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SPRAYING DEVICE

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Fig. 1

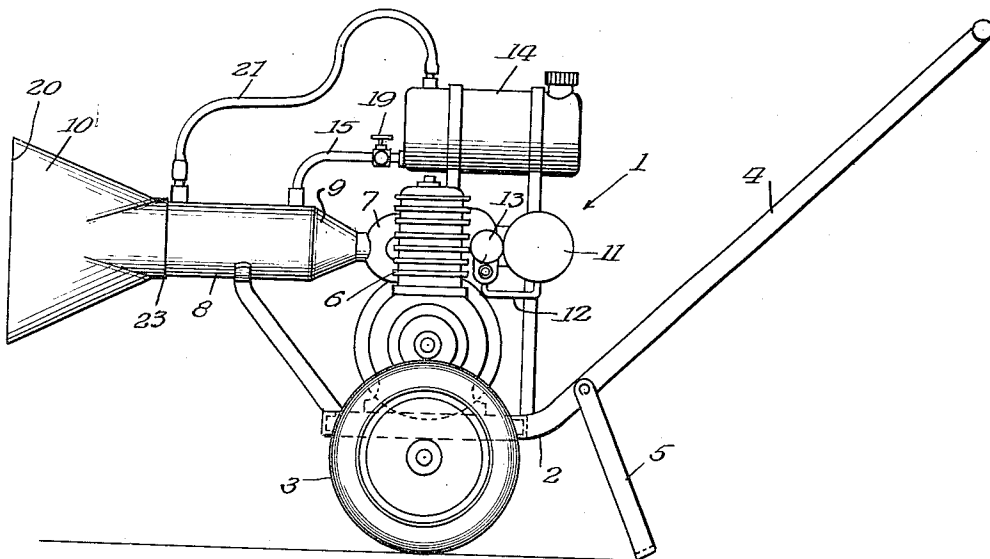


Fig. 2

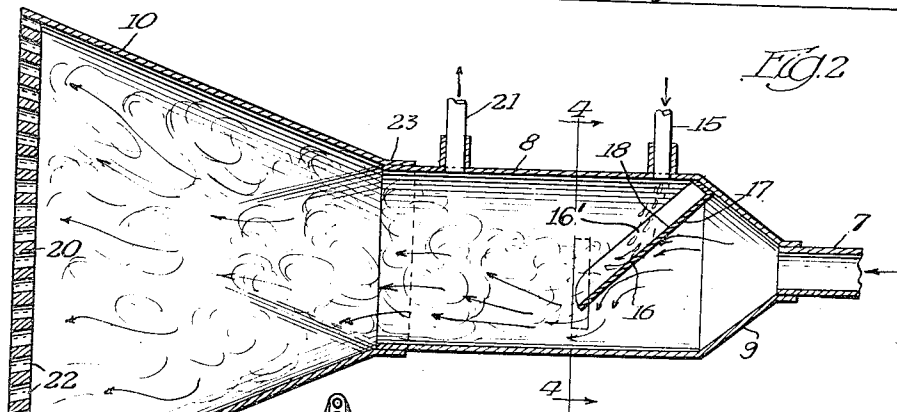


Fig. 3

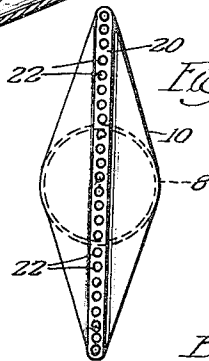
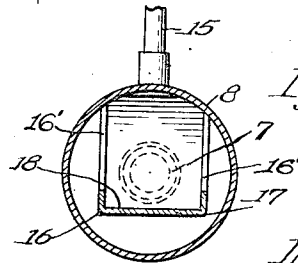


Fig. 4



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SPRAYING DEVICE

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3 Claims. (Cl. 43-129)

1

This invention relates to a device for spraying insecticides on the ground, trees, bushes, and shrubbery, as well as other places where insects are likely to be and breed.

The primary object of the present invention is to provide a new ambulatory device for spraying a petroleum soluble insecticide by means of heat generated and pressure produced from the exhaust of an internal combustion motor.

Another important object of the invention resides in the provision of new and improved means for creating an insecticide fog in a nozzle by the creation of a baffle therein to disperse properly the insecticide; another object is the provision of means for relieving pressure within the nozzle.

A further object of the invention is the provision of an ambulatory spraying device which is adapted to be shifted easily and quickly from place to place and to spray a dry fog produced from a petroleum solution containing an insecticide such as DDT by the heating of the solution to a predetermined temperature from the exhaust of an internal combustion motor.

Numerous other objects and other advantages will be apparent throughout the progress which follows.

The accompanying drawing illustrates a selective embodiment of the device or apparatus and the views therein are as follows:

Fig. 1 is a side elevational view of the improved device of the invention;

Fig. 2 is a vertical sectional view of the improved nozzle including the mixing chamber therefor;

Fig. 3 is an end elevational view of the discharge end of the nozzle; and

Fig. 4 is a vertical sectional view on the line 4-4 of Fig. 2.

The particular embodiment herein shown for the purpose of illustrating the invention comprises an ambulatory apparatus 1 which is adapted for spraying a dry fog of insecticide, particularly a petroleum soluble insecticide carrying a material such as DDT or the like.

The apparatus or device 1 consists of a base or platform 2 of any suitable size or shape which is mounted above the ground by means of wheels 3 so that the device may be shifted easily from one position to another. The platform or base may be of skeleton formation and has an operating handle 4 to push the device from one location to another. A pivotally mounted link 5 is connected to the handle 4 so that the device may be maintained when at rest in the position shown in Fig. 1. An internal combustion motor or en-

2

gine 6 of the gasoline powered type is mounted on the base or platform 2. The motor or engine 6 includes the conventional exhaust manifold 7 through which the hot exhaust gases are discharged.

A hollow preferably cylindrical sleeve member 8 forming a mixing chamber is connected at one end with the large end of a tapered inlet sleeve 9, said inlet sleeve having a relatively small end connected to the exhaust discharge manifold 7, of the engine 6, for the purpose of expelling a dry fog or mist through a laterally flattened and vertically flared discharge nozzle 10 which is attached to the opposite end of the sleeve member 8, said nozzle providing a narrow elongated outlet 20, opening at one end of the nozzle, and a sleeve-like end portion 23 remote from said outlet and connected with the sleeve-like member 8 at the end thereof remote from said inlet sleeve 9.

A gasoline tank 11 is appropriately supported adjacent the motor 6 to supply fuel to the motor or engine. The outlet line 12 from the tank 11 is operatively connected to a carburetor 13 which is operatively connected to the motor in the usual conventional manner.

A supply tank 14 for liquid insecticide is properly carried by the device or apparatus and is arranged immediately above the motor 6 so that a liquid insecticide solution, preferably a petroleum insecticide solution containing DDT, may flow by gravity through the outlet pipe 15 and into the mixing chamber 8 adjacent the inlet sleeve 9.

The mixing chamber 8 has a trough-shaped baffle 16 mounted within and having an upper end secured to the top of the sleeve member 8, adjacent the end thereof which is connected with the inlet sleeve 9, the baffle 16 being inclined downwardly and forwardly in the sleeve member 8 in a direction away from the inlet sleeve, whereby hot gases coming through the exhaust manifold will strike or impinge against the rear or under side 17 of the baffle 16 and heat said baffle. The pipe line 15 is positioned directly above the baffle 16 so that the liquid insecticide solution, as it flows from the tank 14, will flow on the upwardly facing front or top side 18 of the baffle 16. The baffle 16 thus comprises an inclined plate having a lower edge spaced inwardly of the bottom of the sleeve member 8 so that engine exhaust gases, after impinging against the trough bottom 17, will flow under the baffle and carry with these exhaust gases the insecticide material. The side edges of the baffle 16 are also spaced inwardly of the opposite sides of the mix-

3

ing chamber and are provided with upstanding edge flanges 16' to permit the exhaust gases to flow freely about the sides of the baffle. A valve 19 is arranged in the pipe line 15 so that the amount of insecticide flowing out of the insecticide supply tank 14 may be regulated.

The hot exhaust gases emitted from the manifold may expand, in passing through the tapered inlet sleeve 9, and impinge against the under side of the baffle 16 to thereby heat this baffle to a temperature of the order of one-thousand degrees Fahrenheit. The insecticide solution, delivered upon the top of the hot baffle plate, will immediately vaporize into a dry fog and the pressure of the gases entering into the mixing chamber from the manifold will expel the fog through the discharge end 20 of the nozzle 10. The baffle 16 thus serves to deflect exhaust gases within the sleeve member, around the bottom and side edges of the baffle, to thereby mix and entrain vaporized insecticide with said associated gases for delivery thence to and the discharge thereof through the vertically elongated discharge end of the nozzle.

Pressure relief means are provided to prevent back pressure in the mixing chamber. This pressure relief means comprises a pipe or air line 21 having communication with the mixing chamber 8 near its forward end and with the top of the insecticide supply tank. Any back pressure which may be created in the mixing chamber 8 is relieved by passing through the pipe line 21 and into the top of the insecticide tank 14 whereby the back pressure will act as a source of pressure against the fluid in the tank 14 and assist the flow of insecticide from the tank 14 through the outlet pipe line 15.

The nozzle 10 is relatively fan-shaped, as shown in Figs. 2 and 3, and the discharge end 20 thereof may be provided with a plurality of spaced holes 22 through which the dry fog created in the mixing chamber 8 may be expelled. The narrow elongated discharge end 20 of the nozzle is preferably disposed in position extending vertically in the spraying apparatus. It may be desirable, however, to suit particular operating conditions, to mount the narrow elongated fan-like nozzle in the spraying apparatus in a horizontal position or at any angular position between horizontal and vertical. The nozzle 10, therefore, may be adjustable or pivotally mounted, at its end 23, upon the outer end of the mixing chamber, so as to permit free and ready adjustment of the nozzle to bring the nozzle to the desired position of adjustment in the spraying apparatus.

Operation

In operation, the motor is first caused to run, whereupon the exhaust gases will pass out of the manifold 7 through the tapered sleeve 9 and into the mixing chamber 8. These hot exhaust gases will impinge against the bottom of the baffle 16 and heat the baffle to a relatively high temperature, the temperature being sufficient to vaporize the insecticide solution delivered upon the baffle through the pipe line 15. The valve 19 may be operated to regulate the amount of insecticide to be used. The heat of the exhaust gases causes the insecticide solution to be vaporized into a dry fog, and the pressure of the gases coming out of the exhaust manifold will force the dry fog through the holes 22 in the discharge end 20 of the fan-shaped nozzle 10. The speed at which the motor 6 operates will determine the

4

size and force of the spray of dry fog insecticide being discharged from the outlet end of the nozzle. The amount of fog being expelled, the pressure at which the dry fog is being dispelled, and the amount of insecticide carried by the dry fog, will be regulated by the speed of the motor which is controlled by the operator and also by the operation of the valve 19 which is also controlled by the operator. The amount, size, kind and pressure of fog desired, therefore, is easily under the control of the operator.

The apparatus of the present invention has been found exceedingly useful in places where insects breed. It is easy to handle and operate and may be shifted and moved readily from one position to another. The ease of mobility permits the apparatus to be used adjacent the side walls of homes, along driveways, along building edges, and for spraying shrubbery for the purpose of killing insects to prevent breeding thereof. In actual practice the device, when used, emits or expels a dry mist which rises rapidly upwardly and filters through the shrubbery and other plant life, reaching all parts of the plant life. Also, much of the dry fog is sprayed on the ground underneath the plants or bushes or other shrubbery to kill insect larvae. The device is capable of use at various locations such as in basements and in buildings which are closed for a considerable length of time during the day, such as churches, halls and the like, as well as around homes, hotels and other places. The device is light in weight and can be easily shifted from one location to another and may be economically operated and easily controlled.

Changes may be made in the form, construction and arrangement of parts from that disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes fall within the scope of the claims appended hereto.

The invention is hereby claimed as follows:

1. A spray device for liquid insecticide, comprising a sleeve member forming a housing, a tapered inlet sleeve having a large end connected with one end of the sleeve member and a relatively smaller end formed for connection with the exhaust pipe of an internal combustion engine, a laterally flattened and vertically flared discharge nozzle, providing a narrow, vertically elongated outlet end and a remote sleeve-like end connected to the sleeve member at the end thereof remote from said inlet sleeve, an inclined trough-shaped baffle mounted within and having an upper end secured to the top of said sleeve member, adjacent the inlet sleeve connected end thereof, said baffle extending downwardly and inwardly of the sleeve member, in a direction away from the inlet sleeve, and having side and bottom edges spaced inwardly of the enclosing walls of the sleeve member, a tank for liquid insecticide mounted above said sleeve member, a conduit connected with the tank and with said sleeve member, at the top thereof and vertically above said inclined baffle, for the delivery of liquid insecticide, by gravity, from said tank and the application thereof upon the upwardly facing inclined surface of said baffle, whereby hot engine exhaust gas, delivered through the tapered sleeve, may expand and impinge upon the downwardly facing surface of the baffle to heat the same for the vaporization of insecticide delivered on the baffle, said baffle serving also to deflect exhaust gases, within the sleeve member, around the

5

bottom and side edges of the baffle, to thereby mix and entrain vaporized insecticide with said exhaust gases for delivery thence to and discharge thereof through the vertically elongated end of the discharge nozzle, and a pipe connected between the tank and said sleeve member for applying, in the tank, the exhaust gas pressure prevailing in the sleeve member when the device is in operation.

2. A spray device for liquid insecticide, comprising a sleeve member forming a housing, a tapered inlet sleeve having a large end connected with one end of the sleeve member and a relatively smaller end formed for connection with the exhaust pipe of an internal combustion engine, a laterally flattened and vertically flared discharge nozzle, providing a narrow vertically elongated outlet end and a remote sleeve-like end connected to the sleeve member at the end thereof remote from said inlet sleeve, an inclined baffle mounted within and having an upper end secured to the top of said sleeve member, adjacent the inlet sleeve connected end thereof, said baffle extending downwardly and inwardly of the sleeve member, in a direction away from the inlet sleeve, and having side and bottom edges spaced inwardly of the enclosing walls of the sleeve member, and means to deliver liquid insecticide, at a regulated rate, upon the upwardly facing inclined surface of said baffle, whereby hot engine exhaust gas, delivered through the tapered sleeve, may expand and impinge upon the downwardly facing surface of the baffle to heat the same for the vaporization of insecticide delivered on the baffle, said baffle serving also to deflect exhaust gases, within the sleeve member, around the bottom and side edges of the baffle, to thereby mix and entrain vaporized insecticide with said exhaust gases for delivery thence to and discharge thereof through the vertically elongated end of the discharge nozzle.

3. A spray device for liquid insecticide, comprising a sleeve member forming a housing, a tapered inlet sleeve having a large end connected with one end of the sleeve member and a rela-

6

tively smaller end formed for connection with the exhaust pipe of an internal combustion engine, a flared discharge nozzle connected to the sleeve member at the end thereof remote from said inlet sleeve, an inclined baffle mounted within and having an upper end secured to the top of said sleeve member, adjacent the inlet sleeve connected end thereof, said baffle extending downwardly and inwardly of the sleeve member, in a direction away from the inlet sleeve, and having side and bottom edges spaced inwardly of the enclosing walls of the sleeve member, and a conduit connected with said sleeve member, at the top thereof and vertically above said inclined baffle, for the delivery of liquid insecticide, by gravity, upon the upwardly facing inclined surface of said baffle, whereby hot engine exhaust gas, delivered through the tapered sleeve, may expand and impinge upon the downwardly facing surface of the baffle to heat the same for the vaporization of insecticide delivered on the baffle, said baffle serving also to deflect exhaust gases, within the sleeve member, around the bottom and side edges of the baffle, to thereby mix and entrain vaporized insecticide with said exhaust gases for delivery thence to and discharge thereof through the discharge nozzle.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,037,623	Hinsky	Sept. 3, 1912
1,777,472	Mock et al.	Oct. 7, 1930
1,950,796	Hilgerink	Mar. 13, 1934
2,024,938	Marshall	Dec. 17, 1935
2,062,511	Haddock et al.	Dec. 1, 1936
2,293,931	Cook	Aug. 25, 1942
2,313,976	Sullivan	Mar. 16, 1943
2,422,024	Levey et al.	June 10, 1947

FOREIGN PATENTS

Number	Country	Date
293,367	Great Britain	June 28, 1928