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TRANSFER SHEET AND INK THEREFOR

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This invention relates to transfer sheets and it is particularly directed to a new ink formulation for use on impervious bases.

Standard transfer sheets or carbon papers consist of high grade tissue bearing a pigmented coating of a waxy nature which is capable of being transferred to other surfaces by pressure. Although the conventional carbon paper has proved satisfactory in many respects, it still has several disadvantages. For example, most carbon papers tend to curl under varying conditions of humidity. Further, since the tissue base or backing is porous, there is appreciable penetration of the ink into the sheet, thus actually causing a loss in the amount of usable ink. The high grade tissue paper necessary for the manufacture of satisfactory carbon papers is expensive and the presence of pin holes in the paper tends to allow the ink to pass through and form craters on the reverse side of the sheet, which disfigures the carbon paper and causes soiling of the writing paper in the typewriter. Also, some carbon papers are characterized by flaking or breaking of the coating from the sheet.

In an effort to overcome these difficulties, it has been proposed to use an impervious base or backing for the carbon paper, instead of paper tissue, and carbon papers have been made with backs of transparent sheets of the cellulose derivatives. However, the transfer inks which are used on paper tissue to make the standard transfer sheets are not satisfactory for use on impervious bases because they will not adhere to smooth surfaces. This is to be expected because the conventional transfer inks depend mainly on penetration for their largely mechanical bond to the backing, whereas inks used on impervious bases must depend mainly on surface adhesion.

This invention provides a transfer sheet or carbon paper having an impervious base which compares favorably in transfer properties with the best carbon papers commonly available and, due to the impervious base, it is free from substantially all of the disadvantages inherent in conventional carbon papers and enumerated above. Also, the invention provides a new ink formulation which will adhere firmly to the impervious backing, will not flake or break off or smudge in handling, and will transfer to other sheets with the application of pressure in the same way and substantially to the same degree as the best of the standard carbon papers using paper tissue bases.

Although any flexible thin sheet may be used as the base of the transfer sheet or carbon papers of this invention, moistureproof Cellophane is easily handled, is relatively inexpensive and is therefore preferred.

The transfer ink of this invention differs from the standard transfer inks essentially in the quantity and kind of waxes employed. An essential ingredient of most carbon paper inks is carnauba wax or an equivalent thereof such as candelilla wax or the treated vegetable waxes which have substantially the solubility characteristics of carnauba wax, about the same hardness and about the same solvent power for dyestuffs, as for instance a treated vegetable wax, available on the market and known as "Asco Wax #55" (a mixed vegetable wax made by American Specialties Co.). The proportion of carnauba wax, or substitute for carnauba wax, in our ink is important and it has been found that not less than about 10% nor more than about 30% should be employed. In order that the ink may have sufficient adherence and hardness, it is necessary to include between about 15 and about 26% beeswax along with the other waxes just mentioned.

To give our ink the flexibility and the desired transfer properties the above waxes must be softened with "heavy oils" having viscosities similar to lanoline or to lard oil. A mixture of about equal parts of lanoline and lard oil varying from about 10 to about 35% of the total ink is preferred.

If the pigment desired includes carbon black it is desirable to add about 1% of a wetting agent such as copper oleate, copper naphthenate or any of the commonly known organic wetting agents including "Triton W-30" (an aromatic ether alcohol sulfonate—Rohm and Haas), "Triton S-51" and "Daxad 27" (an alkyl aryl sulfonate salt—Dewy and Almy).

The colorant, which may be any of the organic and inorganic materials commonly used for such inks, should constitute between about 25 to about 50% of the ink.

An especially satisfactory ink formulation has been found to be as follows:

	Per cent by weight
Carnauba wax	15
Candelilla wax	2
Beeswax	25
Copper oleate	1
Black lake	20
Carbon black	10
Methyl violet dye	3
Victoria blue dye	4
Lanoline	12
Lard oil	8

Due to the fact that the ink formulations of this invention contain large amounts of waxes and pigments, they are relatively hard, which may be partly responsible for their durability and lack of smudging. Despite the relative hardness of the inks, the beeswax and lanoline content (or mineral oils) render them sufficiently flexible to perform satisfactorily under ordinary typing conditions. Since the impervious base is more rigid than ordinary tissue carbon paper, the carbon papers of this invention are largely free from tendency to "dog-ear" at the corners. Moisture proof Cellophane owes its moisture proof qualities to a thin wax-containing coating or film on both sides. This film is similar in moisture permeability characteristics to our coating. Since the curling of carbon paper is primarily due to unequal moisture absorbance by the back of the carbon tissue, which is usually uncoated, and the front, which carries the carbon coating, the use of moisture proof Cellophane in combination with our inks eliminates this trouble.

In addition to moistureproof Cellophane, it has been found that sheets of such materials as cellulose acetate, plain Cellophane, coated and uncoated glassine and ethyl cellulose also yield satisfactory transfer sheets when coated with inks whose formulae come within the above limitations.

The inks are prepared in the customary manner by melting the waxes together and adding the other materials with stirring and milling by conventional methods until a uniform composition is obtained. Then the moisture proof base sheet may be roll coated with the hot melt and the coated sheet allowed to cool. After coating and solidification of the ink the sheet may be cut and packaged.

To overcome the tendency to slip during normal typing operations due to the smoothness of the uninked side of the transfer sheet, this side is preferably coated with a continuous film or with a discontinuous film such as may be applied by an engraved cylinder. For this purpose, pigmented lacquers give the desired effect.

We claim:

1. A transfer sheet comprising a moisture proof ink-impervious cellulosic base coated on at least one side with an ink comprising from about 10% to about 30% of a wax having hardness and solvent power for dyestuffs essentially similar to carnauba wax, from about 15% to about 26% beeswax, from about 10% to about 35% of a heavy animal oil having a viscosity similar to lanoline, and from about 25% to about 50% of colorant the sheet being characterized by the adhesion of the ink coating to the base under impact from typewriter keys.

2. A transfer sheet as claimed in claim 1 wherein the ink includes a small amount of a wetting agent.

3. A transfer sheet as claimed in claim 1 wherein the wax consists essentially of a mixture of carnauba and candelilla wax, and the heavy oil consists essentially of a mixture of lanoline and lard oil.

4. A transfer sheet comprising moisture proof Cellophane base coated with an ink comprising about 15% carnauba wax, about 2% candelilla wax, about 25% beeswax, about 12% lanoline, about 8% lard oil, and about 38% colorant the sheet being characterized by the adhesion of the ink coating to the base under impact from typewriter keys.

5. A transfer sheet as claimed in claim 4 wherein the ink includes about 1% of a wetting agent.

6. A transfer ink comprising from about 10% to about 30% of a wax having hardness and solvent power for dyestuffs essentially similar to carnauba wax, from about 15% to about 26% beeswax, from about 10% to about 35% of a heavy animal oil having a viscosity similar to lanoline, and from about 25% to about 50% of colorant.

7. A transfer ink comprising from about 10% to about 30% of a mixture of carnauba and candelilla wax, from about 15% to about 26% beeswax, from about 10% to about 35% of a mixture of lanoline and lard oil, and from about 25% to about 50% of colorant.

8. A transfer ink comprising about 15% carnauba wax, about 2% candelilla wax, about 25% beeswax, about 12% lanoline, about 8% lard oil, and about 38% colorant.

9. A transfer ink comprising about 15% carnauba wax, about 2% candelilla wax, about 25% beeswax, about 12% lanoline, about 8% lard oil, about 1% of a wetting agent and about 37% of colorant.

10. A transfer sheet comprising a moisture-proof Cellophane base coated on at least one side with an ink comprising from about 10% to about 30% of a wax having hardness and solvent power for dyestuffs essentially similar to carnauba wax, from about 15% to about 26% beeswax, from about 10% to about 35% of a heavy animal oil having a viscosity similar to lanoline, and from about 25% to about 50% of colorant, the sheet being characterized by the adhesion of the ink coating to the base under impact from typewriter keys.

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