Sept. 2, 1952 L. C. STEARMAN 2,609,233

VAPOR SPRAY SYSTEM

Filed Aug. 3, 1948

FIG_1_

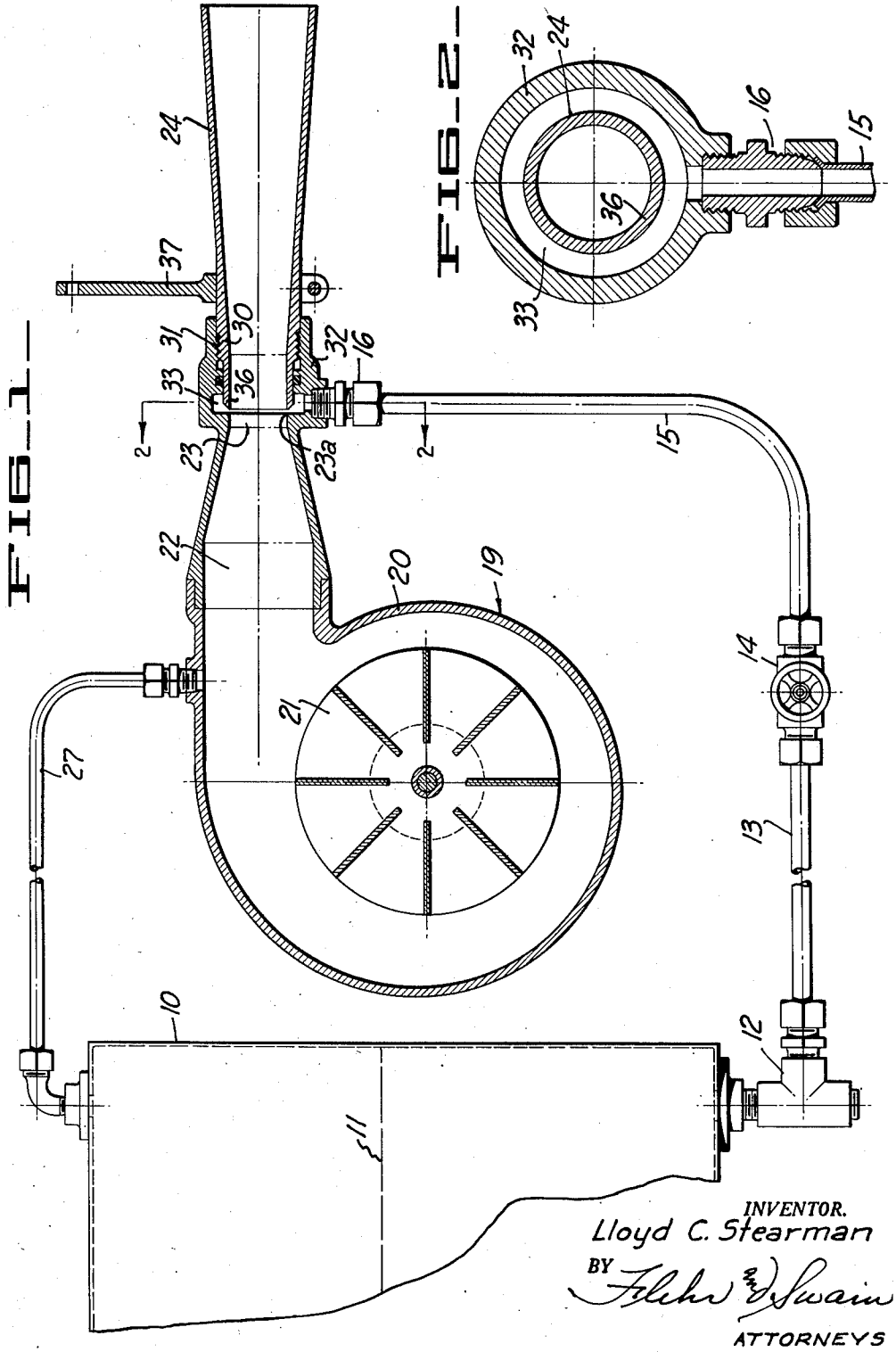


FIG_2_

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VAPOR SPRAY SYSTEM

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1 Claim. (Cl. 299—86)

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This invention relates generally to spray devices and particularly to that type of device adapted for use in connection with spraying of liquid such as insecticides, etc., where it is necessary to break the same into a fine liquid spray or fog and to disperse the same over a substantial area.

In the past various forms of blowers have been utilized and liquid has been discharged into the air stream at various points and with varying results. All of these devices have been subject to various difficulties either by way of their failure to properly break the liquid into a mist or fog, because of their expense, because of their undue complexity, or because of other mechanical difficulties such as the difficulty of cleaning them, the difficulty of adjusting them, etc.

It is an object of the present invention to provide a liquid spray device which is easy to manufacture, easy to operate and simple to repair and adjust.

It is a further object of this invention to provide a device of the character described in which the liquid to be sprayed is discharged into the air stream in such a manner that complete atomization or vaporization of the same is attained.

Further objects and advantages of the present invention will appear from the accompanying description taken in conjunction with the drawing in which:

Figure 1 is a side elevational view, partly in cross section, of a device incorporating my invention, and

Figure 2 is a cross-sectional detail taken along the line 2—2 of Figure 1.

As shown in Figure 1, I have provided a storage tank 10 in which a suitable quantity of liquid 11, which is to be vaporized and discharged, is stored. The liquid 11 passes from the tank 10 through a piping system consisting generally of a T 12, suitable conduit 13, valve 14, conduit 15 and fitting 16 to a discharge nozzle which will more fully hereinafter be described.

I have also provided a blower 19 consisting of a housing 20, and a fan or rotor 21 which may be driven by any suitable means such as an electric motor or an internal combustion engine. The rotor 21 rotates at high speed and discharges a substantial quantity of air at high velocities through the discharge passage 22 which, as shown in Figure 1 is in the form of a truncated cone which is narrowed to a circular orifice 23 which opens into a flared nozzle 24, also in the form of a truncated cone, creating a Venturi tube. A second conduit 27 is provided generally as shown on the inflow side of the venturi which leads back

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to the tank 10 and maintains a slight pressure upon the body of liquid 11. The purpose of applying pressure to the upper surface of the body of liquid 11 is, of course, to insure a proper supply of liquid through the conduit 15 to the nozzle system which will hereafter be described.

As is shown in Figure 1 the flared nozzle 24 is threaded at 30 to cooperate with threads 31 within housing 32 which forms the passageway 22. An annular orifice 33 is provided in housing 32 and is in communication with the conduit 15. The rear lip 36 of the nozzle 24 is adapted to be moved toward or away from the lip 23*a* of opening 23 by rotating the flared nozzle 24 as by means of a handle 37.

It is obvious that by rotating the flared nozzle 24 the lip 36 will be urged into contact with the lip 23*a* or will be urged away from the lip 23*a* depending upon the direction of rotation of the member 24. By varying the distance between the lip 36 and the lip 23*a* one will naturally vary the space between them and control the quantity of liquid which will pass between the lips into the air stream passing through the venturi formed by the passageway 22 and the member 24.

Operation of the device may briefly be described as follows:

A suitable quantity of liquid 11 is placed in the tank 10. The rotor 21 is caused to rotate by any suitable source of power, the valve 14 is opened and liquid is allowed to flow through the fitting 12, conduit 13, valve 14, conduit 15 and fitting 16 into the annular orifice 33 in the housing 32. As air under pressure is forced in great volume and at high velocity through the passageway 22 and through the throat of the venturi created at 23 by the passageway 22 and the outwardly flared nozzle 24, the liquid forced from passageway 33 through the space between the members 22 and 24 will be discharged with the air stream through the nozzle 24.

By varying the space between the lip 23*a* and the lip 36 one may vary the volume of liquid forced into the air stream from the annular orifice 33.

When one desires to cut off the flow of liquid into the air stream, rotation of the flared member 24 by operation of handle 37 until the lip 36 and the lip 23*a* engage, will suffice. Should foreign matter get into the annular orifice 33 or into the aperture between the lips 36 and 23*a*, merely increasing the distance between the lips 36 and 23*a* by rotation of the flared member 24 by means of handle 37 will usually open the aper-

ture sufficiently for foreign matter to be discharged therefrom into the air stream.

It is obvious that a conventional blower as shown at **20** is not essential to my plan and that any reasonable and suitable mechanical substitute therefor may be arranged without departing from the spirit of the invention. For example the exhaust from an internal combustion engine may be utilized where it is desired that the air blast be heated or where it makes no difference whether the air blast is heated or not or when the impurities in the exhaust stream from the internal combustion engine do not detract from the effectiveness of the material being sprayed.

I claim:

In a vapor spray apparatus, a sealed tank for containing the liquid to be sprayed, means to produce a constant air pressure, fluid flow connecting means to apply said air pressure to the top of said tank from said means, a quick cut-off discharge nozzle comprising a pair of truncated cones, one of said cones being stationary and providing a threaded body member at its smaller diameter end for engagement with the smaller diameter end of said second cone, said second cone being movable thereby into and out of engagement with the smaller inner diameter of said stationary cone, said cones forming a Venturi tube having an adjustable and closable suction orifice, and fluid flow means for connecting the bottom of said tank to said orifice.

LLOYD C. STEARMAN.

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