May 8, 1956 E. O. WHITE 2,744,790

ATOMIZERS

Filed Aug. 5, 1953 2 Sheets-Sheet 1

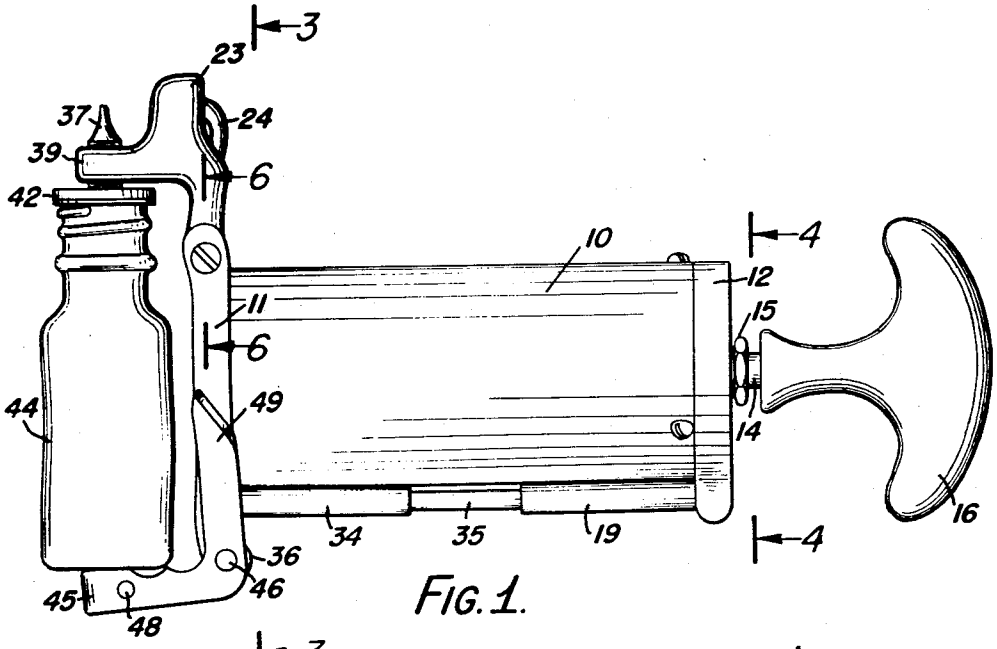


FIG. 1.

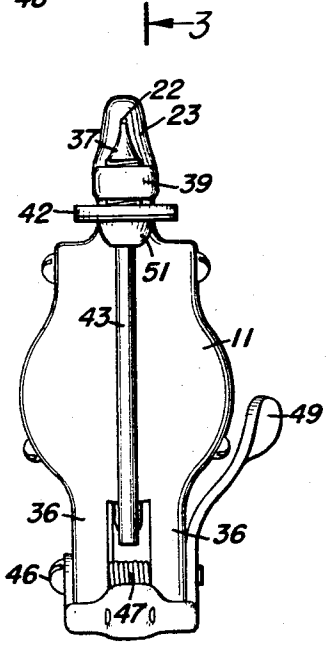


FIG. 2.

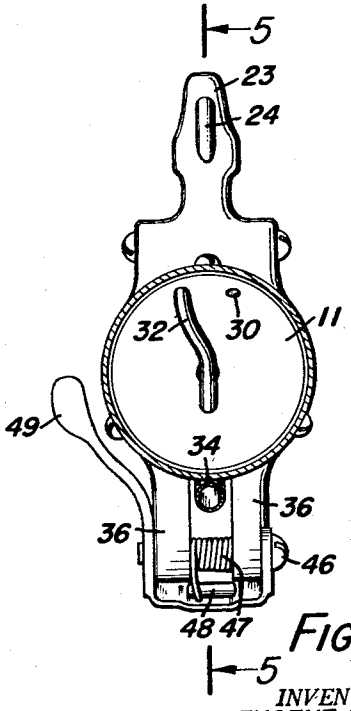


FIG. 3.

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ATOMIZERS

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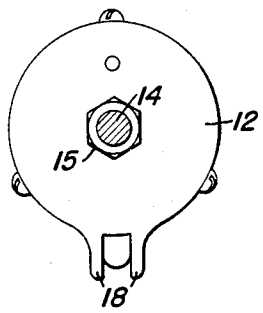


FIG. 4.

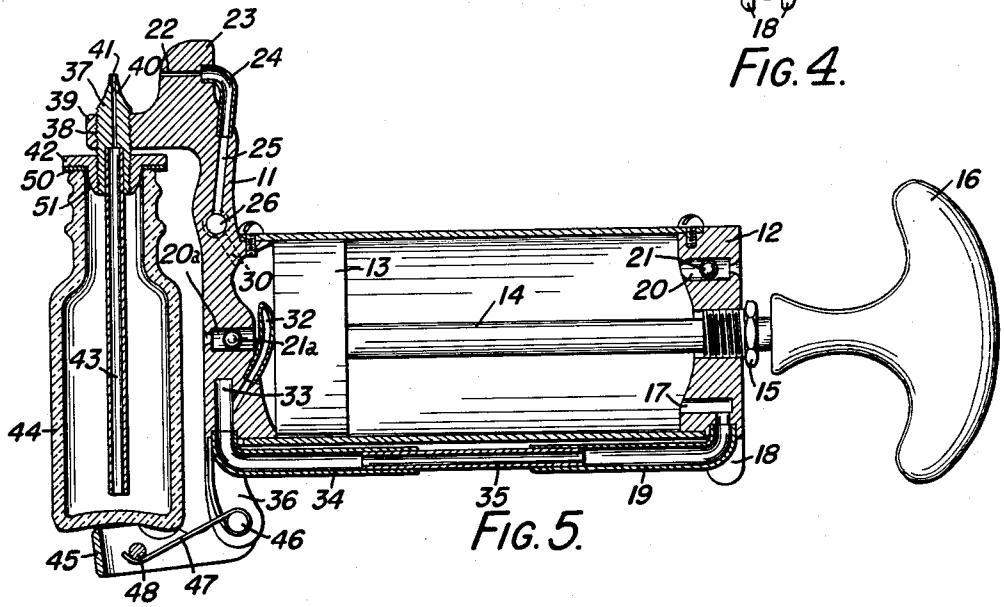


FIG. 5.

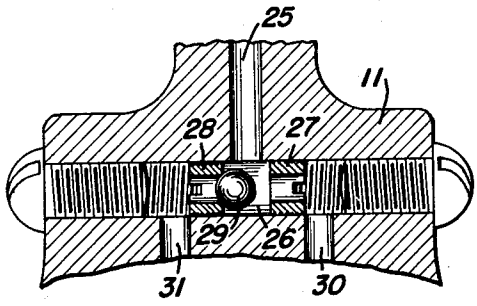


FIG. 6.

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2,744,790

ATOMIZERS

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Application August 5, 1953, Serial No. 372,574

4 Claims. (Cl. 299—88)

This invention relates to atomizers and, more particularly, to those of the hand-operated type for atomizing and spraying liquids, providing various improvements on the atomizer disclosed in Patent No. 2,026,369 granted to me December 31, 1935, one object of this invention being to provide an atomizer having a more simple, convenient and practical construction adapted, for example, for use by morticians in applying cosmetics to corpses.

Another object of the invention is to provide an atomizer of the character described having a more simple, compact and streamlined construction, with fewer externally projecting parts liable to be injured by impacts and handling.

Another object is to provide such an atomizer having more sturdy and easily adjustable nozzle means for properly regulating the atomizing action.

A further object is improved means for releasably holding and sealing a liquid reservoir container in cooperation with the liquid eduction means.

Still a further object is to provide an atomizer having the above advantages in a type of construction capable of being more readily and economically manufactured and assembled and maintained in satisfactory working condition.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a side elevation of an atomizer embodying the present invention.

Fig. 2 is an end elevation as viewed from the left in Fig. 1 but with the liquid container removed.

Fig. 3 is a sectional elevation on the line 3—3 in Fig. 1.

Fig. 4 is a sectional elevation on the line 4—4 in Fig. 1.

Fig. 5 is a sectional elevation on the line 5—5 in Fig. 3, and

Fig. 6 is an enlarged fragmentary sectional elevation on the line 6—6 in Fig. 1.

The present embodiment of the invention, herein disclosed by way of illustration, comprises a double-acting, cylinder and piston, air pumping means having at one end an operating handle for the piston and at its other end the atomizing means and liquid container. The pump cylinder 10 (Fig. 1) is preferably made of tubing or sheet metal, as well understood in the art and has its inner and outer ends closed by heads 11 and 12, respectively. The piston 13 (Fig. 5) is fixed on a piston rod 14 passing through a packing gland 15 of known or suitable construction, the outer end of the piston rod being provided with a convenient handle 16 for manually reciprocating the piston in the cylinder.

Each cylinder head is provided with an air outlet port and with an inlet port controlled by an inwardly opening check valve of known or suitable construction.

The outlet port of head 12 preferably comprises a passageway 17 leading to the circumference of the head between spaced lugs 18 thereon where it connects with a pipe section 19 extending longitudinally of the cylinder, as shown. The valved inlet port of head 12 preferably comprises a valve chamber 20 under control of a ball valve 21 acting as a check valve to admit air to the cylinder during the suction stroke of the piston. The head 11 is provided with a similar inlet valve chamber 20*a* and valve 21*a*, substantially as described in my said patent.

Cylinder head 11 is preferably constructed as a casting and formed internally with an atomizing air nozzle, valved air passageways for supplying the same, eductor nozzle means and means for releasably holding a supply bottle. The atomizing nozzle is preferably formed as a horizontal duct 22 of small diameter in an upward extension 23 of the head, being supplied through a short pipe 24 connected with an outlet passageway 25 leading to a two-way valve chamber 26 formed in the head (Figs. 5 and 6) for connecting the nozzle alternately with opposite sides of the piston 13.

Valve chamber 26 may be conveniently formed by a horizontal bore drilled through the upward extension of the head as shown in Fig. 6. This bore is threaded on opposite sides of its connection with outlet passageway 25, for the reception of threaded and adjustable bushings 27 and 28 having inner ends serving as spaced seats for an interposed ball valve 29. Bore 27 communicates outside the bushings with passageways 30 and 31 formed in the head and the outer ends of the bore are closed by screws as shown. Passageway 30 communicates directly with the adjacent or inner end of the pump cylinder, while passageway 31 is connected in the same end of the cylinder with a short pipe section 32 (Fig. 3) leading to a further passageway 33 formed through the head to its lower circumference where it connects with a short pipe section 34 extending longitudinally of the cylinder in spaced relation with pipe section 19. The spaced ends of these pipe sections are connected by a telescoping section 35 to facilitate the assembly of the heads on the cylinder. Pipe section 34 connects with the head between a pair of spaced lugs 36 extending integrally from the head, similarly to the lugs 18, thus protecting the pipe sections against injury.

It will be seen from the above description that the outlets at the ends of the cylinder are connected, respectively, with the opposite inlet ports of valve chamber 26 in head 11 and that the valve 29 in the chamber operates to transmit pressure alternately from the ends of the cylinder to the atomizing air nozzle 22, while preventing the return of the air to the suction side of the piston.

The liquid eductor means comprises preferably a tubular plug 37 (Fig. 5) threadedly mounted in an opening 38 in a horizontal arm or extension 39 of cylinder head 11. Plug 37 is formed with a nozzle opening 40 of small diameter discharging vertically through its upper pointed end 41 and spaced from and opposite the atomizing nozzle 22, as shown. Plug 37 has fixed thereon, below the arm 39, a flange 42 of substantial diameter adapted to be conveniently rotated between the fingers to turn the plug in its threaded connection with the head extension 39 and thus adjust the elevation of the tip of the nozzle relative to the air nozzle, for best operation. Nozzle plug 37 has fixed in its lower end an eductor tube 43 communicating with the nozzle bore 40 and adapted to extend within a reservoir bottle, or container 44, as hereafter described.

It will be seen that since the air nozzle 22 is formed internally of the head extension and the liquid eductor nozzle 37 is of substantial construction, both protected

within the outlines of the head extensions 23 and 39, these nozzles are well protected against deranging impacts or other injury.

The means for supplying the liquid comprises devices for releasably holding a bottle or other suitable container 44 in cooperative relation with the eductor means, preferably including a lever 45 in the form of a bail having its arms pivotally mounted on the outer ends of a screw 46 extending through the spaced lugs 36 of head 11. A spring 47 coiled about the screw between the lugs has one end engaged with the head and the other end with a pin 48 on the lever, so as to urge its outer end into contact with the bottom of the bottle 44. The lever carries an integral arm 49 terminating in a conveniently shaped end for operation by the fingers to release the bottle for refilling or replacement. The open upper end of the mouth of the bottle is pressed by the lever against a gasket 50 on the lower side of disk 42 of the eductor means and is centered by a boss 51 on the disk, these parts serving as a stopper for holding and sealing the mouth of the bottle.

In operation lever 49 is depressed and the liquid supply bottle is inserted in place with the eductor tube 43 depending adjacent its bottom and with the mouth of the bottle sealed by gasket 50 of the stopper means. Lever 49 is then released to securely clamp the bottle in such position and the atomizer is ready for use. Pump cylinder 10 is conveniently grasped with one hand and handle 16 reciprocated with the other hand, to maintain a substantially continuous jet of atomizing air and a substantially continuous supply of finely atomized liquid which may be closely regulated by the adjustment of the eductor nozzle. The exterior of the pump cylinder is encumbered by only a single air pipe compactly arranged along its bottom and the remaining air passageways are all compactly formed internally of the head 11 or in short pipe sections confined within its outlines. The liquid eductor means and the bottle clamping means are sturdily supported on integral extensions of head 11. The eductor nozzle is strongly constructed and conveniently adjusted by means of the accessible adjusting disk 42. The construction as a whole is thus convenient, durable, and compact and streamlined in arrangement, so as to facilitate convenient handling and offer a minimum of visual obstruction. At the same time the construction is relatively simple, so as to be readily and economically manufactured and assembled and maintained in efficient working condition.

It will thus be seen that the invention accomplishes its objects and while it has been herein disclosed by reference to the details of a preferred embodiment, it is to be understood that such disclosure is intended in an illustrative, rather than a limiting sense, as it is contemplated that various modifications in the construction and arrangement of the parts will readily occur to those skilled in the art, within the spirit of the invetnion and the scope of the appended claims.

I claim:

1. In an atomizer, a double acting pump cylinder and piston, said cylinder having heads provided with outlet ports and valve inlet ports, a pair of spaced lugs on each of said heads, one of said heads having thereon an aspirator nozzle and having passageways formed therein for connecting said nozzle with said cylinder and with an external opening located between said lugs of said head, pipe means connected with said opening between said lugs and with the outlet port of the other of said heads between said lugs thereof, eductor means on the first mentioned head having a nozzle positioned for cooperation with said aspirator nozzle and a tube arranged to extend into a reservoir container on said first mentioned head, means for releasably holding said container in cooperation with said eductor means, and manual means for opearting said piston.

2. In an atomizer, a double-acting pump cylinder and piston, said cylinder having heads provided with outlet ports and valved inlet ports, a pair of spaced lugs on each of said heads, one of said heads having thereon an aspirator nozzle and having passageways formed therein for connecting said nozzle with said cylinder and with an external opening located between said lugs of said head, a pipe section connected with said opening between said lugs, a pipe section connected with the outlet port of the other of said heads between said lugs thereof, said pipe sections extending longitudinally of said cylinder and having an intermediate pipe section telescopically engaging and connecting the same, eductor means on the first mentioned head having a nozzle positioned for cooperation with said aspirator nozzle and a tube arranged to extend into a reservoir container on said first mentioned head, means for releasably holding said container in cooperation with said eductor means, and manual means for operating said piston.

3. In an atomizer, a double-acting pump cylinder and piston, said cylinder having heads provided with outlet ports and valve inlet ports, a pair of spaced lugs on each of said heads, one of said heads having thereon an aspirator nozzle and having passageways formed therein for connecting said nozzle with said cylinder and with an external opening located between said lugs of said head, a pipe section connected with said opening between said lugs, a pipe section connected with the outlet port of the other of said heads between said lugs thereof, said pipe sections extending longitudinally of said cylinder and having an intermediate pipe section telescopically engaging and connecting the same, an extension on said head having a threaded opening therethrough, eductor tube means threaded in and extending through said opening with a nozzle for cooperation with said aspirator nozzle and a tube arranged to extend into a reservoir container on said head, means for releasably holding said container in cooperation with said eductor means, and manual means for operating said piston.

4. An atomizer as specified in claim 3 in which said eductor means has a flange thereon for adjustably rotating said eductor means in the threaded opening in said extension of said head.

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