April 18, 1961 P. B. MARASCO 2,980,344

ASPIRATOR MEANS

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FIG. 1

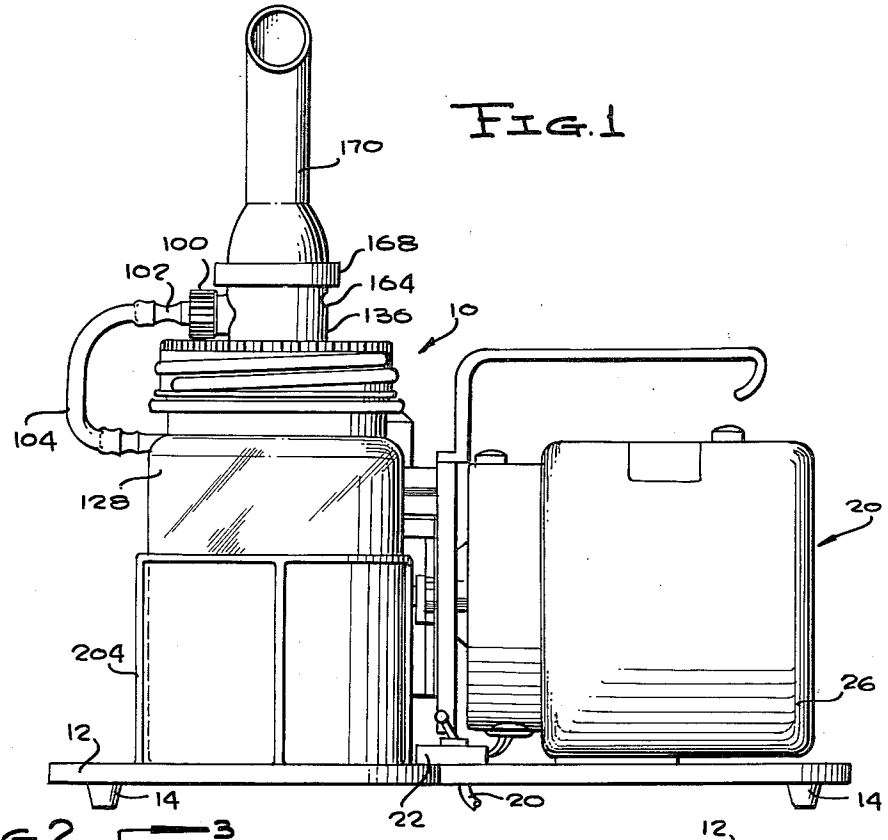
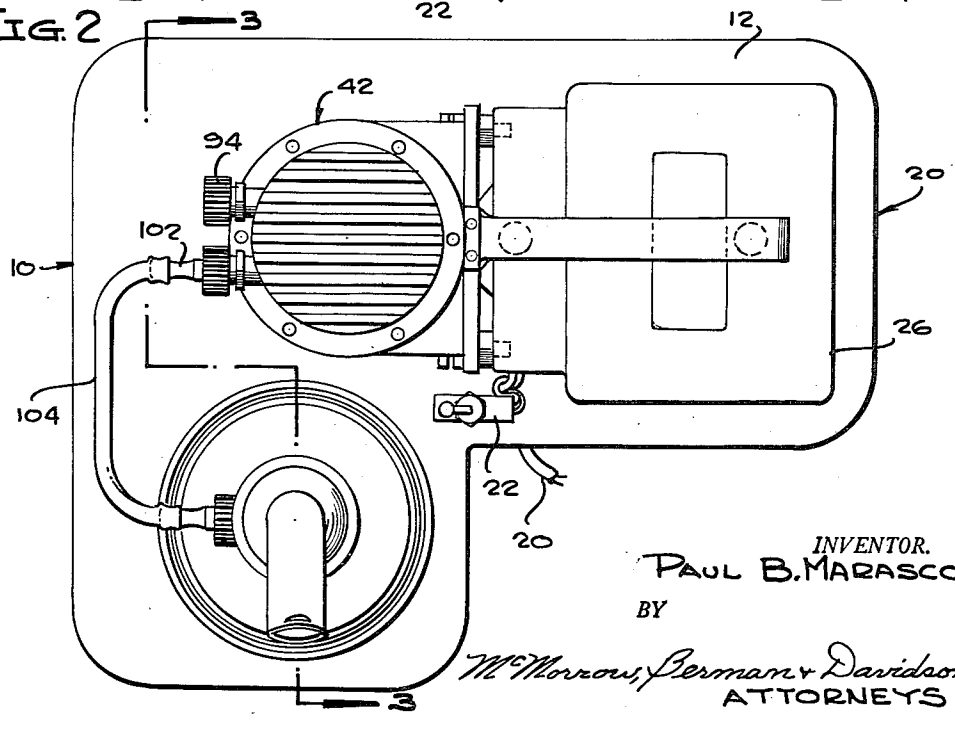


FIG. 2



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FIG. 3

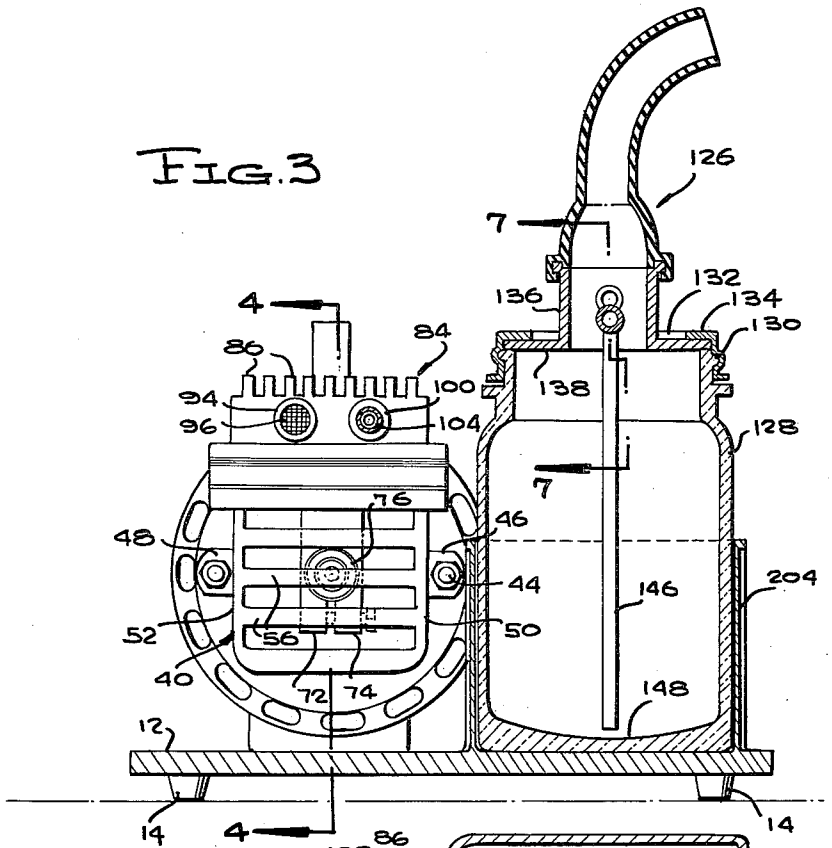
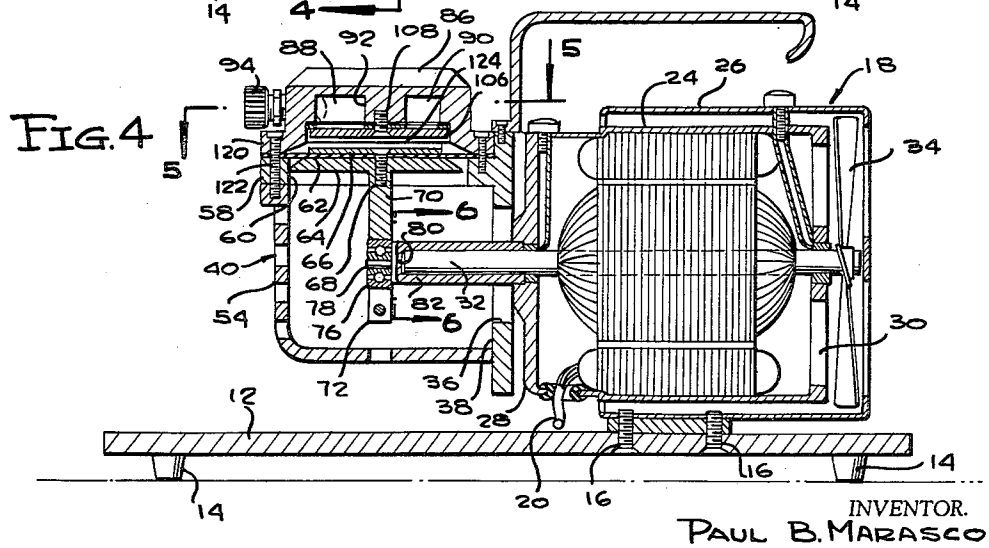


FIG. 4



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ASPIRATOR MEANS

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FIG. 5

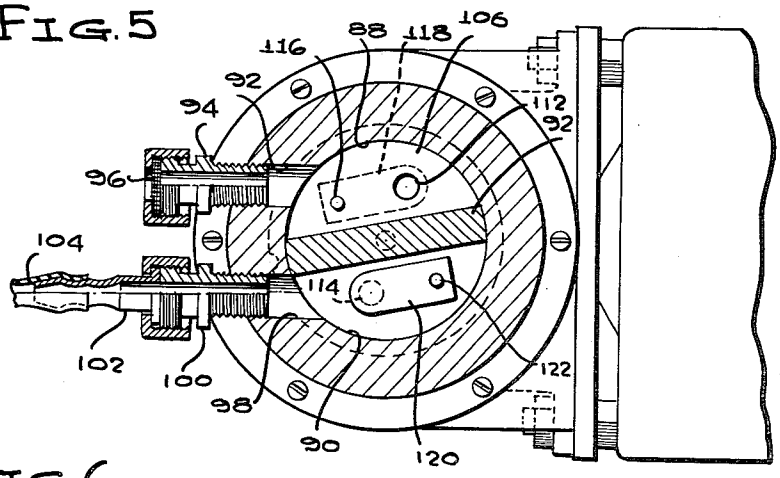


FIG. 6

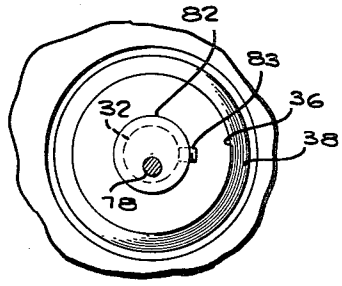


FIG. 8

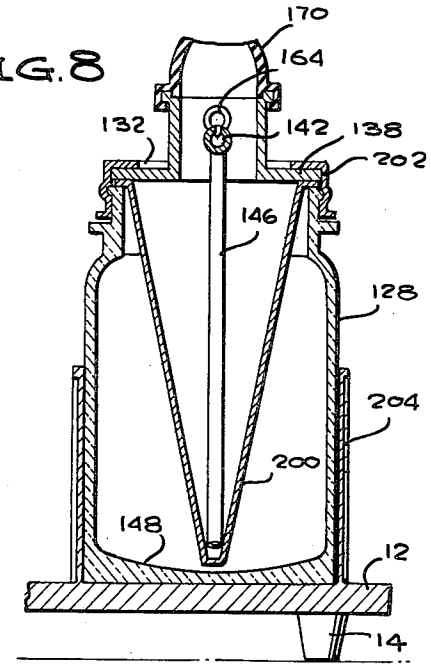
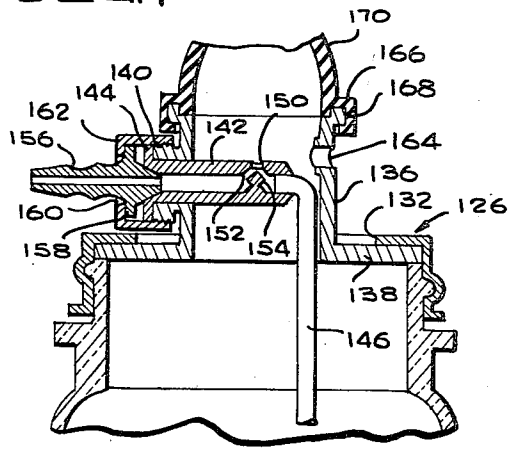


FIG. 7



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ASPIRATOR MEANS

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1 Claim. (Cl. 239—338)

This invention relates to devices for generating sprays, fogs, or vapors, and more specifically, this invention pertains to a device of the aspirator class.

One of the primary objects of this invention is to provide an aspirator with a pulsating pump or compressor.

Another object of this invention is to provide a fog nebulizing vaporizer for the prophylaxis and treatment of colds, croups, respiratory infections, as well as to provide means for treating chronic asthmatics and other chronic pulmonary diseases.

A further object of this invention is to provide a vaporizer or atomizer having relatively few movable parts.

This invention contemplates, as a still further object thereof, the provision of an atomizer which is noncomplex in construction and assembly, inexpensive to manufacture, and durable in use.

Other and further objects and advantages of the instant invention will become more evident from a consideration of the following specification when read in conjunction with the annexed drawings, in which:

Figure 1 is a side elevational view of an atomizer constructed in accordance with this invention;

Figure 2 is a top plan view of the device illustrated in Figure 1;

Figure 3 is a detail cross sectional view, partly in elevation, Figure 3 being taken substantially on line 3—3 of Figure 2, looking in the direction of the arrows;

Figure 4 is a detail cross sectional view of the pump or compressor unit together with its driving means, Figure 4 being taken substantially on the vertical plane of line 4—4 of Figure 3, looking in the direction of the arrows;

Figure 5 is an enlarged detail cross sectional view of the compressor head and illustrating the arrangement of the air inlet and outlet chambers, the control valves, and the air inlet and outlet means, Figure 5 being taken substantially on the horizontal plane of line 5—5 of Figure 4, looking in the direction of the arrows;

Figure 6 is an end elevational view of the driving means and illustrating the eccentric driving means for the piston rod, Figure 6 being taken substantially on the vertical plane of line 6—6 of Figure 4, looking in the direction of the arrows;

Figure 7 is an enlarged detail fragmentary cross sectional view of the atomizing elements; and

Figure 8 illustrates a modified atomizer container.

Referring now more specifically to the drawings, reference numeral 10 designates, in general, a nebulizing or atomizer device or unit constructed in accordance with the teachings of this invention. The device 10 is seen to include a base plate 12 supported on suitable legs 14. Fixedly secured to the base plate 12 by screws 16 is a conventional electric motor 18 adapted to be connected in an electric circuit through leads 20, the circuit to the motor being controlled by an electrical toggle switch 22 fixedly mounted on the base plate 12 (see Figures 1 and 2). The motor 18 is provided with spaced inner and outer casings 24, 26, a front end wall 28, and an

oppositely disposed open spider 30 at its other end. The forward end of the drive shaft 32 projects beyond the end wall 28 and is journaled for rotation therein and in the spider 30, and to its other end is connected a plurality of fan blades 34 to effect circulation of air between its inner and outer casings in order to maintain the operating temperature of the motor at a minimum.

The forward end of the drive shaft 32 extends through an opening 36 formed in an end wall 38 of a substantially hollow noise silencing and guard housing 40. The housing 40 serves to reduce operational noises and to guard against personal injuries by contact by the user with the moving parts of an air compressor or pump 42. The housing 40 is rigidly connected to the end wall 28 by means of a pair of bolts 44 which project through and are connected with a pair of flanges 46, 48 extending laterally from the housing side walls 50, 52, respectively. The other end wall 54 is formed with a plurality of heat dissipating fins 56.

The end wall 38 has an upper extension 58 apertured at 60 which is superposed over the upper end of the housing 50 and a flexible diaphragm 62 extends across the aperture 60 and seats on the marginal edge thereof. Engaging against the lower side of the diaphragm 62 is a piston head 64 and superposed thereover is a backing plate 66. The piston head 64 and backing plate 66 are connected to the diaphragm 62 by a countersunk screw 68. Depending from the piston head 64 is a piston connecting rod 70 having bifurcated arms 72, 74 which, at their inner ends are formed with semicircular recesses to receive a sealed oiless learing 76. The bearing 76 journals a crank pin 78 projecting eccentrically from the end wall 80 of a cylindrical sleeve 82 mounted on the drive shaft 32 for rotation therewith. A set screw 83 maintains this relationship.

Reference numeral 84 denotes an air pump or compressor head having integrally formed laterally projecting heat dissipating fins 86 extending from a side thereof. The oppositely disposed side is formed with a pair of inwardly opening inlet and outlet chambers 88, 90 separated from each other by a rib 92. The inlet chamber connects with the ambient atmosphere through a bore 92 and a fitting 94 having an air filter 96 at the inlet end thereof.

The air outlet chamber 90 is connected to a bore 98 with a fitting 100 to which is connected one end of an air discharge nozzle 102, the latter being connected to one end of a hollow conduit 104.

Reference numeral 106 denotes an inner chamber closure plate which extends across both the air inlet and outlet chambers 88, 90, respectively, and is secured to the rib 92 by means of a set screw 108. Reference numeral 110 connotes a sealing gasket interposed between the plate 106 and the head 84.

The plate 106 is formed with a pair of air inlet and outlet ports 112, 114 communicating, respectively, with the air inlet and outlet chambers 88, 90, and to the underside of the plate 106 is hingedly connected at 116 a flap valve 118 which extends across the air inlet port 112. A similar flap valve 120 is hingedly connected at 122 to the upper side of the plate 106 and extends across the air outlet port 114.

As is clearly seen in Figure 4, the head 84 is formed with a circular flange 121 which engages over the marginal edge of the upper side of the diaphragm 62 and bolts 122 serve to clamp the same between the flange 121 and the upper side of the extension 58 to effect an airtight seal therebetween and to create an air compression or pumping chamber 124.

From the foregoing description it should be now manifest that upon energization of the motor 18 the drive shaft 32 is rotated which, in turn, due to the crank con-

nection between the pin **78** and the connecting rod **70**, causes the piston to reciprocate and flex the diaphragm **62**. On the down-stroke of the piston **64**, a partial vacuum is created in the compression chamber **124** which causes the inet valve to open away from the inlet port **112** and to close the outlet valve **121** against the outlet port **114**. Thus, air is admitted to the air inlet chamber **88** and passes into the air compression chamber **124**. The piston **64**, on its upper compression stroke, compresses the air in the chamber between the diaphragm **62** and the plate **106** and in so acting, the air pressure closes the inlet valve **118** and forces open the outlet valve **121** whereby compressed air is admitted into the air outlet chamber **90**. This compressed air is then available for discharge through the fitting **100** and conduit **102** into an aspirator designated, in general, by reference numeral **126**.

The aspirator **126** includes a substantially hollow cylindrical container **128** having a pair of opposed open and closed ends. The upper open end of the container **128** is provided with an external thread **130** to threadedly receive a circular cap **132** having a central opening **134** formed therein giving rise to an annular flange **134**. Reference numeral **136** denotes a hollow cylindrical neck having an outwardly extending radial flange **138** at one end thereof, the outer marginal edge of the latter being clamped between the flange **134** and the upper end of the container **128** with the neck **136** projecting upwardly through the aperture **133**. The neck **136** is constructed with a laterally projecting, externally threaded boss **140** through which extends a substantially hollow tubular aspirator member **142** having a pair of opposed open ends. One end of the member **142** is provided with a radial abutment flange **144** to limit the extension of the member **142** into the neck **136**, and the other end thereof is connected with one end of a pipe **146**, the other end of the latter being disposed proximate to, but spaced from, the closed end **148** of the container **128**.

The aspirator member **142** has an upwardly opening orifice **150** formed therein, the orifice being substantially in coaxial alignment with the neck **136** and having a countersunk underside **152** disposed in coaxial alignment with, but spaced from a deflector **154**.

One end of a fitting **156** is received in the flanged end **144** of the aspirator member **142**, and the fitting is provided with a radial flange **158**. The fitting **156** extends through an aperture **160** formed in the cap **162** on the boss **140**, the other end of the conduit **104** is connected to the fitting **156** to deliver air under pressure to the aspirator member **142**.

The upper end of the neck **136** is apertured at **164** and terminates in an outwardly offset peripheral flange **166** forming an anchor for a snap-over flange **168** of an elongated fog, vapor or steam discharge spout **170** formed of a flexible material.

In operation, pulsating compressed air is delivered to the aspirator **142** and strikes against the deflector boss **154** for deflection upwardly into and through the orifice **150**. This air stream creates a vacuum in the pipe **146** causing fluid disposed within the container **128** to be drawn upwardly therethrough, the fluid striking the deflector **154** and becoming entrained in the air stream in the form of very small particles. The atomized fluid then passes through the discharge spout **170** to the point at which the same is to be used.

Figure 8 illustrates a second embodiment of this invention which is adapted for use when special medications are required. As is illustrated therein, this embodiment of the invention discloses that an inverted substantially hollow conical medical container **200** is disposed within the container **128**, the medical container **200** having an open base end provided with an outwardly turned radial flange **202** which is adapted to be supported on the upper terminal end of the container **128**. In all other respects this embodiment of the invention is identical to the first.

The container **128**, if desired, may be removably supported on the plate **12** within a vertically extending cylindrical side wall **204**.

Having described and illustrated the present inventions in detail, it will be understood that the same are offered merely by way of example, and that the inventions shall be limited only by the scope of the appended claim.

What is claimed is:

A power driven atomizer comprising an air compressor, a liquid container having opposed open and closed ends, a centrally-apertured cap extending across said open end of said container, a flange clamped between said cap and the adjacent end of said container, said flange having a neck portion projecting through said apertured cap and in communication with the interior of said container, liquid aspirating means carried on said neck portion and means for connecting said air compressor with said aspirating means, said aspirating means comprising an elongated open ended hollow tubular substantially cylindrical element having an orifice extending traansversely therethrough adjacent one end thereof, a deflector disposed within said hollow tubular member coaxially aligned with said orifice, said cylindrical element having its opposed ends terminating externally and internally of said neck, said connecting means being connected with the external end of said tubular member, and a pipe having one of its ends connected to the other end of said tubular member, the other end of said pipe terminating adjacent to but spaced from said closed end of said container.

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