

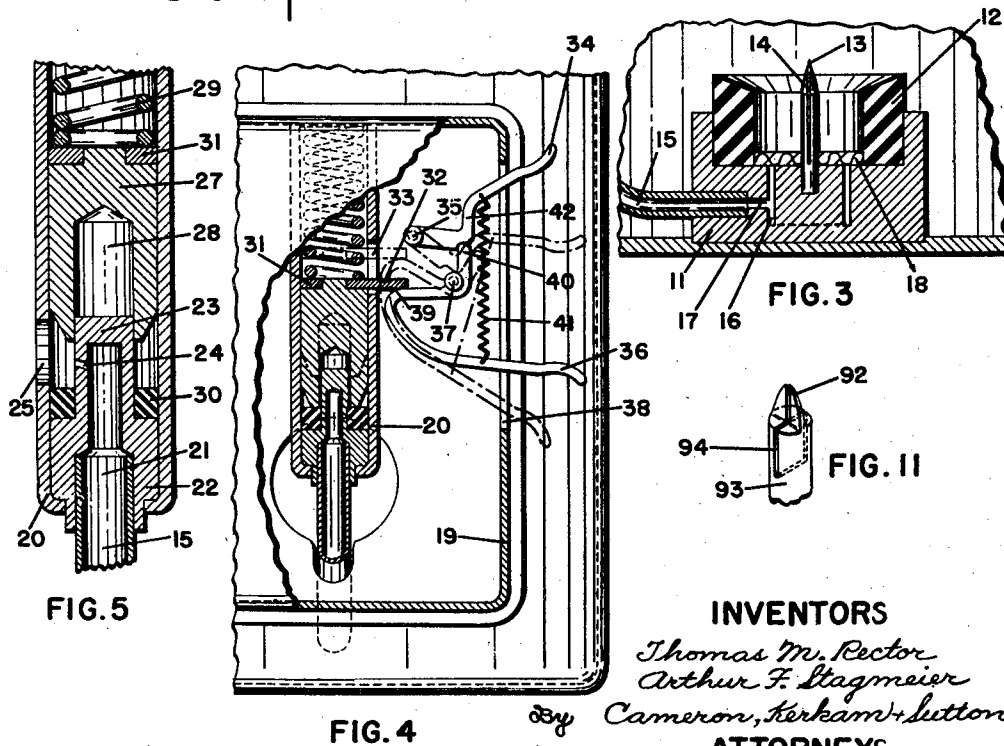
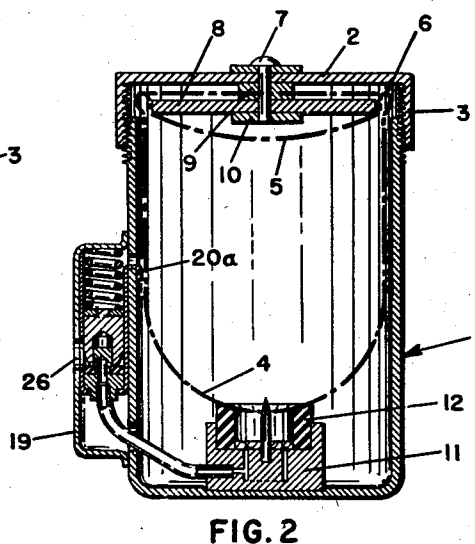
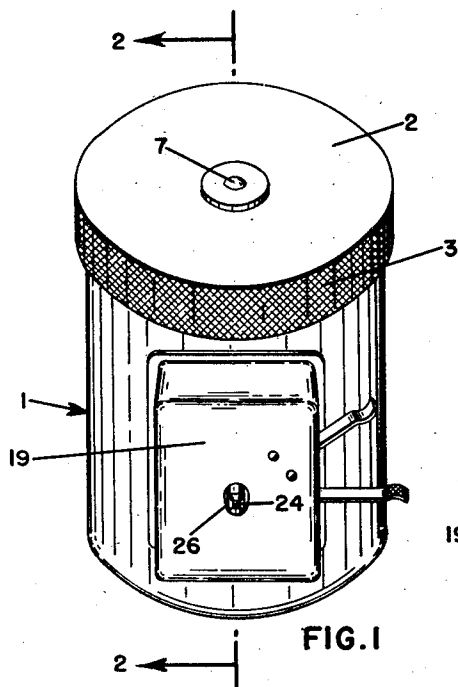
Jan. 2, 1951

T. M. RECTOR ET AL
AEROSOL INSECTICIDE DISPENSER

2,536,221

Filed Oct. 18, 1945

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

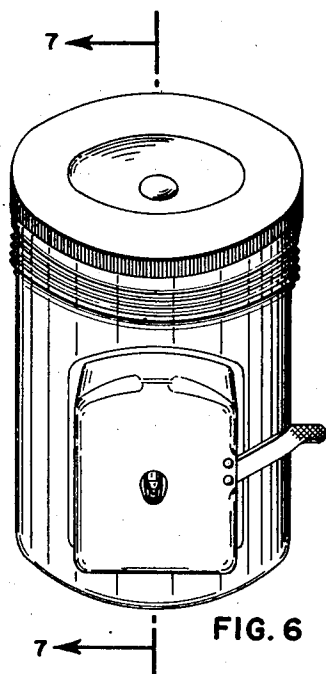


FIG. 6

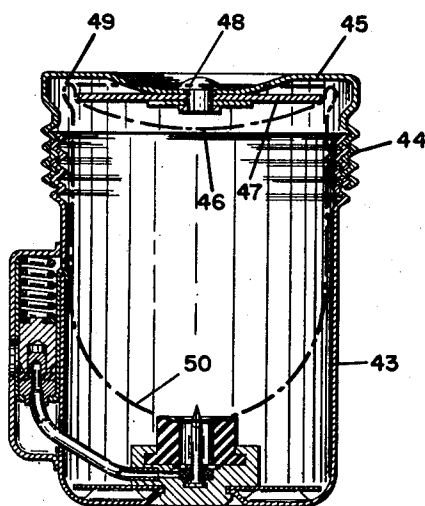


FIG. 7

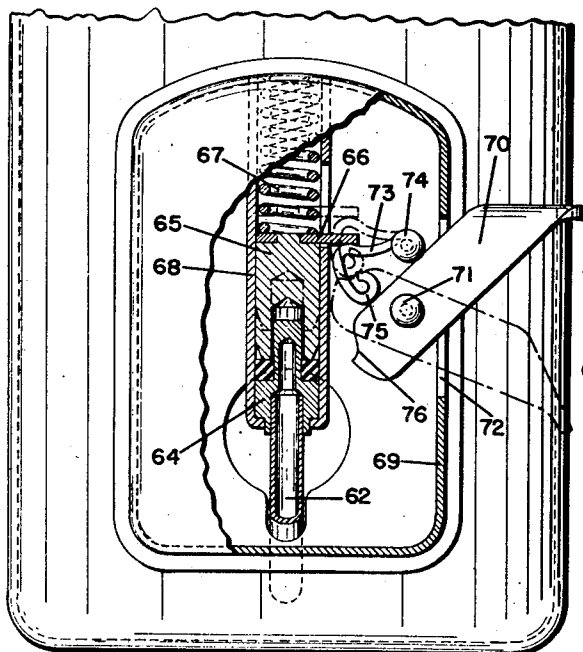


FIG. 9

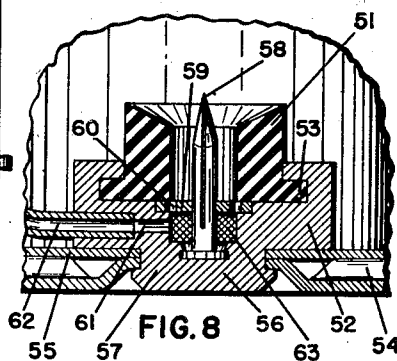


FIG. 8

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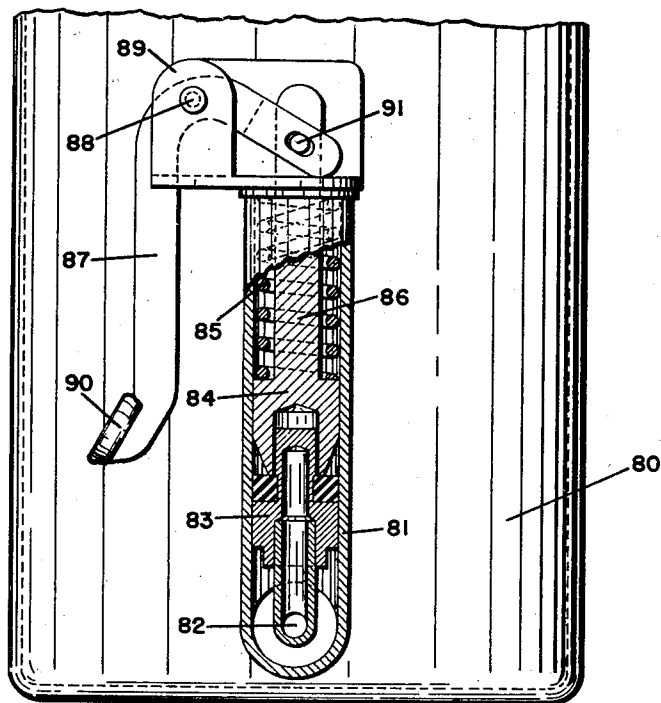


FIG. 10

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2,536,221

AEROSOL INSECTICIDE DISPENSER

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Application October 18, 1945, Serial No. 623,120

1 Claim. (Cl. 222—5)

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This invention relates to insecticide dispensing devices and more particularly to dispensing devices adapted to discharge the insecticide in the form of an aerosol.

The invention is especially adapted for use with aerosol insecticide bombs holding a liquefied gas under pressure, in which the insecticide is dissolved. The insecticide is discharged from such bombs by virtue of the vapor pressure of the liquefied gas, which evaporates or reverts to the gaseous state so rapidly as to leave the insecticide in an extremely fine state of dispersion in the atmosphere. Bombs of this type that have been used by the armed forces in recent years have consisted simply of heavy metal containers provided with appropriate means for discharging the insecticide. Also, in order to protect such bombs against bursting as a result of inadvertent exposure to relatively high temperatures, they have included safety devices in the form of soft metal inserts adapted to melt at certain temperatures or of thin metal membranes adapted to rupture at certain pressures. The entire contents of the bombs have been discharged on melting or fracture of these devices.

For general use of such bombs, as for example in the household, it is desirable to provide a dispensing device for holding a disposable and replaceable bomb or cartridge and for controlling the discharge of its contents by the user. One of the objects of the invention is to provide a novel dispensing device for this purpose which is simple and inexpensive, small, compact and convenient to handle, and easy to charge and use.

Another object is to provide such a device in which proper location and puncturing of the bomb or cartridge with respect to the puncturing device and associated means are insured without special care or attention by the user.

A further object is to provide such a device in which a simple but effective valve serves both to control the discharge of the bomb contents and as a safeguard against excessive pressures by permitting the discharge of the bomb contents, though also functioning to stop such discharge in the event of timely removal from the effect of high temperatures.

Still another object is to insure against expansion and refrigeration effects which might interfere with the desired rapid evaporation of the liquefied gas and conversion of the insecticide to an aerosol.

Other objects of the invention will appear more fully hereinafter as the description proceeds.

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Several embodiments of the invention have been illustrated in the accompanying drawings, but it is to be expressly understood that said drawings are for purposes of illustration only and are not to be taken as a definition of the limits of the invention, reference being had to the appended claim for this purpose.

In the drawings,

Fig. 1 is a perspective view of a device embodying the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional view of the lower central part of Fig. 2;

Fig. 4 is an enlarged view, partly in section, showing the valve and its operating mechanism;

Fig. 5 is an enlarged view showing the valve in open position;

Fig. 6 is a perspective view of another device embodying the invention;

Fig. 7 is a section on the line 7—7 of Fig. 6;

Fig. 8 is an enlarged sectional view of the lower part of Fig. 7;

Fig. 9 is an enlarged view, partly in section, showing the valve and its operating mechanism;

Fig. 10 shows another form of valve operating mechanism; and

Fig. 11 shows another form of puncturing device.

Referring first to Figs. 1 to 4, the device shown is substantially cylindrical in shape and of a size adapted to be held easily in one hand. It comprises a cup-shaped casing 1, preferably in one piece, and a cover 2 having an internally threaded rim 3 that is screwed on the top of the externally threaded casing 1.

The shape and size of the bomb itself are indicated in dot and dash lines in Fig. 2. It comprises a cylindrical container having a rounded bottom 4 and a dished top 5 connected by an upwardly projecting bead or seam 6 which is of somewhat greater diameter than the cylindrical body of the bomb. This bomb or cartridge must be punctured at the bottom to permit proper discharge of the insecticide as an aerosol, and it is desirable that the cylindrical part of the bomb fit closely within the casing 1 in order to center it with respect to the puncturing and other mechanism described below. Hence the parts are proportioned so that when the bomb is fully seated, the cylindrical casing wall 1 terminates below the bead 6, the latter projecting outwardly over the top of the wall. The rim 3 of the cover 2 is then made deep enough to extend beyond the bead 6 into engagement with the external thread on the casing 1.

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The cover 2 does not directly engage the top of the bomb as it is screwed on, but is provided with a rotatable presser plate so that the bomb is not turned. In the form shown, a pivot pin 7 is suitably secured in the top of the cover and a disc or the like 8 is rotatably mounted thereon, being held in place by spacers 9 and a retaining washer 10. The presser element 8 is of the proper size to engage the dished top 5 of the bomb inside the bead 6, but the cover 2 is prevented from contacting the bead by reason of the spacers 9. Hence the cover can be screwed on to force the bomb down into the casing without turning it in the casing. Preferably and as shown, the pressure element 8 fits snugly within the bead 6 to hold the bomb in true axial alignment with the cover and further facilitate assembly.

The bottom of the casing carries puncturing and sealing means, one form of which is shown in Figs. 2 and 3. A block 11 is secured centrally to the bottom of the casing and is recessed on top to receive an annular gasket 12 of rubber or the like, the upper surface of which is shaped more or less conically to correspond with the shape of the bottom 4 of the bomb. The block 11 also carries a puncturing needle 13 disposed centrally within the gasket 12 and adapted to puncture the rounded bottom 4 of the bomb as it is forced down in the casing. The needle is slotted at 14 so that after it punctures the bomb, gas may escape through the slot into the space enclosed by the gasket 12. The parts are arranged so that the gasket makes firm sealing contact with the bomb before it is punctured, and the centering of the cylindrical bomb in the casing due to its close fit therein permits the use of a small gasket and ensures a good seal. In the embodiment shown, accurate centering of the bomb is further insured by the close fit of the pressure plate 8 within the bead 6.

The gas can escape from the space within the gasket 12 by way of suitable passages in the block 11 which communicate with a tube 15 leading to the valve mechanism. In the form shown, an annular passage 16 is formed in the block below the gasket, and a communicating lateral passage 17 leads to the tube 15. Preferably the gas is filtered before it enters the passages 16, 17, as any small particle might clog the small discharge opening in the valve to be described. To this end filtering means such as a wire screen or gauze 18 is placed within the gasket 12 over the annular passage 16.

The tube 15 leads out through an opening in the casing 1 to a valve mechanism that is mounted on the side of the device and housed in a small auxiliary casing 19. The valve unit per se is contained in a casing 20, preferably cylindrical, which is conveniently anchored on the wall of the casing 1 by means of a lip 20a projecting through an opening in the casing 1 and turned down inside the casing. The end of the tube 15 enters the valve casing 20 at its lower end and is inserted in a recess 21 in a stationary valve body 22 seated in the lower end of the casing. The recess is continued upwardly within a reduced extension 23 of the valve body, which is provided with a valve passage 24 extending laterally from the recess 21 toward an opening 25 in the valve casing 20 which registers with an opening 26 in the casing 19. The opening of passage 24 constitutes an orifice controlling the escape of the insecticide mixture, and being located at the extreme end of the passage leading from the

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bomb, objectionable expansion and refrigeration effects are avoided.

The valve passage 24 is normally closed by a valve member 27 slidable axially in the valve casing 20 and shown in closed position in Fig. 4 and in open position in Fig. 5. This valve member is centrally recessed at 28 to receive the end of the extension 23 of the valve body, and is pressed toward closed position by a spring 29 in the upper part of the valve casing. As shown in Fig. 4, the valve member when in closed position engages a gasket 30 of rubber or the like which is preferably in the form of a washer surrounding the extension 23 and seated on the shoulder formed by the enlarged lower part of the valve body 22. Due to the close sliding fit between members 23 and 27, a negligible amount of insecticide mixture is allowed to pass through the opening 24 when the valve is closed and vertical movement of valve member 27 as well as accurate seating thereof on the gasket 30 are insured.

Means are also provided for opening the valve against the spring 29 and in the embodiment shown, a self locking trigger mechanism is used for this purpose. A plate 31 secured to the top of the valve member 27 has a projection 32 extending slidably through an opening 33 in the valve casing 20. An upper trigger 34 is pivoted at 35 in the casing 19, and a lower trigger 36 is pivoted at 37 in said casing, ends of both triggers extending movably through a slot 38 in the side of the casing. When the valve is in closed position as shown in Fig. 4, the projecting finger 32 is held in engagement with the lower trigger at 39, maintaining this trigger in the full line position. The lower trigger has a tail 40 which engages a notch in the upper trigger 34, the two triggers being held together in this relation by a spring 41.

The upper trigger is thus locked against downward movement, and is practically at the upper end of its travel. The lower trigger is locked against upward movement, but it can be moved downwardly if sufficient force is exerted to lift the valve member 27 against the spring 29 and thus to open the valve, these parts moving to the dotted line positions shown in Fig. 4. At the same time the tail 40 is moved away from the notch in the upper lever which is then pulled downwardly by the spring 41 to its dotted line position. The lower lever is now locked against upward movement because the part 42 of the upper lever lies in the path of the tail 40, and the valve is thus locked in open position. The upper lever, however, is now free to be moved upwardly, restoring the triggers to full line position by virtue of the spring 41 and causing the valve to be closed by the spring 29.

The valve may be designed to open automatically at any pressure safely below the seam bursting pressure of the cartridge. For example, if the latter is say 3.75 lbs. per square inch, the valve may be designed to open at say 200 lbs. per square inch. The pressure in the cartridge at normal operating temperatures of 65-75° F. will be considerably lower, for example, about 55-70 lbs. per square inch for the insecticide mixtures illustrated in the table below. If at any time, however, the device is left in such heated surroundings as to cause the pressure to increase to 200 lbs., the valve will open, whereby the cartridge contents will be permitted to escape. The valve thus functions as a safeguard against excessive pressure as well as a control valve. Timely removal of the device from the effect of high

temperatures will stop the resulting discharge by causing the valve to close.

The composition of the insecticide and gas charged in the bomb may vary widely and is not part of the present invention. The following table illustrates suitable mixtures:

Pyrethrum extract (20% pyrethrins) -----	1 to 3%
DDT (dichlorodiphenyltrichloroethane) -----	1 to 5%
Deodorized kerosene -----	5 to 10%
Perfume -----	As desired
Pentane -----	10 to 20%
Freon (dichlorodifluoromethane) -----	Qs to make 100%

Figs. 6-9 show another embodiment of the invention comprising a cup-shaped casing 43 having a threaded rim for engagement by the threaded rim 44 of a cover 45. The casing threads are pressed outwardly so as to maintain the inside diameter of the casing and permit the cylindrical body of the bomb to fit closely within the casing for centering purposes as described above. The dished top 46 of the bomb is engaged by a presser plate 47 that is rotatably mounted on a pin 48 secured to the cover, the plate 47 preferably seating snugly inside the bead 49 of the bomb. This bead is accommodated within the rim 44 of the cover and above the top of the casing 43 as described in connection with Fig. 2.

The rounded bottom 50 of the bomb is seated in an annular gasket 51 of rubber or the like which corresponds to the gasket 12 described above, the gasket 51 being mounted in a block 52 which is recessed and undercut to receive a retaining flange 53 on the base of the gasket. To permit the use of a lighter metal for the casing and yet provide the necessary strength, the bottom of the casing is corrugated as indicated at 54 and a base plate 55 rests on the corrugations, the plate and the bottom of the casing having registering openings to receive an extension 56 of the block which is rolled over at 57 to fasten the parts securely together.

A slotted puncturing pin or needle 58, which may be like the pin 13 described above, is seated in the block 52 and projects centrally with respect to the gasket. The bottom of the space within the gasket is closed by a plate or disc 59 having ports or apertures 60 whereby gas escaping from the punctured bomb can pass downwardly into the central recess of the block 52 and thence by a lateral passage 61 to a tube 62 leading to the valve mechanism. For filtering purposes, a felt washer 63 or the like occupies this central recess below the plate 59, this washer surrounding the stem of the pin 58.

The valve unit comprises a stationary valve body 64 to which the tube 62 leads, a movable valve member 65 and operating finger 66, and a spring 67 all mounted in a valve casing 68 which in turn is housed in an auxiliary casing 69 on the side of the casing 43. These parts are similar to the correspondingly named parts of Figs. 1-5 to which reference is made for more detailed description.

As best shown in Fig. 9, the valve operating mechanism comprises a single lever 70 pivoted at 71 and movable in a slot 72 in the casing 69. Interposed between the lever and the valve operating finger 66 is a cam piece in the form of a bent strip of metal 73 having one end pivoted at 74 and the other end 75 in engagement with the lever 70, the bend at the middle of the cam

piece engaging the finger 66. When the lever 70 is depressed, the cam piece and with it the finger 66 and valve body are lifted against the spring 67 to open the valve. As the desired limit of movement is reached, the end 75 of the cam piece enters a curved notch 76 on the end of the lever and the parts are locked with the valve in open position as shown in dot and dash lines. To close the valve again, it is only necessary to lift the lever 70 far enough to release the end 75 of the cam piece from the notch 76, whereupon the spring 67 snaps the valve closed and returns the lever and other parts to normal position.

Fig. 10 shows still another form of valve actuating mechanism embodying a single lever but not self-locking. The main casing 80 carries a valve casing 81 on one side, the tube 82 from the bomb entering the bottom of the casing. The valve casing contains a stationary valve body 83 to which the tube is attached, a movable valve member 84 and a spring 85 all of which are similar to the correspondingly named parts of Figs. 4 and 5 to which reference is made for detailed explanation. However, the valve member 84 has an extension 86 projecting upwardly within the spring 85 and out the top of the valve casing 81. A bent lever 87 is pivoted at 88 on a bracket 89, one end of the lever depending to a point where a finger piece 90 is conveniently located for the user. The other end of the lever has a slot through which is a pin 91 that is connected to the projecting end of the extension 86 of the valve member. By pushing the finger piece 90 toward the valve casing, the valve member 84 can be lifted against the spring 85 and held up as long as desired. As soon as the finger piece is released, however, the spring 85 snaps the valve to closed position.

Fig. 11 shows another form of puncturing device which comprises a thin flat pointed blade 92 formed on the end of a shank 93, instead of a needle type device as shown in the previously described embodiments. The blade and shank are slotted at 94 to permit escape of gas from the punctured bomb.

It will be observed that the devices described above are simple and inexpensive and at the same time small, compact and convenient to handle. In fact, the overall shape and dimensions of the device do not differ greatly from those of the bomb itself. Used cartridges or bombs are easily removed and replaced simply by removing and replacing the screw top or cover of the device, the projecting bead of the bomb enabling the user to grasp and handle it with facility. Due to the close cylindrical fit of the bomb in the main casing, it centers and aligns itself accurately on insertion in the casing and proper engagement of the rounded bottom of the bomb with the sealing gasket and puncturing device are thus automatically ensured. The valve itself is of simple construction and yet effective in controlling the insecticide discharge and at the same time provides safety against excessive pressure. Also the arrangement of the valve and its operating mechanism for actuation in a direction parallel to the axis of the device contributes substantially to easy and convenient operation while the device is held in the hand of the user.

It will be understood that the invention can be used for dispensing parasiticides in general, fumigants, deodorants, and in fact any substance capable of being converted to an aerosol in the manner described above.

It will be understood that the invention is not

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restricted to the particular embodiments illustrated and described above, and that various changes may be made by those skilled in the art in the form, details of construction and arrangement of the parts without departing from the spirit of the invention. Reference should accordingly be had to the appended claim for a definition of the limits of the invention.

What is claimed is:

A device of the class described comprising a substantially cylindrical cup-like casing having an open top and adapted to receive a substantially cylindrical bomb having a bead on its upper edge of greater diameter than its cylindrical body, the top of the casing wall being externally threaded, a screw-type cover having a threaded rim adapted to engage the threads on the casing wall, a member rotatably mounted on said cover to engage the top of the bomb and force it down in the casing as the cover is applied to the top of the casing, an annular gasket mounted on and projecting upwardly from the bottom of the casing to engage and seal off an area of the bottom of the bomb, a puncturing device located within said gasket in position to puncture the bottom of the bomb in said area and establish communication between the interior of the bomb and the space enclosed by the gasket, the axial dimensions of the casing wall and the cover rim providing a space between the top of said wall and the cover

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when the latter is applied in position to seat the bomb on said gasket and puncturing device, whereby the cylindrical body of the bomb may fit closely within the cylindrical casing with the bead projecting into said space, said member being substantially coextensive with the casing and fitting closely within said bead to engage the top of the bomb, a manually operable discharge valve mechanism mounted on the outside of the casing and including a valve-controlled discharge orifice, and means forming a conduit extending from the space enclosed by said gasket through the casing and to said orifice.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,938,621	Cornell	Dec. 12, 1933

FOREIGN PATENTS

Number	Country	Date
19,113	Great Britain	Sept. 8, 1898
431,742	Great Britain	July 15, 1935