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THERMOGRAPHIC TRANSFER SHEET HAVING A SUPPORT OF A PAPER AND PLASTIC COATING AND THE METHOD OF USE

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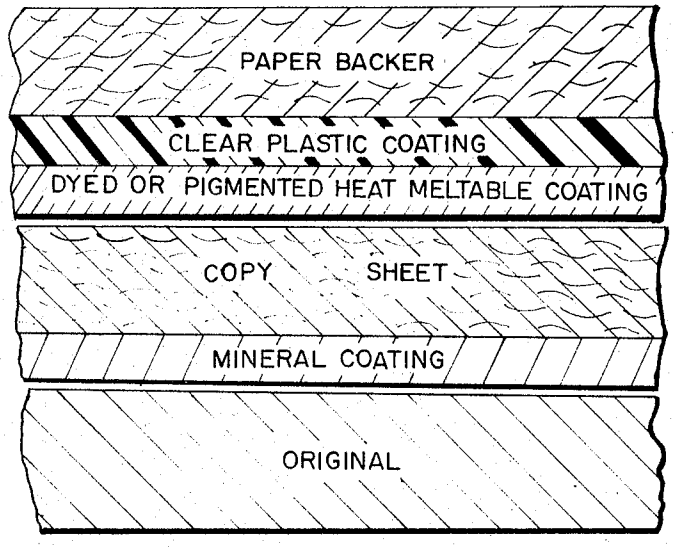

INVENTOR.

Robert B. Russell

BY

Porter, Chittick, Russell & Pfund

Attys.

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THERMOGRAPHIC TRANSFER SHEET HAVING A SUPPORT OF A PAPER AND PLASTIC COATING AND THE METHOD OF USE

Robert B. Russell, 248 Park St., Newton, Mass. 02158

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This invention relates to thermographic copying and more particularly to an improved transfer sheet of the type described and claimed generically in my prior and copending application Serial No. 68,286, filed November 9, 1960, now U.S. Patent 3,131,080, entitled "Thermographic Copying Process and Transfer Sheet Therefor."

In my said prior application, five species are claimed, and it is my intention herein to claim a sixth species coming within the general purview and mode of operation of the invention of that application.

The objects of this invention are essentially to provide an improved transfer sheet for use in the process which I call "Prestofax" and which is more specifically described in my above said copending application. The salient features of "Prestofax" which call for a special form of transfer sheet are: (a) the transfer sheet serves as a tensioning belt to press the copy sheet against the original; (b) the incident radiation strikes the exposed back side of the transfer sheet; and (c) the transfer sheet is separated from the copy sheet at a critical moment following irradiation. The object then of this invention is to provide a transfer sheet which is designed specifically for improved performance under those special conditions.

In the invention described herein, I accomplish this object by applying to a paper base a smooth coating of a clear plastic, and thereafter coating the plastic with a dyed (or pigmented) heat meltable coating.

The advantages of this form of invention are several. The paper base provides dimensional stability and resistance to heat. The unreinforced plastic transfer sheets of FIGS. 2, 3 and 5 of my above-said prior application print remarkably well, but they can become weak when heated. This is usually not a serious problem, but during extended periods of use the lamp and reflector absorb a great deal of heat, and thereafter when the machine is idle this residual heat tends to weaken the unreinforced plastic transfer sheet of those examples. However, when the plastic sheet is laminated to a paper base, as herein described, the result is a dimensionally stable and heat resistant transfer sheet.

Another advantage of this form of the invention is that the dyed or pigmented heat meltable coating overlies a smooth, relatively uniform, and highly conductive surface which is also made dimensionally stable under heat by the paper backer. These factors lead to high uniformity and clarity in the printed image.

The single figure shows a simple paper backer carrying a clear plastic coating or lamination and a dyed or pigmented heat meltable coating, overlying a mineral coated copy sheet, which in turn overlies an original.

The paper base may be any suitable sheet. I have used Monarco (S. D. Warren Co.) with excellent results. A relatively thin, smooth and uniform sheet is desirable, but not required. Cost is probably the major consideration in the selection of the paper backer and accordingly, the least expensive sheet per foot having sufficient strength, when laminated, to serve as the tensioning belt in "Prestofax" is adequate.

The clear plastic coating is also a matter of choice. Regenerated cellulose, cellulose acetate, PVC, PVA, polystyrene, polyethylene, nylon, Teflon, and Mylar and the like substances are all satisfactory. The main thing is to provide a smooth, homogeneous and highly conductive

(as compared to paper) surface to receive the heat meltable coating and its melting point must be substantially higher than that of the heat meltable coating.

The heat meltable coating may be a wax or other similar substance. I find that a melting point of about 150° F. to 180° F. is entirely satisfactory. Paraffin and microcrystalline waxes are suitable. A sharp melting point is also desirable.

The dye can be any one of numerous dyes, having low infra-red absorptivity. Various forms of pigment have also been used with success. The type of coloring matter employed is not critical provided it is not highly absorbent of infra-red radiation. In fact, I intend herein to claim the heat meltable coating broadly enough to cover it whether or not it contains coloring matter.

In connection with the use of pigment, I find that a mineral coated copy sheet is markedly better than a simple unfilled and uncoated sheet. Apparently the pigment has a filtering action which is particularly suitable for mineral coated paper. Accordingly, I also intend to claim this feature specifically herein. In addition, I have found that a sheet which is coated only on one side makes markedly better copy when the coated side is placed facing the original, and I also intend to claim this combination specifically herein.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

I claim:

1. A transfer sheet for thermographic copying in which the transfer sheet serves as a tensioning belt and is exposed to the direct radiation of a source of radiation, said transfer sheet comprising: a paper base, a clear plastic coating on said base, and a heat meltable coating on said plastic having a melting point substantially lower than the melting point of said plastic coating.

2. The transfer sheet defined in claim 1 further characterized by said heat meltable coating containing coloring matter which is essentially transparent to infra-red radiation.

3. A transfer and copy sheet combination for use in a thermographic copying process in which the transfer sheet serves as a tensioning member, said combination including a heat meltable coating on said transfer sheet, a mineral coating on said copy sheet, said coating on said transfer sheet facing toward said copy sheet, and said coating on said copy sheet facing away from said transfer sheet.

4. The transfer and copy sheet defined in claim 3 further characterized by a coloring pigment in said heat meltable coating.

5. In the process of imaging a copy sheet comprising the steps of superposing original infrared radiation-absorbing images together with a copy sheet and a transfer sheet having a heat-transferable imaging layer, the imaging layer being in intimate surface contact with the surface of the copy sheet, and applying thereto infrared radiations which are absorbed by the original images and converted to heat patterns in the shapes of said images, thereby heating corresponding portions of the imaging layer and causing them to melt and transfer to the copy sheet in areas corresponding to the locations and shapes of the original images, the improvement which comprises using as the transfer sheet one which is free of materials that absorb sufficient amounts of infrared radiation on instantaneous exposure thereto to cause transfer of the imaging layer and is comprised of a thin paper foundation having on one surface thereof a non-melting, non-transferable plastic intermediate layer and a top heat-transferable imaging layer based upon wax binder material, said transfer sheet being heat resistant and dimensionally stable at the melting temperature of the said imaging

layer whereby the portions of the imaging layer that are transferred to the copy sheet form clear and uniform images.

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RALPH G. NILSON, *Primary Examiner.*

W. F. LINDQUIST, J. W. LAWRENCE, H. S. MILLER, *Assistant Examiners.*