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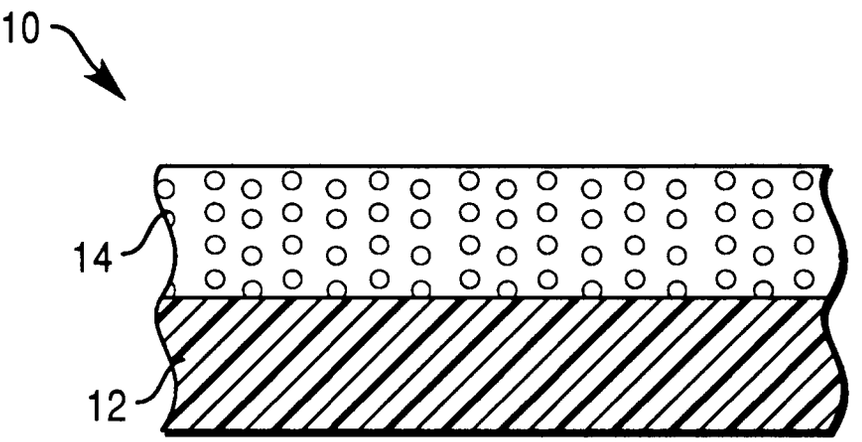
## (54) Improved recording material.

(57) The invention provides for a receiver stock (12) having a coating (14) which enhances the smoothness and absorbency thereof in order to provide improved smear resistance. The receiver stock (12) having a coating (14) consisting essentially of about 80% hollow sphere pigment and about 20% binder. In one embodiment, the hollow sphere pigment is a styrene acrylic emulsion and the binder is a latex binder. In another embodiment, the binder is a polyvinyl alcohol. A water soluble dye may be added to the formulation in order to colour the receiver stock.




EP 0 515 060 A1

The present invention relates to a recording material comprising a receiver stock having a coating.

In the past, attempts have been made to provide a receiver stock having an improved thermal transfer print property. One or more coatings are applied to a surface in an attempt to make the surface smooth so that sharp images can be thermally transferred thereon from a thermal transfer ink ribbon. The receiver stocks are commonly coated with compositions which include clay or carbonate, a binder, and other additives. For example, one known composition consists essentially of 75% clay pigment and 25% latex binder. However, a problem with these previous coatings is that the data printed on the receiver stock tends to smear because the surface of the receiver stock is not absorbent enough to receive the thermally transferred ink from the thermal transfer ink ribbon. Another problem with such receiving stocks having a rough or non-smooth surface is that they have to be used in printers that keep the thermally transferred ink in a molten state long enough for the ink to "fill in" or cover the rough surface.

It is therefore an object of the present invention to provide a coating for a receiver stock which will enable the receiver stock to be smoother and more absorbent, thereby improving the quality of the transferred image and the smear resistance of any data printed on the receiver stock.

According to the present invention there is provided a recording material comprising a receiver stock having a coating thereon, characterized in that said coating comprises a hollow sphere pigment and a binder.

The present invention is advantageous in that it provides a recording material having a coating which improves the absorbency of a receiver stock. The coating can likewise improve the smoothness of the receiver stock and also the resistance of the material to smearing.

Yet another advantage of the present invention is that the coating can be applied to a receiver stock to provide a smooth surface which enables use of a thermally transferred ink which "sets up" quicker than one which can be used on receiver stocks having rough surfaces.

The invention is described further hereinafter, by way of example only, with reference to the accompanying drawing which is a sectional view of a receiver stock having a coating on a substrate.

The drawing is a sectional view of a recording material or receiver stock 10 that constitutes the structure of the present invention. In a preferred embodiment, the receiver stock 10 comprises a substrate 12 having a coating 14 thereon for improving the smoothness and absorbency of the receiver stock 10.

The following examples show coating systems including means for providing a receiver stock 10 having a smoothness and absorbency that inhibits smearing of data that has been printed thereon.

EXAMPLE I

In a preferred embodiment, the coating 14 is arranged as shown in the drawing and is comprised of the following elements:

| Material | % Dry | Wet Wt.(gm) | Range (% Dry) |
|---|---|---|---|
| Pigment: | 79 | 832 | 50-90 |
| Latex Binder: | 20 | 156 | 10-50 |
| Water Soluble Dye (optional) | 1 | 6 | 0-5 |

The pigment is a hollow sphere synthetic pigment, such as a styrene acrylic emulsion. In a preferred embodiment, the pigment is Ropaque OP-90 available from Rohm & Haas Co. of Philadelphia, PA. The binder used in this example is a latex binder. A suitable binder is a styrene butadiene, such as the Dow 620 Latex binder, manufactured by Dow Chemical Co. of Midland, Michigan. It should be noted that an optional water soluble dye could be added to the composition shown in Example I if it is desired to provide the receiver stock 10 with one or another colour. One suitable water soluble dye is Hidacid Tartrazine Ex. Conc. 115%, manufactured by Hilton-Davis of Cincinnati, Ohio.

EXAMPLE II

Example II is a coating 14, arranged as shown in the drawing, which was applied to the substrate 12.

| Material | % Dry | Wet Wt.(gm) | Range (% Dry) |
|---|---|---|---|
| Pigment: | 79 | 533 | 50-90 |
| Polyvinyl Alcohol Binder: | 20 | 417 | 10-50 |
| Water Soluble Dye (Optional) | 1 | 6 | 0-5 |

In this example, the pigment is a hollow sphere synthetic pigment, such as a styrene acrylic emulsion. In this embodiment, the pigment is Ropaque OP-90. The binder used in this example is a polyvinyl alcohol binder. A suitable polyvinyl alcohol binder is Vinol 107, manufactured by Air Products of Allentown, PA. As in Example I above, a water soluble dye could be added to the composition shown in Example II to provide a receiver stock of one or another colour.

**TEST PROCEDURE AND RESULTS**

The smoothness and absorbency of the receiver stock 10 with the coating 14 applied thereto was tested using the following procedures.

**SMOOTHNESS**

A test sample was prepared for each of Examples I and II. The materials for Examples I and II were stirred and flexographically coated on 50# EDP substrate 12 at a coating weight of 31b./3300 square feet. A first control sample of a substrate 12 without any coating 14 was selected. A second control sample was prepared by coating a substrate 12 with a conventional coating having 75% clay and 25% latex binder. A third control sample was prepared by coating a substrate with a commercial print varnish, such as AWX5-91006 available from Arcar Graphics, Inc. of West Chicago, Illinois. The test samples and the control samples were evaluated for smoothness in an uncalendered form and then calendered and evaluated again. They were then evaluated for smoothness using a Parker Print-Surf analyzer with a soft backing disc and 20kg/cm$^2$ clamp pressure. The Table 1 below shows the readings from the Parker Print-Surf analyzer. The smoother the receiver stock 10, the lower the number in the Table 1. The higher the number, the rougher is the receiver stock 10.

TABLE 1

| SMOOTHNESS | | |
|---|---|---|
| Print-Surf Readings | | |
| | Uncalendered | Calendered |
| First Control Sample (uncoated) | 4.01 | 3.49 |
| Second Control Sample | 3.99 | 2.90 |
| Third Control Sample | 4.12 | 2.81 |
| Example I test Sample | 3.02 | 2.21 |
| Example II test Sample | 3.94 | 2.78 |

**ABSORBENCY**

In order to test for absorbency, the materials for Examples I and II were stirred and flexographically coated on 10 point uncoated tag stock at a weight of 31b./3300 square feet. Control samples were prepared using a 10 point tag without any coating 14. Eight (8) point coated one side tag stock, commercially available from Union Camp of Savannah, Georgia, was selected as the second control sample. Data (not shown) was printed on one set of test and control samples using a Soabar 370 thermal transfer printer with a TR 4050 thermal transfer ribbon, manufactured by Sony Chemicals Corp. of America of WoodDale, Illinois. Data was also printed on a second set of test samples and control samples using a SG Sato thermal transfer ribbon, manufactured by IIMAK of Amherst, N.Y. The printed samples were then subjected to a smear test. The surface on which the data was printed of each sample was rubbed with a conventional rubbing pad under a weight of 2 kilograms for 10 cycles. The smeared print was then read using a MacBeth

RD-400 densitometer, manufactured by MacBeth Instrument Corp. of Newburgh, N.Y. The greater the smear, the darker was the image, and thus the higher the densitometer reading. The lower the densitometer reading, the less the data was smeared, thereby indicating a greater smear resistance. The results of the smear test are shown in Table 2.

TABLE 2
SMEAR RESISTANCE

| | DENSITOMETER READING |
|---|---|
| SONY TR 4050 RIBBON | |
| EXAMPLE I | 0.68 |
| EXAMPLE II | 0.70 |
| FIRST CONTROL SAMPLE (uncoated tag) | 0.73 |
| SECOND CONTROL SAMPLE (commercially available coated tag) | 1.10 |
| IIMAK SG SATO RIBBON | |
| EXAMPLE I | 0.93 |
| EXAMPLE II | 0.90 |
| FIRST CONTROL SAMPLE (uncoated tag) | 0.91 |
| SECOND CONTROL SAMPLE (commercially available coated tag) | 1.08 |

Various changes or modifications in the invention described may occur to those skilled in the art without departing from the spirit or scope of the invention. The above description of the invention is intended to be illustrative and not limiting, and it is not intended that the invention be restricted thereto but that it be limited only by the true spirit and scope of the appended claims.

**Claims**

1. A recording material (10) comprising a receiver stock (12) having a coating (14) thereon, characterized in that said coating (14) comprises a hollow sphere pigment and a binder.

2. A material according to claim 1, characterized in that said coating (14) comprises 50-90% hollow sphere pigment.

3. A material according to claim 1 or 2, characterized in that said hollow sphere pigment is a styrene acrylic emulsion.

4. A material according to claim 1, 2 or 3, characterized in that said binder comprises latex binder.

5. A material according to claim 4, characterized in that said binder comprises 10-50% styrene-butadiene latex.

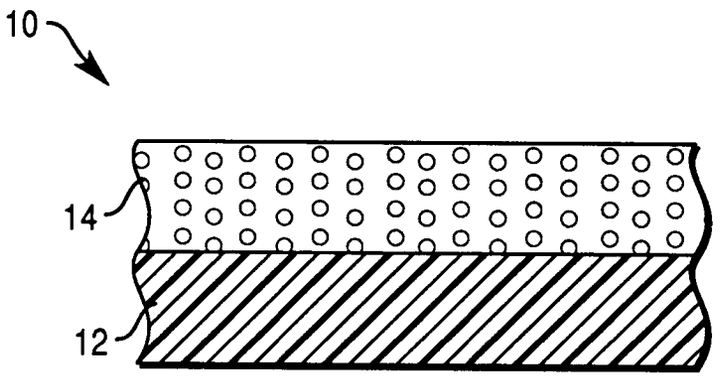
6. A material according to claim 4 or 5, characterized in that said coating (14) comprises about 20% latex binder and about 80% hollow sphere pigment.

7. A material according to claim 1, 2 or 3, characterized in that said binder comprises polyvinyl alcohol.

8. A material according to claim 7, characterized in that said binder comprises 10-50% polyvinyl alcohol.

9. A material according to any one of the preceding claims, characterized in that said coating (14) further comprises a water soluble die.

10. A material according to claim 9, characterized in that said coating (14) comprises about .1-5% water soluble die.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# EUROPEAN SEARCH REPORT

Application Number

EP 92 30 4089

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl.5 ) |
|---|---|---|---|
| P,X | US-A-5 106 818 (TETSUYA ASHIDA) 21 April 1992<br>*The entire document*<br>--- | 1-10 | B41M5/00<br>D21H21/54 |
| X | JP-A-2 286 290 (MITSUBISHI PAPER MILLS) 26 November 1990<br>*The entire document & US-A-5106818*<br>--- | 1-10 | |
| X | JP-A-2 305 688 (MITSUBISHI PAPER MILLS) 19 December 1990<br>*The entire document & US-A-5106818*<br>--- | 1-10 | |
| X | JP-A-3 010 889 (MITSUBISHI PAPER MILLS) 18 January 1991<br>*The entire document & US-A-5106818*<br>----- | 1-10 | |

TECHNICAL FIELDS SEARCHED (Int. Cl.5 )

B41M
D21H

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 19 AUGUST 1992 | FOUQUIER J. |

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