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NONFLAMMABLE CLEANING SOLVENT

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2 Claims. (Cl. 87—5)

This application is a division of my co-pending application Serial No. 467,997, filed July 14, 1930.

This invention relates to cleaning solvents and it pertains more particularly to non-flammable mixtures of light hydrocarbons and halogenated solvents.

The object of my invention is to provide a cleaning solvent containing a large amount of flammable light hydrocarbons protected by chlorinated solvents, so that when the cleaning solvent is evaporated both the vapors and the residual liquids are non-flammable.

Light hydrocarbons, such as benzine, petroleum naphtha, etc., are excellent solvents and are relatively inexpensive, but they are dangerous because of their flammable and explosive nature. Non-flammable solvents, such as carbon tetrachloride, are non-explosive, but are expensive and are objectionable because they dissolve too much oil from furs, woolen goods, etc. Carbon tetrachloride has been added to relatively heavy naphthas for rendering the evaporated vapors non-explosive, and attempts have been made to render the naphtha non-volatile by the addition of waxy bodies. In such cases, when the initial mixture is on the verge of flammability, the residual solvent very soon becomes flammable and such mixtures are therefore objectionable and dangerous.

I have discovered that by preceeding directly contrary to the above practice, both the evaporated vapors and residual liquids may contain high percentages of light hydrocarbon solvents (such as petroleum naphtha) and still be non-explosive. I use a relatively volatile petroleum naphtha instead of a non-volatile naphtha and I select flammable and non-flammable solvents of substantially the same volatility for my mixture. Such a mixture may be evaporated to any degree and still maintain the same ratio of flammable solvent to non-flammable solvent, both in the evolved vapors and in the residual liquid. In other words, I provide a mixture which cannot readily be fractionated by distillation.

As a specific example of my cleaning solvent I may mix about 35 to 40 parts by volume of petroleum naphtha, having a boiling range of from 160 to 220° F., with about 65 to 60 parts by volume of carbon tetrachloride. More carbon tetrachloride may be used, but I prefer to use the maximum quantity of naphtha which can be employed without danger of flammability. When this solvent is used as a dry cleaner and a large amount of it is evaporated, the gaseous or vapor phase will always be non-flammable because it will always contain about 60 to 65% carbon tetrachloride. Likewise the liquid phase will be non-flammable because it will always contain the same proportion of non-flammable solvent. There is no tendency for the naphtha to concentrate in the residual solvent. Consequently I am enabled to employ larger proportions of naphtha in the mixture than has heretofore been possible without danger of flammability.

As another example of my invention I may use a heavier mixture. I may use acetylene tetrachloride with petroleum naphtha, whose boiling range is about 290 to 325° F. In fact, I may use any mixture of flammable hydrocarbon solvents with non-flammable solvents as long as the volatility of one is substantially the same as the volatility of the other so that there will be no tendency of the mixture to fractionate or separate into different components by distillation or evaporation.

By departing from prior usage and employing a flammable solvent of substantially the same volatility as the non-flammable solvent, I have produced several noteworthy results. The solvent mixture is as safe to use under any conditions as carbon tetrachloride, but at the same time it is less expensive than carbon tetrachloride, it does not have as great a tendency to remove natural oils from furs, woolens, etc., and it combines the properties of hydrocarbon solvents with chlorinated solvents.

While I have described preferred embodiments of my invention in detail, I do not limit myself to said details except as defined by the following claims:

I claim:

1. A dry cleaning solvent comprising a mixture of petroleum naphtha having a boiling range of about 290–325° F. with acetylene tetrachloride, the amount of acetylene tetrachloride being sufficient to yield a substantially non-flammable mixture and a substantially non-flammable residue upon evaporation.

2. A dry cleaning solvent comprising a substantial amount of a petroleum naphtha component having a volatility approximately equal to that of acetylene tetrachloride and a substantial amount of acetylene tetrachloride, the ratio of the amount of said acetylene tetrachloride to the amount of said petroleum naphtha component being sufficiently high to render the mixture of said acetylene tetrachloride and said petroleum naphtha component substantially non-flammable and non-explosive.

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