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MOISTURE SET MAGNETIC INKS

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1 Claim. (Cl. 252—62.5)

This invention relates to inks and more particularly to moisture-set magnetic inks.

Ink materials are now available which when applied to a surface may be instantaneously affixed thereto by the application of water vapor, steam or the like. These inks are called moisture-set inks. Ink materials are also now available which are used for the production of magnetic records on non-magnetic record media, such as paper. Such magnetic inks contain ferromagnetic materials in finely divided form, uniformly dispersed in the ink. In printing magnetic data representing characters on statistical cards or business documents it is imperative that the imprint be sharp and that it carry as high a percentage of magnetic material as is possible.

It is an object of this invention to provide a moisture set magnetic ink having particular utility with printing machines used to provide record material for use in business machines, which inks are capable of forming non-smearing, sharply defined data-representing magnetic deposits on paper sheets, cards and other record materials and are affixed to said record materials by the application of water vapor.

Another object is to provide an ink carrying a high percentage of magnetic material which provides a clear non-smear imprint of high magnetic stability.

In general the inks of this invention relate to a vehicle containing a binder constituent comprising a resinous material which is insoluble in water, a liquid carrier component in which the resinous material is dispersed or dissolved, said carrier being miscible with water, a stabilizing agent which increases compatability to water under atmospheric conditions but not under conditions of steam and a magnetic pigment consisting of an evenly dispersed ferromagnetic material of small particle size having either high magnetic remanence in the case of ink for use with the retentive type sensing or a high magnetic permeability in the case of the reluctance type sensing.

MAGNETIC PIGMENT

The magnetic pigment may be a retentive type having high magnetic remanence or a reluctance type having high permeability. It consists of a magnetic powder preferably of 10 microns or less in particle size having acicular, cubicle or round shape. Specific non-limiting examples include ferric oxides in the gamma crystalline form, natural and artificial magnetites, hematites and ferrites. Proportions up to about sixty-five percent by weight have been successfully employed.

LIQUID CARRIER AND BINDER

A heavy or loose bodied varnish may be employed. These varnishes may comprise between about 20 and about 60 percent by weight of a liquid carrier and the remainder a resinous material. The carrier may be one of the series of monomeric or polymeric glycols, perferably of the aliphatic saturated species, ranging from ethylene glycol to about 8 carbon atom glycols such as octylene glycol and above. The resinous binder is soluble in the liquid carrier while under atmospheric conditions but insoluble

under application of steam or water vapor. Examples include organic resinous polymeric materials such as phenolics, Vinsol, which is a petroleum hydrocarbon insoluble resin derived from pine wood and has a melting point of 116° C., maleated and fumarated rosins such as the adducts of maleic anhydride or fumaric acid with rosin, beta-naphthol pitches and the like.

STABILIZING AGENT

Minor amounts of a stabilizing agent may be used, between about five and about eight percent by weight. Non-limiting examples are the polyethylene glycol aliphatic homologous series, polyethanolamines such as di and tri, higher molecular weight clycols such as octylene, wax compounds and wetting agents. Such wetting agents as Nopco 1825–C, an ethoxylated fatty amino amide having a distillation point of 200° C. and, produced by Nopco Chemical Company, Inc., the Igepal group of wetting agents—a group of alkyl phenolethylene oxide condensation products produced by General Dyestuffs, Inc.—and particularly Igepal CO 630. Another wetting agent that may be used is Venice turpentine sold under the trade name of Veniturp by S. P. Penick and Company.

In addition, a film forming composition such as the protein resins, i.e. zein, the simple protein prepared from corn, dissolved in a glycol such as ethylene glycol may be added. Around 8% by weight is preferable. Zein A resin, included as an ingredient in some of the following examples of ink compositions, is a modified corn protein having a melting point of 180° C. to 200° C. The zein A resin chars before melting, contains 14 amino acids in the full strength and has a molecular weight of 20,000 to 30,000.

A minor amount of a colorant may be employed and suitable colorants are carbon black, dyes and lakes.

The constituents of the ink are prepared and mixed in a conventional fashion and care is taken to evenly disperse the magnetic pigment throughout the vehicle.

Examples of specific inks are as follows:

Example No. 1

RETENTIVE TYPE

Percent	Material	Function
35	Gamma ferric oxide powder, particle size .2 to 20 microns high magnetic remanence.	Magnetic pigment.
5	Diethanolamine, oleic acid mixture 30:70.	Stability compound.
31	Fumarated rosin dissolved in ethylene glycol 60:40.	Heavy body varnish binder.
17	Fumarated rosin dissolved in ethylene glycol 50:50.	Medium body varnish binder.
8	Zein resin dissolved in diethylene glycol 25:75.	Film forming compound.
4	Carbon black, channel type	Colorant.

Example No. 2

RELUCTANCE TYPE

Percent	Material	Function
60	Spherical pure iron powder, particle size .2 to 10 microns.	Magnetic high permeability.
20	Fumarated rosin dissolved in diethylene glycol 60:40.	Heavy body varnish binder.
4	Triethanolamine, oleic acid 30:70	Stability compound.
4	Wax-rosin mixture diluted with octylene glycol.	Do.
4	Impingement type carbon black	Colorant.
8	Zein resin dissolved in diethylene glycol 25:75.	Film forming compound.

Example No. 3

Percent	Material	Function
50	Acicular synthetic magnetite	Magnetic.
33	Fumarated wood resin having a melting point of 150° in dipropylene glycol 50:50.	Heavy body varnish binder.
5	Triethanolamine in oleic acid 30:70	Stabiliby compound.
6	Zein A resin in diethylene glycol 25:75	Film Forming compound.
3	Impingement carbon black	Colorant.
3	Nopco 1825-C	Wetting Agent.

What has been disclosed are specific embodiments of the present invention. Other embodiments obvious to those skilled in the art from the teaching herein are contemplated to be within the spirit and scope of the following claim.

What is claimed is:

A moisture-set magnetic ink consisting of, by weight, approximately 50% finely divided magnetic pigment, 33% of a 50:50 solution of fumarated wood resin having a melting point of 150° C. in dipropylene glycol, 5% of a 30:70 solution of triethanolamine in oleic acid, 6% of a 25:75 solution of zein A resin in diethylene glycol, 3% of carbon black and 3% of an ethoxylated fatty amino amide having a distillation point of 200° C.

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