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INK RECEPTIVE OIL TRANSPARENTIZED PAPER

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2 Claims. (Cl. 117—154)

This invention relates to a new and improved translucent or substantially transparent paper and is more particularly concerned with the production of transparentized record paper suitable for duplication purposes on a machine of the Bruning or Ozalid type. In its more specific aspects the invention pertains to and is concerned with a novel coating composition adapted to render ordinary bond paper translucent or substantially transparent, either before or after the paper has received typed, written, printed or drawn indicia or characters.

In the Bruning or Ozalid duplicators, a transparent master sheet is placed in contact with a sensitized sheet and then exposed to an actinic light source. Any opaque media upon the transparent master sheet will project itself upon the sensitized sheet as a reproduction but will not be visible until developed. In developing the reproduction, the processes differ. In the Bruning process, a liquid solution is applied to the copy paper as it passes through developing rollers, whereas in the Ozalid process, ammonia vapor is used for developing. Hence this process is known as the dry process. Both of these processes offer many advantages for reproducing customers letters, bills of material, bulletins and other record forms, whether typed, written, printed or drawn. On the other hand, the main disadvantage of both processes is readily apparent. Many commercial papers are simply not sufficiently translucent or transparent to be processed in these machines.

It is, accordingly, the main object of the present invention to produce translucent or substantially transparent paper which may be utilized in duplicating machines and processes of the foregoing character.

A further object is to render commercial bond record paper more transparent at a relatively low cost.

Another object is to provide a paper of this character treated with a novel transparentizing composition, which paper will not dry out, will be free from odor and which will not stick to the surface of the duplicator.

A further object of the invention is to provide a treated paper of the foregoing nature which will not bleed and seep but which will be receptive not only to printing and fountain pen ink but receptive to pencil writing as well.

A still further object of the invention is to provide a novel transparentizing composition for bond paper which may be employed to transparentize previously typed or printed sheets, or which may be employed first to transparentize blank bond paper and yet provide a surface receptive, without bleeding or seeping, to printing and fountain pen ink as well as to pencil writing.

A still further object is to provide a transparentizing composition of this nature which is inherently self-sealing to prevent seepage and bleeding.

Other objects will become apparent as the description proceeds.

In the preferred embodiment of the invention blank paper is employed which, after receiving a coating of the novel transparentizing composition, is suitable for use in various business operations such as the type herein-

before referred to. Preferably ordinary non-translucent mill stock bond paper is employed and this is conveniently of lower basis weight, preferably 10 to 13 pounds (17 x 22—500 basis).

This bond paper still may be employed by the individual sheet although it is preferred to transparentize the paper from rolls thereof by subjecting it continuously to the coating and/or saturation operation.

Bond paper of the foregoing character is transparentized in accordance with the present invention by coating or impregnating the same with the novel transparentizing composition of the invention which includes, in a single treating composition; (1) a transparentizer (2) a sealer (3) a solvent for the transparentizer (4) an antioxidant and (5) an odor neutralizer.

Transparentizers suitable for the practice of the present invention include any greasy or oily substance which will leave a permanent transparent stain in the paper. Among those found useful are cottonseed oil, corn oil, olive oil, castor oil, cocoanut oil, palm kernel oil, lard oil, grapeseed oil, butterfat and mineral oil, or mixtures of any of these materials. In the transparentizing composition the transparentizer is preferably employed in amounts of 10% to 25%.

Suitable volatile solvents for the foregoing oils and fats are ether, carbon bisulfide, chloroform, carbontetrachloride, benzene naphtha, petroleum ether and alcohol, or mixtures thereof. It is possible to employ water emulsions of the various oily and fatty transparentizers but it has been found that better results are obtained by employing the indicated volatile solvents. The solvent or solvent mixture for the transparentizers preferably makes up 35% to 55% of the ultimate transparentizing composition.

The sealer ingredient of the transparentizing composition is the most salient feature of the present invention because, as already indicated, the particular sealers employed are self-sealing and completely obviate any seepage or bleeding of the oily and fatty transparentizers on the treated paper. It has been found, in accordance with the invention, that polyethylene glycols as a class are generally effective not only to obviate such seepage and bleeding but also to render the treated paper water-ink and printing-ink receptive as well. They are, of course, soluble in the foregoing solvents. Typical of these polyethylene glycols are the various Carbowaxes such as Carbowax 1000, Carbowax 1500, Carbowax 1540, Carbowax 4000, and Carbowax 6000 or mixtures thereof. The foregoing numerals designate the average molecular weight of the particular Carbowax. All of these Carbowaxes are non-volatile, water-soluble, waxy solids admirably suited in the role of sealer for the oily and greasy substance in the transparentizing composition. Long-chain monoesters of any of the indicated Carbowaxes, such as the monostearate of any Carbowax, are also suitable for the purpose under consideration. Found specifically useful is Carbowax 4000 monostearate. Any of these sealers, or a mixture thereof, is employed in amounts of 20% to 50% of the transparentizer composition, although it is preferable to have the sealer content higher than the transparentizer content to afford optimum protection against bleeding and seepage.

To guard against oxidization of the transparentizer a small amount of a suitable antioxidant is added to the mixture. Found useful for this purpose are conventional antioxidants such as alpha-naphthol, tertiary butyl hydroquinone, phenylnaphthylamine, N. D. G. A. antioxidant.

It is also preferable to incorporate into the transparentizing composition, a small amount of an odor masking substance such as oil of sweet grass, oil of lavender, oil of cinnamon and neutralizer 202.

In order to indicate and illustrate the preferred per-

centages of ingredients of the transparentizer composition the following general formula is given:

	Percent
Transparentizer	10–25
Sealer	20–50
Solvent	35–55
Antioxidant	.01–1
Odor neutralizer	.01–1

A specific formulation found quite useful is the following:

	Percent
Carbowax 4000 monostearate	37.82
Cold pressed castor oil	18.91
Denatured alcohol	43.22
Antioxidant solution—10A N. G. D. A. (Norigard Corp.)	.03
Odor neutralizer 202 (Magnus, Mabee & Reynard)	.02

In preparing the transparentizing composition, the transparentizer, sealer and antioxidant are thoroughly mixed and dissolved in the warm solvent and then, after cooling, the odor neutralizer is added and thoroughly mixed.

The particular method by which the transparentizing composition is applied to the bond paper is of no particular consequence as long as the paper is thoroughly saturated or a uniform film is deposited. As already stated hereinbefore, the transparentizing solution may be either coated on one side of the bond paper or said paper may be saturated with the solution. In either case, the treated web is heated to drive off the volatile solvent. In some cases where the volatile solvent is very low boiling, adequate evaporation is obtained at room temperature. Any conventional coating or saturating method may be employed as by the use of a roller, dip, knife or spray applicator.

A specific example of the manner in which a particular coating is applied follows, it being understood, however, that the invention is in no way limited to the specific formulation and the manner of application set forth.

The ordinary non-translucent bond, paper, above described, passes from the supply roll thereof between two squeegee rollers, the upper one of which is steel while the lower one is preferably rubber and acts as a fountain roll. The periphery of the rubber fountain roll runs in a tank of heated coating material, the tank being heated to maintain the coating material in a heated condition. The upper steel roll is so mounted that it may be moved toward and from the lower roll and it acts therefore as a metering roll, regulating and controlling the amount of coating material applied to the web of paper.

As the strip of paper passes between the two rolls it changes its direction of travel by following partially around the upper roll. The paper web then passes through a hot air oven where the diluent in the coating material is evaporated. As the strip of paper leaves the oven it passes about a steam heated drying cylinder and removes the final traces of the diluent. The coated and dried paper web then passes to a rewind roll.

The supply fountain is maintained at a temperature between 125° and 150° F. so as to keep the wax-like material in solution. The drying oven through which the paper passes is maintained at approximately 200° F. and the drying cylinder is kept at approximately 175° F.

The specific formulation used with the foregoing temperatures is as follows:

	Percent by weight
Carbowax 4000 monostearate	36.5
Castor oil	18.2
Nordigard antioxidant	.04
Odor neutralizer (202)	.02
Alcohol	45.24

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise but one of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

What is claimed is:

1. Normally non-translucent bond paper transparentized by treatment with a solution comprising 35% to 55% of a volatile organic solvent having dissolved therein 10% to 25% of castor oil, 20% to 50% of the monostearate ester of a polyethylene glycol having an average molecular weight of 4000, 0.01% to 1.0% of an antioxidant and 0.1% to 1.0% of an odor neutralizer, said glycol being effective not only to obviate seeping and bleeding of the castor oil on the paper but also to render the treated paper water-ink and printing-ink receptive.

2. Normally non-translucent bond paper transparentized by treatment with a solution comprising 35% to 55% of a volatile organic solvent having dissolved therein 10% to 25% of castor oil, and 20% to 50% of the monostearate ester of a polyethylene glycol having an average molecular weight of 4000, said glycol being effective not only to obviate seeping and bleeding of the castor oil on the paper but also to render the treated paper water-ink and printing-ink receptive.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,851,378 September 9, 1958

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 36, for "0.1%" read -- 0.01% --.

Signed and sealed this 31st day of March 1959.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents