Oct. 3, 1961 C. L. SPEXARTH 3,002,237

PORTABLE FOGGING DEVICE FOR INSECTICIDES AND THE LIKE

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Fig. 1

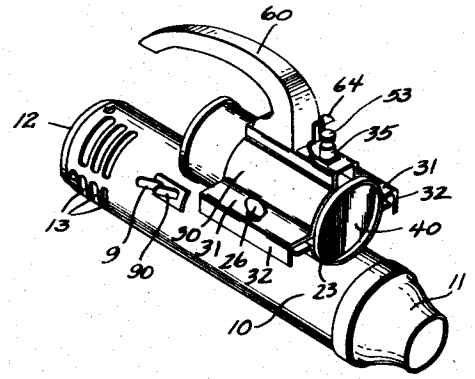


Fig. 2

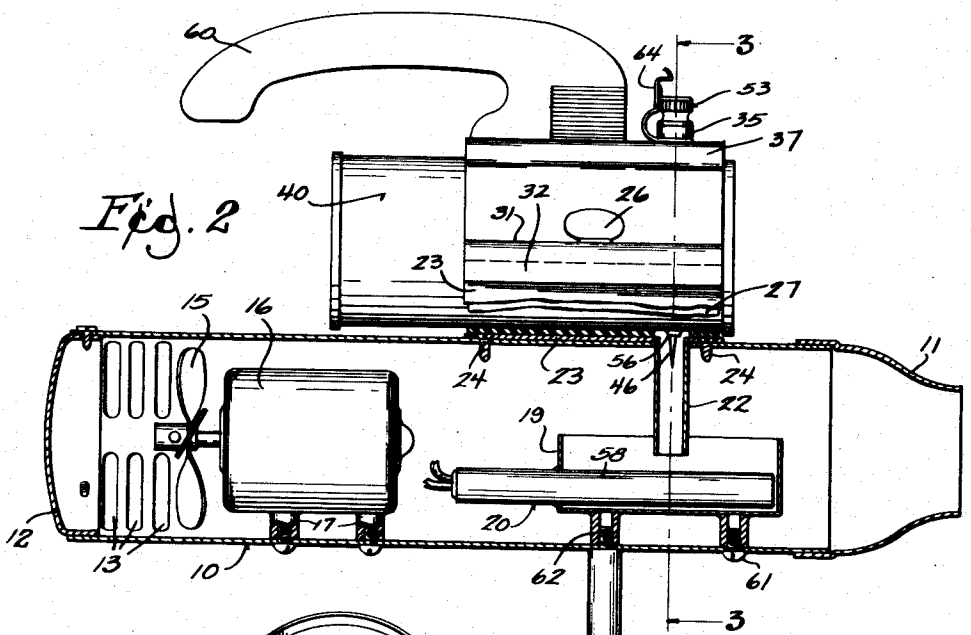
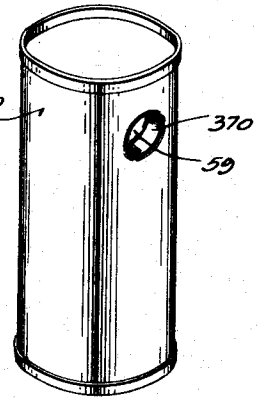


Fig. 8



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Fig. 3

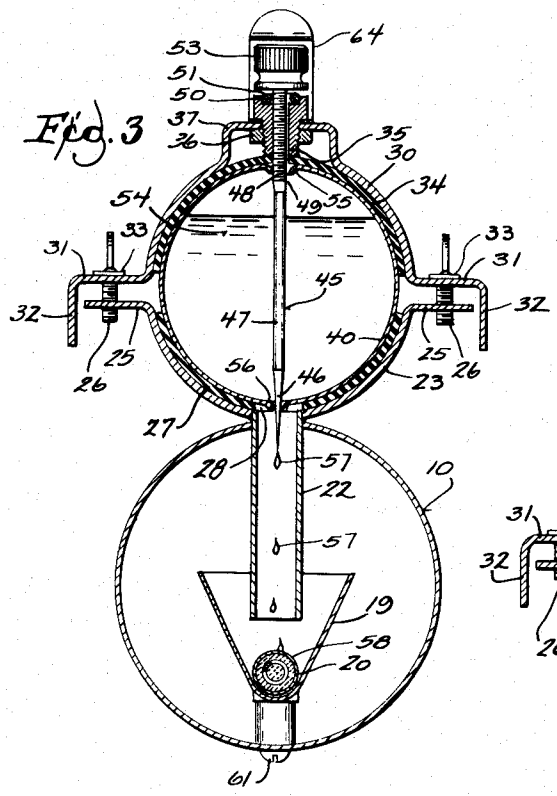


Fig. 4

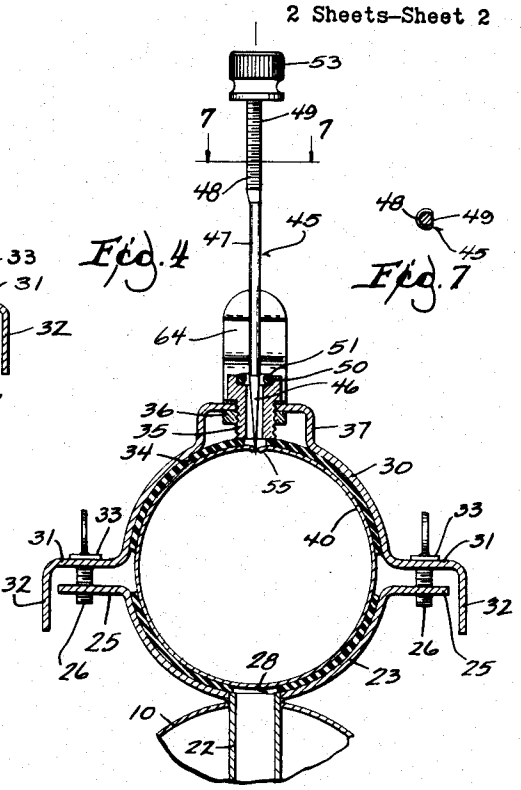


Fig. 7

Fig. 6

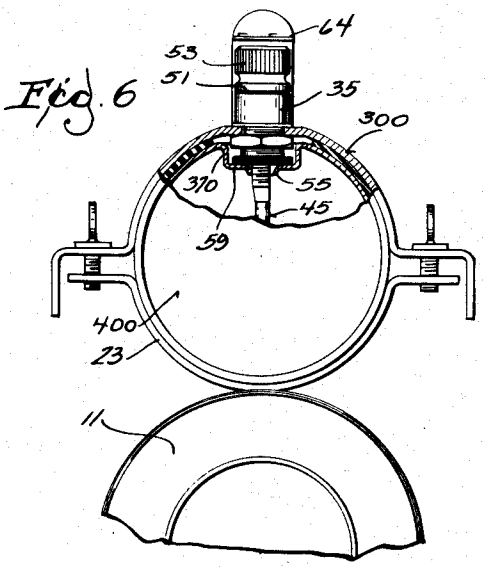
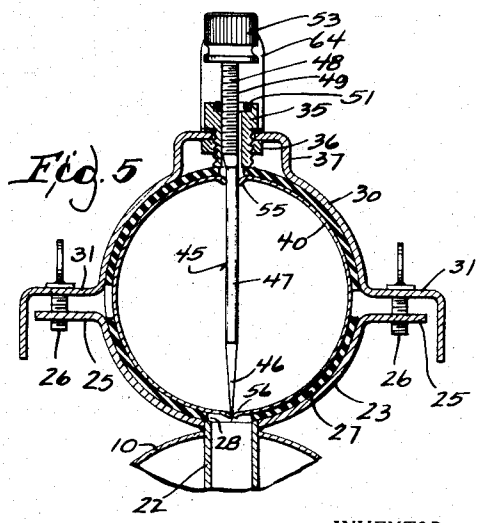


Fig. 5



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PORTABLE FOGGING DEVICE FOR INSECTICIDES AND THE LIKE

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16 Claims. (Cl. 21—109)

The invention relates to a portable fogging device for insecticides and the like.

The invention seeks to provide a light-weight, inexpensive, but unusually effective fogging device. A major feature is the provision of means whereby the material to be diffused can be supplied in cans which are not only perforated at the time of installation in the device, but are adapted to provide the valve seat which is opened, controlled and regulated by a needle valve which forms a permanent part of the device, and which is used to effect the perforation of the can.

Another major feature of the device is the arrangement whereby drops of the liquid to be diffused are delivered by gravity onto an electric heating element in the same housing with a fan and desirably disposed in a well in which it is protected from the direct blast of the fan which diffuses the vapor. As the vapor is formed, it rises from the channel into the air blast set in motion by the fan.

The fan and the motor which drives it and the channel with its contained heating element are arranged in series in a tubular housing which has a handle and may also have a mounting stake to be driven into the ground. The The housing has a large open nozzle at its discharge end and a louvered inlet adjacent the fan.

The handle is desirably mounted on the upper part of a can clamp, whereof the lower part is fixed to the housing. From the lower part, the tube leads into the channel in which the heating element is disposed. The two parts of the clamp are in detachable connection and they are provided with elastically deformable lining means which contacts the can.

The top part of the clamp is provided with a screw-threaded fitting counterbored to provide a seat for packing. Extending through this fitting is a needle valve having a long tapered point at its lower end and a short length of screw threads at its upper end, the dowel being grooved or otherwise flattened through the threaded portion to provide for an air vent which can be sealed when the head at the upper end of the valve contacts the O-ring packing in the counterbore.

It is important that the length of the stem below the threads be such that the perforation in the top of the can can be made by using the valve as a punch for axial movement through the fitting without regard to rotation on its threads. At the same time, the length of the valve is such that the valve must be rotated on its threads to perforate the bottom of the can. The slow steady axial pressure developed in the threaded rotation of the valve through the fitting produces a smooth valve seat in the bottom of the laterally disposed can to and from which the valve may be moved for regulation of flow or total interruption thereof.

In referring to the housing as tubular, it is obviously not intended to restrict the invention to a housing of circular cross section.

In the drawings:

FIG. 1 is a view in perspective of a device embodying the invention.

FIG. 2 is an enlarged detail view of the device partially in axial section and partially in side elevation, and illustrating the optionally available mounting peg.

FIG. 3 is a further enlarged detail view taken in cross section on the line 3—3 of FIG. 2.

FIG. 4 is a view similar to FIG. 3 showing parts in the course of manipulation to achieve can perforation.

FIG. 5 is a view similar to FIG. 4 showing another step in the process of can perforation.

FIG. 6 is a fragmentary detail view partially in end elevation and partially in the same section as FIG. 3 showing the air vent sealed and also showing a slightly modified embodiment of the invention.

FIG. 7 is a fragmentary detail view taken on the line 7—7 of FIG. 4.

FIG. 8 is a view in perspective and on a reduced scale of the can shown in FIG. 6.

The device comprises an elongated tubular housing 10 having a somewhat restricted discharge nozzle 11 which nevertheless provides an opening of substantial size through which the vaporized material and blast of entraining air are delivered. At the end opposite the nozzle 11, the housing is provided with a closure 12, the inlet being provided by louvres 13 in order to protect users from possible contact with the fan 15 which is mounted directly on the armature shaft of motor 16 to constitute means for creating the air blast. The motor is mounted on legs 17 screwed to the bottom of housing 10.

Similarly mounted on the bottom of housing 10 between the motor and the nozzle 11 is a vaporizing means comprising an elongated shallow trough 19 into which heating element 20 extends through one end wall. Switches 9 and 90, which are externally exposed as shown in FIG. 1, are provided with operative connections (not shown) to the fan motor and the heating element 20. The walls of the trough 19 rise substantially above the heating element to receive and confine the insecticide or other liquid to be vaporized as delivered into the trough through the tube 22.

On top of the tubular housing 10 is means for detachably clamping to the housing a can or container of liquid to be vaporized. The clamping means includes a bottom clamp 23 of semi-circular cross section to which the tube 22 is connected by solder or otherwise. The tube 22 serves as a means for guiding liquid from the external container (such as can 40) into the well provided by trough 19. The tube is of sufficient diameter so that plenty of clearance is provided for the needle valve, and it is of sufficient length to extend well below the top of the trough 19 in which the heating element 20 is disposed. The clamp member 23 can be connected with the housing by sheet metal screws 24 or otherwise (FIG. 2). It is provided with laterally projecting flanges at 25 in which the clamping screws 26 are threaded as shown in FIG. 3. A lining 27 of natural or synthetic rubber is desirably provided within the clamping member 23. This lining desirably has a large opening at 28 registering with the tube 22.

Cooperating with the clamping member 23 is a removable clamping member 30 having outwardly projecting flanges at 31 overlying the flanges 25 and desirably downwardly turned at 32 to conceal the gap between these clamping flanges. The clamp screws 26 have head portions 33 seating on flanges 31 to exert clamping pressure in a downward direction, thereby constituting means for drawing clamp members 30 and 23 together for clamping the can to the housing. Like the clamping member 23, the removable clamp 30 is desirably provided with a lining 34 having an aperture below the screw-threaded fitting 35. This fitting may be mounted by means of clamp nut 36 upon an upwardly channeled portion 37 of the upper clamp member 30 as shown in FIG. 3. Alternatively the clamp member 300 shown in FIG. 6 may mount the fitting 35 on its semi-cylindrical upper surface provided the can engaged within the clamp members

23 and 30 has a recess in it as shown in FIG. 6. In the FIG. 3 construction, the channel 37 carries the fitting 35 at such an elevation that an ordinary cylindrical can 40 can be clamped between the members 23 and 30 and embraced by the lining segments 27 and 34.

A needle valve 45 is provided which comprises a long tapered point at 46, an elongated valve stem 47, and a threaded shank portion 48 which is slightly larger than the stem and is flattened or otherwise relieved at 49 past its enlarged threaded shank portion to provide clearance through which air can reach the can 40 when the device is in use. At the upper end of fitting 35 there is a counterbore 50 in which an O-ring packing 51 is provided to project slightly above the fitting for engagement with the knurled head 53 at the upper end of the shank 48. FIG. 6 shows the head seated on the packing 51 to close the air vent and make the device leakproof when the needle valve is closed in the manner hereinafter described.

As a means of supplying to the vaporizer drops or other appropriate quantities of liquid to be vaporized, the operator removes the upper section 30 of the clamp and places an ordinary can 40 containing vaporizable liquid such as insecticide 54 upon the liner 27 of the lower clamp element 23. With the needle valve wholly or largely retracted, the upper clamp member 30 is then placed upon the horizontally arranged can as shown in FIG. 4 and the upper clamp member 30 is tightened on the can by means of the screws 26.

The needle valve is then pushed manually through the threads of the fitting 35 to cause the needle point 46 to penetrate the top of the can. The reduced diameter of the valve stem and valve permit the valve to be manipulated axially through the fitting without injury to the threads of the fitting.

After the valve point 46 has been forced through the can 40, its downward motion is continued until the threads of its shank 48 mesh with the threads of fitting 35. Desirably this should occur before the needle point 46 reaches a lower side of the can wall. It will be observed in FIG. 5 that the penetration of the lower side of the can by point 46 has been achieved following a substantial threaded movement of shank 48 through fitting 35. However, at the time the penetration of the can wall is commenced, the head 53 is still well above the O-ring seal. The dimensions of the parts are such that the head should reach the O-ring seal well before the conically tapered needle point 46 has passed through the lower wall portion of can 40, the correct proportions being well illustrated in FIG. 3.

It will be found that where the needle valve is simply used as a punch and driven through the can to make the opening in the upper wall portion thereof, the metal of the can will be curved inwardly in the manner shown at 55, and in somewhat jagged fashion, there being no very tight fit between the needle valve and the can at this point. However, when the needle point penetrates the lower wall portion of the horizontal can under the relatively smooth and axially guided thrust which is developed by the rotation of the threaded shank of the valve in the threaded fitting 35, a rather smooth conical seat will be formed in the can as shown at 56 in FIG. 3, and this seat will be sufficiently tight when engaged by the needle point 46 to hold the contents of the can securely against dripping. Thus, when the valve is screwed down tightly to engage its head 53 with the packing 51, thereby closing the air vent 49, the tapered point 46 will also engage to seal the seat 56 which it has formed in the can.

With the valve backed off slightly as shown in FIG. 3, the can will be vented to receive atmospheric pressure, and the point 46 will clear the seat 56 sufficiently so that drops 57 will fall at intervals from the can to pass through the shielding tube 22 which protects them from the blast of fan 15 and causes them to be delivered into contact with the sheath 58 of the heating element 20 in

trough 19. As the liquid is vaporized, the vapor expands out of trough 19 and is picked up in the slip stream of fan 15, and the pneumatic current in which the vapor is entrained is discharged from the nozzle 11. In normal use for the intended insecticidal purpose, the vapor condenses following discharge to form a fog. The condensed droplets comprising the fog adhere to any surface contacted and will ordinarily wet and spread upon such a surface to provide effective insecticidal control.

The upwardly formed channel 37 of the clamping device is used only in the event that special cans 400 are not available. In the preferred practice of the invention, clearance for the fitting 35 is provided by forming a special channel 370 in the can itself as shown in FIG. 6, the opening 55 being forced into the can by penetration of the bottom wall 59 of the channel 370. Otherwise the FIG. 6 construction may be identical with that already described.

For convenience of manipulation, a carrying handle 60 is desirably mounted on the upper clamping element 30 and extends rearwardly therefrom to overhang the center of gravity of the device. In addition, I may replace one of the screws 61 which anchors the vaporizing trough 19 by a screw 62 projecting from the upper end of a sharpened peg 63 adapted to be driven into the earth to provide fixed support for the device during its operation in a given area. Optionally the spring detent 64 is used to engage the knurled handle 53 of the valve to fix it in any position to which it may be adjusted.

I claim:

1. A fogging device comprising the combination with an elongated housing internally provided with a motor driven fan and having an air inlet and a vapor discharge port, of vaporizing means in the housing between the inlet and discharge port in the path of air set in motion by the fan, and discharged through said port, means including a supply reservoir having a discharge opening communicating with said vaporizing means for supplying to the vaporizing means a liquid to be vaporized.

2. The device of claim 1 in which the liquid supplying means includes a replaceable can mounted externally on the housing, clamping means for connecting the can to the housing, a valve fitting mounted on the clamping means and a valve in threaded connection with the fitting and extending through the can, the can providing a seat for said valve in registry with said tube.

3. In a fogging device, the combination with a can clamp, of a screw-threaded valve fitting mounted thereon at one side of the position of a can engaged in the clamp, and a valve of sufficient length to span the can and comprising a needle point at its end, a stem extending from the point for nearly the diameter of the can, a threaded shank in screw-threaded connection with the fitting and a handle connected with the shank externally of the fitting, the threaded shank exceeding the stem in diameter, whereby the stem may be passed freely through the fitting to enable the valve to be used as a punch for the perforation of the can at the side contiguous to the fitting, the valve being of such length that its pointed end will penetrate the opposite side of the can as the shank is screwed into the fitting, whereby to form the opposite side of the can as a seat to and from which the valve is movable in the rotation of its shank in said fitting.

4. The device of claim 3 in which the fitting is provided with a counterbore having annular packing, the valve handle comprising a pressure head engageable with the packing to provide a seal in the position of the valve in which the valve is engaged with said seat, the shank of the valve being relieved where it passes the fitting to provide an air vent sealed by engagement of said head with said packing.

5. The device of claim 4 in which the packing comprises an O-ring.

6. The device of claim 4 in which the can clamping means has a deformable lining engaging the can about

the seat and provided with an opening with which the seat communicates.

7. The device of claim 6 in further combination with a guide tube extending away from the can from said opening and adapted to protect drops of liquid issuing from said can subject to the control of said valve.

8. The device of claim 7 in further combination with a tubular housing upon which the can clamping means is mounted and across which said tubular guide means at least partially extends, the said housing being provided with a heating element constituting means for vaporizing drops of liquid delivered by said guide means, fan means for creating an air blast through said housing and across said vaporizing means for entraining the vaporized liquid, and baffle means about said vaporizing means and into which the tubular guide means extends, the guide means and baffle means protecting drops of said liquid from the air blast until vaporized.

9. The combination with a can clamp comprising a pair of members adapted to engage opposing sides of a can, means for drawing said members together into can engagement, one of said members being provided with a screw-threaded fitting for a valve, a valve comprising a tapered point and stem freely receivable through said fitting, said valve having a threaded shank portion of larger diameter than the stem and adapted for threaded engagement with the fitting, the valve point being adapted to pass freely through the fitting and to be punched through a can embraced by the clamping means, and the length of said stem being such that the point of the valve will not reach across the can to the opposite side of the can before the threaded shank reaches threaded engagement with said fitting, said point being adapted to penetrate the far side of the can as the shank is screwed into the fitting, whereby to produce an opening in the can conically tapered and with smooth walls as the point of the valve penetrates the can, said walls constituting a seat to and from which the valve is movable in the rotation of the threaded shank in the fitting.

10. The device of claim 9 in which the clamping means has deformable lining means engaging the can about the valve shank and seat.

11. The device of claim 9 in which the clamping means has an offset portion in which the fitting is mounted.

12. The device of claim 9 in which the fitting extends inwardly from the clamping means, the can being channeled to receive the fitting and having a wall portion at the bottom of the channel through which the point of the valve is driven.

13. The combination with a can having an inwardly indented wall, of a can clamp including opposing clamp members, one of which spans the indention in the wall, a screw-threaded fitting mounted on the last mentioned clamping means and extending into the indention of the can and a valve havig a screw-threaded shank portion in

threaded connection with the fitting, said valve further having a stem extending through the indented wall of the can and across the interior of the can and terminating in a sharp needle valve projecitng beyond the wall of the can remote from the fitting, said needle valve being so disposed as to have been forced through said remote wall in the course of threaded movement of the shank through the fitting, the said remote can wall being outwardly deformed by the needle valve in the course of such movement to provide a seat to and from which the needle valve is movable in the threaded adjustment of the shank respecting the fitting.

14. The combination with an elongated housing internally provided with a fan and a vaporizing well having a heating element therein and having a liquid-retaining bottom, the housing having an air inlet and an air outlet between which the well and fan are located in series, and means including a supply reservoir and a valve-controlled conduit leading therefrom toward said well for delivering a vaporizable liquid into the well to be vaporized by the heating element, the vapor of the vaporized liquid being exposed to a current of air through the housing set in motion by the fan, to be entrained in said current and projected from said outlet.

15. The combination with an elongated housing internally provided with a fan and a vaporizing well having a heating element therein and having a liquid-retaining bottom, the housing having an air inlet and an air outlet between which the well and fan are located in series, and means including a supply reservoir and a valve-controlled conduit leading therefrom toward said well for delivering a vaporizable liquid into the well to be vaporized by the heating element, the vapor of the vaporized liquid being exposed to a current of air through the housing set in motion by the fan, to be entrained in said current and projected from said outlet, the said reservoir comprising a liquid container disposed externally of the housing, and said conduit comprising a tube having a discharge end extending into the well for guiding liquid from said external container to said well and for protecting said liquid from exposure to said air current prior to its vaporization by heat from said heating element.

16. The device of claim 15 in which the external container comprises a replaceable can in detachable clamped connection with the housing, the guiding means including a tube extending downwardly from the can into said well.

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