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DUPLICATOR FLUID

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This invention relates to duplicator fluids, and more particularly to fluids used in transferring upon paper or other suitable sheet material dye or the like impressions formed upon a gelatin, wax or other suitable surface in so-called duplicator or print transfer machines.

Such machines are used to a great extent when it is desired to produce a large number of duplicate copies of some subject matter originally printed with a typewriter, for example. The machine is prepared in somewhat the following manner:

A special duplicating or carbon paper the transfer surface of which comprises a coating or layer of suitable waxes and dyes is placed against a clean sheet of any standard or suitable typewriting paper in the usual manner. As the typist prints the desired subject matter, an impression is made upon the clean paper which backs up the special carbon paper, and this impression is transferred, by pressure, to a gelatin or the like surface in the duplicator machine, the said gelatin surface then being adapted to act as a master copy from which the large number of duplicates are to be formed. The impressions on the master are then transferred to clean sheets first by wetting either the gelatin master or the clean sheets with a suitable solvent for the dye and wax impression and then by bringing the sheets into contact with the gelatine master under pressure. It is this solvent which is referred to herein as the duplicator or transfer fluid.

For the most efficient transfer action, it is essential that the transfer fluid not only be a good solvent, but it must also have good penetrative qualities so as to be able to penetrate the impression on the master and dissolve off a sufficient quantity of the dye to make a satisfactory impression on the clean paper. Although a number of transfer fluids are available on the market, they are objectionable for any one or more of several reasons among which are (1) insufficient penetrative ability, (2) poor evaporation, (3) poor solvent action, (4) high cost, and (5) toxicity. The latter objection has, in fact, been one of the most serious ones in a number of cases.

The primary object of my invention is to provide a duplicator or transfer fluid of the type specified which will be free from the objections noted heretofore.

Another object of my invention is to provide an improved duplicator fluid which is especially applicable to transfer mediums compounded with waxes.

Still another object of my invention is to provide an improved duplicator fluid which will not only have good penetrative and evaporative qualities as well as good solvent action, but which will be non-toxic in its effect upon the human system.

A further object of my invention is to provide an improved duplicator fluid which will have the characteristic of being able to simultaneously dissolve waxes and water or alcohol soluble dyes.

Still a further object of my invention is to provide an improved duplicator fluid which will reduce blurring, creeping and smearing of transferred copies whereby clean, clear copies may be obtained.

Another object of my invention is to provide an improved duplicator fluid which is not only highly efficient in action but which is economical in cost.

In accordance with my invention, I compound my improved duplicator fluid from ethyl alcohol, ethylene glycol mono-ethyl ether and water in such proportions as to render each ingredient most effective for the particular purpose for which it is included.

The novel features of my invention are set forth with particularity in the appended claims. However, the invention itself will best be understood from the following description of a specific embodiment:

Among the duplicator or transfer fluids heretofore available are some which employ methyl alcohol as the dye solvent. Efforts have been made to substitute ethyl alcohol for the toxic methyl alcohol so as to render the transfer fluid non-toxic, but a mere substitution of ethyl alcohol for methyl alcohol results in a product which lacks sufficient penetrative properties. For this reason, methyl alcohol has been retained despite its toxic action.

In my experiments with transfer fluids of this type, I have found that the amount of water present has a great influence upon the solvent and penetrative qualities of the fluid. I have found that a fluid in which ethyl alcohol has been substituted for methyl alcohol can be made even more efficient in its action than the methyl alcohol containing fluid by the introduction of a substantially greater amount of water than has previously been used in any of the duplicator fluids with which I am familiar. Apparently the water content is very important in determining the solvent and penetrative qualities of the transfer fluid, and, by a proper proportioning of the ingredients, a fluid having optimum characteristics

may be obtained. Thus, the toxic methyl alcohol may be eliminated and a fluid obtained which is highly efficient in action as well as being free from the objection of toxicity.

As an example of what I have found satisfactory, the following formula is cited:

Denatured ethyl alcohol	25% by volume
Ethylene glycol mono-ethyl ether (known commercially as cellosolve)	60% by volume
Water	15% by volume

The ingredients are mixed in the proportions indicated and the resulting fluid is at once ready for use. The water content may be varied between certain limits depending upon the number of copies it is desired to produce. I have found, however, that best results are obtained when the water content is not less than 12% by volume and preferably not over 18% by volume.

A transfer fluid compounded as above will produce a much greater number of copies than a like quantity of previously known fluids, and the copies will be more clear and uniform than those heretofore obtainable. The alcohol and water bath act as solvents for the waxes and dyes in the carbon paper, the water apparently assisting in the wetting and penetrating action, while the ethylene glycol mono-ethyl ether acts as a penetrating agent and evaporation stabilizer.

While I have described a certain specific embodiment of my invention, I am aware that many modifications thereof are possible. For example, other alcohols which are substantially non-toxic in character in the vapor state may be used in place of the ethyl alcohol. Also, other substituted di-hydric alcohols may be employed in lieu of ethylene glycol mono-ethyl ether, although the one used should be water soluble. Moreover, it may be found desirable to change the water content, especially where the other ingredients are changed. My invention, therefore, is not to be limited except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim as my invention:

1. A transfer fluid comprising a mono-hydric alcohol, a water soluble substituted di-hydric alcohol, and water, the water content comprising approximately 15% by volume.

2. A transfer fluid comprising a non-toxic, mono-hydric alcohol, a water soluble substituted di-hydric alcohol, and water, the water content comprising approximately 15% by volume.

3. A transfer fluid comprising a non-toxic, mono-hydric alcohol, a water soluble substituted di-hydric alcohol, and water.

4. A transfer fluid comprising ethyl alcohol, ethylene glycol mono-ethyl ether, and water.

5. A transfer fluid comprising ethyl alcohol, ethylene glycol mono-ethyl ether, and water, the water content comprising not less than 12% by volume.

6. A transfer fluid comprising ethyl alcohol, ethylene glycol mono-ethyl ether, and water, the water content comprising not more than 18% by volume.

7. A transfer fluid comprising ethyl alcohol, ethylene glycol mono-ethyl ether, and water, the water content comprising not less than 12% nor more than 18% by volume.

8. A transfer fluid comprising ethyl alcohol, ethylene glycol mono-ethyl ether, and water, the water content comprising approximately 15% by volume.

9. A transfer fluid comprising a mono-hydric alcohol approximately 25% by volume, a water soluble substituted di-hydric alcohol approximately 60% by volume, and water approximately 15% by volume.

10. A transfer fluid comprising a non-toxic, mono-hydric alcohol approximately 25% by volume, a water soluble substituted di-hydric alcohol approximately 60% by volume, and water approximately 15% by volume.

11. A transfer fluid comprising ethyl alcohol approximately 25% by volume, ethylene glycol mono-ethyl ether approximately 60% by volume, and water approximately 15% by volume.

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