July 23, 1957 T. U. MARRON 2,800,077

PLANOGRAPHIC PRINTING PLATES AND METHODS FOR MANUFACTURING SAME

Filed March 27, 1952

Fig. 1

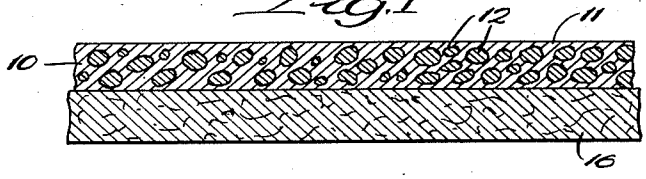


Fig. 2

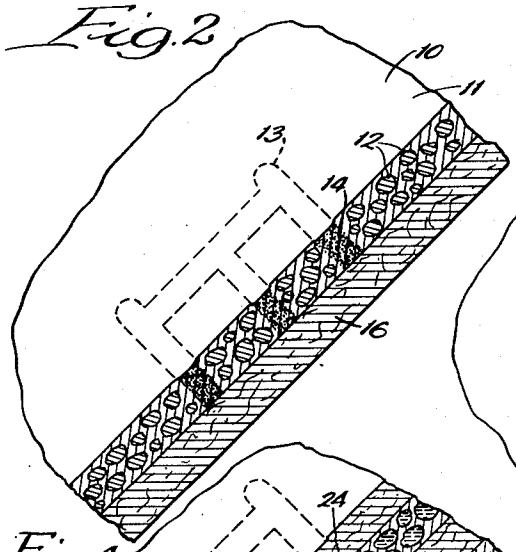


Fig. 3

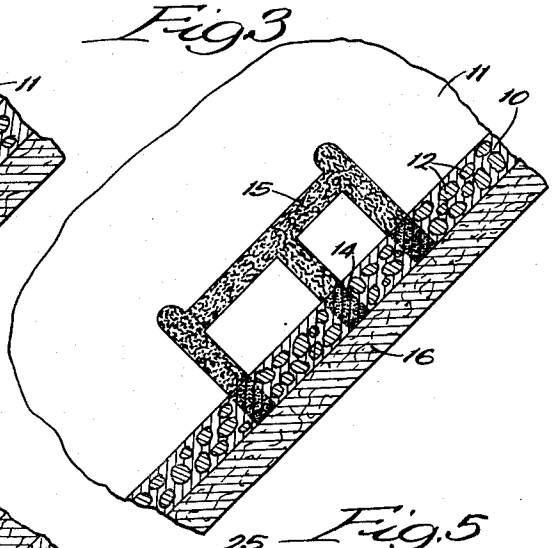


Fig. 4

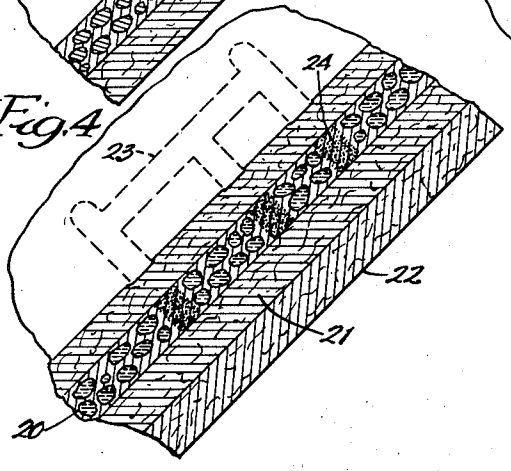


Fig. 5

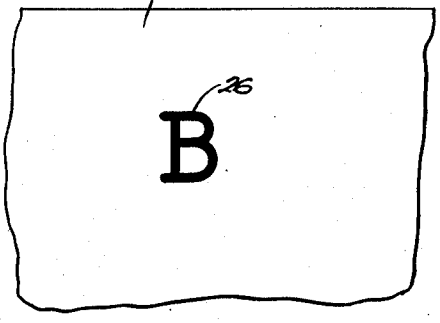


Fig. 7

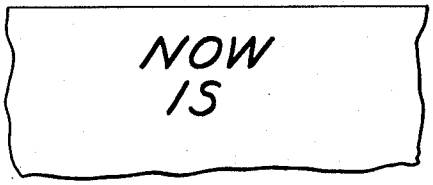
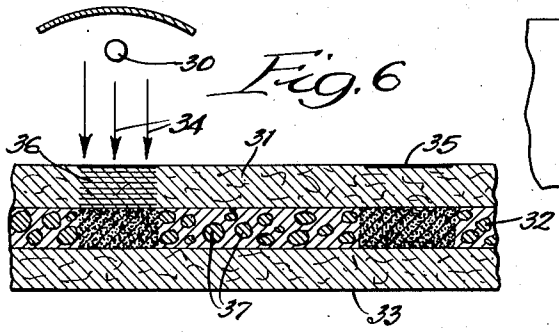


Fig. 6



INVENTOR:
Thomas U. Marron,
BY
Dawson & Owens,
ATTORNEYS.

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2,800,077

PLANOGRAPHIC PRINTING PLATES AND METHODS FOR MANUFACTURING SAME

Thomas U. Marron, Glenview, Ill., assignor to A. B. Dick Company, Niles, Ill., a corporation of Illinois

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4 Claims. (Cl. 101—149.2)

This invention relates to a new and improved planographic printing plate and more particularly to planographic plates for the production of copies by hectographic or lithographic technique and to new and improved methods for producing the same.

In general, a lithographic plate comprises an imaged portion formed of an ink receptive, water repellent material formed or applied onto a surface which beyond the imaged portion is hydrophilic and preferentially receptive to water or other aqueous medium. Thus if the surface of the plate in use is first wet with an aqueous repellent composition and then has an oil type ink composition applied thereto, the repellent solution will wet out the non-imaged portion of the surface and the ink composition will be received only by the imaged portion for transfer in the production of copy by the direct or offset method. At the present time an imaged lithographic plate of the type described is produced generally by two systems hereinafter referred to as the direct image plate and the indirect image plate, which develops the image on the surface of the plate by reaction to light or certain light rays resembling photographic processes or the like.

In the direct image plate, the surface is formed of a hydrophilic material which is preferably insolubilized to resist deterioration in water and the image is formed thereon directly by inscription with a writing instrument, pencil, crayon, or by transfer of the ink forming composition from a typewriter ribbon upon impact by keys.

There are a number of limitations in the manufacture and use of present direct image plates which it is desirable to overcome or at least minimize as much as possible. For example, the production of a large number of copies of good quality requires that the image forming material applied to the plate surface becomes strongly anchored thereto, otherwise the image will walk off of the plate in use. Strong anchorage has been found difficult to achieve in view of the vast differences in the physical properties of the respective materials. Generally, the lithographic surface is hydrophilic in character to repel ink composition and preferentially to receive aqueous repellent while the image forming material is hydrophobic in character to provide for ink receptivity and water repellency. The conflicting properties quite naturally oppose the development of a strong interbonded relation between the hydrophilic surface and the image formed thereon and limits the number of copies of good quality that can be produced therefrom.

Considerable care must be exercised in the proper selection and application of imaging material for particular plates and the imaging operation poses many undesirable steps which have heretofore been considered necessary and conducted as a matter of course but can now be eliminated with the use of structures embodying features of this invention which will hereinafter be described.

No one may have raised the point that it would be desirable to eliminate the use of special ribbons, crayons or imaging solutions or that it would be desirable to eliminate the use thereof entirely in the production of an image on a lithographic or hectographic plate but have, as a matter of necessity, painstakingly threaded typewriter ribbons or filled drawing instruments with imaging compositions for transfer to the surface of the lithographic or hectographic plate.

The above merely points out a few of the undesirable characteristics of present plates which can be overcome in accordance with the practice of this invention.

The concepts of this invention relate to direct image plates and it is an object of this invention to produce a new and improved lithographic plate which overcomes many of the objectionable characteristics in the production and use of present plates and it is a related object to produce a new and improved imaged lithographic plate of the type described and to provide a method for producing same.

Another object is to produce a lithographic plate of the type described but in which the steps of imaging the plate do not require the inscription thereon with an ink receptive, water repellent material.

A further object is to produce a lithographic plate of the type described in which the ink receptive image forming material constitutes a component originally embodied in the plate and it is a related object to provide for the development of an image thereon which is strongly anchored into the surface.

A still further object is to produce a direct image lithographic plate which may be simply and economically manufactured and which permits the development of an ink receptive image thereon in an expedient manner without the application of imaging compositions.

Another object is to produce a structure which, in itself, may not constitute a lithographic plate but which may be used in the manner described herein for the development of an ink receptive image on another lithographic surface in a new and novel manner and it is a related object to produce a structure of the type described which may be freely handled as an incidence to normal use without being subject to the transfer of colored inking substances onto the hand or other objects.

A further object is to provide a new and improved structure for use as a direct image lithographic plate or for use in the manufacture of a lithographic plate and it is a related object to provide a new and improved method for developing an ink receptive imaged portion thereon by indirect process.

A still further object is to produce a direct image lithographic plate of the type described which embodies greater flexibility in the composition and in the characteristics of the image forming material and the water receptive material so as to provide for an improved application and use.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration but not of limitation, embodiments of the invention are shown in the accompanying drawing in which—

Figure 1 is an enlarged sectional elevational view of a lithographic plate embodying features of this invention;

Figure 2 is a perspective view in section of the plate shown in Figure 1 illustrating the reactions occurring therein upon being struck by a typewriter key;

Figure 3 is a perspective view in section of the plate of Figure 2;

Figure 4 is a perspective view in section showing the structure of Figure 1 in position of use for the preparation of an imaged plate on another lithographic surface;

Figure 5 is a top plan view of the imaged lithographic plate produced by the process of Figure 4;

Figure 6 is a sectional elevational view of the plate

shown in Figure 1 illustrating a modified method for forming the image thereon, and

Figure 7 is a top plan view of the image plate produced by the process of Figure 6.

Although the objects of this invention appear to be somewhat contradictory in character, they are all capable of achievement by the use of a lithographic plate prepared in accordance with the practice of this invention having a lithographic surface which differs basically from anything which has heretofore been produced. Briefly described, a lithographic plate embodying features of this invention is formed with a lithographic coating **10** in the form of a polyphase system having a film forming, hydrophilic, water receptive material **11** as the continuous phase and an ink receptive, water repellent material **12** as the dispersed phase. The continuous phase constitutes a rupturable medium which insulates the ink receptive, water repellent material dispersed therein as minute particles or droplets. Thus the coating presents a hydrophilic, water receptive surface but, in response to pressure as effected by the impact of a typewriter key **13**, or by a writing instrument or other applied force, the dispersed phase becomes liberated in corresponding areas, as illustrated by numeral **14**, to provide an ink receptive, water repellent imaged portion **15** on the surface. When used in the normal manner for lithographic duplication, repellent then preferably wets out the non-imaged portion while ink composition is received by the imaged portion formed in the areas of liberated ink receptive material for transfer onto copy as previously described.

Upon liberation of the ink receptive material responsive to impact or other applied force, transfer may simultaneously be effected onto a surface of another lithographic plate in surface contact therewith to form the ink receptive image thereon. In this capacity, the polyphase layer existing on a suitable base sheet functions in the manner of a typewriter ribbon or carbon type transfer sheet but without being subject to the objectionable features of such transfer sheets or typewriter ribbons now in use.

Having stated in general the concepts of this invention, description will now be made to the manufacture and use of planographic printing plates of the type described. The material making up the continuous phase of the polyphase system coated upon a suitable base sheet may be selected of such film forming hydrophilic colloids as gelatin, glue, casein, polyvinyl alcohol, hydroxyethyl cellulose, carboxymethyl cellulose, methyl cellulose, carboxymethyl hydroxyethyl cellulose, sodium alginates and the like, preferably insolubilized to resist deterioration by moisture under conditions of use.

The hydroxy and amino-containing film forming materials, such as casein, zein, polyvinyl alcohol, cellulose ethers, cellulose esters and their salts and the alginates may be insolubilized by reaction with an aldehyde, such as formaldehyde, glyoxal or alum or other tanning agents incorporated directly with the colloid as an ingredient in the coating composition or applied afterwards by washing the surface with a solution thereof. The cellulose ethers and their salts and polyvinyl alcohol may also be insolubilized to a desired degree by treatment with acids or acid salts of the type hydrochloric acid, aluminum chloride, iron chloride, zinc chloride and the like, preferably applied as a wash coat after the hydrophilic colloid surface has been formed. Application of the insolubilizing agents as an ingredient in the coating composition may range from 0.5 to 5 percent by weight and treatment as a wash coating may be achived with solutions having a concentration of 2 to 25 percent by weight of the insolubilizing agent dissolved therein. Reference is made to the issued Patents Nos. 2,534,558, 2,534,650 and 2,542,784 for amounts of insolubilizing agents required and the methods of application.

The dispersed phase having a base formed of ink receptive and water repellent materials may be compounded of an oily, greasy or waxy base, such for example as natural waxes including carnauba wax, ceresin wax, Japan wax, montan wax and the like; natural waxes such as paraffin wax or other microcrystalline wax; bitumens such as asphalt; fatty acids such as stearic acid, palmitic acid, oleostearic acid and the like; or fatty acid amides such as stearamide; pentaerythritol, sterols and the like; or oils such as castor oil, cotton seed oil, hydrogenated castor oil, linseed oil, mineral oils and the like. If the polyphase coating is itself adapted to provide the lithographic surface, the dispersed phase may be formed of solids substantially incapable of fluid flow but, in the event that the polyphase layer is to function as a transfer medium for depositing the hydrophobic ink receptive material released therefrom to an adjacent surface, then it is preferred to compound the dispersed phase for flow sufficient to effect the desired transfer onto the lithographic surface in contact therewith. For such purpose, the dispersed phase may be formed of oily or greasy substances capable of flow under the conditions of use or, in the alternative, may be compounded of more solid materials plasticized with oils or the like to introduce flow of the desired character.

The amount of hydrophilic colloid coating and ink receptive hydrophobic material in the coating composition depends chiefly upon the type of hydrophilic colloid which is used in solution to form the continuous phase. The considerations are primarily based upon viscosity to provide coatings of the desired character. Sodium alginate may be incorporated in an amount ranging from 2 to 5 percent by weight. The concentration of sodium carboxymethyl cellulose and other cellulose salt derivatives may range from 3 to 15 percent by weight. Casein, zein, glue and albumen and the like may be used in concentrations ranging from 5 to 25 percent by weight depending, in part, on the amount of ammonia or other alkalizing agent present. Polyvinyl alcohol in amounts ranging from 5 to 25 percent by weight can be introduced. Generally, the coating compositions may be formulated to contain 3 to 30 percent by weight of the hydrophilic film forming composition dissolved therein. The concentration of the ink receptive substance can best be defined in relation to the amount of hydrophilic film forming material in which it is to be dispersed. It is preferred to maintain the ratio between the materials forming the continuous phase and the dispersed phase within the range of 3 parts by weight of the continuous phase to 1 to 3 parts by weight of the dispersed phase but about twice the amount of the dispersed phase may be used in many instances.

In the manufacture of a highly bendable plate capable of use for imaging by typewriters or the like, it is desirable to provide for a polyphase layer having a thickness ranging from 2 to 10 mils. Where bending is of lesser importance, layers as thick as 20 to 25 mils may be used. The thickness of coat may be controlled by the amount of composition applied per unit area within limitations compatible with the production of a uniform layer of desired density. Not infrequently in the production of relatively thick layers, it is expedient to deposit a number of thin coats in successive operations to build up the desired thickness. Coating may be accomplished by conventional means such as by a roller coater, brush coater, spraying, knife coater or by the use of an air blade to control the thickness and distribution of the coating composition as described in the copending application of Mullen, Ser. No. 206,866, now Patent No. 2,721,815.

In the manufacture of a planographic printing plate embodying features of this invention, it is preferred to make use of a backing sheet **16** upon which the coating composition may be applied to form the polyphase layer of desired thickness. For a bendable plate of sufficient flexibility to permit use in a typewriter, the backing sheet

is preferably formed of thin sheet stock such as paper, plastic film, metal foil or the like. Where flexibility is unimportant, plates of metal, glass, plastics, fiber board, cardboard or the like may be used.

For a short run plate, that is a plate adapted for the production of 10–50 copies, it may be sufficient to use ordinary paper, but it is preferred to make use of a high wet strength or waterproof paper, such as the type having a resinous material represented by urea formaldehyde, melamine formaldehyde or phenol formaldehyde incorporated therein or else treated with a waterproofing material such as oils, waxes, varnishes, lacquers or the like. Instead, the polyphase layer may be formed on the surface of paper sheets especially prepared with a surface highly receptive to the coating composition, such as the coated sheets of the above mentioned copending application of Mullen. When the surface of the base sheet is coated with a hydrophilic colloid to provide a receptive base for the polyphase system, the thickness of the polyphase layer may be decreased.

It has been found that the characteristics of the plate may be improved by the use of an inert filler added to the material forming the continuous phase. Suitable fillers may be selected of finely divided clay, silica, titanox, talc, barium sulphate, satin white, diatomaceous earth and the like. When present, the amounts thereof may range from equal parts to ten times the weight of the hydrophilic colloid material.

Compositions for use in the preparation of a polyphase coating of the type described may be represented by the following examples:

Example 1

	Parts by weight
Methyl cellulose (25 cps. viscosity)	16
Glyoxal (30 percent solution)	20
Castor oil	10
Water	184

A suitable coating composition is formed by dissolving the methyl cellulose and glyoxal in water and then dispersing the castor oil into the solution.

Example 2

In the manufacture of a low run plate, the coating composition of Example 1 is applied by roller coater technique in amounts to form a layer of 10 mils thickness onto a sheet of partially hydrolyzed cellulose acetate. A polyphase layer of about 2.5 mils is formed upon drying at room temperature followed by subsequent heating at 105° for 30 minutes.

Example 3

A solution is first formed of a film forming material and is formulated to contain 30 grams hydroxyethyl cellulose (10 percent solution), 25 grams ethylene glycol and 5 grams glyoxal (30 percent solution). A separate emulsion is formed of 5 grams stearic acid, 50 grams castor oil and 5 grams morpholine in 300 grams of water. The emulsion is diluted ten-fold and then incorporated with the solution of film forming material in amounts to dilute the solution up to 300 ml.

The composition formed is applied onto 60-pound wet strength kraft paper by a dip coating process to form a film of about 8 mils thickness which upon drying at room temperature and subsequent heating for 40–60 minutes at 105° F. provides a polyphase layer having a thickness of about 2 mils.

Example 4

	Percent
Casein	16.0
Formalin	3.5
Ammonia	1.5
Paraffin wax	10.5
Mineral oil	2.0
Water	66.5

The paraffin, wax and mineral oil are dispersed in the solution formed of casein, formalin and ammonia in water. The coating composition, in the manufacture of a relatively long run plate, is applied by a brush coater to form a layer of 5 mils thickness onto the surface of a resinous treated paper base sheet of the type described in the aforementioned Mullen application. After drying the coating at elevated temperatures, a second layer of the coating composition is applied after prewetting to deposit another layer of about 8 mils thickness to form a polyphase film having a thickness of about 5 mils when dry.

Example 5

	Parts by weight
Casein	20
Formalin	3
Ammonia	1.5
Clay	40
Castor oil	8
Stearic acid	1

The casein, formaldehyde and ammonia is taken into solution in water and clay dispersed therewith. Then the castor oil and stearic acid is emulsified within the solution and the composition diluted to 30 percent by weight solids.

Example 6

	Percent by weight
Sodium alginate	3.0
Carnauba wax	1.0
Mineral oil	.5
Water	95.5

Example 7

	Percent by weight
Polyvinyl alcohol (low viscosity grade)	15
Castor oil	10
Water	75

The water soluble substances in the above compositions are dissolved in aqueous medium and the ink receptive hydrophobic oily and waxy materials dispersed therein. The polyphase systems are applied by conventional technique onto the surface of a receptive base sheet in amounts to provide the desirable thickness. After the coatings of Examples 6 and 7 have dried, insolubilization of the alginate and the polyvinyl alcohol may be achieved by washing the surface with a 5 percent solution of zinc chloride. The hydrophilic casein of Examples 4 and 5 become insolubilized upon drying by reaction with the formaldehyde contained therein and further insolubilization may be achieved by an after treatment with a 5 to 15 percent solution of a mineral salt such as zinc acetate, zinc chloride or the like, or by an additional treatment with formaldehyde dissolved in aqueous medium.

For the preparation of an ink receptive image **15** on the hydrophilic surface **11** of the polyphase layer **10**, the plate may be positioned to have the keys of the typewriter impact the backside of the plate. In response to the impact pressure, the dispersed ink receptive, water repellent material **12** is liberated from the polyphase system, possibly due to rupture of the continuous film in the impacted areas, whereby the imaged portion **15** in reverse is formed on the surface of the polyphase coating to provide the ink receptive, water repellent imaged portion surrounded by the water receptive surface of the hydrophilic material forming the continuous layer.

If the plate is inserted in the typewriter to present the polyphase coating to impact directly by the keys or to receive other pressure tool, the image formed will be in proper dimension for offset printing. It is preferred to place an interlayer sheet of paper or the like adjacent the polyphase coating so as to militate against transfer of the liberated ink receptive material onto the platen or to the typewriter keys.

When mounted on the duplicating machine for the production of copies, repellent which is first applied wets out

the surface covered by the continuous phase of hydrophilic material and then the ink material which is later applied is received only by the imaged portion for transfer to the copy by direct or offset means depending upon the manner in which the image is located on the plate. When properly adjusted, the pressure developed between the plate surface and the offset and inking cylinders is insufficient to cause rupture of the continuous phase of the lithographic coating whereby the non-imaged portion remains water receptive and the formed image maintains its specific letter outline to produce copy of good quality.

When the polyphase coated structure is to be used as a transfer sheet, such as a carbon or typewriter ribbon in the preparation of an ink receptive image upon a separate lithographic surface, as illustrated in Figure 4, the coated sheet **20** is positioned substantially in surface contact with the lithographic surface **21** of the lithographic plate **22**. Upon impact by a typewriter key **23** or upon the application of pressure to release the dispersed ink receptive phase in corresponding areas, the liberated ink receptive material **24** transfers to the surface **25** of the lithographic plate to form the image **26** thereon. To form the image in reverse for direct printing, the force is applied in the desired letter outline through the coated sheet prepared in accordance with this invention having the lithographic surface **25** in contact with the polyphase layer **27**. If the image is to be formed on the plate in direct order for offset printing, the letter outline is impressed through the transfer sheet containing the polyphase coating.

An important feature of this invention resides also in the utilization of the concepts described and claimed herein in the manufacture of a master for hectograph duplication and particularly for use in spirit duplicating systems.

In spirit duplicating processes as they are presently known, the image is formed on the surface of a hectograph plate by inscribing, drawing, typing or die-impressing to apply a composition containing a high concentration of a water soluble dye in a base capable of being removed slowly as by solution in water or alcohol or a combination of water and alcohol or other solvent. The design or letter outline on the surface of the hectograph plate is then contacted in the duplicating machine with copy paper which has previously been moistened by an aqueous system. A portion of the dye forming the image is dissolved in this medium and consequently transfers in part from the hectograph master to the impression paper to duplicate the image thereon. A substantial number of copies can be made from the hectograph master before the dye is removed therefrom in sufficient quantity to militate against production of good copy.

It will be apparent from this description that the problems in forming a suitable image on the hectograph master and the use thereof in the manufacture of copy of good quality corresponds in many ways to the practice with the lithographic plate.

Therefore, it is an object of this invention also to produce and to provide a method for producing a new and improved hectograph plate and it is a related object to provide means for producing an imaged plate without inscription with imaging materials.

More specifically, it is an object of this invention to incorporate all of the objective sought for a lithographic plate into the manufacture of a new and improved hectographic plate.

In the manufacture of a hectographic plate in accordance with the concepts embodied in this invention, the materials adapted for use in forming the continuous phase of the polyphase system are not limited to hydrophilic film forming materials but may in fact and preferably are selected of film forming materials which are not soluble in water or solvent system used for transfer of the coloring medium by hectographic technique. Thus the continuous phase may be formed of such highly resistant film forming materials as polystyrene, polyvinylidine chloride, polyalkyl acrylates such as polymethylmethacrylate, polyvinyl acetate, vinyl chloride-vinyl acetate copolymer, polyvinyl acetal or butyral, or cellulose ethers and esters of the type nitrocellulose, ethyl cellulose, cellulose acetate, cellulose butyrate and the like resinous materials, or rubber or synthetic elastomeric compositions of the type butadiene-acrylonitrile copolymer, butadiene-styrene copolymer, rubber hydrochloride, chlorinated rubber and the like. For proper strength and flexibility, these film forming materials may be compounded with or without plasticizers or softeners.

The dispersed phase may be formed of a base substance which can be slowly dissolved in an alcohol or an alcohol and water system such as of waxes of the type paraffin wax, montan wax, esparta wax, beeswax, petrolatum and the like, alone or in admixture with each other. Use may also be made of fats and oils such as hydrogenated castor oil, tallow oils, vegetable oils, animal oils and derivatives thereof. In order to secure sufficient flow for use in transferring to a hectographic surface in the event that the structure embodying features of this invention comprises a carbon type or other transfer sheet, plasticizers or softeners may be incorporated with the materials, such for example as mineral oils, castor oils, petroleum oils, polyethylene glycols, triethylene glycols and the like.

The material forming the continuous phase is preferably formed of the water soluble film forming substances previously described in the event that the image is to be formed directly in the polyphase layer. If the polyphase layer is to operate as a transfer medium for depositing the image on an adjacent receptive surface, then the continuous phase may be formed of any film forming material including not only the resinous and rubber-like substances previously described but also the hydrophilic film forming materials used to form the continuous phase in the manufacture of a lithographic plate heretofore described.

The concentration of film forming material in the coating composition may be varied consistent with a suitable viscosity for use of the treating composition in coating. The amount very often depends upon the specific materials and may range from 15–30 percent by weight polystyrene, 10–20 percent by weight polyvinylidine chloride, 10–30 percent by weight butadiene-acrylonitrile copolymer and 10–20 percent by weight rubber hydrochloride. The ratio of dispersed phase to continuous film forming material may correspond to the amounts used in the manufacture of lithographic plates and the thickness of films desired to be deposited on the backing sheet remains substantially the same. Suitable dyes for use as an ingredient in the dispersed phase may be selected of the rhodamine dyes, saffranine, Victoria green or the like.

Example 8

	Percent
Vinyl chloride-vinylidine chloride copolymer	15
Methyl ethyl ketone	85

A composition containing 40 percent paraffin wax, 50 percent Victoria green dye and 10 percent petroleum oil is dispersed in the solution of vinyl chloride-vinylidine chloride copolymer and the dispersion applied onto a high wet strength paper by a brush coater in amounts to supply a layer having a thickness of about 10 mils. Upon air drying and heating for a short time at a temperature of about 110° F., a polyphase layer is formed having a thickness of about 3 mils.

The above is merely representative of the manufacture of a hectographic plate embodying compositions of this invention. It will be understood that other film forming materials may be substituted for polystyrene within the defined amounts and that other waxy or oily

substances in various combinations may be substituted in whole or in part for paraffin in the dispersed phase.

When the prepared plate is impacted with a typewriter key or other writing instrument for producing the image on the hectograph surface, the wax base composition containing the dye as the dispersed phase is liberated to form the corresponding image on the surface for subsequent use as an imaged plate in normal duplicating operations. Instead of forming the image on the plate surface, the liberated hectograph medium may be transferred onto a hectograph surface in contact therewith and the other plate mounted in the duplicating machine for the production of copies therefrom.

When mounted in the hectograph duplicating machine, the impression paper is wetted on one side with an aqueous alcoholic solution and then pressed into surface contact with the imaged plate whereby a portion of the imaging composition is dissolved and transferred to the impression paper in the production of copy.

A new and novel concept of this invention also resides in the technique for developing an image on the described planographic masters by a method wherein a heat pattern is developed by directing radiations rich in infrared from a light source **30** onto an original **31** in surface contact with the polyphase coating **32** of the planographic plate **33**. The infra-red radiations **34** are absorbed by the letter outlines **35** of the original **31** and converted into heat **36**. A heat pattern is formed which transfers to the polyphase layer **32** and is sufficient to cause rupture of the continuous film forming phase in corresponding areas or for other unknown reasons apparently liberates the ink receptive or separate soluble dispersed phase **37** to form an image for use in lithograph or hectograph duplication, respectively. Instead of forming the image on the polyphase layer, transfer may be effected to a receptive surface in contact therewith, as in the transfer sheets previously described. In the latter event, the original may be placed adjacent the master or adjacent the transfer sheet. Considerable advantage results in transfer systems of the type described when the dispersed phase is compounded with a base substance reducible to flowable condition at the elevated temperatures developed.

It will be apparent from this description that there is provided a planographic master which is characterized by exceptional response to impact or pressure and heat to develop an imaged portion thereon for use in duplication by lithographic technique or hectographic technique or to transfer an imaged portion onto a surface and form a master for hectograph or lithograph duplication.

It will be apparent that a transfer sheet of the type produced by this invention is capable of being handled without causing colored material to dirty surfaces or objects in contact therewith thereby to permit use without being subject to the undesirable features of normal carbon sheets, typewriter ribbons or other transfer structures now in use.

More important, preparation of an image for lithograph or hectograph duplication can be achieved without the use of such ribbons, carbons or other transfer materials inscribed upon the surface of the master thereby to eliminate one element and operation in the preparation of a duplicating master. In addition, a wide variety of materials may be compounded in the dispersed phase or in the continuous phase to enhance the bonding relation between the two substances in effecting a more permanent imaged master and to impart a flexibility in reproduction and in image [illegible] fore been available to the [illegible]

The structure embodying featu[illegible] vides a radically new concept in the [illegible] plicating masters and the production of ima[illegible] It will be apparent that numerous other advanta[illegible] naturally from structures of the type described and [illegible] greater latitude is provided with respect to the colors and designs which may be formed for transfer in the imaged master.

It will be understood that numerous changes may be made in the materials, the details of their application and in their operation without departing from the spirit of the invention, especially as defined in the following claims.

I claim:

1. A lithographic printing plate comprising a base sheet and a continuous layer on the surface of the base sheet which layer forms the hydrophilic lithographic surface of the plate and consists of a polyphase system having a hydrophilic, water insoluble, film forming colloid as the continuous phase and a dispersed phase of an ink receptive, water repellent imaging material which forms an ink receptive image on the lithographic surface when released to the surface of the coating from the polyphase system in the imaged areas.

2. A lithographic plate as claimed in claim 1 in which the materials forming the polyphase system are present in the ratio of 3 parts by weight of the material forming the continuous phase to 1–6 parts by weight of material forming the discontinuous phase.

3. An imaged lithographic printing plate comprising a base sheet, a layer on the surface of the base sheet which forms the hydrophilic lithographic surface of the plate and consists of a polyphase system having a hydrophilic, water insoluble, film forming colloid as the continuous phase, and a dispersed phase of an ink receptive, water repellent imaging material which forms the ink receptive image on the lithographic surface when released from the polyphase system in the imaged areas, and an image formed of the ink receptive, water repellent material released from the polyphase system to the surface of the coating with the unbroken polyphase system forming the non-imaged portion of the plate.

4. In the method of producing an imaged planographic printing plate the steps of coating a base sheet with a polyphase system consisting of a continuous phase of an ink repellent, water receptive, hydrophilic, film forming colloid insoluble in water and a dispersed phase of an ink receptive, water repellent hydrophobic imaging material, drying the coating on the surface of the base sheet to form the hydrophilic lithographic surface thereon, and applying force to the polyphase coating in the imaged areas to break the polyphase system for releasing the imaging material to the surface of the plate to form the image thereon while the remainder of the polyphase system forms the non-imaged hydrophilic portion of the plate.

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