Nov. 21, 1950 W. M. VOGEL 2,530,557

SPRAYER

Filed Nov. 13, 1946

Fig. 1

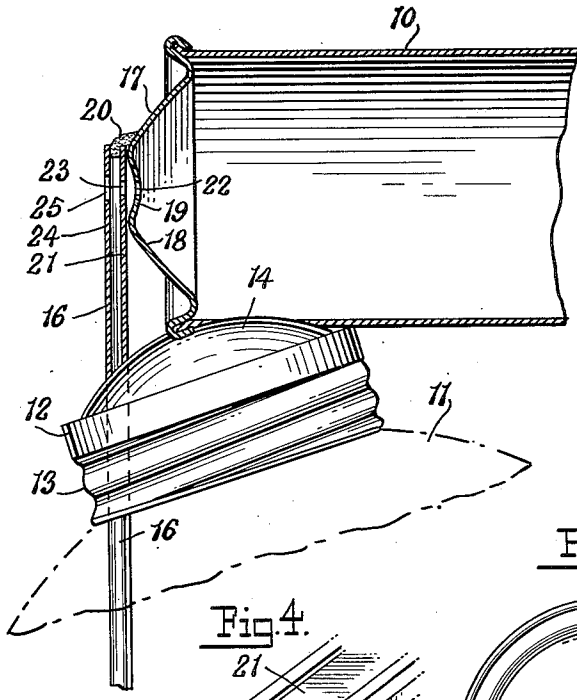


Fig. 7.

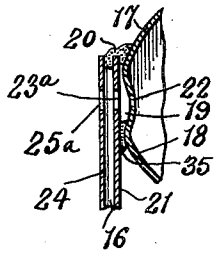


Fig. 2.

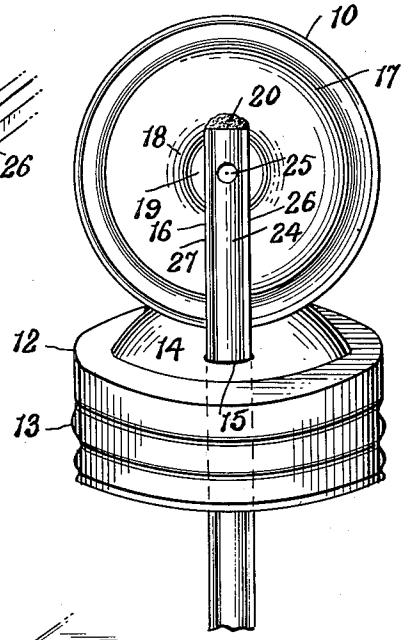


Fig. 4.

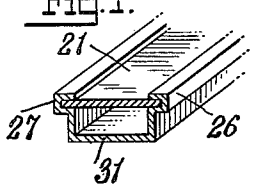


Fig. 3.

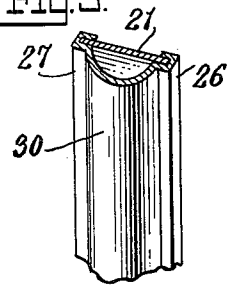


Fig. 5.

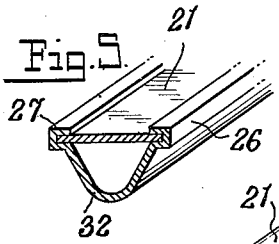
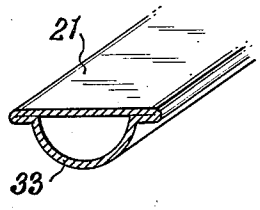


Fig. 6.



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Patented Nov. 21, 1950

2,530,557

UNITED STATES PATENT OFFICE

2,530,557

SPRAYER

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Application November 13, 1946, Serial No. 709,585

2 Claims. (Cl. 299—88)

1

This invention relates to insecticide sprayers or atomizers of the kind generally used for the distribution of liquid insecticide, and the invention has for its primary object the provision of an improved construction of this character whereby better, more effective and more positive results are secured than with types of spraying devices now in use for the purpose.

An object of the invention is the provision, in a device of this type for the purpose specified, of means to insure a dense and fine atomization of the fluid to be distributed. In carrying out the invention, I provide a construction utilizing a liquid suction tube of particular shape in cross section, and this, in combination with certain arrangements of spray discharge opening and air-blast openings arranged in alignment, and the arrangement of other parts in the structure, enables the invention to effectively perform the desired spraying action.

Another feature of the invention resides in the manner in which the liquid suction tube is constructed and attached to its associated parts; to the particular shape and disposition of said tube and to its co-operation with various other elements embodied in the structure to produce the desired mode of operation.

These and other objects are attained by the invention, a more particular description of which will appear hereinafter and be set forth in the claims appended hereto.

In the accompanying drawing, forming a part hereof, Fig. 1 is a side elevation, with certain parts in section, of a spraying device constructed in accordance with the invention; Fig. 2 is a front elevation of the same; Fig. 3 is a sectional view through one of the types of liquid suction tubes successfully employed in the structure; Fig. 4 is a sectional view through a suction tube of different cross-sectional shape; Fig. 5 is a sectional view through another type of suction tube; Fig. 6 is a sectional view through a single-piece type of suction tube, and Fig. 7 is a sectional view through a modified form of suction tube and arrangement of spray holes and air blast opening.

Referring in detail to the accompanying drawing, it will be seen that the improvements are represented as embodied in a spraying structure of the character conventionally employed for the purpose of spraying any of the well-known liquid insecticides. This type of sprayer structure includes an air pump provided with an elongated cylinder 10 having a piston slidably mounted within it, said piston being attached to a rod which terminates in a handle located exteriorly

2

of the rear end of the cylinder. These elements are all of well-known form and with the exception of the cylinder 10 are omitted from the drawing to simplify illustration of the novel features of the invention.

The device also includes a liquid fuel receptacle, a portion of which is shown at 11, the fuel receptacle having a spout arranged to threadably receive a cap 12, the latter being provided with the threads 13 by means of which it is detachably secured to the spout of the receptacle 11. In the form shown, the cap 11 is provided with a domed top 14 formed with an aperture 15, through which is extended the suction tube 16. The lower portion of the suction tube, or that part of the tube extending below the cap 11, projects downwardly within the fuel receptacle 11 to reach the contents thereof to draw the same upwardly for spraying.

The cylinder 10 is attached to the top of the cap 11 by being soldered or otherwise firmly attached, and at its forward end the cylinder 10 is provided with a closure or head having its central portion bulged forwardly as at 18, the center part of the forwardly-extended part 18 being provided with a depression or recess as indicated at 19. In the center of the recess or depression 19 is provided the air blast opening 22 through which a blast of air is forcibly ejected by operation of the piston within the cylinder 10.

The spray tube 16 has its upper end portion located in front of the recess or depression 19 and is slightly spaced therefrom, as shown in Fig. 1 and the tube is long enough to bridge the depression 19. At the top, the tube 16 is closed. This can be done by pinching the upper end of the tube together, or the closure of the top end of the tube can be effected by solder, as indicated at 20, the solder used for the purpose being also employed for fastening the upper end of the tube 16 to the head 17 above the air blast opening 22.

In the arrangement shown in Fig. 1, the tube 16 has its rear wall 21 formed with an opening 23 and its front wall 24 formed with the opening 25. Thus, the three openings 22, 23, and 25 are in axial alignment. In the arrangement shown in Fig. 1, the air blast opening 22 is of relatively small size. The opening 23 in the back wall of the tube 16 may be of substantially the same size or possibly slightly larger than the opening 22. The opening 25 in the front wall of the suction tube is the larger of the three openings. This arrangement of the openings has been found to be very effective in securing extensive and well-diffused atomizing of the liquid. Another very

effective arrangement of the spray openings is shown in Fig. 7 wherein the two openings in the suction tube, indicated respectively at 23*a* and 25*a*, are shown as being substantially of the same size, and both of these holes are larger than the air blast opening 22 with which they are axially aligned. An improved spraying effect over the construction shown in Fig. 1 is attained by the hole arrangement of Fig. 7.

It is to be noted that the production of the recess or depression 19 in the head 17 results in the suction tube 16 being slightly spaced from the head around the air blast opening. This permits of a passage for the escape of excess air forcibly blown through the air blast opening 22. The escape of excess air above the top of the tube 16 is prevented by the soldered connection 17 which acts as a baffle and traps the air tending to escape at the top and limits its escape to movement laterally of the tube 16. Thus the closure 20 at the top of the tube 16 serves to cause the air to be directed through the openings 23 and 25 with any excess thereof directed laterally and beyond the sides of the tube 16.

In cases where it might be found desirable to further restrict or limit the escape of air ejected from air blast opening 22, a second baffle might be employed as indicated at 35 in Fig. 7, the same consisting of solder flowed between the suction tube 16 and head 17 and thus not only serving to aid in trapping the air but also acting to securely attach the tube 16 to the head 17.

In the operation of the sprayer, when the piston in the cylinder 10 is forced toward the head end 17, strong blasts of air will be ejected through the aligned openings 22, 23 and 25, the air being prevented from upward escape by the closure 20 and excess air escaping laterally beyond the sides of the tube 16. The air blasts passing through the opening 22 causes the fluid in the receptacle 11 to rise into the tube between the opening 23 and 25 where the liquid is caught and discharged through the opening 25 in a fine mist or vapor.

In practice I have found that the cross-sectional shape of the suction tube 16, in conjunction with the spray openings has a great deal to do with the effectiveness of the spraying results. Thus, by the formation of the suction tube in different cross-sectional shapes, various effects may be secured. For example, in the structure shown in Figs. 1 to 3 inclusive, the suction tube 16 is formed of two strips of metal, namely, a back strip 21 and a front strip 24. The front strip 24 is provided with the edge flanges 26 and 27 shaped to embrace the rear strip 21 between them. The front strip 24 is bulged forwardly on a curved or rounded line into arcuate form as at 30 so that the resultant tube produced is half-cylindrical in cross-sectional shape. With this arrangement the aperture 23 is produced in a flat plate, while the front aperture 25 is thus produced in a curved or arched plate. This combination of semi-cylindrical tube and arrangement of spray openings is efficient in producing wide distribution of the sprayed material.

When it is found desirable to provide the two openings 23 and 25 in parallel surfaces, a rectangular suction tube of the cross-sectional shape shown in Fig. 4 may be employed. Therein, the

front plate 31 is shaped to have its forward surface flat and substantially parallel to the rear plate 21. In Fig. 5 the front plate of the tube, indicated at 32 is sharply extended forwardly so that a tube of triangulated cross-sectional shape is the result. In Fig. 6 a modification of the tube shown in Fig. 3 is shown, and wherein the tube is of single piece construction, the same having the rear plate 21 formed integrally with the arched or curved front plate 33.

By the various cross-sectional shapings of the spray tube coupled with various arrangements of the openings in the tube and in the head of the cylinder 10 spraying effects most suitable to the material being sprayed, the quantity sprayed and the area or distribution of the spray is had and the results most desirable for particular materials and circumstances can be selected and the sprayer constructed accordingly.

While I have shown several embodiments of the invention, it is obvious that the same is not to be restricted thereto but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. In a sprayer of the character described, a pump cylinder having an end wall, a siphon tube having an end portion disposed across said end wall, the end wall having a hole, the tube having aligned holes in its walls disposed in alignment with the hole in the end wall and with at least the hole in the front wall of said tube larger than the hole in the end wall, the tube being attached to the end wall above the aligned holes, closure means for the upper end of the siphon tube, said tube being composed of a pair of united elongated strips, the forward one of said strips being of substantially semi-cylindrical shape and having its edges flanged to embrace the edges of the rear strip, the latter strip being relatively flat and disposed toward the end wall of the cylinder.

2. In a sprayer of the character described, a pump cylinder having an end wall, a siphon tube having an end portion disposed across said end wall, the end wall having a hole, the tube having aligned holes in its walls disposed in alignment with the hole in the end wall and with at least the hole in the front wall of said tube larger than the hole in the end wall, the tube being attached to the end wall and closed at its upper end, said tube being characterized by a flat surfaced rear wall disposed toward the end wall of the cylinder and a front wall of substantially semi-cylindrical shape.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
776,556	Sibley et al.	Dec. 6, 1904
1,209,533	Abbott	Dec. 19, 1916
1,891,325	Fitch	Dec. 20, 1932
2,123,029	Vogel	July 5, 1938
2,126,924	Rose	Aug. 16, 1938