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SELF PROPELLING FIRE EXTINGUISHING CHARGE CONTAINING A DOUBLE HALOGEN HYDROCARBON COMPOUND

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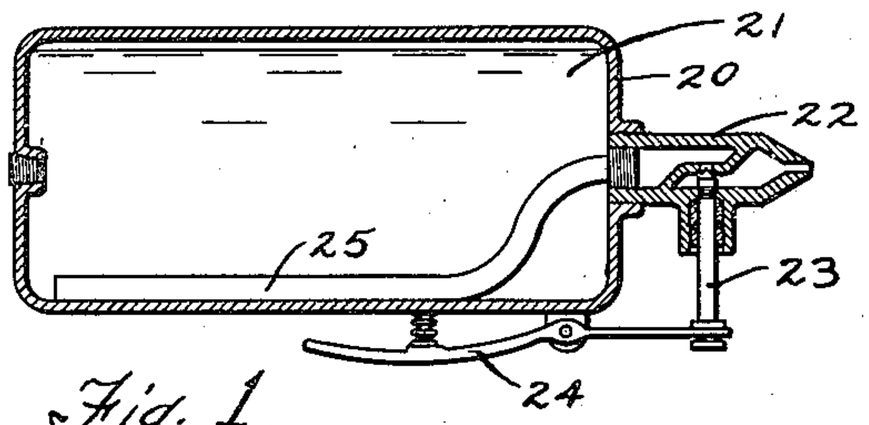

Fig. 1

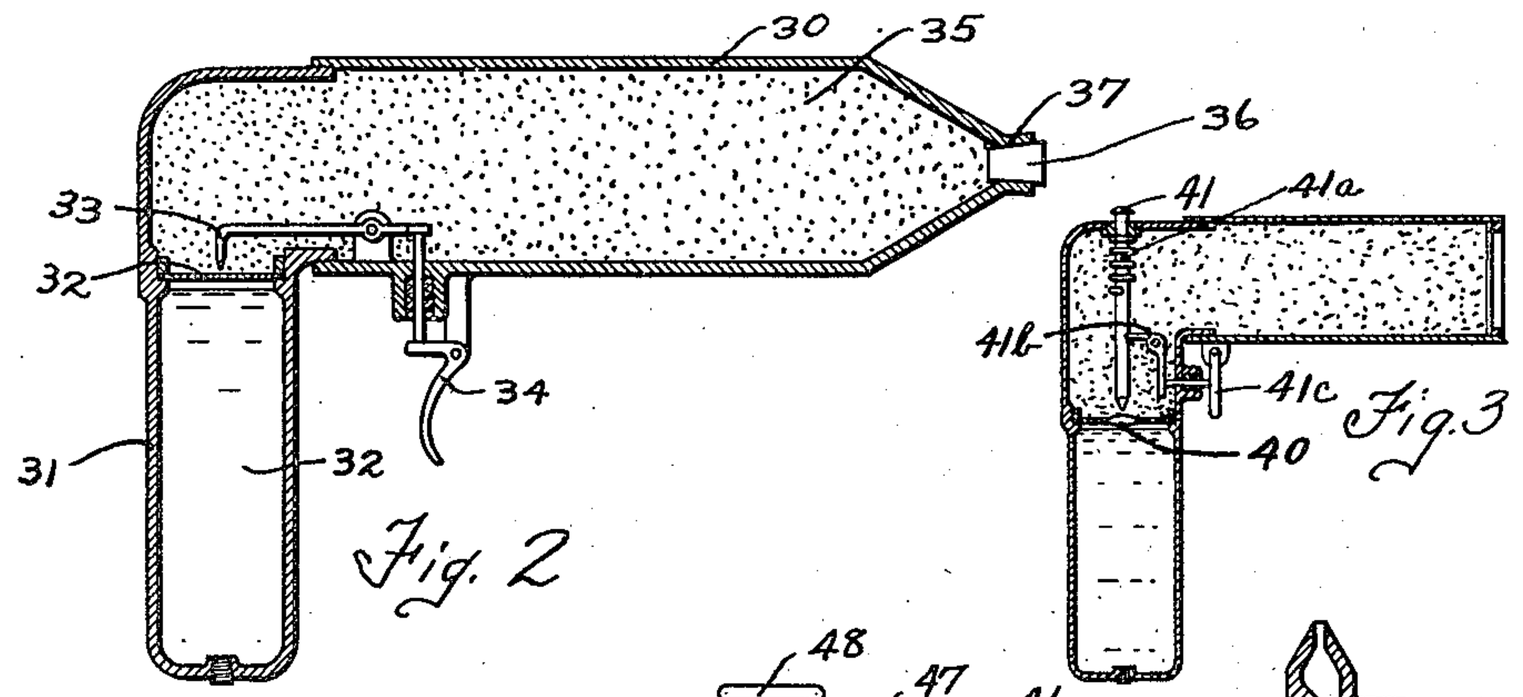

Fig. 2

Fig. 3

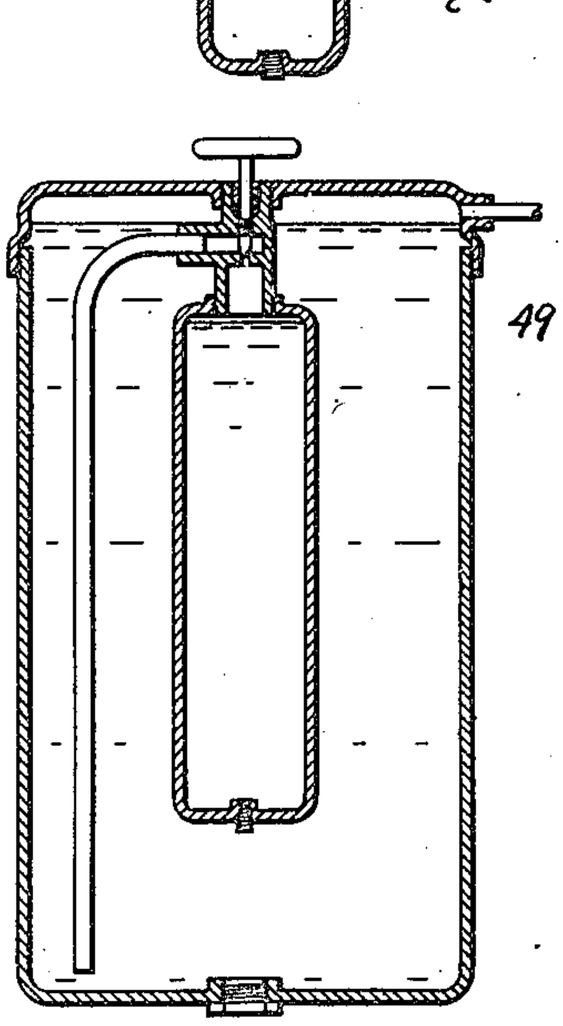

Fig. 5

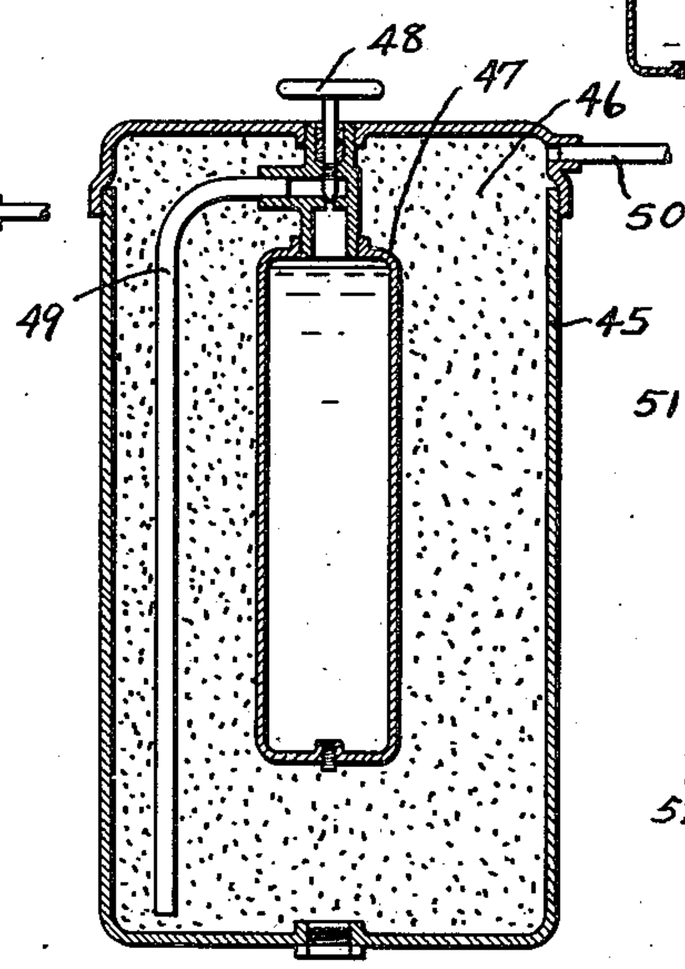

Fig. 4

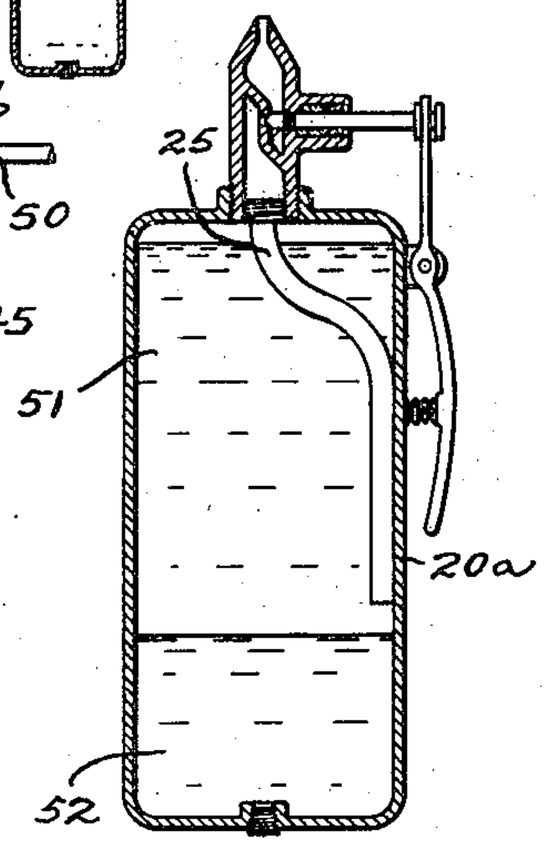

Fig. 6

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SELF PROPELLING FIRE EXTINGUISHING CHARGE CONTAINING A DOUBLE HALOGEN HYDROCARBON COMPOUND

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16 Claims. (Cl. 23—12)

The invention relates to chemistry and more particularly to the use for fire extinguisher purposes of halo-fluoro derivatives of hydrocarbons.

An object of this invention is to provide a fire extinguishing mode in which the propelling agent does not have excessive pressures, is nontoxic, and can be stored in its container without appreciable decomposition.

Another object of this invention is to provide a fire extinguisher containing a halo-fluoro derivative of a hydrocarbon.

Another object of this invention is to provide a fire extinguisher composition in which a halo-fluoro derivative of a hydrocarbon is an important factor.

Another object of this invention is to provide a fire extinguishing compound which has a relatively constant low self propelling pressure.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a cross-sectional view, somewhat diagrammatic, of a fire extinguisher embodying features of this invention;

Fig. 2 is a cross-sectional view of a modification of a fire extinguisher embodying features of this invention;

Fig. 3 is a cross-sectional view of a further modified embodiment of this invention;

Fig. 4 is a cross-sectional view of a further modification of a fire extinguisher embodying features of this invention;

Fig. 5 is a modified form of the extinguisher shown in Fig. 4; and

Fig. 6 is a modified form of extinguisher shown in Fig. 1.

I have discovered that halo-fluoro derivatives of the hydrocarbons are particularly useful for the purpose of extinguishing fires. There are many of these derivatives which may be used, but the outstanding characteristic is that the derivative includes some other halogen besides fluorine. Preferably the chloro-fluoro derivatives of the hydrocarbons in which at least half of the hydrogen atoms have been replaced by a halogen are used. It is desirable that these derivatives should have a sufficient pressure at ordinary temperatures in order to be self propelling. Thus CCl_2F_2, CH_2ClF, $CHCl_2F$ and $CHClF_2$ of the methane derivatives and mixtures of the same with inert solvents, have been found to be satisfactory when it is desired to have the derivative self propelling. CF_3CHClF, CHF_2CClF_2, CF_3CH_2Cl, CF_3CCl_2F, $CClF_2CClF_2$ among the derivatives of the ethane group have also been found satisfactory when the derivatives are desired to be self propelling.

Other halo-fluoro derivatives can also be used of the non-self propelling type where some propellant is provided either separately or mixed with them. Thus CCl_3F of the methane derivatives and a great mass of ethane derivatives such as CF_3CHCL_2, CHF_2CClF_2, CHF_2CCl_2F, $CClF_2CCl_2F$, CF_3CCl_3, $CHClFCCl_2F$ among the ethane group derivatives have been found to be suitably useful as fire extinguishers where other propelling means is provided.

In Fig. 1 is shown a fire extinguisher in which a self propelling halo-fluoro derivative of a hydrocarbon is used. This fire extinguisher includes a container 20 for the fire extinguishing composition 21 and a discharge device 22 for releasing the fire extinguishing composition. The device 22 may include a valve 23 operated by a trigger 24. A flexible pipe 25 may be provided inside of the container 20 so that the extinguisher tends to empty completely in liquid form all of the composition regardless of the position of the extinguisher. In this form the composition 21 may contain one or a mixture of the halo-fluoro derivatives of hydrocarbons. These substances are excellent fire extinguishing substances and are useful by themselves for extinguishing fires. Thus it may be either substantially pure CCl_2F_2 or $CHClF_2$ or a mixture with each other or with other extinguishing media such as carbon tetrachloride.

The type of apparatus shown in Fig. 1 is rendered available for use with carbon tetrachloride by the addition of a halo-fluoro derivative of the hydrocarbons. Thus a solution of CCl_4 and CCl_2F_2 may be made which has a substantially constant discharge pressure until all of the contents are emptied, and this pressure is thus never excessive. The composition including CCl_4 and CCl_2F_2 is thus a very desirable fire extinguishing compound.

In Fig. 2 the halo-fluoro derivatives of the hydrocarbons are used as propellants for some other fire extinguishing chemical, for instance of the type which is decomposed by heat to form extinguishing gases. Thus the container 30 may contain sodium bicarbonate and the container 31 may contain a suitable halofluoro derivative of a hydrocarbon by itself or with some other fire extinguishing liquid. Preferably the container 31

contains a body 32 of dichloro-difluoro methane, CCl_2F_2. The containers 30 and 31 are separated by a diaphragm 32 which is pierced by the needle 33 operated by the trigger 34 for operation of the device. When the diaphragm 32 is perforated the pressure on the CCl_2F_2 is relieved, causing the liquid CCl_2F_2 to evaporate and the resulting gases under slight pressure drive the sodium bicarbonate out of container 30. CCl_2F_2 thus acts as a propellant. Preferably a cork 36 is so inserted in the opening 37 of the container 30 that it is first driven out by the release of the propellant in the container 31.

In the modification shown in Fig. 3 the diaphragm 32 is replaced by an explosive cap 40 which is exploded by a snap-acting plunger 41, pulled against the action of the spring 41*a* and thereafter released by the yoke 41*b* operated by the trigger 41*c*. Otherwise the modification shown in Fig. 3 may be substantially the same as shown in Fig. 2.

In the modification shown in Fig. 4, the container 45 contains a chemical which is decomposed by heat to form extinguishing gases and this chemical 46 may be sodium bicarbonate, $NaHCO_3$. The container 47 may be placed inside of the container 45 and this container 47 may be charged with a suitable halo-fluoro derivative of a hydrocarbon, preferably CCl_2F_2 or $CHClF_2$ or a mixture of these two. In order to operate this device the valve 48 may be opened to release the propellant through the tube 49 in a manner to drive out the fire extinguishing composition (a mixture of $NaHCO_3$ and CCl_2F_2) through the outlet 50 and through a hose or the like.

The modification shown in Fig. 5 is practically the same apparatus as shown in Fig. 4 except that the sodium bicarbonate is replaced by water, or any other fire extinguishing liquid such as carbon tetrachloride. In the modification shown in Fig. 6 an apparatus substantially as shown in Fig. 1 may be used with the exception that a certain proportion of liquid in the container 20*a* may be water while the remainder of the liquid may be a halo-fluoro derivative of a hydrocarbon by itself or mixed with carbon tetrachloride. In this case, the CCl_2F_2, for instance, is not miscible with the water and ordinarily there would be two separate bodies of liquid H_2O shown at 51 and CCl_2F_2 by itself or mixed with CCl_4 shown at 52.

Thus in the modifications disclosed in Figs. 2, 3, 4, 5 and 6 the non-self-propelling substance is propelled out of the container by the escape of the low-boiling non-toxic gases resulting from the evaporation of the halo-fluoro derivative.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A fire extinguishing mixture containing a fluorine derivative of a hydrocarbon and a chemical decomposed by heat to form extinguishing gases.

2. A fire extinguishing mixture containing a fluorine derivative of a hydrocarbon and a chemical decomposed by heat to form CO_2.

3. A fire extinguishing mixture including a non-self propelling fire extinguishing substance and a halo-fluoro derivative of a hydrocarbon as a propellant.

4. A fire extinguishing mixture containing as fire extinguishing substances, carbon tetrachloride and a halo-fluoro derivative of a hydrocarbon.

5. A fire extinguishing mixture containing as fire extinguishing substances, carbon tetrachloride and dichloro-difluoro methane.

6. A fire extinguishing mixture containing as fire extinguishing substances a non-self-propelling fire extinguishing substance and an organic halo-fluoro derivative as the propellant.

7. A fire extinguishing mixture containing as fire extinguishing substances a non-self-propelling fire extinguishing substance and an aliphatic halo-fluoro derivative as the propellant.

8. A mixture comprising a non-self-propelling substance and an organic double halogen derivative containing fluorine as the propellant.

9. A mixture comprising a non-self-propelling substance and an aliphatic double halogen derivative containing fluorine as the propellant.

10. A mixture comprising a non-self-propelling substance and a hydrocarbon double halogen derivative containing fluorine as the propellant.

11. A mixture comprising a non-self-propelling substance and an aliphatic hydrocarbon double halogen derivative containing fluorine as the propellant.

12. The method comprising evaporating a halo-fluoro derivative of a hydrocarbon to create a pressure, and utilizing the pressure so created to force a non-self propelling substance from a container.

13. The method comprising evaporating a chloro-fluoro derivative of a hydrocarbon to create a pressure, and utilizing the pressure so created to force a non-self propelling substance from a container.

14. The method comprising evaporating a halo-fluoro derivative of methane to create a pressure, and utilizing the pressure so created to force a non-self propelling substance from a container.

15. The method comprising evaporating a chloro-fluoro derivative of methane to create a pressure, and utilizing the pressure so created to force a non-self propelling substance from a container.

16. The method comprising evaporating CCl_2F_2 to create a pressure, and utilizing the pressure so created to force a non-self-propelling substance from its container.

FRANCIS R. BICHOWSKY.