

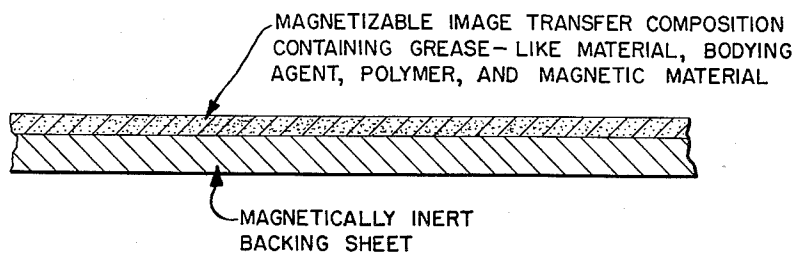
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MAGNETIZABLE IMAGE TRANSFER MEDIUM

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MAGNETIZABLE IMAGE TRANSFER MEDIUM
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This invention relates to magnetic coatings and, more particularly, to a coating composition adapted to form a magnetizable image transfer medium.

Physical image transfer media such as carbon paper, typewriter ribbons for single image transfer and duplicator stencils are commonly used to transfer a visual image from one medium to another. Each of these transfer media comprises a supporting base of paper or plastic foil carrying a coating of a pigmented or dyed wax-containing material. Inasmuch as relatively little pigment or dye is required for this type of coating, the physical properties of wax are retained. Thus, the coating composition can be liquefied for application to the supporting base simply by melting the wax component of the composition, and after the composition solidifies it exhibits the characteristics of the wax, notably its softness, weak cohesive forces, freedom from tackiness and absence of cold flow, which make it particularly suitable for mechanical transfer of a visual image from one medium to another.

For the mechanical transfer of a magnetizable image from one medium to another, the strength of the magnetic response is directly proportional to the concentration of the magnetizable material in the composition. Accordingly, a relatively large percentage of magnetizable material must be incorporated in a magnetizable image transfer coating composition. Hot-melt compounds such as the waxes used for the aforementioned visual image transfer coating composition lose their desirable characteristics when such relatively large proportions of a magnetizable pigment are added to the waxes. Other conventional materials which are generally useful in forming thin films, such as the resins and many plastics soluble at room temperature in technical solvents, are either too hard when dried or become tacky when softened by the addition of a plasticizer. Greases, on the other hand, are prone to cold flow even though the grease is relatively hard. The problem, then, is to produce a magnetizable image transfer coating composition which can be mechanically transferred from one medium to the other with the ease and clarity of detail characteristic of the visual image transfer coating compositions.

We have now discovered that it is possible to compound a mixture of finely-divided magnetizable material with a minor proportion of certain other materials with the result that the mixture exhibits the aforementioned desired magnetic and physical characteristics for a magnetizable image transfer coating composition. The composition of our invention consists essentially of (a) a grease-like material of the group consisting of soft mineral waxes, animal fats and vegetable fats, (b) a bodying agent of the group consisting of fatty acids having from 12 to 18 carbon atoms and the esters and metallic salts thereof, (c) a hydrophobic oil soluble normally-solid chain polymer, (d) an amount of a finely-divided magnetizable material at least equal to the total amount of the aforementioned materials, and (e) an organic solvent capable of solvating the normally-solid polymer and present in amount sufficient to impart a fluid consistency to the composition. The composition can be readily applied to a sheet of magnetically inert material to form, after the solvent has been driven off, a magnetizable image transfer medium which can be transferred mechanically from one medium to an-

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other like the aforementioned conventional visual image transfer mediums.

In the accompanying drawing, the single FIGURE is a fragmentary cross-sectional view of a magnetisable image transfer medium embodying the invention.

The grease-like materials that form the base of our new composition comprise soft mineral waxes such as petrolatum and microcrystalline petroleum waxes, as well as animal and vegetable fats such as lanolin and cacao butter. These materials, whether used singly or in combination with one another, are supplemented by other materials, herein referred to as bodying agents, which add body to the grease-like materials. The bodying agents consist of fatty acids having from 12 to 18 carbon atoms and the esters and metallic salts thereof. Stearic acid, sorbitan monopalmitate, calcium stearate and barium stearate are representative examples of such bodying agents.

The bodied grease-like material is further reinforced by the addition of a minor proportion of a hydrophobic, oil-soluble, normally-solid chain-type polymer which is also soluble in a mutual solvent for the bodied grease-like material. Chlorinated rubber, cellulose esters, cellulose ethers and similar polymer compounds are effective for this purpose. In the case of relatively inflexible polymers, such as the chlorinated rubber polymers, a plasticizer for the polymer may also be incorporated in the mixture. Dioctyl phthalate or dihexyl phthalate are particularly suitable, although other plasticizers such as dioctyl adipate or dioctyl sebacate are equally effective.

The resulting mixture is solvated by any suitable solvent such as toluene. Although the solvent may be added directly to the mixture of grease-like material, bodying agent and polymer reinforcing agent, we have found that dissolution of all components is facilitated if the polymer is first dissolved in a portion of the solvent and the resulting polymer solution is then added to the other solid components along with the balance of the solvent.

The resulting mixture forms the carrier vehicle for the magnetizable material. The magnetizable material may comprise any of the finely-divided materials commonly used as the magnetizable component of magnetic recording tapes and sheets, such, for example, as ferrosoferric oxide and gamma ferric oxide. Finely-divided metallic iron, iron alloys and magnetic ferrites are similarly useful.

The proportions of the aforementioned components of the composition of our invention are such that the amount of the bodying agent is at least one-half and preferably exceeds that of the grease-like material, that the amount of the polymer does not exceed and is generally less than the grease-like material, and that the amount of the solvent is sufficient to impart flowability when these components are admixed with an amount of magnetizable material at least equal to the total amount of the non-volatile components, to wit, the grease-like material, the bodying agent and the polymer. Percentagewise, the amount of the bodying agent varies between 50% and 300% by weight of the grease-like material, the amount of the polymer varies between 20% to 100% by weight of the grease-like material, the amount of the solvent varies between 200% and 350% by weight of the total amount of the grease-like material, the bodying agent and the polymer, and the amount of the magnetizable material ranges between 100% and 200% by weight of the aforesaid total of the grease-like material, the bodying agent and the polymer.

The resulting composition is then applied by any conventional coating technique, such as by a doctor blade, to a sheet of magnetically inert material such as webs of paper, cellulose acetate, polyvinyl chloride and acetate

polymers and co-polymers thereof, and a polyester such as the condensation product of ethylene glycol and terephthalic acid. The coating is advantageously about 0.25 mil thick, although thinner and thicker coatings are useful. The coated web is then cut into ribbons of any desired width by means of conventional slitting machinery.

The following specific examples are illustrative of the novel composition of our invention. In each example, the components which form the carrier vehicle for the magnetizable material were simply physically admixed and then the magnetizable material was added. The resulting mixture was then ground in a ball mill or the like to insure thorough dispersion of the magnetizable material throughout the vehicle:

Example I

Component	Identity	Parts by Weight
Grease-like material.....	Anhydrous lanolin.....	15
Bodying agent.....	Barium stearate.....	30
Polymer.....	Chlorinated rubber.....	10
Polymer plasticizer.....	Diethyl phthalate.....	15
Solvent.....	Toluene.....	150
Magnetizable material.....	Ferrosoferric oxide.....	100

Example II

Component	Identity	Parts by Weight
Grease-like material.....	Petrolatum.....	25
Bodying agent.....	Stearic acid.....	25
Polymer.....	Ethyl cellulose.....	10
Solvent.....	Toluene.....	150
Magnetizable material.....	Ferrosoferric oxide.....	100

Example III

Component	Identity	Parts by Weight
Grease-like material.....	Anhydrous lanolin.....	35
Bodying agent.....	Sorbitan monopalmitate.....	25
Polymer.....	Ethyl cellulose.....	10
Solvent.....	Toluene.....	200
Magnetizable material.....	Ferrosoferric oxide.....	100

Each of the products of Examples I, II and III was applied to a ribbon of cellulose acetate 0.5 mil thick, the thickness of the coating after drying being about 0.25 mil. The ribbons were tested by using them as typewriter ribbons and were effective in providing magnetizable typed letters and numerals on paper of a clarity equal to that of a conventional typewriter ribbon.

We claim:

1. A coating composition adapted when applied to a sheet of magnetically inert material to form a magnetizable image transfer medium, the composition being characterized by a proportion of magnetizable material at least equal in weight to the total of the other solid mate-

rials in the composition and consisting essentially of (a) a grease-like material selected from the group consisting of soft mineral waxes, animal fats and vegetable fats, (b) from 50 to 300 percent of a bodying agent selected from the group consisting of fatty acids having from 12 to 18 carbon atoms and the esters and metallic salts thereof, (c) from 20 to 100 percent of a hydrophobic, oil-soluble, normally-solid polymer selected from the group consisting of chlorinated rubber, cellulose esters and cellulose ethers, (d) from 200 to 350 percent of a volatile organic solvent capable of solvating the aforementioned materials, and (e) from 100 to 200 percent of a finely-divided magnetizable material selected from the group consisting of ferrosoferric oxide, gamma ferric oxide, metallic iron, iron alloys and ferrites, each of the percentages of the bodying agent and of the hydrophobic polymer being based on the weight of the grease-like material while each of the percentages of the organic solvent and of the magnetizable material are based on the total amount of the aforementioned grease-like, bodying and hydrophobic materials.

2. A magnetizable image transfer medium comprising a backing sheet of magnetically inert material having a coating on one surface thereof consisting essentially of a major proportion of finely-divided magnetizable material selected from the group consisting of ferrosoferric oxide, gamma ferric oxide, metallic iron, iron alloys and ferrites dispersed in and carried by a composition consisting essentially of (a) a softening agent selected from the group consisting of soft mineral waxes, animal fats and vegetable fats, (b) from 50 to 300 percent of a bodying agent selected from the group consisting of fatty acids having from 12 to 18 carbon atoms and the esters and metallic salts thereof, and (c) from 20 to 100 percent of a hydrophobic, oil-soluble, normally-solid polymer selected from the group consisting of chlorinated rubber, cellulose esters and cellulose ethers, each percentage being based on the weight of the grease-like material, the amount of the finely-divided magnetizable material contained in the coating being from 100 to 200 percent by weight of the composition.

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