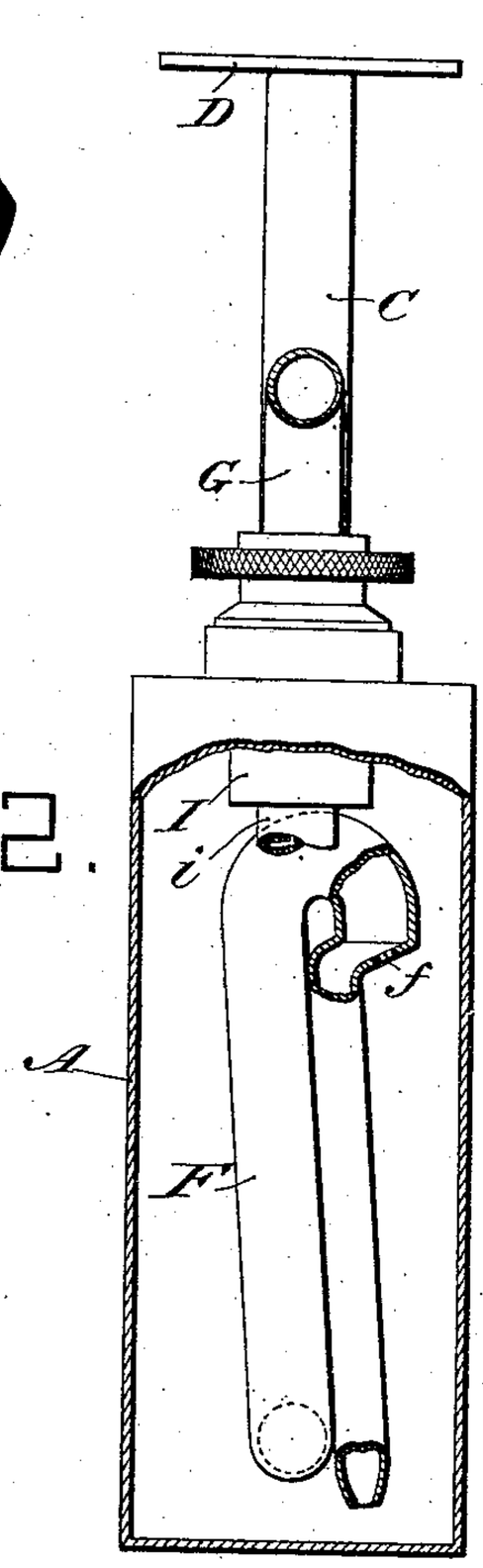
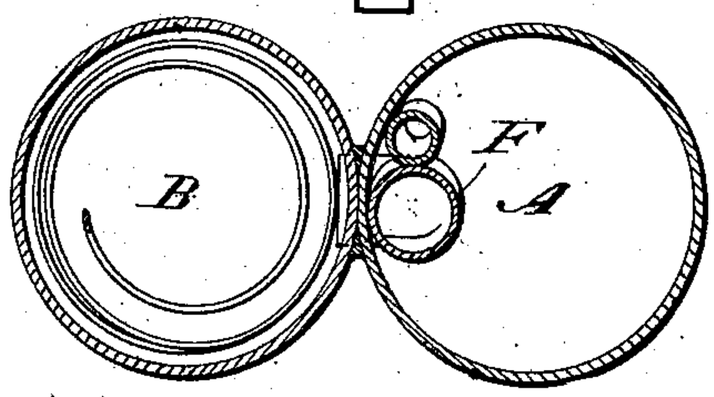


Fig. 3.



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UNITED STATES PATENT OFFICE.

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ATOMIZER.

No. 915,646. Specification of Letters Patent. Patented March 16, 1909.

Application filed April 8, 1908. Serial No. 425,811.

To all whom it may concern:

Be it known that I, ELMORE J. WORST, a citizen of the United States, residing at Ashland, in the county of Ashland and State of Ohio, have invented certain new and useful Improvements in Atomizers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to atomizers, and more particularly to the type of atomizer illustrated and described in Letters Patent of the United States granted Sept. 3, 1907, and numbered 865,021 and 865,022.

The objects of my invention are to provide an improved atomizer of the character referred to, with provision for easily cleansing and re-filling and which is more compact and less liable to be broken or injured in handling than the previously patented devices, and in which the nasal arm or douche tube cannot drop off, the several parts of the device being arranged in compact form, so as to occupy but a small space, and combining simplicity, efficiency and durability in practical use.

The invention will first be hereinafter more particularly described, with reference to the accompanying drawings, which are to be taken as a part of this specification, and then pointed out in the claims at the end of the description.

Referring to said drawings, in which the same reference letters are used to denote corresponding parts in different views, Figure 1 represents a vertical sectional elevation on an enlarged scale of an atomizer embodying my invention; Fig. 2 is a vertical sectional elevation of the same, the section being taken through the atomizing chamber, on the line 2—2 of Fig. 1; and Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 1, looking downward.

In the drawings, the letters A and B denote a pair of cylinders, preferably of sheet metal, placed side by side and rigidly secured together, by soldering or otherwise, so as to form a double cylinder practically in a single piece, or if desired the two cylinders may be formed integrally, of any suitable material, which will secure the desired rigidity and compactness of structure. Within the chamber B is fitted a piston consisting of a flexible disk *c* underneath a plate *c'* secured to the lower end of a piston-rod C so that the flexible disk may press tightly against the cylinder on the downward stroke and slide backward easily on the upward stroke. The piston-rod or stem C is preferably tubular and has a presser or thumb-plate D at its free end, a check-valve E at its lower end, and an intermediate air-port *e* for the admission of air through the tube when the piston is at the limit of its upward stroke. Said check-valve may consist of a conically apertured plug inserted within the tubular stem and held against upward movement beyond a certain limit by a shoulder formed by indenting the tube as shown. The piston-rod C passes through an aperture in the top-plate or cover B' of the piston-cylinder, which top-plate is detachably secured within the cylinder so that it may be easily removed by spring catches *b*, *b*, at the upper end of the cylinder engaging an annular rib or shoulder on a depending flange *b'* of the cover.

In order to steady and guide the piston-rod in its movements a tubular boss or projection b^2 is formed on the under side of the top or cover B' surrounding the aperture through which the piston-rod passes, and this construction also gives additional strength and facilitates the removal of the cover with the piston-rod and its attachments for cleansing purposes. Below the piston-rod is placed a suitable spring, preferably a conical helix, to effect the up-stroke or return of the piston to normal position after it has been depressed by pressure upon the thumb-plate D. Within the cylinder A is placed a vaporizer consisting of an air tube F having a bend at its lower end inserted through an aperture in the double wall of the two cylinders, near the bottoms thereof, as shown, through which tube compressed air below the piston may be forced into the vaporizing chamber; the said air-tuhe being of such size as to conduct a considerable volume of air to a point near the top of the vaporizing chamber and having a return bend at that point below which the tube is of a reduced size, and may be formed integrally with or soldered to the section of smaller size. An offset is formed at the junction of the larger and smaller sections of the tube

and provided with a jet-orifice *f*, from which the section of reduced size extends to a point near the bottom of the vaporizing chamber. The mouth-piece or douche tube G at the top of the vaporizing chamber has a swiveled connection with a plug or stopper H which may be screwed into an interiorly screw-threaded feed-opening in the top or cover A′ of the vaporizing chamber. Said top plate or cover may be secured within the upper end of the cylinder by soldering or otherwise, and a pendent tubular boss or projection I thereon is interiorly screw-threaded to receive the exteriorly threaded plug or stopper in which the douche tube or nasal arm H is swiveled, thus adapting the stopper to be easily removed to afford access to the vaporizing chamber for cleansing purposes or for re-filling. The swiveled connection between the douche tube or nasal arm may be conveniently secured by inserting the tube in the hollow plug and spreading or upsetting its projecting end so as to prevent it from being withdrawn, further inward movement being prevented by a rib or shoulder *h* thereon resting on the plug or stopper. The douche tube is thus firmly secured in place with provision for rotating or turning it into any desired position, and it is so held that it cannot drop off. The pendent projection I, beneath the cover, may have a reduced section *i*, either integral therewith or secured thereto, extending slightly below the jet-orifice in the vaporizer, to conduct the vapor into the douche tube; an air-space K being provided between the lower end of the douche tube and said reduced section having exit ports *k* to permit any vapor rising to the top of the cylinder to be drawn into said air-space and commingled with the larger volume of vapor passing through the reduced section of the pendent tubular projection or vapor conduit. Air vents *i′* at the top, normally closed by the stopper H, serve to drain off the liquid contents after scalding out with hot water, and permit the escape of air when the vaporizing chamber is being re-filled, the stopper being removed.

In operation, on the upward stroke of the piston a portion of the medicament or medicated liquid is drawn up through the smaller section of the vaporizing device, and on the downward stroke a volume of air is forced up through the larger section of said device and out through the jet-orifice *f*, the medicament being carried with the current and thus finely divided or vaporized and the vapor is forced out through the douche tube, on the free end of which a nasal, aural or other end-piece may be detachably secured. This operation does not produce sufficient back pressure or suction to raise the liquid or medicament past the bend in the larger limb of the vaporizing device, so that no moisture can escape into the piston-chamber to corrode it or otherwise impede its action. At the same time the requisite means are provided in the adjoining cylinder for finely dividing and disseminating the medicament without increasing the size of the instrument, which is small enough to be easily carried in the vest-pocket when the nasal arm or douche tube is turned around over the thumb-plate on the piston-rod so as to hold it down against the pressure of the spring. The atomizer thus constructed is compact, yet strong and durable, and affords a better volume of vapor without the danger of breaking or tearing the two cylinders apart which is incident to the previous constructions. Moreover, the piston may be easily removed for cleansing purposes or for the renewal of the flexible packing or other part that may become worn, and the douche tube may also be easily removed for the purpose of cleansing or re-filling the vaporizing chamber, and there is no danger of the douche tube dropping off and becoming lost.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is;

1. An atomizer comprising a pair of cylinders rigidly secured together side by side, one containing a reciprocating piston and the other containing a tubular vaporizing device connected at one end with the compression end of the piston-chamber through an aperture in the united side walls of the two cylinders, the vaporizing-chamber being provided with a feed-opening through its top and a tubular plug or stopper detachably secured in said opening and having a douche tube swiveled therein.

2. An atomizer comprising a compression or piston chamber having a reciprocating piston therein, a vaporizing-chamber rigid with said piston-chamber, and a vaporizing device consisting of a substantially U-shaped tube one section of which is of larger diameter than the other section and extends from the compression end of the piston-chamber upwardly through the vaporizing chamber where it has a return-bend and unites with the section of reduced size extending downwardly through said vaporizing-chamber, there being a jet-orifice at the junction of the larger and smaller sections of the tube, together with a vapor conduit and douche tube at the upper end of the vaporizing-chamber.

3. An atomizer comprising a pair of cylinders rigidly secured together side by side, one containing a reciprocating piston and the other containing a tubular vaporizing device connected at one end with the compression end of the piston-chamber through an aperture in the united side walls of the two cylinders and extending up through the vaporizing-chamber and thence with a return-bend and in reduced size to near the bottom of the vaporizing-chamber, the latter being provided with a feed-opening through its top

and a tubular plug or stopper carrying a douche tube detachably secured in said opening.

4. An atomizer comprising a pair of cylinders rigidly secured together side by side, one containing a reciprocating piston having a tubular stem with an air-port and a check-valve therein, and the other containing a tubular vaporizing device connected at one end with the compression end of the piston-chamber through an aperture in the united side walls of the two cylinders and extending up through the vaporizing-chamber and thence with a return-bend and in reduced size to near the bottom of the vaporizing-chamber, the latter being provided with a feed-opening through its top and a tubular plug or stopper carrying a douche tube detachably secured in said opening.

5. In combination with an air-chamber and a vaporizing-chamber joined together so as to form practically an integral structure, a tubular vaporizing-device arranged wholly within said vaporizing-chamber and having its air-inlet end connected directly with said air-chamber through an aperture in the adjoining side walls of the two chambers, means for forcing the air from said air-chamber into said vaporizing-device, and a conduit for vapor issuing from said vaporizing-chamber.

6. An atomizer comprising a pair of rigidly connected cylinders, one containing a tubular vaporizing device having one end thereof connected with the compression end of the other cylinder, and the other cylinder containing a reciprocating piston, the vaporizing cylinder having a feed-opening in its top and a hollow plug or stopper carrying a swiveled douche tube detachably secured in said opening, and the piston cylinder having a detachable cover with an aperture therein through which the piston-rod extends, said piston-rod consisting of a tube having a check-valve at its lower end, a thumb plate at its upper end and an intermediate air-port.

7. An atomizer comprising a double cylinder having an air compressor in one cylinder and a vaporizer in the other, said vaporizer consisting of an air-tube of comparatively large size leading from the compressor along the interior of the adjoining cylinder and thence with a return-bend and in reduced size back to the starting point, a jet-orifice being provided at the junction of the return-bend with the section of reduced size.

8. In an atomizer, a vaporizing-chamber having a douche tube or conduit for vapor issuing therefrom and a tubular vaporizing-device therein, in combination with an adjoining cylinder communicating with said vaporizing-device and provided with a detachable top or cover having a pendent tubular boss, a tubular piston-rod extending through said boss, having an air-port therein and carrying a valved piston below said boss, said top or cover and piston-rod and attachments being removable as a unit.

9. In combination with the air compressor, the vaporizer having a feed-opening in its top and a surrounding pendent tubular projection, a tubular plug or stopper for said feed-opening extending part-way through said projection, leaving an air-space for commingling air and vapor at the base of the plug, and a douche-tube swiveled in said plug and removable therewith only.

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

ELMORE J. WORST.

Witnesses:
R. H. GWINNER,
E. M. HARVUST.