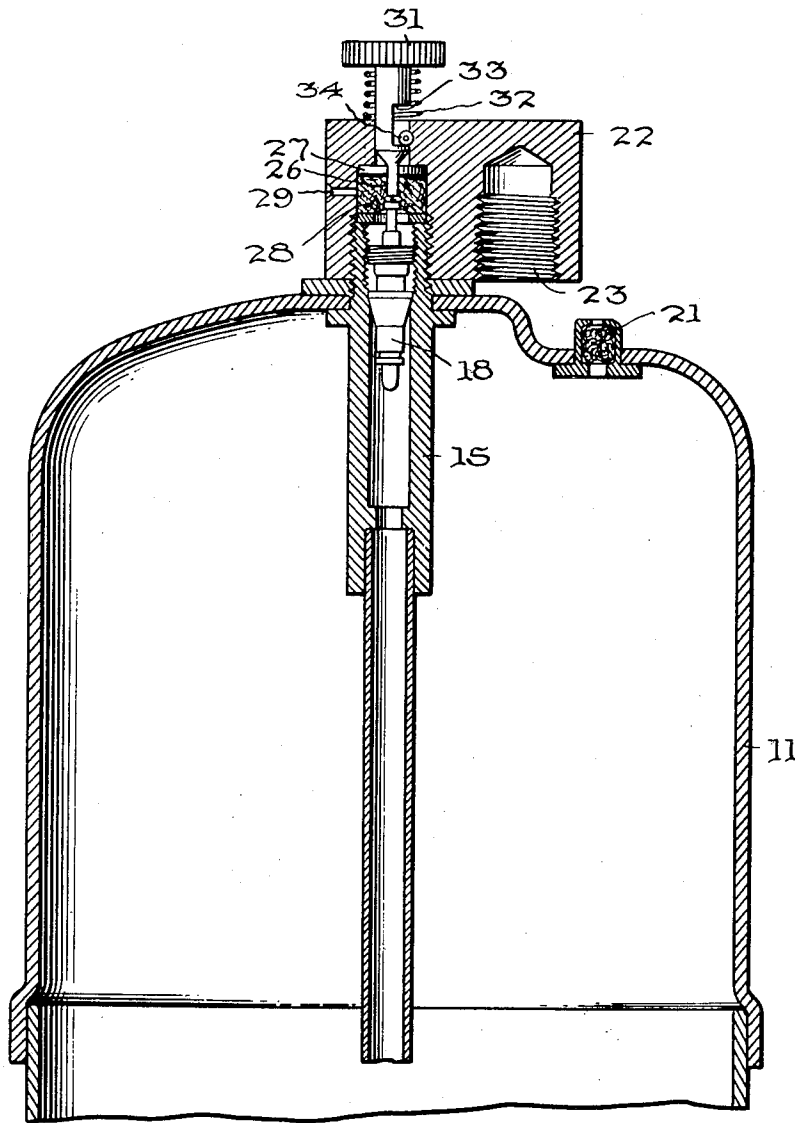


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APPARATUS FOR PRODUCING AIR-BORNE
PARTICLES OF INSECTICIDE
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APPARATUS FOR PRODUCING AIR-BORNE PARTICLES OF INSECTICIDE

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The invention relates to an apparatus for producing air borne particles of insecticide.

A variety of insecticide materials have heretofore been marketed which are disseminated by means of a liquid carrier, such as kerosene. These materials have ordinarily been distributed in the air, by means of a hand sprayer or some similar device. The object of spraying the material is to cause the particles of insecticide to be suspended in the air for a period of time.

In order to better distribute the insecticide and to keep it suspended for a longer period of time, there has been more recently devised a method for distributing insecticide in which a low boiling liquid, such as dichlorodifluoromethane is used as the propellant for the insecticide and this material, when released from a vessel, evaporates instantly and disseminates the insecticide it carries into the air.

Apparatus for containing and dispensing this low boiling liquid insecticide have been devised, but these devices have many undesirable features. Many are unnecessarily complicated, thus making them expensive. Others are not devised to be easily refilled, which is an important factor in such a dispenser, while others have failed to deliver the insecticide material in a sufficiently finely divided form. In all of these the character of the spray and the delivery of precise quantities of liquid have not been easily and simply controlled.

One of the objects of this invention is to provide an apparatus, with a minimum of complication, for containing and dispensing air borne particles of insecticide efficiently.

Another object of this invention is to provide an apparatus for the purpose which can be reused and easily emptied and refilled.

These and other objects are attained by this invention which comprises a high pressure container having affixed therein a spring biased plunger valve and operating means including a restricted orifice designed to properly distribute the insecticide.

Other and further advantages of the invention will be manifest from the following description and drawings wherein the single figure is a view, partly in section, of an insecticide container including valve mechanism and operating means.

Referring to the drawing, there is shown an insecticide container having an upper cup-like portion 11 and a lower portion preferably heat brazed together to form the complete container. The upper portion 11 of the container has an affixed cylinder 15 in which is inserted a tube through which the liquid in the containers enters to pass up the tube.

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The upper end of cylinder 15 is threaded both on the inside and the outside, the inside threading being adapted to receive a spring biased plunger valve 18. This valve may be one of several types of pressure valves, having a spring biased plunger such as the type ordinarily used on automobile tires and illustrated, for example, in U. S. Patent 2,048,843 to John C. Crowley. This type valve allows the container to be filled under pressure and emptied by pressing down on the valve stem. The cylinder may be held in place on the container by furnace brazing. A gasket, preferably of asbestos which has been impregnated with graphite, acts as a liquid seal. The upper portion 11 of the container contains a plug 21 of an easily fusible metal which acts as a safety valve and melts at a temperature below the temperature at which there would be danger of the container exploding.

Affixed to the top of the container by means of the outer threads on cylinder 15 is a block 22 which is adapted to seal the container while in shipment, to contain the device which operates the valve plunger and to direct the flow of the escaping fluid. The block contains an inside threaded cavity 23 which is adapted to be screwed on to cylinder 15 so as to seal the valve from any accidental opening during shipment or periods when the container is not in use. In the block illustrated, there is shown a plunger rod 31, the lower end of which has an elongated pin-like rod which is adapted to contact and press down the valve plunger when the plunger rod is depressed. Immediately below the cavity wherein the plunger rod operates, is a somewhat larger cavity at the top of which is a flexible gasket 27 or other sealing device, preferably of rubber to prevent leakage of the fluid under pressure around the plunger rod. Immediately below the gasket 27 is a fiber pad 28, preferably of porous cotton felt, which is adapted to filter out any dirt or rust particles and to slow down the flow of the fluid from the container, so that a comparatively large easily drilled orifice 29 may be used.

It will be noted that the plunger rod is formed with a conical surface between its main body portion and the elongated pin-like portion and is thus designed to prevent leakage through the hole in gasket 27 when the plunger rod is in position for releasing the insecticide.

The plunger rod preferably has an enlarged head as shown and is adapted to be depressed by hand and returned to its uppermost position by a coil spring 32. The movement of plunger 31 is limited by slot 33 therein, which operates against a pin 34 passing through the block 22.

The container may be refilled by removing block 22 and connecting a hose or pipe from a supply of the insecticide solution to the outer threads of the cylinder 15, while simultaneously pressing down on the plunger of valve 18 in a manner very similar to the way in which a pneumatic tire is filled with air. After filling, the block 22 can be replaced either in the position illustrated or by placing the threaded cavity 23 over the valve to prevent leakage or accidental discharge in storage and shipment.

It will be seen that it is most desirable to keep the container in an upright position, particularly when it is almost empty, so that the fluid emitted will contain a large proportion of liquid. As previously mentioned, the block 22 may be unscrewed and used as a seal instead of a releasing device. Because of the off-center location of the threaded cavity, removal of the block is facilitated by its handle-like laterally projecting portion which allows leverage to be applied in removing it.

While it will be understood that this device may be used for various materials, it is particularly adapted to contain and dispense fluid capable of producing air borne particles of insecticide. These particles may be so distributed in the atmosphere as to remain in suspension for 20 minutes or more. For this purpose, the insecticide is dissolved in a carrier which is a low boiling liquid (a gas at atmospheric pressure and room temperature). For this purpose, it has been found desirable to use dichlorodifluoromethane ("Freon 12"), which expands approximately 240 times its liquid volume upon release. Other suitable propellants may be selected from the field of low boiling liquids, as, for example, methyl chloride. The active ingredient of the insecticide may be pyrethrum and sesame oil may be used along with it.

The design of the apparatus illustrated is particularly useful for spraying insecticide into rooms or small chambers, such as airplane cabins or freight cars. By changing the dimensions of the orifice, changing the pressure on the fluid, etc., the device may be adapted to spraying insecticide into large chambers, such as auditoriums, restaurants, etc. Furthermore, the device may be used for spraying materials other than insecticides, as for example window cleaner, particularly for automobile windows, for spraying thin coating materials, etc.

Thus I have described a new and useful apparatus adapted to contain and dispense a liquid capable of producing air borne particles of insecticide in an efficient manner.

What I claim is:

1. In a dispenser for air borne particles by discharge of fluid under pressure from a container having an eduction tube projecting therefrom and a unitary spring biased plunger valve and seat mounted in the eduction tube, the combination therewith of a dispensing cap fitted to the projecting end of the eduction tube, a chamber therein into which said eduction tube discharges and communicating with a restricted fluid discharge passage, a compressible fluid permeable material in said chamber covering the end of said discharge passage, an annular gasket seated on the projecting end of said eduction tube, and an opposed flexible diaphragm, said gasket and diaphragm confining the fluid permeable material in said chamber, valve actuating means carried by said cap, comprising a stem portion extending into said chamber, said stem portion terminating

in a pin projecting through said diaphragm and penetrating said fluid permeable material in alignment with the plunger of said spring biased valve, said pin joining said stem portion in a conically tapered portion immediately above said flexible diaphragm, whereby the opening therein through which said pin projects will be kept plugged as it expands under flexure of the diaphragm, a rectangular slot in said stem portion, a detent carried by said cap to extend into said slot, a finger piece on the outer end of said stem portion, and a spring mounted between said finger piece and outer surface of said cap for holding the stem portion retracted.

2. In a dispenser for air borne particles by discharge of fluid under pressure from a container having an eduction tube projecting therefrom and a unitary spring biased plunger valve and seat mounted in the eduction tube, the combination therewith of a cap for the eduction tube comprising an elongated handle member adapted to be grasped by a user in applying and removing the cap, said handle member having a bore of stepped diameter extending therethrough adjacent one end thereof and defining an internal shoulder, a flexible sealing diaphragm abutting said shoulder, valve operating means guided in the smaller portion of said bore, said means comprising a stem formed at its inner end with a conical portion terminating in a projecting pin, said pin extending through the flexible diaphragm, whereby the conical portion of said stem maintains a seal as the stem is depressed and the gasket is caused to flex with consequent enlargement of the opening therein for the pin, an orifice in the end of said handle member communicating with the larger portion of the bore therein, and a plug of compressible filtering material within the larger portion of the bore and covering said orifice, the said projecting pin portion of said stem penetrating the filtering material and extending into proximity to the plunger of the spring biased valve, whereby upon depression of said stem the valve is caused to open for releasing the contents of the container.

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