

June 3, 1941.

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2,244,341

METHOD FOR DISPENSING METHYL BROMIDE

Filed Dec. 17, 1937

2 Sheets-Sheet 1

FIG. 1

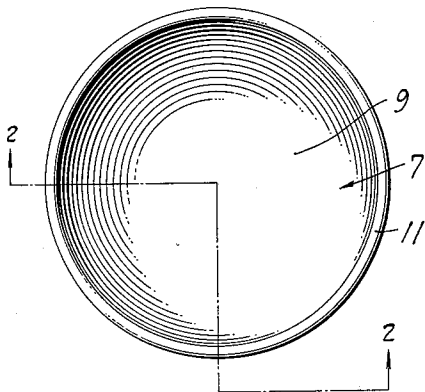


FIG. 2

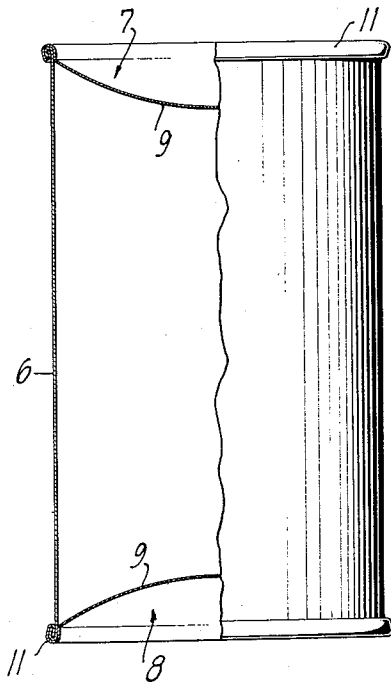
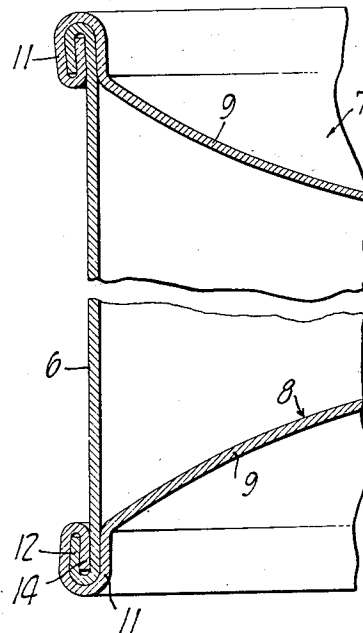


FIG. 3



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FIG. 4-

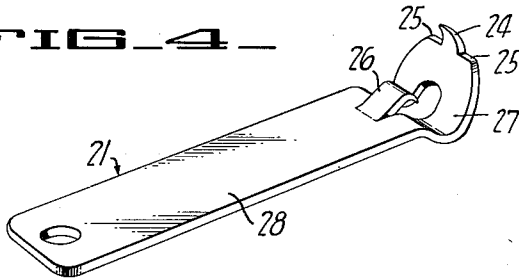


FIG. 5-

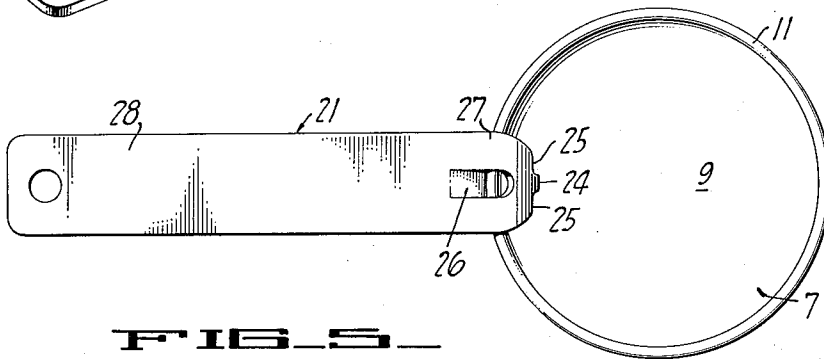


FIG. 7-

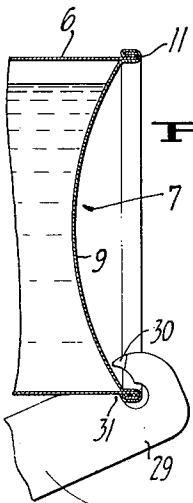
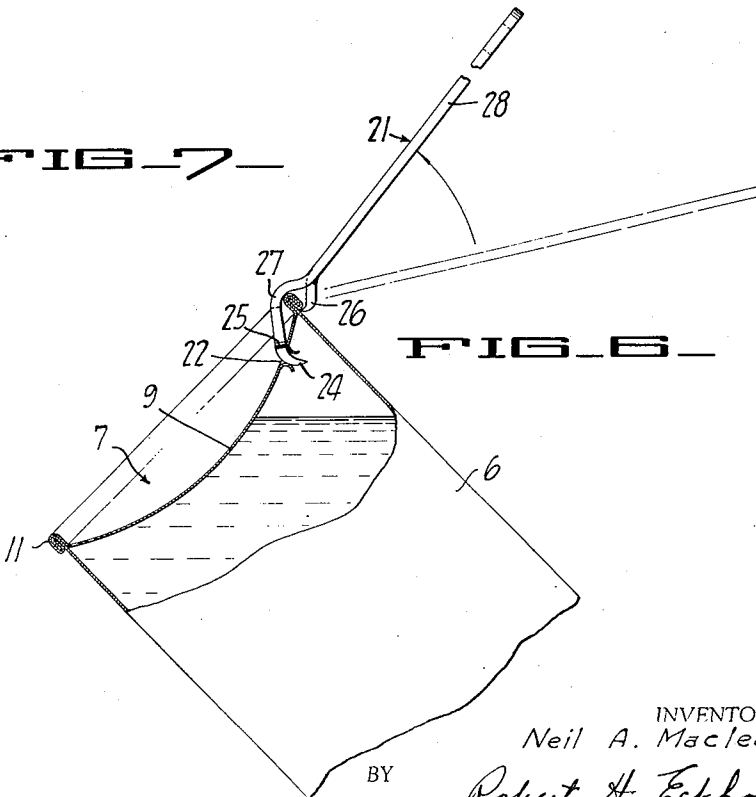


FIG. 6-



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METHOD FOR DISPENSING METHYL
BROMIDE

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Application December 17, 1937, Serial No. 180,469

3 Claims. (Cl. 21-58)

The present invention relates to a method and apparatus for practicing fumigation.

The invention is particularly concerned with fumigation with methyl bromide. This chemical, at ordinary temperatures, is a gas. The boiling point of the liquid is 4.5° C. or 40.1° F.

In attempts to utilize methyl bromide as a fumigant for potatoes, tomatoes, grains, dried fruits, fresh vegetables, et cetera, I have found certain difficulties in releasing the methyl bromide. This chemical is relatively expensive, selling for about \$1.00 per pound. It cannot therefore be used freely, for overdosing is costly.

One practice, cited by way of example, is to place a large cylinder of the methyl bromide on a platform scale and release gas from the container through a hose into the space to be fumigated. The workman will leave the space, and will only return when he believes sufficient gas has been emitted. Since the extent of opening of the valve controlling gas emission is unknown, the resulting concentration is a matter of guess work, inasmuch as when the workman returns he usually merely shuts off the valve. As a consequence, under-dosage as well as over-dosage frequently occurs.

In attempts to dispense methyl bromide from small containers, I have found other difficulties. For example, methyl bromide being a gas at ordinary temperatures must be packed in a container that will withstand considerable internal pressure. Furthermore, I have found that the release of methyl bromide through a small opening tends to cool down the body of the methyl bromide to such an extent that the rate of emission drops. I have found liquid methyl bromide still in a container even though it had been open to the atmosphere for 24 hours and even though the atmospheric temperature was at all times considerably above the boiling point of the methyl bromide.

In accordance with this invention I provide a simple, novel container for the dispensing of methyl bromide.

Another object of the present invention is to provide a simple novel process for dispensing methyl bromide as a fumigant.

The invention includes other objects and features of advantage, some of which, together with the foregoing, will be set forth hereinafter wherein the present preferred form of fumigator of this invention is disclosed.

In the drawings accompanying and forming a part hereof,

Figure 1 is a plan view of the fumigator of the present invention.

Figure 2 is a section taken along the line 2-2 in Figure 1.

Figure 3 is an enlarged sectional view taken longitudinally through the fumigator.

Figure 4 is a perspective of a fumigator opener.

Figure 5 is a plan view illustrating application of the opener.

Figure 6 is a view, partly in section, illustrating the use of the fumigator.

Figure 7 is a side elevation, partly in section, showing another fumigator opener in use.

I have discovered that by releasing methyl bromide as a liquid, the effect of the latent heat of vaporization can be offset so far as the container is concerned. That is, by releasing methyl bromide as a liquid, the cooling effect attendant upon the drop in pressure does not cool the liquid body in the container. The cooling effect is isolated from the container, occurring in the atmosphere at a point beyond the container.

I have further discovered that by providing a fumigator in which the metal surface is increased so that the heat input into the methyl bromide is in excess of that ordinarily available by reason of the surface area of the container, quick and effective dispensing of the methyl bromide can be secured. This is of advantage in treating stocks of fruit, grain and the like, wherein the material must be fumigated to kill rodents, insects, larvae and the like, but where, because of the value of the material, it is highly objectionable to tie up the material for any length of time, 24 hours being a maximum, ordinarily.

In accordance with this invention, I preferably package the methyl bromide in a container such as that illustrated in the drawings wherein I have disclosed a fumigator including tubular side wall member 6 having end closures 7 and 8. These end closures are substantially identical. In accordance with this invention the end closures include a spherical portion 9 provided centrally of the closure and adjacent to a rim portion 11. The rim portion 11 is formed upon the member so that the rim fits snugly within the interior of side wall member 6 and at an angle greater than a right angle to the central portion.

The side wall member 6 has each end thereof rolled over and turned back upon itself to provide a hooked portion 12 in a spaced relation to the outside face of the member 6 but parallel thereto. Each end closure is so formed that the peripheral edge thereof fits snugly over the por-

tion 12 of member 6, the edge 14 of the rim portion being bent back and hooked over the end of the wall member between the end and the outer face of the wall member. This structure will withstand considerable internal pressure application, solder being applied on the interlocked surfaces in a manner well known in the art.

By providing both ends of the container of a spherical shape certain novel features are made available for use in fumigation. First of all, in heating the methyl bromide containers, the rate of heat transfer to the methyl bromide is materially increased inasmuch as the surface area of the container is larger than would ordinarily be the case if the side wall member 8 was merely closed by flat end members. Second, during vaporization, by reason of the increased metal surface, the heat input into the container from the atmosphere is increased. Third, drainage of the device is facilitated so that liquid residues of methyl bromide are not left in the container, thus avoiding contact with the liquid methyl bromide when the container is removed from the space fumigated. Fourth, by reason of having the spherical end members depending into the container the vapor space within the container is kept at a minimum while space for liquid expansion is provided. Also by having members in engagement with the liquid on all sides the rate of heat input is increased.

The advantage of the container of the present invention will be readily appreciated upon disclosure of its method of use. For example, in fumigating a refrigerator car filled with fruit, immersion of the container in a bucket of hot water, preferably at a temperature of about 100° F. for a matter of 5 minutes, will serve to heat the container to such a temperature as to create a pressure within the container of about one hundred pounds. An opening is thereupon made in one of the end closures or in the side wall, as by jamming the container down upon the point of a nail, and the contents of the can will be released.

In a hot atmosphere—about 75° F.—the opening is made while holding the can in that position in which it appears in Figure 6. Tool 21 is placed over the rim of the can, as illustrated in Figures 4 and 5, and rotated. This serves to make a small hole 22 adjacent to the rim of the can, as appears in Figure 6, and releases the gas pressure. The can is then inverted in position and held horizontally (Figure 1) so that the liquid covers the opening. The vapor pressure of the methyl bromide, that created by the heat in the liquid and in the can, is utilized to eject the liquid as such from the can. Because of the internal pressure within the can the liquid is sprayed out as such for a distance of from ten to twenty feet, permitting an operator to hold the can in his hand and spray the material about the refrigerator car, or other space, without coming in contact with the fluid or being subject to any considerable concentration of the gas. Remote corners of the space can be reached easily and quickly. This operation is continued as desired.

The opening made is preferably large enough so that it does not act as an expansion valve to any substantial extent. With the cans at about 90° F. an opening about 0.125 inch in diameter suffices. As the temperature is lowered the hole size should be increased and in refrigerator cars relatively large holes should be made, of the order of 0.25 inch and larger. At the low tem-

peratures existing in a refrigerator car it is also desirable to open the can at the bottom, as in Figure 7, so that liquid issues initially in a liquid stream and is ejected as a liquid stream beyond the container.

Since the methyl bromide is packed in half pound or pound containers it is a simple matter to secure the correct dosage. One merely opens the required number of fumigators and ensures discharge of their contents in the confined space to be fumigated.

Usually application of a pound of methyl bromide per thousand cubic feet of cubical content suffices if the material is left undisturbed for 24 hours. Less material can be used if artificial circulation is practiced and stratification avoided. I have successfully used a half pound for each thousand feet when artificial circulation was practiced.

Spraying of liquid methyl bromide in a jet from a body of the liquid also ensures circulation of the atmosphere in the container to be fumigated and more nearly uniform gas concentrations in the container. The liquid jet stirs up the air and, since the liquid vaporizes as it is sprayed, the distributing of the methyl bromide is facilitated.

In treating a stock of fruit or other produce, the operator opens a container and places it so that methyl bromide flows out from the liquid portion in the can. The can is placed on top of the fruit to ensure that vaporized methyl bromide flows downwardly. The fruit is preferably enclosed with a canvas to ensure high gas concentrations.

As previously mentioned, I have found that if a can carrying a small hole is left standing in an upright position with the hole venting the gas and not the liquid space, residual methyl bromide will be found in the can even though the can has stood for as long as twenty-four hours in an atmosphere at a temperature of about 60° F. The practice advocated herein obviates this, gas pressure being employed to force the liquid out into the atmosphere.

The tool shown in Figures 4 and 5 is formed after that of Patent No. 1,996,550. Here, however, the tool includes a short beak-like projection 24 extending from between shoulders 25. A lip 26 is struck from the tool to fit on either end of the fumigator and on either face of the rim 11 at each end of the fumigator, the tool head 27 being bent so that the beak 24 cuts a hole in close to the rim when handle 28 is rocked, for example, counterclockwise in Figure 6. The shoulders 25 limit the puncture, beak 24 only making a small opening so that gas pressure can be used to free the liquid in a jet.

The tool 29 shown in Figure 7 is made of a flat strip with a short beak 30 placed cooperatively with respect to container rim engaging shoulder 31. The beak 30 is short, making a small hole close to the rim upon rotation of the tool as indicated by the arrow in Figure 7.

I claim:

1. A method for securing rapid, complete evacuation of a vessel sealed under the pressure of a filling of methyl bromide, the vessel containing a body of liquid methyl bromide of such relatively small volume that release of gaseous methyl bromide through a small opening in the vessel cools said body and lowers the vaporization appreciably, said method comprising puncturing said vessel below the liquid level therein to release methyl bromide only as a liquid from said

vessel through said puncture to eject liquid methyl bromide out from said vessel whereby said methyl bromide vaporizes and cools said ejected methyl bromide away from the body remaining in said vessel.

2. A method of dispensing methyl bromide as a fumigant comprising heating methyl bromide in a closed container to about 100° F., puncturing said container and forming an opening therein at least substantially 0.125 inch across said opening and releasing methyl bromide as substantially unatomized liquid through said opening.

3. A method for securing rapid, complete evac-

uation of a vessel sealed under the pressure of a filling of methyl bromide, the vessel containing a body of liquid methyl bromide of such relatively small volume that release of gaseous methyl bromide through a small opening in the vessel cools said body and lowers the vaporization appreciably, said method comprising puncturing said vessel and releasing methyl bromide only as a liquid from said vessel through said puncture to eject liquid methyl bromide out from said vessel whereby said methyl bromide vaporizes and cools said ejected methyl bromide away from the body remaining in said vessel.

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