April 3, 1951 J. E. MARCUSE 2,547,084

SPRAYING DEVICE

Filed April 15, 1950

Fig. 1.

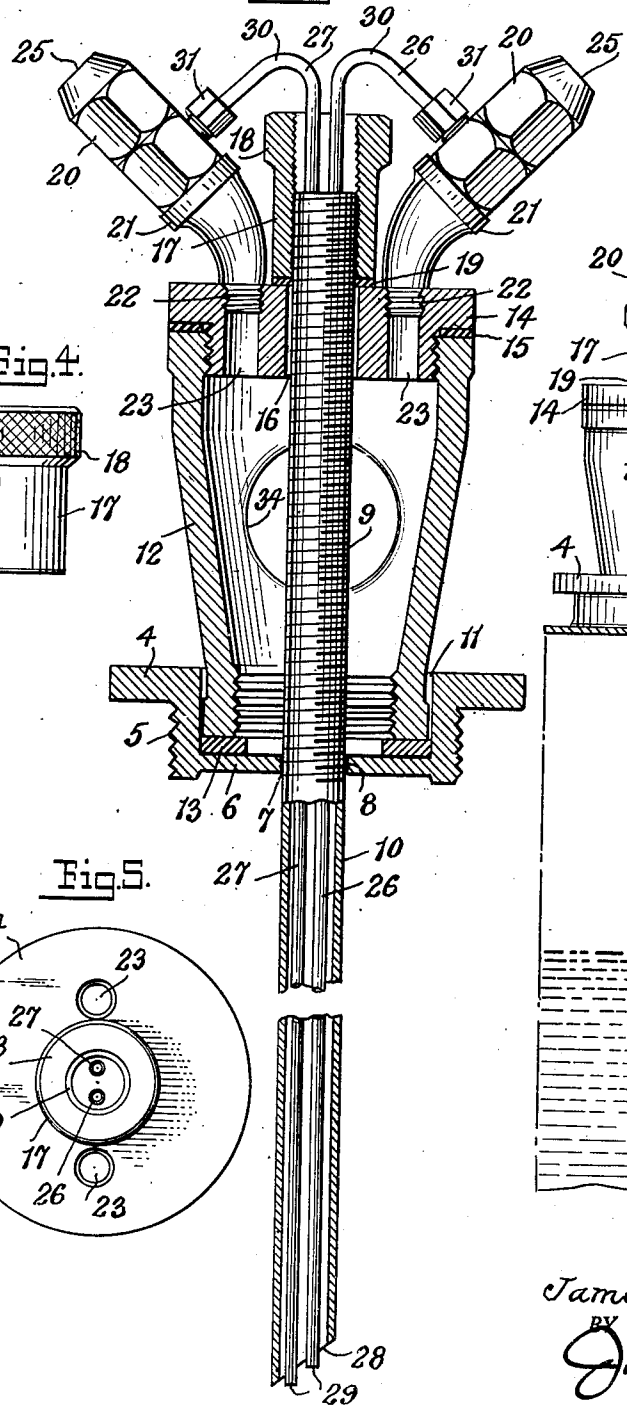


Fig. 3.

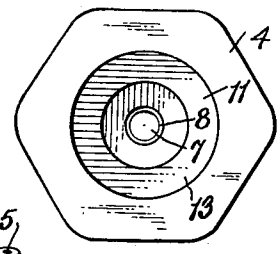


Fig. 4.

Fig. 2.

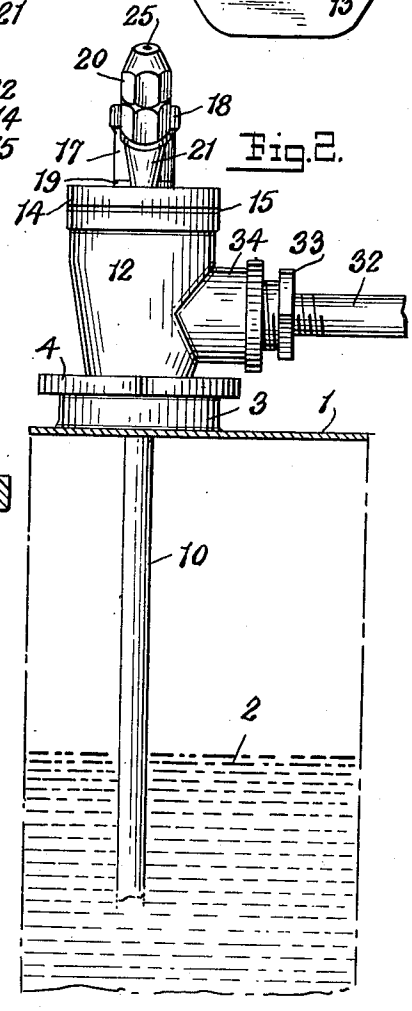


Fig. 5.

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SPRAYING DEVICE

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5 Claims. (Cl. 299—86)

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This invention relates to spraying devices, and particularly to those of the portable type of the kind generally employed for the distribution of liquid disinfectants, insecticides or similar fluids.

An object of the invention is to provide a spraying head, incorporating a plurality of nozzles, so arranged as a unit with respect to a liquid supply tank that the head and nozzles carried thereby can be directionally arranged as desired in order to readily cover a selected area with the fluid being sprayed.

Another object is to provide a spraying unit in which a plurality of nozzles, siphon tubes and air supply means are unitarily connected in a manner to enable the unit to be readily attached to, detached from, or adjustably mounted on a tank or other liquid-containing receptacle, or shipping container which acts as the tank. The conventional shipping container such as a drum, thereby eliminates any handling of the material.

Still another object of the invention is to provide in a portable spraying device, a combination of nozzles, supporting structure therefor, liquid and air supply means connected together and associated in a manner to provide an efficient spraying device usable in many ways and adjustable to suit various spraying requirements.

With these and other objects to be hereinafter set forth in view, I have devised the particular arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawing, wherein an illustrative embodiment of the invention is disclosed, Fig. 1 is a vertical sectional elevation through a spraying device constructed in accordance with the invention; Fig. 2 is a view, taken at right angles to Fig. 1 showing the spraying device as attached to a liquid-containing tank or other receptacle; Fig. 3 is a top plan view on a reduced scale, of the closure plug of the spraying device; Fig. 4 is a side elevation of the knurled lock nut, and Fig. 5 is a top plan view of the closure cap at the top of the air chamber, showing the lock nut and the apertures in the cap for the reception of the spray nozzles.

The improved spraying device is primarily, but not necessarily, intended for attachment to a liquid-containing tank in which a liquid disinfectant, insecticide or other liquid to be sprayed is contained, and such tank may be one designed for portability. For such purpose, the tank may be mounted on a carriage or dolly by which it may be readily transported through the area to be sprayed. A small portion of such tank is shown at 1 in Fig. 2, the disinfectant, insecticide or other liquid to be sprayed contained within the tank as indicated at 2. At a desired point in the tank, and preferably at the top thereof, is provided a threaded outlet 3 into which a closure plug 4 located at the lower end of the spray head

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is threadably inserted to attach the spray head to the tank. Said closure plug 4 is provided with the threaded portion 5 for reception in the outlet 3 and is also provided with a bottom wall 6 formed with a central aperture 7 which is internally threaded at 8 to receive the lengthy threaded upper portion 9 of a long sleeve or tube 10.

The closure plug 4 is cupped or recessed as at 11 and the wall 6 at the bottom of said recess constitutes a seat for the reception of the lower end of a tapered air chamber 12 which has its smaller open end clamped against the seat 6 as will be presently explained. A gasket 13 is interposed between the lower end of the air chamber 12 and the seat 6 to make a liquid and air-tight joint at this point.

The upper or large end of the air chamber 12 is closed by a closure cap 14, which is threaded into the upper end of the air chamber, with a gasket 15 interposed between it and the top of the air chamber, as clearly seen in Fig. 1. The closure cap 14 is formed with a central aperture 16 through which the sleeve or tube 10 freely passes, the upper end of the threaded portion 9 of said sleeve or tube projecting above the top of the closure cap 14 where it is threadably engaged by an adjusting or clamping nut 17. Said nut 17 is provided with a knurled head portion 18 by which it may be manually tightened or loosened as required. A gasket 19 is interposed between the lower end of the nut 17 and the top of the closure cap 14 to provide a seal at this point.

In the embodiment of the invention shown, two spray nozzles 20 are employed, the same being attached to and extending angularly upwardly and outwardly from the top of the closure cap 14. The nozzles may be of any known type employed for liquid-spraying purposes, and an example of a suitable nozzle is shown in the co-pending application of John A. Marcuse, Serial No. 785,605, filed November 13, 1947. Each of the nozzles 20 extends upwardly and outwardly at an angle of approximately forty-five degrees, but this angle may be of greater or lesser degree if desired. Each of the nozzles is attached to the closure cap 14 by means of a curved nipple 21, provided at its smaller end with the threaded portion 22 received in the upper threaded portion of the hole 23 extending through the closure cap 14. By means of the two holes 23, communication between the nozzles and the interior of the air chamber 12 is established. It will be thus clear that air under pressure conveyed into the air chamber 12 will be forced up through the nozzles to siphon the liquid from the tank 1 through tubes 26 and 27 and spray the same out through the outlet ends 25 of the nozzles.

The siphon tubes leading from the interior of the tank 1 to the nozzles, and shown at 26 and 27, are of relatively small diameter and extend

downwardly through the central sleeve or tube 10 and are thus, for the greater portion of their length, being sheathed and protected by the sleeve or tube 10. The sleeve or tube 10 is open at its beveled lower end 28 and the open lower ends 29 of the siphon tubes 26 and 27 thus have access to the liquid contents 2 of the tank 1.

At their upper ends, each of the tubes 26 and 27 is bent or goose-necked as shown at 30 and attached to a coupling nipple 31 threaded into the nozzle 20. The arrangement of passages through each of the nozzles 20 is such that the end of the siphon tube leading into the nozzle brings the liquid siphoned up by it to the air stream and is thus sprayed out of the ejection end 25 in relatively fine mist in the manner known in this art.

The air under pressure for producing the spraying action just explained, is conveyed from a compressing means or other suitable source of compressed air, through a flexible hose or tube, into a pipe 32 attached by a coupling nut 33 to a nipple 34 forming an integral lateral extension of the air chamber 12 and leading into the interior of the chamber. The flow of air into the air chamber 12, and thus the spraying action, may be controlled by a suitable valve not shown.

From the foregoing, it will be apparent that as long as a liquid supply is contained in the tank 1 and air under pressure is caused to flow into the air chamber 12, the liquid will be sprayed or diffused out of the nozzles 20. The upward and angular direction of the nozzles will cause the mist to be sprayed upwardly and outwardly in a room or other space and will cover a substantial area. Since the entire spraying head, from the air chamber upwardly, is maintained as a unit by having the lower end of the air chamber 12 clamped down on the seat 6 by the threadable engagement of the clamping nut 17 with the threaded portion 9 of the tube or sleeve 10, it will be apparent that by loosening the nut 17 to a relatively slight extent, the air chamber, the closure cap 22 and the nozzles 20 carried thereby, may be rotated as a unit to any desired extent, thus enabling the nozzles to be swung in any direction to accordingly direct the spray wherever desired. By the provision of an air chamber of substantial capacity in communication with the nozzles, I have found that a free flow of air is attained and a smooth and uniform spraying action is secured.

While I have herein shown and described one embodiment 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 spraying device, a supply tank having an opening, a closure plug threadably fitted into said opening, a tube attached to and extending through the plug and projecting into the tank, said tube having a threaded upper end, a tubular member defining an air chamber surrounding but spaced from the tube, said chamber having a lower end seated against the plug, a closure cap threaded into the upper end of the tubular member, a plurality of spray nozzles mounted on and carried by the closure cap, said closure cap having passages leading from the nozzles and passing through the closure cap to communicate with the interior of the air chamber, and each nozzle being provided with a separate siphon tube extending from it and passing down through the tube to reach the interior of the tank.

2. In a spraying device, a supply tank having an opening, a plug fitted in said opening, a tube extending centrally through the plug and entering the tank, a tubular member defining an air chamber disposed around the tube and resting on the plug, a cap fitted in the upper end of the air chamber and through which the tube extends, nozzles carried by the cap and in communication with the air chamber, means for supplying air under pressure into the air chamber, a nut adjustable on the upper end of the tube for clamping the lower end of the tubular member against the top of the plug, and siphon tubes extending from the nozzles and directed downwardly through the tube to enter into the tank.

3. In a spraying device as provided for in claim 2, wherein the plug is provided with a gasketed seat in its top against which the lower end of the tubular member is clamped by the nut, whereby a loosening of said nut will permit the tubular member to be rotatively moved on its seat to thereby shift the operating position of the nozzles.

4. In a spraying device, a tank having an opening, a plug threaded into said opening, a depression at the top of the plug forming a seat, a tubular member defining an air chamber having an open lower end held against said seat, a tube extending through and atached to the plug, said tube extending through the air chamber and projecting above the same, a cap threadably received in the top of the tubular member to close said end of the air chamber, a plurality of nozzles carried by the cap and in communication with the air chamber through openings extending through the cap and in which the nozzles are threadably mounted, the portion of the tube located above the cap receiving a threaded nut, and each of said nozzles being provided with a siphon tube, the siphon tubes extending from the nozzles downwardly through the tube to enter the tank.

5. In a spraying device, a tank having an opening, a threaded plug received therein, a tube extending through the plug and projecting above the same, said tube being threadably received in the plug, the plug being provided with a seat, a tubular member defining an air chamber resting on said seat and rising above the plug, said tubular member surrounding the tube, the air chamber being closed at its top by a threaded cap through which the tube extends, nozzles mounted on top of the cap and in communication with the interior of the air chamber through holes provided in the cap and in which the nozzles are threadably mounted, the tube being provided with a threaded end portion located above the cap, a nut threadably received on said threaded end portion of the tube to clamp the tubular member and its attached cap between it and the seat, each of the nozzles being provided with a siphon tube, said tubes having one end located in the tank and extending upwardly from said ends out of the tank and through the tube and attached at their opposite ends to each nozzle.

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

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