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2,931,752

TRANSFER MEDIUM AND METHOD OF MAKING

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No Drawing. Application September 16, 1953
Serial No. 380,589

2 Claims. (Cl. 162—172)

This invention relates to transfer mediums and more especially to flexible webs or sheets carrying a transfer coating and commonly known in the art as carbon paper, and to a method of making the same.

Heretofore carbon papers have been made primarily by applying to a flexible foundation a coat of a colored wax mixture, usually by melting the mixture and spreading the same on the foundation while still in molten condition.

It has been known, heretofore, that carbon papers could be made by dispersing certain ingredients in an aqueous vehicle and spreading on a foundation at substantially room temperatures, but carbon papers of a waxy nature using water-insoluble waxes have never been prepared in this fashion, and reliance has had to be placed primarily on such ingredients as polyvalent metal soaps and the like to carry the coloring matter.

According to the present invention there is provided a transfer layer in which the color carrying material is primarily water-insoluble wax, but which is of such nature that it can be spread directly from a water dispersion rather than being applied in a molten condition with attendant temperature control problems.

It has also been discovered that when waxy coatings are placed using water suspensions according to the present invention, their penetrative action is much less than when they are spread in a molten condition, so that much more porous and inexpensive papers can be used as foundations than when molten waxy layers are applied, without danger of the coating being absorbed excessively by the foundation.

In carrying out the manufacture of carbon paper according to the present invention, a mix is prepared by stirring finely divided wax into water which is preferably warmed somewhat for the purpose. In addition there is also added a fatty acid and an alkali which help in dispersing the wax and also serve to soften and plasticize the waxy coating which ultimately results. Suitable coloring matter is added to the mix, preferably by first dispersing the same in a quantity of water which is then mixed with the wax-water dispersion. The whole is then preferably passed through a ball or colloid mil to render the dispersion smooth and uniform.

When the coating mix is completed it is spread evenly on a flexible foundation, such as paper, by vat coating, spraying, air-knife, reverse roll coating or the like. It is then allowed to dry, forming a waxy colored layer which is transferable to an adjacent contacting surface by pressure, but which is exceedingly dry, non-tacky and smudge resistant.

It is a feature of the present invention that a waxy carbon paper employing water-insoluble waxes can be prepared by coating a web of paper directly as it comes from the paper making machine, after the web has been dried or while still somewhat moist, and before it is wound on a roll for the first time. This procedure brings about a remarkable reduction in the cost of manufacture;

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and the process of making a transfer element in this manner is also embraced in the present invention.

This new process of making carbon paper includes with the steps of making a continuous paper web and at least partially drying and compacting the same, the steps of continuously coating the surface of the web with a water dispersed transfer composition, continuously drying said web and composition and finally collecting the web for storage, as by winding it as it issues continuously from the drying operation.

The ingredients mentioned heretofore are required in about the following proportions in order to give a layer having good transfer properties:

Parts by weight	
Wax	8.
Fatty acid and alkali	10 to 20.
Coloring matter	16 to 32.
Water	Sufficient to provide coating consistency.

Various waxes and wax mixtures may be used and waxes which have been found especially suitable are ouricury wax, a microcrystalline petroleum wax known as Be Square wax, beeswax and montan wax.

No particular limitations need be placed on the type of fatty acid or alkali used, but oleic acid and potassium hydroxide have been found to work very satisfactorily. In this connection it is noted that the alkali should be present in sufficient amount to bring about proper suspension in the water of all of the other ingredients, and to this end it is preferred that the alkali be at least equal in weight to the fatty acid present.

The coloring matter may be any of various pigments or lakes depending upon the hue desired and preferably is present in an amount equal to about two to four times the weight of the wax present. In case it is desired that the transfer layer have hectographic or copying properties so that the mark produced shall be usable as a master in a hectographic duplicating process, dyes soluble in water and/or alcohol may be substituted in whole or in part for the pigments or lakes.

While it is not essential, the character of the coating is frequently found to be improved by adding a small amount of glycerine which acts as an additional softening agent.

In order that the invention may be more clearly understood the following description of a particular preferred coating composition is given by way of example but is not intended to be limiting upon the invention.

Example	
Parts by weight	
Ouricury wax	4
Microcrystalline petroleum wax (Be Square wax)	4
Oleic acid	6
Potassium hydroxide	8
Glycerine	1
Water	100

When the above-listed ingredients have been thoroughly intermixed and reduced to a smooth uniform consistency, preferably in a colloid mill, they are mixed with about an equal weight of a color mixture, for example, a 20% dispersion in water of a pigment (e.g. carbon black), a lake, or a dye, and the whole composition is preferably milled together for a brief period. The composition is then in condition to be spread in a thin layer on a foundation member according to the procedure hereinbefore recited. When the layer is dry, which may be hastened, if desired, by heating at low temperatures, the result is a completed transfer member whose coating is readily and easily transferred to a contacting sheet by writing or typing pressure. Furthermore, the surface of

the transfer coating is clean and non-tacky and does not tend to smudge or offset in those areas where pressure is not applied. The coating will be found to be supported well up on the surface of the foundation and will not be impregnated materially into the body of the foundation even when relatively inexpensive and porous papers are used.

As hereinbefore stated, this invention includes the direct manufacture of carbon paper as a low-cost continuous paper making process, including the steps of continuously placing paper pulp in water suspension, spreading the suspension in the form of a continuous blanket on a moving foraminous support, continuously consolidating the blanket and withdrawing the water therefrom as it moves on said support to form a continuous web, at least partially drying and compacting the web as it leaves said support, continuously coating the surface of the web with a water dispersed transfer composition, continuously drying the moving web and the composition thereon, and finally collecting the web for storage as by winding it as it issues continuously from the drying operation.

The term "pressure-responsive transfer medium" as used herein denotes articles in the nature of carbon paper having marking layers locally released by writing or typing pressure, regardless of the particular coloring matter or foundation web material used, and regardless of whether presented in web, strip, sheet or ribbon form.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. The method of making carbon paper which consists essentially in the steps of continuously placing paper pulp in water suspension; spreading the suspension to form a continuous blanket on a moving foraminous support; continuously consolidating the blanket and withdrawing the water therefrom as it moves on said support to form a continuous paper web; at least partially drying the web and compacting the same at a compacting station as it leaves said support; and continuously coating the surface of the web directly upon leaving said compacting station with a water dispersed composition whose dried residue forms an adherent but pressure-transferable marking film on the surface of the web.

2. The method of making carbon paper which consists essentially in the steps of continuously placing paper pulp in water suspension; spreading the suspension to form a continuous blanket on a moving foraminous support; continuously consolidating the blanket and withdrawing the water therefrom as it moves on said support to form a continuous paper web; at least partially drying the web and compacting the same at a compacting station as it leaves said support; continuously coating the surface of the web directly upon leaving said compacting station with a water dispersed composition whose dried residue forms an adherent but pressure-transferable marking film on the surface of the web; continuously drying the coated web; and collecting the web for storage by winding it for the first time as it issues from the last mentioned drying operation, said water dispersed composition consisting essentially of the following ingredients:

	Parts by weight
Ouricury wax	4
Microcrystalline petroleum wax	4
Oleic acid	6
Potassium hydroxide	8
Glycerine	1
Water	100
Water dispersion of coloring matter, 20% by weight	123

References Cited in the file of this patent

UNITED STATES PATENTS

1,312,682	Clapp	Aug. 12, 1919
1,685,917	Hans	Oct. 2, 1928
1,911,592	Supligeau et al.	May 30, 1933
2,117,256	Rafton	May 10, 1938
2,144,642	Stoughton	Jan. 24, 1939
2,170,140	Grupe	Aug. 22, 1939
2,183,580	Ohashi	Dec. 19, 1939
2,313,810	Dalton	Mar. 16, 1943
2,364,632	Handy	Dec. 12, 1944
2,441,842	Prince	May 18, 1948
2,705,682	Wille	Apr. 5, 1955

FOREIGN PATENTS

132,271	Australia	Nov. 28, 1946
664,427	Great Britain	Jan. 9, 1952
664,428	Great Britain	Jan. 9, 1952