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March 6, 1934. G. BRAUN 1,949,857

FIRE EXTINGUISHER

Filed May 16, 1931

Fig. 1.

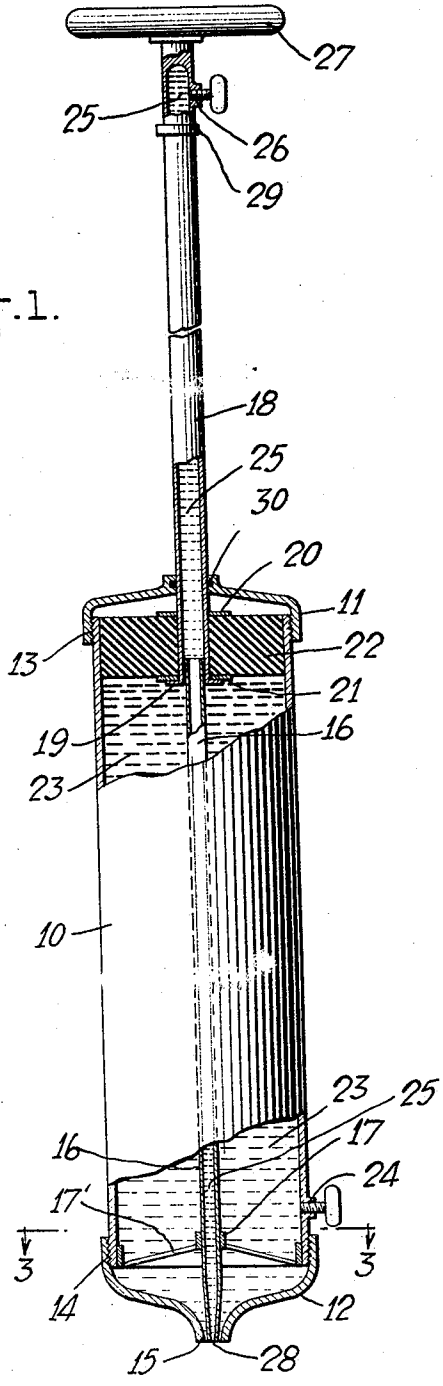


Fig. 2.

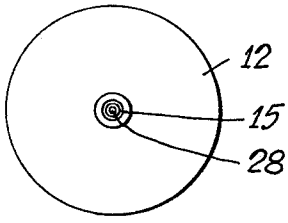
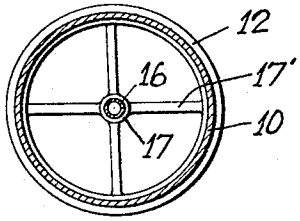


Fig. 3.



INVENTOR

GEZA BRAUN

BY ATTORNEY

Watson, Bristol, Johnson & Leavenworth

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FIRE EXTINGUISHER

Geza Braun, New York, N. Y., assignor to Paul J. Sartain, Richard C. Schwoerer, both of Philadelphia, Pa., and Richard C. Fassnacht, New York, N. Y.

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12 Claims. (Cl. 23—12)

This invention relates to fire extinguishers.

It is an object of this invention to produce a fire extinguisher which will possess effective fire extinguishing properties and will maintain those properties under the conditions of use to which it may be subjected.

It is a further object to provide a fire extinguisher which can be used easily and conveniently with complete safety to the persons employing it.

It is a further object to provide a fire extinguisher which will be non-corrosive to any metal containers or apparatus with which it may come in contact.

Other objects will in part be obvious and will in part appear hereinafter.

The drawing illustrates an apparatus with which this fire extinguisher may conveniently be employed, in which Figure 1 is a side elevation partly in section of the apparatus, and Figure 2 is an end view, and Figure 3 is a section on the line 3—3 of Figure 1.

Among the available fire extinguishing liquids, the polychlorinated products of methane and ethane are the most important. The higher the chlorine content in these compounds, the lower the inflammability, which is desirable in regard to the use of a compound as a fire extinguishing liquid. For this reason carbon tetrachloride and pentachloroethane possess very desirable characteristics.

With the increase in chlorine content, however, there is an increase in the reactivity of the chlorine atoms, which means that the higher chlorinated products are more easily decomposed and are more corrosive to metals than the compounds with lower chlorine content.

These compounds, moreover, under the conditions of use, are apt to form various poisonous or otherwise objectionable gases such as phosgene, hydrochloric acid and chlorine.

It is an object of this invention to provide a fire extinguisher which can be kept in contact with metal containers or apparatus for long periods of time without corrosion so that the compound and the apparatus will, at all times, be ready for instant use.

It is a further object to provide a compound in which the hazard to the fire fighters from the formation of toxic gases is eliminated.

In accordance with my experiments, I have determined that the less highly chlorinated hydrocarbons possess little, if any, liability to form phosgene.

For example, I have subjected carbon tetrachloride, chloroform and methylene dichloride to the same test conditions by subjecting them to 80% fuming sulphuric acid, that is, to the condition most favorable to the formation of phosgene. Under these conditions I found that carbon tetrachloride gave 90% of the theoretical possible phosgene, and chloroform yielded 25%, but methylene dichloride did not yield any phosgene at all.

Methylene dichloride, on the other hand, is not, in itself, sufficiently incombustible to be completely satisfactory as a fire extinguisher. In accordance with this invention, I utilize the excellent fire extinguishing properties of the vapors of highly chlorinated hydrocarbons such as carbon tetrachloride while at the same time gaining the benefit of the methylene dichloride without the disadvantages of either.

It has been discovered that certain compounds, when added to carbon tetrachloride or other highly halogenated hydrocarbon, destroy the corrosive character of the liquid and react with toxic gases to destroy their harmful character.

Of the compounds possessing this property, I have discovered that certain of them comprising the unsaturated hydro-aromatic compounds possess properties which seem to place them in a class by themselves in that they are able to unite directly and instantly with hydrochloric acid as well as with chlorine and phosgene. By unsaturated hydro-aromatic compounds I refer to aromatic compounds in which at least one, but not all, of the double bonds has been broken by hydrogenation such as cyclopentene, cyclohexene, pinene, dipentene etc. I have found particularly desirable results, however, in the use of pinene.

Some of these compounds having quite desirable properties, have relatively high boiling point. Under certain circumstances, therefore, it may be found desirable to add to the principal halogenated hydrocarbon some other high boiling point halogenated hydrocarbon to assist in the vaporization of the hydro-aromatic compound and to suppress its inflammability, for example, where one to three percent of pinene is employed by volume, it may be desirable also to add one to three percent of hexachlorethane.

These substances, moreover, possess the property of remaining in solution in halogenated hydrocarbons without destructive interaction. Moreover, these compounds are very effective to make the solution non-corrosive to metals, so that the resultant solution may be kept for long periods of time even in direct contact with metal

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containers and apparatus without destroying the useful qualities of the compound and without attacking the container.

Other compounds are useful in destroying the poisonous character of phosgene, hydrochloric acid and chlorine. Among these the organic nitrogen bases including the amines are particularly desirable because of the readiness and completeness with which they attack even small traces of the toxic gases. It has also been found that certain alcohols, such as methyl or ethyl alcohol, assist in the elimination of phosgene. I therefore, in some instances, may care to use them as a solvent for the organic nitrogen bases.

It is not feasible, however, to attempt to dissolve these compounds in the halogenated hydrocarbon because interaction occurs directly between the two, resulting in the destruction of the amine. Moreover, the amines themselves are in general quite corrosive to metals so that if the amine be dissolved in the halogenated hydrocarbon, it not only attacks the metal container, but it also quickly loses the safety which the amine was designed to confer. In accordance with this invention, the fire fighting compound is devised to possess the non-corrosive and safe character which the hydro-aromatic compound is capable of imparting and, in addition thereto, if desired, the extra safeguard may be employed resulting from the use of the organic nitrogen base without the difficulties hereinbefore referred to.

In making my compound, therefore, I preferably employ a solution of carbon tetrachloride and methylene dichloride, for example, in the proportions of 80 to 90 parts carbon tetrachloride and 20 to 10 parts of methylene dichloride in which mixture is dissolved from 1 to 3 parts of pinene with a commensurate quantity of hexachloroethane and this composition in itself forms an excellent and safe fire extinguisher, which may be readily kept for long periods of time, even in metal containers. I preferably, however, combine with the foregoing compound at the time of projection upon the fire, a substance which will react still more readily with the toxic gases, such as the organic nitrogen bases, for example, the amines, propylamines, butylamines, amylamines and the diethyl and triethyl amines or amyline or other bases such as pyridine, quinolene or piperidine. In order to project these compounds upon the fire in proper proportions and in proper mixture at the time of use, I employ the apparatus herein illustrated, or any other suitable apparatus.

In the drawing the numeral 10 designates a cylindrical container having caps 11 and 12 added at its respective ends. These caps are preferably threaded onto the container 10 as shown at 13 and 14. The cap 12 is provided with an outstanding nose having a central opening 15 which serves as a nozzle for the apparatus. Centrally disposed within the container 10 is a tube 16 supported in its central position by a spider 17 having arms 17' extending to the outer walls of the container. This tube has its lower end contracted to provide a central nozzle 28 concentric with but not closing the opening 15. The termination of the nozzle 28 may conveniently be flush with the opening 15 if desired, to minimize the liability of any admixture of materials between the interior of the container 10 and the interior of the tube 16.

Slidably disposed upon the tube 16 and sliding within an opening in the cap 11 is a tube 18 which is adapted to telescope upon the tube 16 and form a water-tight joint therewith. To this end the upper end of the tube 16 may be slightly enlarged to provide a plunger sliding within the tube 18 if desired.

Mounted upon the lower end of the tube 18 and held between flanges 20 and 21 is a plunger 22. The container 10 is intended to contain the main fire extinguishing liquid comprising, for example, the carbon tetrachloride and methylene dichloride with the pinene. This liquid is generally indicated by the numeral 23. The tube 18 is closed at the top and comprises a second liquid container adapted to contain the organic nitrogen base either alone or in alcohol solution. This liquid is indicated in the drawing by the numeral 25.

The container 10 is provided with a filling opening 24 and the tube 18 is provided with a filling opening 26 while the tube 18 carries at its upper end a handle 27.

With the foregoing construction it will be understood that when it is desired to use the device, the container 10 may be grasped in one hand and the tube 18 pushed in by means of the handle 27, and the whole directed toward the base of the flames. This results in a projection upon the fire of proportionate quantities of the liquid 23 out of the opening 15 and of the liquid 25 out of the nozzle 28, and it will be clear that at all times the proportions of these two liquids projected will be determined by the relative areas of cross sections of the tube 18 and of the container 10. It will be also clear that there is no danger of admixture of the organic base with the chlorinated hydrocarbon within the receptacle and on this account all danger of corrosion of the metal of the receptacle is avoided.

It will of course be understood that the tube 18 will be chosen from a metal which is immune to the attack of the solutions contained within it.

It may be desirable to provide a cap simultaneously to close the nozzle 28 and the opening 15 when the extinguisher is not in use, but this is an obvious expedient which is not deemed necessary to illustrate.

Since certain changes may be made in carrying out the above process and in the product, and modifications effected in the apparatus for practicing the principle thereof, without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A fire extinguishing compound comprising a mixture of methylene dichloride and carbon tetrachloride having mixed therewith a sufficient quantity of unsaturated hydro-aromatic compound to render it non-corrosive.

2. A fire extinguishing compound comprising a mixture of methylene dichloride and carbon tetrachloride having mixed therewith from 1 to 3% of an unsaturated hydro-aromatic compound.

3. A fire extinguishing compound comprising a mixture of methylene dichloride and carbon tetrachloride having from 1 to 3% of pinene.

4. A fire extinguishing compound comprising a mixture of methylene dichloride and carbon tetrachloride having pinene dissolved therein to render it non-corrosive.

5. A fire extinguishing compound including a mixture of 90 to 70 parts of carbon tetrachloride and 10 to 30 parts of methylene dichloride and 1 to 3% of pinene.

6. The method of extinguishing a fire which comprises projecting upon the fire a polychlorinated hydrocarbon and mixing therewith at the time of projection, an amine.

7. The method of extinguishing a fire which comprises projecting upon the fire a polychlorinated hydrocarbon and mixing therewith at the time of projection, an organic nitrogen base.

8. The method of extinguishing a fire which comprises projecting upon the fire a polychlorinated hydrocarbon and mixing therewith at the time of projection, an amine dissolved in an alcohol.

9. The method of extinguishing a fire which comprises projecting upon the fire a polychlorinated hydrocarbon and mixing therewith at the time of projection, an organic nitrogen base dissolved in an alcohol.

10. The method of extinguishing a fire which comprises projecting upon the fire a polyhalogenated hydrocarbon mixed with pinene and simultaneously therewith projecting an amine in predetermined proportions.

11. A fire extinguishing compound comprising a mixture of methylene dichloride and carbon tetrachloride with a small percentage of pinene.

12. A fire extinguishing package containing separate compartments and enclosing separate substances adapted to be projected simultaneously upon the fire, one of said substances comprising polyhalogenated hydrocarbons and pinene and the other of said substances including an amine.

GEZA BRAUN.

