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FIRE EXTINGUISHING LIQUID

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1 Claim. (Cl. 252—8)

This invention relates to new and improved fire extinguishing agents which are especially useful under conditions of extremely low temperatures and more particularly to such agents comprising carbon tetrachloride as a base.

It has been common practice to utilize carbon tetrachloride-base agents in vaporizing-liquid type fire extinguishers. Carbon tetrachloride is a useful extinguishing agent but has an undesirable physical property in that it freezes at -8.68°F . This disadvantage has been mitigated to some extent in the past by addition of other chemicals which act as antifreeze agents. However, it has been possible to lower the freezing point of the carbon tetrachloride-base liquid only to -50°F . and these antifreeze agents inhibit the fire extinguishing efficiency of the carbon tetrachloride to some degree. Such mixtures have been satisfactory for use on small fires in the more moderate climates, but are unsuitable for outdoor use in some sections of the northern United States, Canada and Alaska and in similar cold climates, or in aircraft flying at high altitudes, since temperatures below -50°F . are frequently encountered at such locations.

I have discovered that by blending certain fluorinated hydrocarbon materials with a carbon tetrachloride-base fire extinguishing agent I can vastly improve the efficacy of a carbon tetrachloride agent as well as depress the freezing point to below -65°F . Also the stabilizing effect of the fluorine element effectively decreases the toxic effects which are so prevalent with carbon tetrachloride and greatly increases fire extinguishing efficiency.

It is therefore an object of my invention to provide a superior fire extinguishing agent comprising carbon tetrachloride which does not freeze at extremely low temperatures and which has less toxicity and greater fire fighting efficiency than does carbon tetrachloride.

Another object is such a fire extinguishing liquid which does not freeze at temperatures such as -65°F .

Further objects and the applicability of my invention will become apparent from the following detailed description in which it is my intention to illustrate the applicability of my invention without thereby intending to limit its scope.

In accordance with my invention I may prepare a composition containing about 50% to 80% carbon tetrachloride and 50% to 20% of a fluorinated hydrocarbon such as dibromodifluoromethane, difluorobromochloromethane, or dibromotetrafluoroethane. These solutions have the advantage that the components are entirely miscible with one another and do not separate on prolonged standing or during shipment or other handling. It is preferable that the moisture content of the solution be substantially nil if the solution is to function well at low temperatures.

A solution containing 20% to 50% of one or more of said halogenated hydrocarbons is suitable but a solution containing 30% to 40% is preferable.

In spreading my improved fire extinguishing liquid on a fire, I may use an extinguisher of the air-pressurized type which can be conveniently pressurized at any source of clean, dry air. The continuity of the discharge stream is beneficial and the mechanical simplicity of this extin-

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guisher is a decided advantage for extreme low-temperature use. The pump-type extinguishers which I may also use are, however, much more subject to mechanical failure and are not as efficient as the air-pressurized type when used under adverse conditions.

It has been found that my improved fire extinguishing liquids are not only less toxic than the ordinary carbon tetrachloride-base agents, but also are less corrosive as well. This is an important feature since these liquids are usually stored for extended periods in metal containers and, at times, under various climatic conditions which are conducive to rapid corrosion.

As is well known to those proficient in the art, when carbon tetrachloride-base agents are used on fires of deep-seated origin there is a noted tendency for the fire to flash back after being apparently extinguished. There is noticeably less tendency for this phenomenon to occur when my improved agents are used. This is due, at least in part, to the improved physical properties of the vapor phase, which hovers over the fire zone considerably longer than the usual vaporized carbon tetrachloride agents. Also the fluoro-bromo radicals cause the blended agents to become more stabilized in the fire zone and thus to become more efficient in the prevention of flame propagation.

As is shown by the following example, the fire fighting efficiency of the mixture of my invention is much greater than that of carbon tetrachloride alone.

Example

The increased efficiency of my improved agents has been demonstrated on a deep-seated fire consisting of a pile of dry straw soaked with gasoline. A one-quart capacity air-pressurized extinguisher was used in the tests. A steel pan covering an area of $13\frac{1}{2}$ square feet was filled with six pounds of dry straw in a layer 6 to 8 inches deep. This straw was soaked with one gallon of standard gasoline, the straw ignited and allowed to burn for thirty seconds before application of the fire extinguishing agents. The following results were obtained:

CCl ₄ , Percent	CBr ₂ F ₂ , Percent	Freezing Point ($^{\circ}\text{F}$.)	Time Required to Extinguish Standard Fire with One Quart of agent (Seconds)
100	0	-8.68	1∞
90	10	-----	33
80	20	-----	25
70	30	-70.00	18
60	40	-100.00	15
50	50	-----	13

¹ One quart of carbon tetrachloride would not extinguish the fire; 3 to 4 quarts extinguished the fire in about 25 seconds.

While the various elements of the invention have been described in detail, it will be understood that variations from the disclosure can be made without departing from the scope of the invention.

Having thus disclosed my invention, I claim:
A fire extinguishing liquid composed of 60% to 70% of carbon tetrachloride and 30% to 40% of dibromodifluoromethane.

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