

No. 865,022.

F. C. DORMENT.
ATOMIZER.

PATENTED SEPT. 3, 1907.

APPLICATION FILED APR. 20, 1907.

2 SHEETS—SHEET 1.

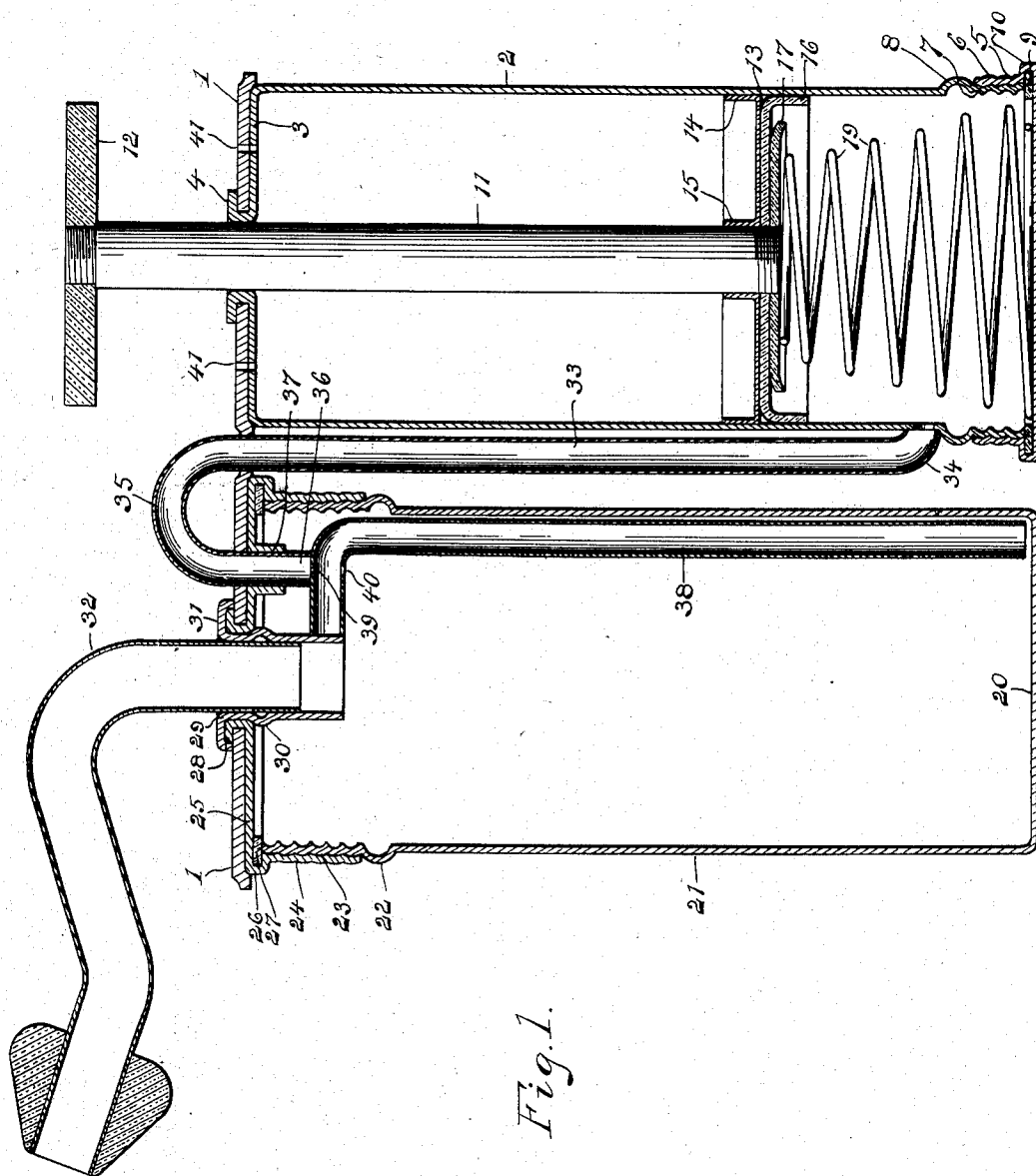


Fig. 1.

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INVENTOR

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By [Signature]
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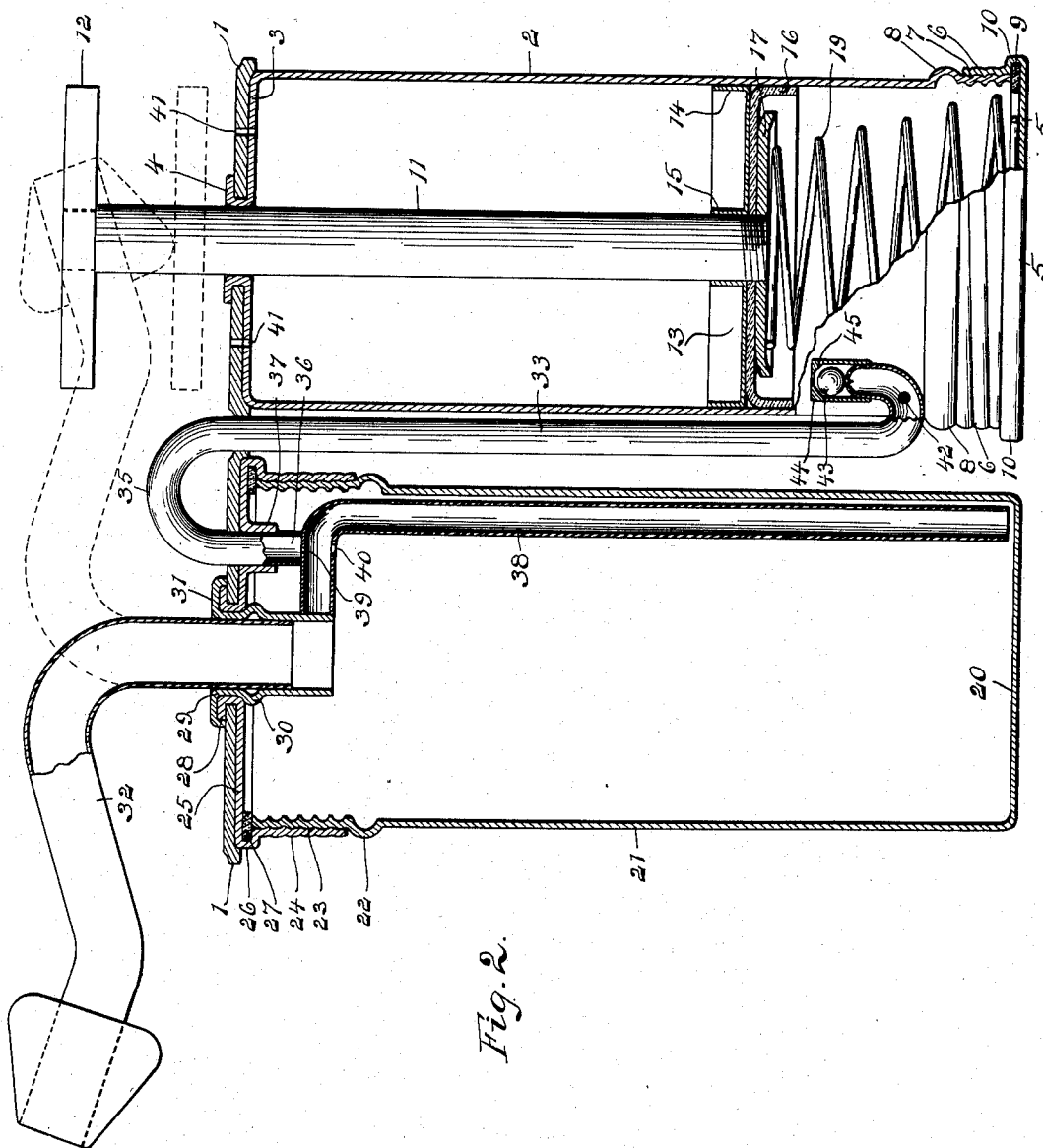


Fig. 2.

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UNITED STATES PATENT OFFICE.

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ATOMIZER.

No. 865,022.

Specification of Letters Patent.

Patented Sept. 3, 1907.

Application filed April 20, 1907. Serial No. 369,305

To all whom it may concern:

Be it known that I, FRANK C. DORMENT, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Atomizers, of which the following is a specification, reference being had therein to the accompanying drawings.

In atomizers of the usual type, difficulty is had in obtaining finely and evenly divided spray without the use of a large and bulky vaporizing chamber, and other complications of construction which make the instrument difficult to use for medicinal purposes especially, where it is desirable that the instrument be readily carried in the pocket without fear of losing the medication, and where the parts must be easily changed and replaced.

This invention relates to atomizing means, wherein the jet is projected through a sufficient air space to insure its being finely and thoroughly vaporized, and at the same time, in such direction as to preclude any liquid escaping from the douche tube or mouth piece, or being drawn into the compression chamber to the injury of the working parts, while the compact arrangement and disposition of the parts is such that the instrument is readily carried in the vest pocket.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

Referring to the drawings, Figure 1 is a view, greatly enlarged, in longitudinal section through an atomizer embodying features of the invention; Fig. 2 is a similar view of the atomizer with an outer air valve.

The atomizer comprises a pair of cylinders preferably of the same size, secured at their upper ends in parallel, spaced relation to a plate 1, which conforms closely to their contour. While these may be of any suitable material, such as rubber or the like, in the preferred form of construction these cylinders are each drawn out of a piece of suitable sheet metal, with one end integral with the cylinder wall. One of these cylinders 2 is provided with a central aperture struck through its end wall 3, the upturned resultant flange 4 being passed through a similar aperture in the plate 1 and pressed flat against the plate to secure the parts together. The lower open end of the cylinder is provided with a removable cap 5, likewise preferably spun out of sheet metal, with its marginal flange 6 rolled to engage screw-threads 7 which are formed upon the lower part of the tube.

A bead 8 is formed above the screw-threads to give finish to and to stiffen the open end of the cylinder against collapse or flattening.

To insure an air tight joint, a gasket or packing ring 9 is inserted between the cap and cylinder, and may be conveniently secured thereon by carrying out the

head of the cap beyond its flange and turning it with a square bend 10 which forms a seat for the ring.

The piston stem 11 is longitudinally reciprocable in the apertured end of the cylinder. Its upper end is screw-threaded and a circular disk or thumb plate 12 is removably secured thereon. A piston 13 is secured to its inner end. As a suitable form of construction, this consists of a circular metal plate having a fair sliding fit in the cylinder, provided with an outer annular flange 14 or bearing surface against the cylinder wall, and an inner annular flange 15 by which it is held in alinement on the stem. A packing disk 16 of flexible material, leather, rubber or the like, is secured against the piston face by a circular metal plate 17 of less diameter than the head, screwed on or otherwise secured to the projecting end of the piston stem and slightly outwardly concave.

The diameter of the packing disk 16 is greater than the internal diameter of the cylinder, so that it is cupped, its margin packing the cylinder tightly on its downward stroke and drawing away from the piston wall and head on the up stroke so that air may pass around it.

While the other parts may be of any preferred construction, it is an essential feature that the packing disk be applied as designated.

A spiral spring 19 is in compression between the cylinder cap and piston face, to return the piston. Preferably it is a conical helix, to avoid striking the coils together and to clear the walls.

The closed end or bottom 20 of the other cylinder 21, or atomizing chamber, is imperforate. A finish and stiffening bead 22 is formed near its upper open end, and screw-threads 23 above the bead engage the screw-threaded flange 24 of a cap 25. The head of the latter is formed with a square fold 26, adapted to retain a packing ring or gasket 27, and is centrally apertured, the margin 28 of the aperture being passed through an aperture in the plate 1 and folded flat against the plate to hold the cap in place. A tubular bushing 29 is inserted in the cap aperture, a bead 30 struck out of the wall forming a close shoulder joint while its upper end is flared out and the margin 31 pressed down and rolled over the flange 28 to form an airtight, solderless joint.

Obviously the use of materials other than pressed metal would change the details of construction which are not necessary features of the invention.

A douche tube or mouth piece 32 of any preferred design is movably secured in the bushing, and may have interchangeable nasal, aurai or other end pieces detachably secured thereon.

An air tube 33, preferably of drawn sheet metal, connects the cylinders. In a preferred valveless form of construction, its lower end 34 is inturned directly into the piston cylinder 2 below the piston near the bead

8, above which it extends parallel to the cylinders through a suitable aperture in the plate 1. A U-bend 35 is formed in the pipe above the plate, and the downward arm 36 extends vertically down through the plate and cylinder cap 25, whose aperture is provided with a wide annular flange 37, that forms a long bearing for and close joint with the tube. A vaporizing tube 38 bent at right angles near its upper end with a round turn, is secured in the atomizing cylinder, the end of its short horizontal arm being brazed or otherwise rigidly attached to the bushing 29 and against the end of the tube 33, and its vertical arm extending nearly to the bottom of the cylinder. A small orifice 39 in the upper side of the tube 38 and a slightly larger aperture 40 in the underside, both in axial alinement with the arm 36 of the air tube, forms a spray nozzle or vaporizer which projects the spray the whole length of the cylinder toward the bottom. Air is admitted above the piston by orifices 41 in the cylinder head.

20 In another form of the atomizer, the lower end of the air tube is bent into a U, and secured longitudinally against the side of the piston cylinder near its lower end. An aperture 42 (Fig. 2) extends through the contiguous walls of the tube and cylinder. The upturned end of the tube is drawn in or contracted and forms a seat for a ball 43 which is movable in a valve cap 44 closing over the tube, with an inverted seat 45 on its upper end, which is sealed by the ball against outward passage of air.

30 One of the features of the invention is the accessibility of the parts. By removing the thumb plate on the piston, and the piston cylinder cap, the piston is readily pushed out. In replacing the parts, the piston is pushed back, and the packing disk drawn in, so that its margin easily follows, there being no difficulty in getting the pliable edges to enter the cylinder, as in the usual form of construction where the pushing in of the piston from the top of the cylinder rumples the edges of the packing disk and ultimately renders it useless.

40 In operation, the down stroke of the piston causes an air blast through the orifices in the vaporizing tube, and the resultant vacuum draws the medicament up the tube and projects it in a spray toward the bottom of the cylinder, thereby finely dividing it, and forcing it back up through the mouth piece or douche tube; consequently another principal feature is the projection of this jet downward for the major portion of the length of the cylinder. This long passage through the air space insures very fine division and dissemination of the parts, and at the same time any drops of condensation are thrown down and trapped so that they cannot escape through the mouth piece and come in contact with the user's tissues. The upstroke of the piston

draws air into the compression cylinder, but cannot cause sufficient back pressure or suction to raise the liquid or medicament the length of the vaporizing tube, so that no moisture can get in to the piston cylinder and corrode it or otherwise impede its action. At the same time the cylindrical shape of the atomizing chamber gives a requisite long air space for complete atomizing without increasing the outer bulk of the instrument, which may be very small to fit it for the vest pocket, the inturning of the mouth piece over the piston stem still further reducing its size.

Another feature is the fact that a small amount of medicament can be successfully used without waste, as sufficient liquid to seal the lower end of the vaporizing tube is all that is necessary to render the device operative.

The pipes are rigidly supported and are so disposed between the cylinders that they are not easily strained or bent in handling and are readily cleaned.

In the preferred form of construction there are no valves, as the air passes around the piston on its upstroke. This increases the simplicity of the device.

The parts are readily made at small cost and are of a minimum number of joints and consequently little liability for leakage.

Obviously the design and details of construction may be changed without departing from the spirit of the invention, and I do not limit myself to any particular form or arrangement of parts.

What I claim as my invention is:—

An atomizer comprising a horizontal outer plate, an atomizer and cylinder whose lower end is permanently closed, and whose open upper end detachably engages a cap secured to the under side of the plate, a mouth piece removably secured in the aperture through the cap and plate, a vaporizer secured in the cap whose supply tube extends longitudinally to the bottom of the cylinder and has jet orifices near its upper end adapted to throw a spray jet longitudinally down the cylinder and whose air tube extends longitudinally through the cap and plate, a piston cylinder parallel to the atomizer and cylinder whose upper integral head is secured to the under face of the said plate and whose lower compression end is provided with a detachably secured head, a piston whose stem extends through a guide aperture in the upper head and plate, and whose head is provided on its outer face with a cup shaped, flexible packing disk, the lower end of said air tube being connected to the lower compression end of the piston cylinder, air inlets in the piston cylinder above the piston head, and a spring in compression between the lower cylinder head and piston.

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

FRANK C. DORMENT.

Witnesses:

ANNA M. DORR,

OTTO E. BARTHEL.