Nov. 7, 1950 R. A. COOPER 2,529,245

INSECTICIDE DIFFUSER

Filed March 27, 1946

Fig. 2.

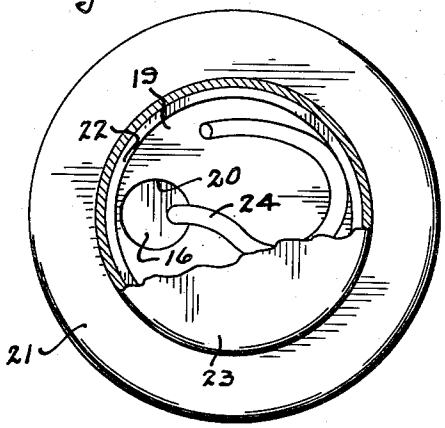


Fig. 1.

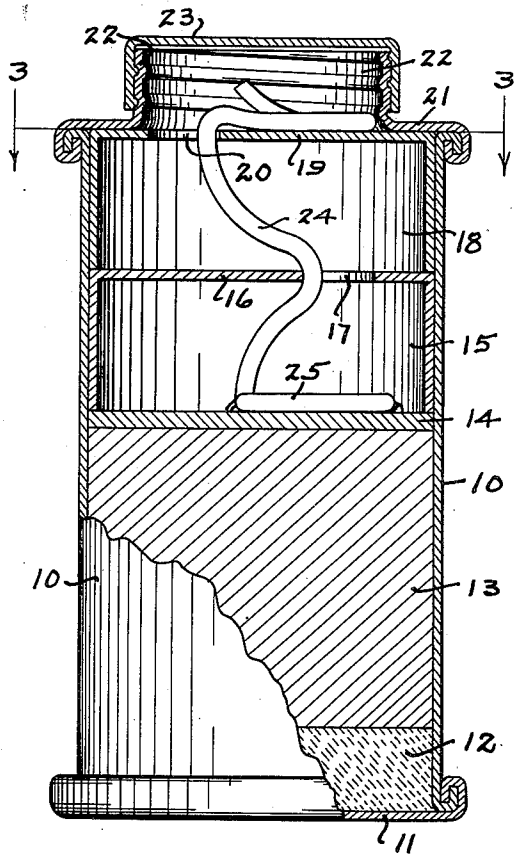
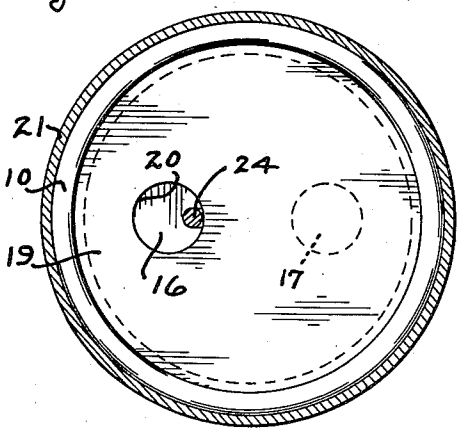


Fig. 3.



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INSECTICIDE DIFFUSER

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4 Claims. (Cl. 43—125)

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This invention relates to means for diffusing an insect killer such as dichloro-diphenyl-trichloroethane, commonly known as "DDT." The object of this invention is to diffuse the material by intimately mixing it in the smoke of the products of combustion of certain materials to the end that the insect killing materials, hereafter termed an insecticide, is conveyed thereon throughout the room being treated to carry it into the fabrics and into cracks and crevices, as well as to deposit it over wall surfaces and the like.

Heretofore, the diffusion of the insecticide has been attempted to be carried out by means of mixing the insecticide in a light oil and then spraying or attempting to atomize the oil to obtain a finely divided state. The difficulty however has been that the insecticide is not broken up into sufficiently small parts so as to obtain the necessary coating of walls and objects within the space being treated.

A further primary object of the invention is to provide means which may be operated simply by igniting a fuse and then closing off the room being treated to permit the means to operate thereafter in an automatic manner all without danger of igniting any combustible matter thereabout and all without harming or injuring in any way the fabrics, finishes, or coatings of materials within the room. Furthermore the means so employed may be safely stored and handled without any danger of preignition or breaking out of containers and the like. Further objects and advantages of the invention will become apparent to those versed in the art in the following description of the one particular form of the invention as now best known to me, as illustrated in the accompanying drawing, in which,

Fig. 1 is a view in vertical elevation and partial section of a device embodying the invention;

Fig. 2, a top plan view also in partial section; and

Fig. 3, a view in transverse horizontal section on a line 3—3 in Fig. 1.

Like characters of reference indicate like parts in the several views in the drawing.

A can 10 generally cylindrical in shape is made to have a bottom 11 either integrally united therewith or attached thereto as indicated in Fig. 1 by seaming. The wall and floor of the can 10 are preferably made of metal or at least of some non-fragile, fire resistant material. Over the bottom or floor 11 is placed a layer 12 of a refractory material such as fire clay in order to prevent transmission of heat from the top

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side to the floor 11 in any appreciable amount within the time during which the upper surface of the layer 12 may be subjected to temperatures on the order of 450° F.

A candle 13 is placed within the can 10 to rest on the layer 12. Preferably the candle 13 is cylindrical in shape to permit it being slipped into the can 10 from the top side with a close fit. It is in this candle 13 that the insecticide above indicated is mixed.

This candle 13 is composed of a number of ingredients that are incorporated in a rather wide range of percentages of the total mix. One highly effective candle composition contains the following materials in the percentages indicated:

	Percent by weight
Zinc powder	45 to 50
Hexachlorethane	22 to 25
Ammonium perchlorate	10 to 24
Dichloro-diphenyl-trichloroethane	5 to 20
Calcium carbonate	.25 to 5
Orange shellac	.25 to 15
Ammonium chloride	.25 to 4
Castor oil	.5 to 2
Linseed oil	.5 to 2

All of those ingredients are thoroughly and intimately intermixed and then compressed under extremely high pressure such as in the neighborhood of 3,600 lbs. per square inch. When this composition burns, an extremely dense, white smoke is produced in large volumes which tends to diffuse into the atmosphere quite readily both laterally and vertically and remains suspended for quite an interval of time, for at least ½ to 2 to 3 hours. A total of two ounces of the candle composition is sufficient to produce adequate dispersion of the insecticide in a chamber up to 10,000 cubic feet in volume.

In the candle composition, the zinc powder and the hexachlorethane serve in the nature of a fuel (hexachlorethane also having some disinfecting effect) and the ammonium perchlorate serves as the oxidizer. These three materials primarily produce the insecticide vehicle of the dense, white smoke. The calcium carbonate (serving as an anti-acid and filler); the orange shellac (acting as a moisture repellant); and the ammonium chloride (serving as a cooling agent) all control the rate of dispersion, and these three ingredients may be varied while the first three named ingredients producing the white smoke remain fixed within the ranges indicated. The amount of amonium chloride employed depends somewhat upon the sizes of the

zinc particles, less being required as the sizes of the particles increase. The castor and linseed oils serve as binding agents for the entire mass.

As indicated in Fig. 1, the candle 13 when rested upon the refractory material 12 in the can 10 has an upper elevation substantially at or above the middle of the can 10. Across the top of the candle 13 is spread a layer 14 of a starting mixture. This starting mixture contains from 10 to 50 per cent of ammonium perchlorate; 20 to 60 per cent of zinc powder; and 20 to 60 per cent of antimony powder. As indicated in the drawing, Fig. 1, this layer 14 of the starting mixture is quite thin in comparison to the height of the handle 13, being in about the proportion thereto indicated by the drawing.

Over the starting mixture layer 14 is placed an inverted cup 15 slidingly fitted within the can 10 to be opened across its underside with the floor 16 uppermost. In this floor 16 is provided an opening 17 to one side of the center of the floor 16. Then over the first cup 15 is placed a second inverted cup 18 to have the rim of its wall resting against the outermost portion of the floor 16 of the lower cup 15. The floor 19 (then in the uppermost position) terminates in the plane of the top end of the can 10. This floor 19 is provided with an opening 20 therethrough and the cup 18 is so positioned as to have this opening 20 offset to one side of the axis of the can oppositely from the offset position of the hole 17. In fact the cups 15 and 18 are duplicates one of the other and the positioning of the opening 17 and 20 is had simply by rotating one cup about its axis in respect to the other cup.

Now to retain all of the various elements so far described within the can 10 there is fixed across the upper end of the can 10 a top 21 to be fixed thereto by any suitable means, herein shown as in the usual manner by seaming. This top 21 has an upturned neck 22 to which is removably secured a cover cap 23, cap 23 being herein shown as telescoping over the neck 22 and screw-threadedly engaging therewith.

A commercial firecracker fuse 24 has a length exposed across the top side of the floor 19, from which length the fuse 24 is carried, down through the opening 20, across and down through the opening 17, and then to a length 25 resting horizontally on the top side of the starting mixture 14. This length 25 is cemented or glued to the layer 14 by an igniting composition such as about 25% of black powder and 75% of a nitro-cellulose cement, this composition being in a pasty or semi-fluid state initially to flow around the fuse length 25 and be in intimate contact with the top surface of the starting mixture 14.

The can 10 with its contents all as above described is placed within a room to be treated. The cover 23 is removed and the upper exposed end of the fuse 24 is ignited. The length of the fuse is such that the operator may have sufficient time following the igniting of the fuse to leave the room and close the exit door. Immediately the fuse burns down to the starting mixture 14, this mixture is ignited, and in turn it ignites the candle. The whole procedure of oxidation proceeds quickly but without explosive effect and the products of combustion escape first through the hole 17 and then across and upwardly through the hole 20 in such manner that these floors 16 and 19 serve as baffles to prevent any solid particles from being thrown out of the can 10 through the neck 22. All that escapes is a dense, white smoke or fog that rapidly fills the room from side wall to side wall and from top to bottom. This smoke is thoroughly impregnated with insecticide which is then in an extremely finely divided state to be most effective in its insecticide properties. Since the temperature of combustion is controlled to be well below the decomposition temperature of around 1390° F. of the insecticide, the insecticide is not broken down in any manner but does become extremely well dispersed throughout the smoke.

While I have herein shown and described my invention in the one particular form, it is obvious that many changes may be employed without departing from the spirit of the invention, and I therefore do not desire to be limited to that precise form beyond the limitations which may be imposed by the following claims.

I claim:

1. A device for diffusing an insecticide comprising a can, a fire resistant floor in the can; a candle over said floor, within which candle an insecticide is dispersed; vertically spaced baffles in the can over said candle, said baffles having staggered passageways therethrough; and a candle igniting fuse extending past said baffles to have an outer exposed end portion and an inner end portion adjacent said candle for initiating ignition thereof; said candle comprising said insecticide, a mixture of powdered zinc, hexachlorethane, ammonium perchlorate, calcium carbonate, orange shellac, ammonium chloride, and a binding agent of at least one of the group of castor oil and linseed oil, said candle being firmly compacted.

2. A device for diffusing an insecticide comprising a can, a fire resistant floor in the can; a candle over said floor, within which candle the insecticide is dispersed; vertically spaced baffles in the can over said candle, said baffles having staggered passageways therethrough; and a candle igniting fuse extending past said baffles to have an outer exposed end portion and an inner end portion adjacent said candle for initiating ignition thereof; said candle comprising a mixture of powdered zinc, hexachlorethane, ammonium perchlorate, calcium carbonate, orange shellac, ammonium chloride, and a binding agent of at least one of the group of castor oil and linseed oil, said candle being firmly compacted; said insecticide consisting of dichloro-diphenyl-trichloroethane in finely divided forms.

3. A device for diffusing an insecticide comprising a can, a fire resistant floor in the can; a candle over said floor, within which candle the insecticide is dispersed; vertically spaced baffles in the can over said candle, said baffles having staggered passageways therethrough; and a candle igniting fuse extending past said baffles to have an outer exposed end portion and an inner end portion adjacent said candle for initiating ignition thereof; said candle comprising a mixture of powdered zinc, hexachlorethane, ammonium perchlorate, calcium carbonate, orange shellac, ammonium chloride, and a binding agent of at least one of the group of castor oil and linseed oil, said candle being firmly compacted; said candle comprising a mixture of powdered zinc, 45 to 50% by weight; hexachlorethane, 22 to 25%; ammonium perchlorate, 10 to 24%; calcium carbonate, .25 to 5%; shellac, .25 to 15%; ammonium chloride, .25 to 4%; castor oil, .5 to 2%; and linseed oil, .5 to 2%; plus the insecticide consisting of dichloro-diphenyl-trichloroethane, 5 to 20%.

4. A device for diffusing an insecticide comprising a can having a heat resistant floor; a one piece combustible candle containing the insecticide seated on the floor; a pair of vertically spaced apart baffles secured to extend transversely across said can, spaced above said candle to define two diffusing chambers within the can above said candle, each of said baffles having a hole therethrough in mis-alignment one with the other; a fuse attached to said candle and carried through both of said baffles to have a terminal length above said uppermost baffle; and a cover normally detachably secured to said can, spaced above said uppermost baffle to provide a chamber thereover within which said terminal fuse length may be loosely carried.

ROBERT A. COOPER.

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