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(54) **A ribbon for non-impact printing.**

(57) The present invention relates to a ribbon for non-impact printing. The ribbon comprises a resistive layer containing a sublimable dye and a conductive layer of aluminium having a thickness of from 200Å to 8000Å.

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A RIBBON FOR NON-IMPACT PRINTING

The present invention relates to a ribbon for non-impact printing. Printing is accomplished with such ribbons by transferring ink from the ribbon to paper by means of localized heating of the ribbon. The heating is obtained by contacting the ribbon with point electrodes and a broad area contact electrode. The high current density in the neighbourhood of the point electrodes during an applied voltage pulse produces intense local heating which causes transfer of dye from the ribbon to a paper in contact with the ribbon.

Resistive ribbon printing per se is well known in the prior art. See, for example, U.S. Patent 3,744,611. This patent is typical of the current state of the art and it teaches a resistive ribbon containing three layers: (1) a resistive layer, (2) a conductive layer, and (3) a heat transferrable ink layer.

U. S. Patents 3,978,247 and 4,088,442 show operations involving the transfer of dye by sublimation. U. S. Patent 4,032,691 deals with a recording material and shows sublimation of a heat sensitive layer exposed to radiation. None of these patents, however, is in any way concerned with resistive ribbon printing.

According to the invention there is provided a resistive ribbon for non-impact printing characterised in that the ribbon includes a resistive substrate containing a sublimable dye and an electrically conductive layer of aluminium having a thickness of from 200Å to 8000Å.

The present invention provides a resistive ribbon for non-impact printing containing only two layers instead of the conventional three layers. These layers are the resistive substrate layer in which the sublimable dye is incorporated and the electrically conductive layer of aluminium. The present invention thus results in a greatly simplified ribbon capable of being manufactured more readily than has been the case in the past.

The thickness of the aluminium conductive layer is a critical feature of the present invention. In order to provide proper electric conductivity, the aluminium layer should be at least 200Å thick. On the other hand, if the aluminium is too thick, the sublimable dye cannot pass through it. The aluminium layer therefore should be no thicker than 8000Å. The optimum thickness is about 400Å. It was an unexpected finding of the present invention that the sublimable dye could successfully pass through an aluminium layer this thick.

The present invention is capable of being used with any known resistive substrate. U.S. Patent 4,103,066 describes such a substrate made of polycarbonate resin containing electrically conductive carbon particles. Such a substrate has given very satisfactory results with the present invention. Substrates made of polyester resin containing carbon particles may also be used in ribbons embodying the present invention such substrates may also include in addition to polycarbonate resin and carbon black, a block copolymer of bisphenol A carbonate and dimethyl siloxane.

Any sublimable dye of choice may be used with the present invention. A preferred example is crystal violet. Other useful dyes include, for example Subla Print Black (L.B. Holliday, Ltd.), Sudan Blue, and Alcian Blue. In general, the resistive layer should be from about 5 to 25 microns thick, and the sublimable dye should be from about 30% to about 40% by weight.

Example I

A resistive ribbon was formulated as follows: 8.25 grams of polycarbonate, 3.5 grams of electrically conductive carbon black and 4.0 grams of crystal violet was dispersed in 156 grams of dichloromethane. The dispersion was formed into a coating having a final thickness of 17 microns. It was then coated by vacuum deposition with a layer of aluminium having a thickness of 200Å. The ribbon is then mounted on a print robot against paper with a print head consisting of tungsten electrodes engaged against the backside. Very good quality print was obtained at 10 inches per second using a current of 50 milliamps. The print had a violet colour.

Example II

A resistive layer as described above was coated and a layer of aluminium was vacuum deposited to a thickness of 5000Å. Print was obtained in the manner described in Example I. The print was violet in colour.

Example III

A resistive layer was prepared in the manner described in Example I except the crystal violet was replaced with Subla Print Black (L.B. Holliday, Ltd.). The layer was coated with a vacuum deposition of aluminium, 200Å thick. Print was obtained in the same manner as Example I. Print was black in colour.

CLAIMS

1. A resistive ribbon for non-impact printing characterised in that the ribbon includes a resistive substrate containing a sublimable dye and an electrically conductive layer of aluminium having a thickness of from 200Å to 8000Å.

2. A ribbon as claimed in Claim 1, in which the thickness of the aluminium is about 400Å.

3. A ribbon as claimed in Claim 1 or 2, in which the resistive layer comprises a resin and conductive carbon.

4. A ribbon as claimed in any one of Claims 1 to 3, in which the sublimable dye is crystal violet.

5. A ribbon as claimed in any one of Claims 1 to 3, in which the sublimable dye is Subla Print Black.

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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	GB - A - 926 164 (ETABILSSEMENT CONSULTING) + Page 2; example 1 + ----	1	B 41 J 31/05
			TECHNICAL FIELDS SEARCHED (Int. Cl.3)
			B 41 J 31/00
			CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
X	The present search report has been drawn up for all claims		&: member of the same patent family, corresponding document

Place of search	Date of completion of the search	Examiner
VIENNA	28-08-1981	KIENAST

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