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PLANOGRAPHIC PRINTING

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This invention relates to the art of planographic printing in general, and more particularly, to image forming compositions for inking fabric typewriter ribbon material, to fabric typewriter ribbon material so inked, and to planographic paper base printing plates bearing a printing image from a typewriter impression of the inked typewriter ribbon material.

Planographic or lithographic printing depends upon the immiscibility of water or aqueous wet-out solution and greasy lithographic printing ink. To print by lithography there is affixed to a suitable flat surface or plate an ink-receptive, water-repellent image, usually greasy, waxy, or resinous in nature. To the plate so imaged is then applied wet-out solution, usually an aqueous solution of glycerine or similar substance rendered slightly acidic as by addition of a phosphate or equivalent acidifying material. The wet-out solution, wets all portions of the plate not already covered by imaging material, but it does not wet the water-repellent image. An inking roll coated with lithographic printing ink now passed over the plate leaves a film of ink upon the image areas but leaves no ink on the unimaged areas which already carry a film of the ink-repellent wet-out solution. The inked plate when brought into contact with an ink-receptive surface transfer thereto the ink in a pattern reverse to that on the plate. The surface so printed upon may be a copy sheet as in direct lithography, but in most cases is an offset blanket which in turn transfers the print in form identical with that on the plate to a paper sheet which is the final printed matter. The plate is repeatedly dampened, inked and printed from until the desired number of prints have been made. The latter process is commonly called offset printing.

In either direct lithographic or offset printing, the image forming composition used for delineating an image on a paper base planographic printing plate must firmly and spontaneously bond or adhere to the dry printing face of the cellulosic plate, and also be capable of leaving on the printing surface thereof, a substantially water-immiscible residue, which is preferentially wettable by a lithographic printing ink, and which exhibits an adherence to the printing surface that persists when the latter is subsequently saturated with aqueous wet-out solution.

In addition to the above requirements, the image forming composition must have the physical characteristics required by the particular mode of image delineation. In this invention, where the image is delineated onto the plate via typewriter impression of coated fabric typewriter ribbon, the impregnant for the typewriter ribbon must be a viscous fluid of low vapor pressure.

There have now been found new and useful image forming compositions that meet the aforementioned requirements for lithographic or offset printing. Not only are the compositions useful as impregnants for fabric typewriter ribbon material where the coated ribbon is to be used for image delineation on a paper base plate, but they are also useful as impregnants where the ribon is to be used by a secretary in normal typing.

The image forming compositions of the invention comprise coloring matter dispersed in a continuous oil vehicle.

The coloring matter includes the conventional pigments used in coating typewriter ribbon material as the various carbon blacks, as e.g. furnace blacks, channel black and bone black. Conventional oil-soluble basic dyes as e.g. nigrosine base dye also may be present. It is preferred that the coloring matter be present in an amount from 12 to 26 percent by weight of the total image forming composition.

Essential to the image forming compositions of the invention and as part of the continuous oil vehicle, there is included an oil soluble material having affinity for the aqueous wet-out solution used in offset printing. By the expression "having affinity for the aqueous wet-out solution used in offset printing" is meant: that when a drop of the oil soluble material is placed in the midle of a watch glass and a drop of aqueous wet-out solution placed on the edge of the watch glass, when the two drops meet, there appears intense bubbling at the interface of the two drops. This interfacial activity can be viewed by the naked eye but is best seen under a microscope. This material is believed to be substantially responsible for the excellent printing life obtained in offset printing with the image forming compositions of the invention. It has been found most desirable when the oil-soluble material having affinity for the aqueous wet-out solution used in offset printing is either a monoalkyl acid orthophosphate wherein the total number of carbons in the alkyl group is at least four or a dialkyl acid orthophosphate wherein the total number of carbons in the alkyl group is at least four. It is preferred that the acid orthophosphate be present in an amount from 15–50 percent by weight of the total image forming composition.

A difficulty arises, however, due to the affinity of the aforementioned oil soluble material for the aqueous wet-out solution used in offset printing. That is, when using the oil soluble material as the vehicle of the image forming composition, there is a tendency for a part of the delineated image to enter the aqueous wet-out solution during the offset printing process. This results in an undesirable broadening of the character impressions on the copy sheets.

To counteract the tendency for a part of the delineated image to enter the aqueous wet-out solution without significantly reducing the printing life of the image, it has also been found necessary to include in the continuous oil vehicle a non-drying oil like material not having affinity for the aqueous wet-out solution used in offset printing. By the expression "not having affinity for the aqueous wet-out solution used in offset printing" is meant; that when a drop of the non-drying oil like material is placed in the midle of a watch glass and a drop of aqueous wet-out solution placed on the edge of the watch-glass, when the two drops meet, no interaction is seen at the interface of the two drops. The use of oleic acid or peanut oil, or tricresyl phosphate, or glyceryl monoricinoleate, as the non-drying oil like material is especially desirable. When one or more of these materials is used in conjunction with the aforementioned acid orthophosphates, the character impressions on the copy sheets remain sharp throughout the printing life of the planographic plate bearing image. It is preferred that the non-drying oil like material be present in an amount from 20–55 percent by weight of the total image forming composition.

It is obviously important during the offset printing process that the image forming material be resistant to displacement under printing conditions. That is, the image must maintain both adhesion to the paper base printing plate and attraction for the lithographic print-

ing ink passed over the plate. To help maintain these forces of adhesion and attraction, it is advantageous but not essential to include a tackifier in the vehicle of the image forming composition. The tackifier, of course, does not have affinity for the aqueous wet-out solution used in offset printing, and is further characterized by its high viscosity; i.e. it is either a solid or very closely approaches a solid at room temperatures. The use of a material such as hydroabietyl alcohol as the tackifier in the image forming composition is especially desirable. About 6 percent of 15 percent by weight of hydroabietyl alcohol of the total image forming composition serves to maintain image integrity against the abrading forces of ink and fountain rollers during the course of long printing runs.

By paper base planographic printing plate as the term is used herein, is meant paper web or base which has been coated on at least one side with a layer of hydrophilic film-forming material which may contain therein some filling material, usually inert, such as clay, blance fixe, or the like. In some cases a light-weight wash coating of substantially clear hydrophilic film-former, i.e., free from filling material, is applied over the before mentioned filled coating in order to prevent excessive penetration by wet-out liquid, i.e. to afford improved hold-up of water wet-out liquid or dampening solution.

The following examples are inserted to illustrate various embodiments of the invention. In the examples disclosing image forming compositions, parts of ingredients refers to the parts by weight of the ingredient of the total image forming composition.

Example 1

This example illustrates an image forming composition within the scope of the invention.

Ingredient:	Parts
Isoamyl isooctyl acid orthophosphate	45.4
Peanut oil	22.7
Hydroabietyl alcohol	11.4
Furnace black	9.1
Nigrosine base dye	11.4
	100.0

In preparing the image forming composition, the first three ingredients are heated to about 130° F. and mixed for ten minutes or until the mixture has cooled to room temperature. The remaining ingredients are then added in order, mixed, and the composition finely ground by a suitable means such as a three-roll mill, pot mill, etc.

Example 2

By means of a conventional ribbon inking machine, 320 thread count cotton ribbon cloth is saturated with the image forming composition of Example 1 and then passed through the nip of two rolls which squeeze out excess image forming composition in proportion to the amount of squeeze applied at the nip. The image forming composition of Example 1, being of high viscosity, requires high pressure at the nip of the squeeze rolls to give 28% inking of the cloth. (Percent inking is determined as 100 times the weight of applied ink divided by the weight of the ribbon holding that ink.)

Example 3

The ribbon prepared in Example 2, is inserted into an electromatic typewriter and images typed onto a paper base planographic printing plate. After images have been typed over the length and breadth of the plate, the plate is affixed to the plate cylinder of an offset duplicator and 5000 copies printed. Standard aqueous wet-out solutions and lithographic inks are used in the printing process. It is found that the image areas of the printing plate are durable to the extent that very legible copies are produced at the end of this 5000-copy run.

Example 4

Another image forming composition is disclosed in this example.

Ingredient:	Parts
Isoamyl isooctyl acid orthophosphate	48.1
Peanut oil	24.1
Hydroabietyl alcohol	6.0
Furnace black	9.7
(Calco Oil Black 4160)	12.1
	100.0

NOTE.—(Calco Oil Black 4160 is the trade name of the American Cyanamid Company for an oil soluble dye.)

The image forming composition is prepared as in Example 1; inked onto fabric ribbon cloth as illustrated in Example 2; an imaged paper base planographic plate prepared; and 5000 legible copies made therefrom by the offset printing process illustrated in Example 3.

Example 5

Another image forming composition is herein disclosed.

Ingredient:	Parts
Isoamyl isooctyl acid orthophosphate	42.3
Hydroabietyl alcohol	10.6
Tricresyl phosphate	21.2
Furnace black	12.2
Nigrosine base dye	13.7
	100.0

The image forming composition is prepared as illustrated in Example 1; inked onto fabric ribbon cloth as illustrated in Example 2; an imaged paper base planographic plate prepared; and 5000 legible copies made therefrom by the offset process illustrated in Example 3.

Example 6

Another image forming composition is herein disclosed.

Ingredient:	Parts
Isooctyl acid orthophosphate	42.3
Glyceryl monoricinoleate	10.6
Tricresyl phosphate	21.2
Furnace black	12.2
Nigrosine base dye	13.7
	100.0

The image forming composition is prepared by mixing the first three ingredients; then adding the remaining ingredients and, mixing and grinding the composition. (Heat is not required in preparing this image forming composition because of the absence of hydroabietyl alcohol in the composition. The latter ingredient's high viscosity compels heating the composition into which it is introduced so that the viscosity is reduced to a point where it can be mixed with the other ingredients of the composition.)

The image forming composition is then inked onto fabric ribbon cloth as illustrated in Example 2; imaged paper base planographic plate prepared; and 5000 legible copies made therefrom by the offset process illustrated in Example 3.

Example 7

Another image forming composition is herein disclosed.

Ingredient:	Parts
Ethyl oleyl acid orthophosphate	42.3
Hydroabietyl alcohol	10.6
Tricresyl phosphate	21.2
Furnace black	12.2
Nigrosine base dye	13.7
	100.0

The image forming composition is prepared as illustrated in Example 1; inked onto fabric ribbon cloth as

illustrated in Example 2; an imaged paper base planographic plate prepared; and 5000 legible copies made therefrom by the offset process illustrated in Example 3.

Example 8

Another image forming composition according to the invention is herein illustrated.

Ingredient:	Parts
Isoamylisooctyl acid orthophosphate	44.2
Hydroabietyl alcohol	15.8
Tricresyl phosphate	19.0
Furnace black	10.5
Nigrosine base dye	10.5
	100.0

The image forming composition is prepared as illustrated in Example 1; inked onto fabric ribbon cloth as ilustrated in Example 2; an imaged paper base planographic plate prepared; and 5000 legible copies made therefrom by the offset process illustrated in Example 3.

Example 9

Another image forming composition according to the invention is herein illustrated.

Ingredient:	Parts
Isoamylisooctyl acid orthophosphate	39.6
Oleic acid	44.8
Furnace black	5.2
Nigrosine base dye	10.4
	100.0

The image forming composition is prepared by mixing the first two ingredients; then adding the remaining ingredients, and mixing and grinding the composition. (Heat is not required in preparing this image forming composition because of the absence of hydroabietyl alcohol in the composition. The latter ingredient's high viscosity compels heating the composition into which it is introduced so that the viscosity is reduced to a point where it can be mixed with the other ingredients of the composition.) The image forming composition is inked on to fabric ribbon cloth as illustrated in Example 2; an image paper base planographic plate prepared; and 5000 legible copies made therefrom by the offset printing process illustrated in Example 3.

The image forming compositions illustrated by the examples can be applied to silk or cotton ribbon cloth

of any desired thread count and thickness and by means of any of the conventional ribbon inking machines.

In place of the acid orthophosphates used in the image forming compositions as illustrated in the examples, there can be used the same amounts of one of the following acid orthophosphates; monoisoamyl; di-2-ethyl hexyl; di-2-amyl; mono-n-butyl; mono-2-ethylhexyl; diethyl; monodecyl; or tridecyl.

It is intended that the foregoing examples be considered illustrative only and not in limitation of the invention.

What is claimed is:

1. An image forming composition for inking fabric typewriter ribbon material, such that typewriter impressions of the inked ribbon on paper base planographic printing plates will provide good receptivity for lithographic printing inks and extensive life during offset printing; said image forming composition consisting of coloring matter dispersed in a continuous oil vehicle including (A) an oil soluble material having affinity for aqueous wet-out solution used in offset printing and taken from the group consisting of monoalkyl acid orthophosphate wherein the total number of carbon atoms in the alkyl group is at least four and dialkyl acid orthophosphate wherein the total number of carbon atoms in the alkyl groups is at at least four and (B) a non-drying oil like material not having affinity for the aqueous wet-out solution used in offset printing and taken from the group consisting of oleic acid, peanut oil, tricresyl phosphate and glyceryl monoricinoleate, the weight ratio of the ingredient described in (A) to the ingredient described in (B) varying from 3/11 to 5/2.

2. An image forming composition according to claim 1 in which the continuous oil vehicle also contains hydroabietyl alcohol.

3. Fabric typewriter ribbon material inked with the image forming composition of claim 1.

4. A paper base planographic printing plate bearing an image from the image forming composition of claim 2.

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