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NONFLAMMABLE SOLVENT

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4 Claims. (Cl. 41—31.6)

The invention relates to solvents and more particularly to solvents for use in direct wet process duplication.

In direct wet process duplication a design is formed in mirror reverse on a master copy by any suitable means. The master sheet is moistened with a solvent for the dye stuff of the design so as to dissolve a thin surface layer of the dye impressions on the master sheet. Copy sheets are then contacted with the moistened master sheet, so that the thin layer of dissolved dye on the master impression is transferred to the copy sheets. In most instances alcohol soluble dye stuffs have been used to form the design of the master copy, and consequently the moistening solvent used in the process has been ethyl alcohol, methyl alcohol or a mixture of the two. Because of the flammability of these materials it has not hitherto been practical to employ electrically driven machines in carrying out the direct wet process duplication method, because of the danger of sparks igniting the alcohol. The wet process duplication method has therefore been limited to hand driven equipment, which naturally retarded the expansion of this otherwise meritorious process.

One embodiment of this invention is a mixture of mono-fluoro tri-chloro methane and any of the flammable organic solvents suitable for dissolving duplicating dye stuff used in direct process duplicating methods.

It has been discovered that as little as 3% of mono-fluoro tri-chloro methane added to a flammable solvent for duplicating dyes is sufficient to substantially reduce the flammability of the solvent. The exact amount of mono fluoro trichloro methane necessary to render a solvent suitable for use in conjunction with electrically driven machines naturally depends on the other ingredients of the solvent mixture, but 10% is ample for this purpose when the solvent has a flash point no lower than that of methyl alcohol.

It has also been discovered that the addition of even as high as 35% and more of mono-fluoro tri-chloro methane to flammable duplicating solvents such as ethyl and methyl alcohol or mixtures thereof will not appreciably influence their solvent characteristics towards duplicating dyes.

To more clearly set forth the practice in accordance with this invention and to more specifically point out the nature of the composition contemplated thereby, the following example is given, it being understood that this example illustrates one embodiment which has given satisfactory results, and that it is not intended to restrict the invention thereto.

A composition composed of 10% of mono-fluoro tri-chloro methane and 90% of a mixture of 50% methyl alcohol, 40% ethyl alcohol, 5% water and 5% of ethylene glycol mono-ethyl ether is added to the solvent reservoir of a direct process duplicating machine. This solvent mixture is non-flammable in the closed space of the reservoir and has a flash point of 100° F. when fully exposed to air. Consequently it does not present a fire hazard and the direct process machine may be electrically driven without danger. The solvent mixture has a pleasant odor, reduced toxicity and gives at least as good copies as the duplication liquid before the addition of the mono-fluoro tri-chloro methane.

While the invention is particularly adaptable for the production of solvents used in direct process duplication, it is not intended to restrict it to any particular use. The invention is of advantage in various manufacturing operations involving highly inflammable inorganic solvents, such as, for example, petroleum refining, manufacture of soya bean oil by the extraction method, manufacture of essential oils and the so-called flower concretes by solvent extraction methods.

Although it is not intended to limit the invention to any theory, it is believed that the high efficiency of mono-fluoro tri-chloro methane as a flame reducing agent is due to the fact that its boiling point is sufficiently low as to cause the formation of a non-flammable vapor film on the surface of the organic solvent, with sufficiently high boiling point as to be substantially retained by the solvents even at high summer temperatures.

I claim:

1. In admixture with a flammable solvent comprising a lower aliphatic alcohol adapted for use in moistening master copies in direct process duplication, from 3% to 35% of mono-fluoro tri-chloro methane as a flammability reducing agent.

2. A non-flammable solvent for use in moistening master copies in direct process duplication, composed mainly of a mixture of methyl and ethyl alcohols and having incorporated therein from 3% to 35% of mono-fluoro tri-chloro methane.

3. A non-flammable solvent for use in moistening master copies in direct process duplication, composed mainly of a mixture of methyl and ethyl alcohols and having incorporated therein approximately 10% of mono-fluoro tri-chloro-methane.

4. In the process of producing copies by direct duplication, in which a copy sheet is contacted with a design on a master sheet, the step of moistening the master sheet with a solvent comprising monofluorotrichloromethane and a flammable alcohol which is a solvent for the dye of the design of the master sheet, the monofluorotrichloromethane being present in from 3% to 35% of the solvent mixture.

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