

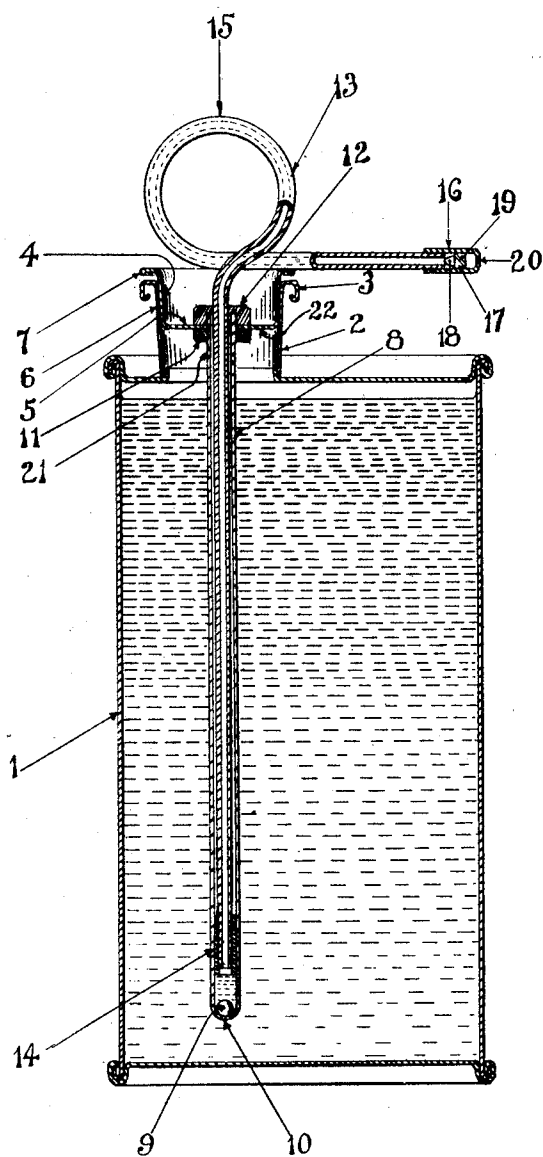
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ATOMIZER

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BY

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ATOMIZER.

Application filed August 23, 1921. Serial No. 494,535.

This invention relates to atomizers particularly adapted for spraying insecticides and similar liquids.

In my co-pending application, Serial No. 492,812, filed August 16, 1921, there is shown an atomizer adapted to be substituted for the ordinary closure of the can or container in which an insecticide is originally supplied, and to remain on the container as long as there is any liquid in it. The container then forms the receptacle of the atomizing device, and the insecticide may be sprayed directly therefrom without the necessity of pouring it into another receptacle. The waste and other disadvantages and disagreeable features attending the transfer of insecticides and similar liquids from a container to a sprayer are thus avoided, and the arrangement possesses the further advantage that atomizers designed to fit the containers of a particular brand or make of insecticide may be sold or perhaps even given away with first purchases to promote subsequent purchases of the same substance.

In accordance with the invention of my co-pending application, the atomizer comprises a cap or the like, adapted to be substituted for the ordinary closure of a container and carrying an outer tube, which, when the atomizer is in place, extends to the bottom of the container and is provided at its lower end with a check valve. Within the outer tube is a reciprocable inner tube carrying at its lower end a piston or plunger fitting closely within the outer tube. The inner tube passes through the cap which carries the outer tube and is bent in such a manner that it may be conveniently gripped and reciprocated within the outer tube to pump liquid through the inner tube to a nozzle at the outer end of this tube, from which it is ejected in the form of a fine spray.

The present invention relates particularly to means for supporting the atomizer in place upon the can or container with which it is to be used. It has for its object the provision of a device for this purpose, which may be easily applied to or removed from a can of standard form and when in place will form a tight closure preventing leakage of liquid from the can in case the latter is tipped over or even inverted. At the same time the device serves as a firm support for the outer tube of the atomizer, which may be clamped thereto by the simple operation of tightening nuts or the like on the end of this

tube. The device is preferably so formed that it serves as a receptacle to catch any liquid that may be forced out around the inner tube as it moves into and out of the outer tube during the spraying operation.

In accordance with the present invention, a can of standard form, such as one having a nozzle adapted to be closed by a seal, is employed, and the atomizer supporting device is in the form of a member which may be pushed into the nozzle after the seal has been removed. A can having a tapering nozzle is preferably used and the member adapted to be inserted therein is formed with a similar taper to cause a tight fit between the member and the nozzle, to hold the atomizer firmly in place and prevent leakage of liquid in case the can is tipped over, while at the same time permitting the member to be easily pried out of the nozzle when it is desired to remove the atomizer from the can.

The atomizer is preferably of substantially the same construction as the one shown in my co-pending application and consists of an outer tube within which is slidably mounted an inner tube carrying at its lower end a piston or plunger. In accordance with this invention the upper end of the outer tube is provided with a thread upon which are screwed two nuts between which the supporting member may be clamped to attach the atomizer to the member with its outer tube extending into the can.

The upper one of the two nuts extends over the top edge of the outer tube and fits closely around the inner tube which may be reciprocated therethrough during the pumping operation.

The particular nature of the invention, as well as other objects and advantages thereof, will appear more clearly from a description of a preferred embodiment as shown in the accompanying drawing, which is a vertical sectional view of a container and the atomizer associated therewith.

In the drawing 1 indicates a metallic can of standard form in which the insecticide or other liquid is supplied and which is provided with a tapering nozzle 2 having its upper end turned over as at 3 to form a flange adapted to receive a suitable seal forming a closure for the can during shipment. In the drawing such seal is shown as having been replaced by a cup 4 comprising a bottom portion 5 and a side wall 6 having substantially the same taper as the nozzle 2 so that

it may be pressed firmly within the latter to form a tight joint. The upper edge of the cup is provided with a flange 7 by which the cup may be more easily pressed into the neck of the can or pried therefrom by a suitable instrument, such as a knife or screw driver.

The bottom portion 5 of the cup is provided with an aperture through which extends the upper end of an outer tube 8 which is of sufficient length to reach nearly to the bottom of the can. The lower end is rounded to constitute a seat for a ball valve 9 and is provided with an inlet aperture 10.

The upper end of the tube 8 is provided with a thread upon which are screwed nuts 11 and 12 between which the bottom portion 5 of the cup may be clamped to support the atomizer upon the cup. The upper nut 12 extends over the upper edge of the tube 8 and is provided with an aperture through which passes an inner tube 13 extending into the outer tube and surrounded at its lower end by a piston or plunger 14 which fits closely within the outer tube. Above the nut 12 the inner tube 13 is bent to form a ring 15 into which a finger may be inserted to permit the inner tube to be reciprocated as a piston rod within the outer tube.

The inner tube 13 is provided at its outer end with a discharge nozzle 16 consisting of a shell secured in any suitable manner upon the outer end of the tube. Within the tube is a slidable member 17 constituting a deflector for the liquid and provided with a tail piece 18 which serves as a closure for the end of tube 13. The body portion of member 17 is in sliding contact with the wall of the shell and is provided with angularly disposed liquid-deflecting slots 19 which open into a chamber at the outer portion of the shell. The length of this chamber varies in accordance with the position of the member 17, which depends upon the fluctuations of pressure in the liquid being forced through the nozzle and out of the discharge orifice 20 at the end of the shell.

In using the device, the seal of the can is removed from the flange 3 and the cup 4 carrying the atomizer is pressed into the nozzle 2. It is intended that the atomizer shall be kept on the can as long as there is any liquid in the latter, and since the cup fits tightly within the nozzle, loss of liquid by evaporation is prevented.

When it is desired to spray the liquid the user slips one finger through the ring or loop 15 and gripping the latter between the finger and thumb moves the inner tube 13 up and down within the outer tube 8 in the manner of a pump. Any liquid, as well as the air, above the piston 14 and between the outer and inner tubes 8 and 13 respectively, will be expelled into the interior of the can

through one or more holes 21 at the top of the outer tube as the plunger ascends. While the plunger is moving upward the liquid will enter the outer tube through inlet 10, displacing the ball 9 from its seat as it flows in. Sufficient air will ordinarily enter the can at the point where the atomizer is supported upon the cup 4 to maintain the interior of the can above the liquid in communication with the atmosphere to insure that the liquid be forced into the tube 8 as the plunger moves upward, but if desired a hole 22 may be provided in the bottom of the cup for this purpose. During this stroke of the plunger the air pressure acting on the outer face of the member 17 will seat its tail piece 18 against the outer end of tube 13 to prevent air from entering this tube and lessening or destroying the suction effect of the plunger.

As the plunger is driven downward on the pumping stroke the pressure transmitted through the liquid in the tube 8 presses the ball 9 against its seat, and the liquid in the tube is forced upwardly through the inner tube 13 and into the discharge nozzle 16 where it first impinges against the tail piece 18 and pushes it away from the end of the tube, at the same time moving the member 17 within the shell of the nozzle.

As the liquid passes over this tail piece it is spread into a tubular column better adapted to enter and pass through the deflecting slots 19 in the member 17. As the liquid emerges from these slots it is directed against the wall of the nozzle chamber and is ejected through the orifice 20 of the nozzle in the cloud-like spray, which may be aimed in any desired direction by turning the inner tube within the outer tube and tipping the cam which will ordinarily be held in one hand while the inner tube and its plunger are being reciprocated with the other hand. The horizontal portion of the tube 13 acts as a stop by engaging the flange 7 of the cup 4, thereby limiting the downward movement of the inner tube and its plunger to prevent the latter from striking the ball 9.

If during the operation of the device any liquid should be expelled around the nut 12, it will collect in the cup and gradually evaporate without running down the sides of the can and soiling the fingers. The cup 4 will be constructed of material having a suitable thickness to give the required rigidity to form a firm support for the atomizer, and permit the cup to be pressed into or pried from the neck 2 of the can without deformation. The method of attaching the outer tube 8 of the atomizer to the cup 4 is simple and inexpensive and does not require the use of any special tools or manufacturing operation. It also permits the parts to be conveniently taken apart for cleaning or repairs.

While the invention has been described particularly with reference to containers for insecticides and a preferred embodiment has been shown and described, it will be understood that it is equally adapted for use with containers for other kinds of liquids and that various changes in the details of construction may be made without departing from the principle of the invention as defined in the appended claims.

I claim:

1. An atomizer for use with a container having a tapering nozzle comprising an air-vented recess-forming member adapted to be pushed into said nozzle and having a rim to extend thereabove, an outer tube extending through said member, an inner tube adapted to reciprocate within the outer tube and provided with a piston at its lower end, separate devices exteriorly mounted on said outer tube fastening the same to said member one forming a guide for said outer tube, and means at the upper end of said inner tube for spraying liquid expelled therefrom by downward movement of the piston, said

inner tube having a laterally projecting portion adapted to engage the rim of said member to limit such movement.

2. An atomizer for use with a container having a nozzle, comprising a cup-shaped member provided with an air-vent and an upper rim, said member being adapted to be inserted in the nozzle, an outer tube extending through the member, an inner tube reciprocatory within said outer tube and provided with a piston at its lower end, a support on the exterior of the outer tube underlying said member, a securing device on the exterior of said outer tube maintaining said member in rigid combination with the latter and said support extending over the outer tube to guide the inner tube, and means at the upper end of the inner tube for spraying liquid expelled therefrom by downward movement of the piston, said inner tube having a laterally extending portion adapted to engage the rim of said member to limit such downward movement.

In testimony whereof I affix my signature.
H. HOWARD HELLER.