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ELECTROSTATIC PRINTING PROCESS FOR PRODUCING
PHOTOGRAPHIC TRANSPARENCIES
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2,857,271

Fig. 1.

COAT AND DRY PHOTO-
CONDUCTOR-RESIN MIX
ON A TRANSPARENT OR
TRANSLUCENT BACKING

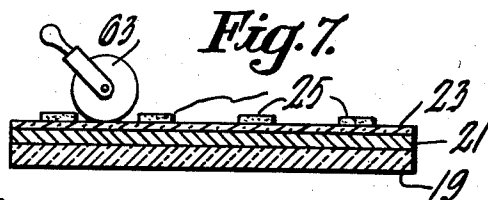
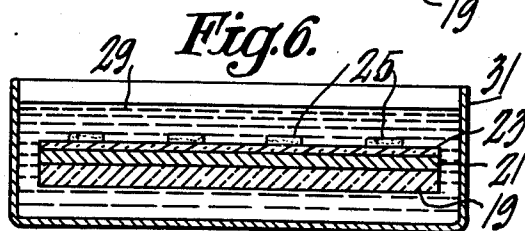
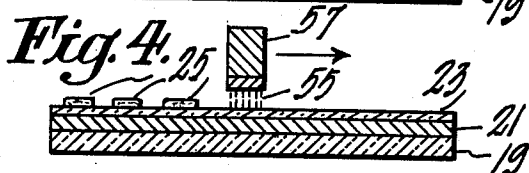
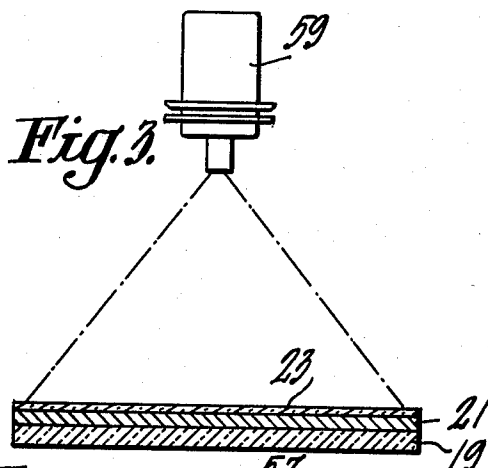
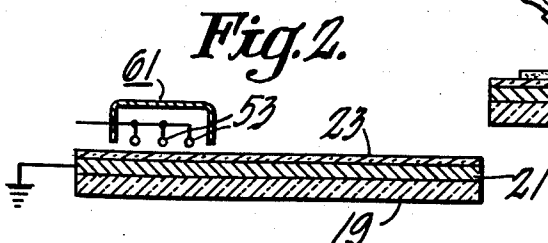
PRODUCE AN ELECTRO-
STATIC IMAGE ON SUR-
FACE OF DRY COATING

DEVELOP ELECTROSTATIC
IMAGE WITH A FINELY-
DIVIDED OPAQUE OR COLOR-
ED DEVELOPER SUBSTANCE

FIX DEVELOPED
IMAGE TO PHOTO-
CONDUCTOR-RESIN COATING

DISSOLVE PHOTOCONDUCTOR
FROM PHOTOCONDUCTOR
RESIN COATING

CONSOLIDATE REMAINING
RESIN COATING
(OPTIONAL)



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2,857,271

ELECTROSTATIC PRINTING PROCESS FOR PRODUCING PHOTOGRAPHIC TRANSPARENCIES

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14 Claims. (Cl. 96—1)

This invention relates to improved methods and means for producing photographic transparencies or translucencies and particularly to methods and means for producing lantern slides and photographic negatives and positives by electrostatic printing processes.

An electrostatic printing process is that type of process for producing a visible record, reproduction or copy which includes as an intermediate step, converting a light image or electrical signal into an electrostatic charge pattern on an electrically-insulating base. The process may include the conversion of the charge pattern into a visible image which may be a substantially faithful reproduction of an original except that it may be different in size. An electrostatic printing process utilizing photoconductive insulating layers for the production of the electrostatic image is described in U. S. Patent 2,297,691, issued October 6, 1942, to C. F. Carlson.

A typical electrostatic printing process may include coating a backing with a photoconductive insulating material comprising a photoconductor, such as white zinc oxide, dispersed in an electrically-insulating, film-forming vehicle or binder, such as a silicone resin and then providing an overall electrostatic charge on the surface of the photoconductive coating. A light image is focused on the charged surface, discharging the portions irradiated by the light rays, and leaving the remainder of the surface in a charged condition, thus forming an electrostatic image thereon. The electrostatic image is latent and may be rendered visible by applying thereto a finely-divided developer substance, such as a pigmented thermoplastic resin powder, which is held electrostatically to the charged areas of the photoconductive coating. The visible powder image thus formed is then fixed directly to the photoconductive coating.

Photographic transparencies, for example lantern slides or other negative and positive transparencies are not easily prepared by previous electrostatic printing processes. By one method, a photoconductor is coated on a transparent electrically-conducting backing and, after the electrostatic image has been developed thereon, is evaporated by heating. Among the disadvantages of this process is that the process is limited to volatilizable photoconductors and that apparatus is necessary for the removal of fumes which are sometimes noxious produced by the evaporation of the photoconductor. By another process, the developed image is transferred from the photoconductive insulating layer to a transparent substrate and fixed thereon, with a consequent loss in picture quality.

An object of the invention is to provide improved methods and means for producing monochromatic and polychromatic photographic transparencies and translucencies.

A further object is to provide improved methods and means of electrostatic printing.

Another object is to provide improved electrostatic methods and means for producing photographic transparencies directly on the final backing.

Another object is to provide improved methods and

means for dissolving the photoconductor from a composition comprising a photoconductor dispersed in a film-forming resin binder.

The foregoing objects and other advantages may be accomplished in accordance with the present invention which includes providing a light transmissive backing having on one surface thereof a coating of a photoconductive material which comprises a photoconductor dispersed in an electrically-insulating, light-transmissive, film-forming vehicle or binder, producing an electrostatic image on the surface of said photoconductive insulating material developing said electrostatic image with a finely-divided developer substance, fixing said developed image substantially in situ, dissolving said dispersed photoconductor from said photoconductive material and then optionally consolidating the remaining film-forming vehicle to improve the light-transmissive properties thereof.

The invention also includes a method of converting a print having an opaque background to a form having a background with appreciable light-transmissive properties having coating of a composition comprising an opaque, finely-divided material and a light-transmissive, film-forming vehicle or binder and having an image fixed to the surface of said coating said method comprising dissolving said dispersed opaque material from said composition with a solution containing a reagent which dissolves said photoconductor and which does not substantially affect said electrically-insulating, film-forming resin and a penetrant for aiding in the dissolution of said opaque material from said composition.

The invention will be described in greater detail by reference to the accompanying drawing in which:

Figure 1 is a chart illustrating the steps of an embodiment of the invention,

Figure 2 is a partially schematic, sectional, elevational view of an apparatus for producing a blanket electrostatic charge on the surface of a photoconductive insulating material, comprising a photoconductor dispersed in an electrically-insulating, light-transmissive, film-forming vehicle,

Figure 3 is a partially sectional, elevational view of an apparatus for projecting a light image upon the charged surface of the photoconductive insulating material of Figure 2,

Figure 4 is a sectional, elevational view of an apparatus for developing the electrostatic image formed on the surface of the photoconductive insulating material of Figure 3,

Figure 5 is a sectional, elevational view of an apparatus for fixing substantially in situ the developing image of Figure 4,

Figure 6 is a sectional, elevational view of an apparatus for dissolving the photoconductor from the photoconductive insulating material of Figure 5, and

Figure 7 is a sectional, elevational view of an apparatus for consolidating the remaining resin of the photoconductive material of Figure 6.

Referring to Figure 1, a typical process embodying the invention comprises coating and drying a photoconductive material comprising a photoconductor dispersed in an electrically-insulating, light-transmissive, film-forming vehicle upon a light-transmissive backing. A typical coating mix may comprise C. P. grade white zinc oxide and a silicone resin in an organic solvent system. This coating may be dried by evaporation of the solvent.

An electrostatic image corresponding to the desired visible image is produced on the photoconductive coating. Such an image may be produced for example by providing a blanket electrostatic charge on the surface of the photoconductive coating, and then projecting a light image, corresponding to the desired visible image, upon the charged surface. The charge is reduced or removed in

the illuminated areas of the photoconductive coating leaving a pattern of charges on an electrostatic image corresponding to the non-illuminated areas of the projected image.

The electrostatic image is latent and may be developed by applying to the electrostatic image a finely-divided, electrostatically attractable developer substance. The developer substance is preferably a thermoplastic powder that has been colored or made opaque by the incorporation of a suitable additive.

The developed image is fixed directly to the photoconductive coating by any of the conventional methods. For example, where the developed image comprises a thermoplastic powder, the powder may be fused directly to the coating.

After the developed image is fixed to the photoconductive coating, the photoconductor is dissolved out of the photoconductive coating. This may be accomplished by immersing the photoconductive coating in a first reagent which dissolves the photoconductor and leaves the film-forming vehicle and the fixed image substantially unaffected. For example, where the photoconductor is zinc oxide, aqueous hydrochloric acid or sodium hydroxide may be used.

This phenomenon is new and unexpected, since one would ordinarily expect the film-forming vehicle of the photoconductive coating to protect the photoconductor particles from the reagent. The phenomenon is utilized in the invention to "clear" the photoconductive coating, and leave the developed image fixed to a porous layer of a film-forming vehicle. To aid the action of the reagent on the photoconductor, it is preferred to include in the "clearing solution" a second reagent or penetrant such as alcohol, for softening the film-forming vehicle.

The film-forming vehicle of the photoconductive coating remaining after the photoconductor is dissolved, may be consolidated or otherwise rendered more light transmissive. Where the vehicle is a thermoplastic, the vehicle may be exposed to heat until it has softened.

Example 1.—A mixture is prepared of the following materials: 65 grams of a 60% solution of a silicone resin dissolved in xylene, such as GE SR-82 marketed by the General Electric Company, Silicone Products Division, Waterford, N. Y., 200 grams of toluene and 100 grams of C. P. white zinc oxide. This liquid mixture is ball-milled for about three hours and then applied to the surface of a transparent backing. The coated backing, hereinafter referred to as the printing base, is then dried.

The backing should be light-transmissive and is preferably transparent and electrically-conducting. A suitable transparent, electrically-conductive backing may be prepared by heat-treating the surface of a glass plate with a suitable vapor. For example, a heated glass plate may be exposed to vapors of chlorides of silicon, tin, or titanium, and then placed in a slightly reducing atmosphere. In some cases, the glass plate may be coated with a solution of stannic chloride, absolute alcohol and glacial acetic acid, if the application by vapors is not convenient. The transparent, electrically-conducting coatings produced by any of these methods are well-known, although the reactions and the exact compositions are not fully understood.

The photoconductive coating applied to the backing will determine the spectral response, the speed of response and the contrast characteristic of the printing base. By a proper choice of the photoconductor and the vehicle, almost any spectral response, speed of response or contrast characteristic may be obtained. Almost any powdered photoconductor having sufficiently high value of surface photoconductivity may be used in the photoconductive coating. For example, the photoconductive oxides, sulphides, selenides, tellurides, and iodides of cadmium, mercury, antimony, bismuth, thallium, antimony, molybdenum, aluminum, lead or zinc. In addition arsenic

trisulphide, cadmium arsenide, lead chromate or selenium may be used. It is preferable for the photoconductor to have a high electrical resistivity in the darkness. Mixtures of one or more photoconductors may be used.

The particular photoconductor utilized determines the spectral response of the printing base. The color of the photoconductor indicates approximately the location of the absorption edge of the photoconductor and of the printing base. Most photoconductors absorb light in the shorter wavelengths. When longer wavelengths are used, a value is reached where the absorption drops off sharply and the photoconductor ceases to absorb radiation. This value is called the absorption edge of the material. It is of particular advantage that by making a proper selection of the photoconductor that one may obtain a printing base with any desired light absorption characteristic and thereby desired spectral sensitivity. For example, thallium iodide has a peak response around 4130A. Silver sulphide has a peak response around 13500A., while other photoconductors may have their peak responses at other wavelengths in the electromagnetic spectrum and over a narrow or wide band of frequencies.

The electrically-insulating, light-transmissive, film-forming vehicle is an essential part of the composition and may be any one of a number of substances. Most desirable is a vehicle having a high dielectric constant and high dielectric strength. The vehicle is preferably a material that is readily removable. These materials may be any natural or synthetic resins or waxes, for example, silicone resins, cellulose esters, polystyrene or shellac. Mixtures including one or more vehicles may be used.

The photoconductor may be suspended in the vehicle in any one of several ways. The simplest way is to dissolve the vehicle in an organic solvent capable of effecting solution and then mixing in the powdered photoconductor. Alternatively, the photoconductor may be dry blended, as by kneading, with the vehicle heated to a sufficiently high temperature to render it plastic.

The proportion of powdered photoconductor to vehicle in the final coating may vary over a very wide range. The preferred ranges are 50% to 90% of photoconductor and 50% to 10% of vehicle. The optimum proportion will depend upon the nature of the photoconductor, the nature of the vehicle and the results desired.

The speed of response of the printing base particularly depends upon the nature of the photoconductive material, the nature of the vehicle and the ratio by weight of photoconductor to vehicle. Since the speed of response depends upon a number of characteristics, almost any desired response may be obtained by the proper selection of materials and composition.

A proper selection of materials and compositions will also determine how long an electrostatic image may be stored on the surface of the photoconductive coating since storage of the electrostatic image depends upon the electrical resistivity of the material. Generally, the higher the resistivity of the coating the longer the storage time for the material.

Referring to Figure 2, the transparent electrically-conducting backing 21 on a glass plate 19 of a printing base is electrically grounded and an electrostatic charging device 61 is passed in darkness over the photoconductive coating 23 of the printing base to provide an electrostatic charge thereon. The charging device may comprise an array of fine wires 53 mounted near the grounded backing 21. A source of D. C. high voltage is connected between the wires 53 and the backing 21 to provide a negative charge on the wires with respect to the backing 21. The voltage should be sufficiently high to cause a corona discharge adjacent the wires. The photoconductive coating 23 of the printing base passed under the charging device 61 becomes charged negatively. The apparatus and process may produce a blanket positive charge if the polarity of the wires 53 is positive with respect to the backing 21.

5

The next step in the processing is to discharge selected parts of the charged surface of the printing base in order to produce an electrostatic image thereon. Referring to Figure 3, this may be accomplished by exposing the printing base to a light image derived, for example, from a projector 59 containing a master to be printed. The light image is focused on the charged surface of the photoconductive coating 23. The subject to be printed may, however, be any subject used in ordinary photographic processes. Any type of electromagnetic radiation may be used for the light image depending on the spectral sensitivity of the photoconductive coating 23. For example, visible light, infra red and ultraviolet rays may be used.

Wherever the light strikes the surface of the photoconductive coating 23, the electrostatic charge thereon is reduced or removed. This leaves an electrostatic image or pattern of charges corresponding to the dark portions of the light image. Other methods of producing an electrostatic image may also be used. The electrostatic image may be stored for a time if desired. Ordinarily the next step is to develop the electrostatic image with a finely-divided electrostatically-attractable substance. Referring to Figure 4, development may be accomplished by maintaining the printing base in darkness and passing a developer brush 55 containing a developer powder across the surface of photoconductive coating 23 bearing the electrostatic image. Areas of developer powder 25 are deposited on those areas of the surface retaining an electrostatic charge.

The developer brush comprises a mixture of magnetic carrier particles, for example, powdered iron and the developer powder. The mixture is secured in a magnetic field by a magnet 57 to form a developer brush.

A preferred carrier material for the developer mix consists of "alcoholized iron," that is, iron particles free from grease and other impurities soluble in alcohol. These iron particles are preferably relatively small in size, being in their largest dimension about .002 to .008". Satisfactory results are also obtained using a carrier consisting of iron particles of a somewhat wider range of sizes up to about .001 to .020".

A preferred developer powder may be prepared as follows: a mixture comprising 200 grams of 200 mesh Piccolastic resin 4358 (an elastic thermoplastic resin composed of polymers of styrene, substituted styrene and its homologs) marketed by the Pennsylvania Industrial Co., Clairton, Pa., 12 grams of Carbon Black 6, marketed by the Eimer and Amend Co., New York, N. Y., 12 grams of spirit nigrosine S. S. B., marketed by the Allied Chemical and Dye Co., New York, N. Y., and 8 grams of Iosol Black, marketed by the Allied Chemical and Dye Co., New York, N. Y., are thoroughly mixed in a stainless steel beaker at about 200° C. The mixing and heating should be done in as short a time as possible. The melt is poured onto a brass tray and allowed to cool and harden. The hardened mix is then broken up and ball milled for about 20 hours. The melted powder is screened through a 200 mesh screen and is then ready for use as a developer powder. This powder takes on a positive electrostatic charge when mixed with glass beads or iron powder. It therefore develops an electrostatic image composed of negative charges. 2-4 grams of the developer powder and 100 grams of the magnetic carrier material are blended together giving the completed developer mix. Other ratios may be used.

The developer substance may be chosen from a large class of liquid or solid materials, but is preferably a pigmented thermoplastic powder. The developer powder is preferably electrically charged to aid in the development of the electrostatic latent image. The powder may be electrically charged because the powder (1) is electroscopic, or (2) has interacted with other particles with which it is triboelectrically active or (3) has been charged from an

6

electric source such as a corona discharge. Examples of suitable developer powders are powdered zinc, powdered copper, carbon, sulphur, natural and synthetic resins or mixtures thereof, powdered dyes and stains.

The developer substance may be a liquid prepared as a mist of suitably colored charged particles as, for example, an ink mist. The developer substance may be a pure or diluted dye or stain for the electrically-insulating, film-forming vehicle of the photoconductive coating.

One may prepare color transparencies by developing three successive electrostatic color separation images on the same printing base with a proper combination of three differently colored transparent or translucent developer substances, one color for each image.

The developer powder may be applied to the image in other ways, for example, it may be dusted on to the image, or it may be mixed with glass beads or other suitable carrier particles and then bringing the mixture into contact with the surface of the printing base. The beads serve merely as a temporary carrier, releasing the powder particles upon contact with the charged surface.

The type of powder described is a positively charged powder and will adhere readily to negatively charged areas of the electrostatic image. In the developed image described, the developed areas of the image correspond to the non-illuminated portions of the optical image. If the printing base is charged positively, as may be done in the case of lead iodide-resin coatings, and the same steps are carried through as above described, a reverse image is obtained. If a negatively charged powder is used in place of the positively charged powder, then a reverse image is obtained in the first case and a positive image is obtained in the alternative case.

Referring to Figure 5, the developed image 25 is now fixed to the photoconductive coating 23. If the developer powder or vehicle in the photoconductive coating 23 has a relatively low melting point, the image may be fixed by heating, for example, with radiant heater 27 to fuse the powder to the surface. The powder image is preferably fused through the photoconductive coating 23. Sulphur or synthetic thermoplastic resin powders may be fixed in this way. Alternatively, the powder image 25 may be pressed into the coating 23. Another method of fixing the powder image 25 is to apply a light coating of a solvent for the material of the powder image 25. The solvent may soften the developer powder particles and cause them to adhere to one another and to the coating 23. Alternatively, a solvent may be used to soften the photoconductive coating 23 and cause the developer powder particles to adhere thereto. Upon standing and preferably with the application of a slight amount of heat the solvent is evaporated from the printing base.

Referring now to Figure 6, the photoconductive coating 23 having the developed image 25 fixed thereon is immersed in a clearing solution 29 comprising:

Parts by volume	
Glacial acetic acid	1.0
Water	5.0
Ethyl alcohol	4.0
Tergitol O8	0.1

contained in a tank 31. The photoconductive coating 23 is permitted to remain in the solution with occasional agitation until the background areas become completely clear of the photoconductor. This ordinarily takes about 10 to 20 minutes. However, the time will depend upon the nature of the clearing solution with respect to the photoconductive coating 23 and the thickness of the photoconductive coating.

The proportion of reagents in the clearing solution may be varied widely. Similarly, other reagents may be substituted for the specific reagents of the example. For instance the solvent for the photoconductor may be replaced with hydrochloric acid, sodium hydroxide, or

phosphoric acid. Any reagent which will penetrate the binder and dissolve out or react with the photoconductor to form a soluble product may be used. As another example, benzene may be used to dissolve powdered selenium dispersed in cellulose acetate.

The proportion of the solvent in the clearing solution may be varied between 0.1% and 100%. Too low a concentration results in excessive clearing times. Too high a concentration will cause excessive bubble formation and possible rupture of the binder film. A preferred range is between 10% and 80%.

The ethyl alcohol, which is a penetrant may be replaced with any other material which wets and preferably softens said binder. It is preferably miscible or emulsifiable with the other components of the clearing solution, and does not precipitate an otherwise soluble reaction product of the solvent and the photoconductor. The proportion of penetrant with respect to the clearing solution may be varied between 0% and 99%. Too low a concentration results in excessive clearing times. Too high concentrations may result in excessive softening of the binder resin, and reticulation of the final transparency. A preferred range is 10%–80%.

A diluent (water) may be added as desired. Similarly an additional wetting agent (tergitol O8) may also be added if desired. Tergitol O8 is a 40% aqueous solution of the sodium sulphate derivative of 2-ethylhexanol and is distributed by the Carbide and Carbon Chemicals Corporation, New York, N. Y. Other wetting agents may be used in place of tergitol O8.

After clearing, the cleared coating 23 is washed thoroughly with water, dried and heated at 200° C. for one hour to cure and flow the silicone resin. Before curing, the silicone resin appears translucent to transparent. After curing, the silicone resin is transparent, with improved light-transmissive properties.

Referring to Figure 7, another method of curing comprises rolling in pressure contact across the surface of the cleared photoconductive coating, a roller 63 coated with a thin layer of ethyl alcohol. The alcohol penetrates the silicone resin layer and softens the resin, without affecting the fixed image. The pressure from the roller consolidates the resin, converting it from translucent to transparent. The alcohol is then evaporated from the consolidated resin layer.

The step of consolidating or otherwise improving the light-transmitting properties of the resin layer is preferred although it is not always necessary. Photographic transparencies having a translucent background are sometimes satisfactory or even desirable.

Example 2.—The process of the invention is carried out substantially as described in Example 1 except that the mix used to produce the photoconductive coating comprises:

Cellulose acetate (low viscosity—EK No. 4644)	grams—	10
Acetone	milliliters—	300
Lead iodide (finely powdered)	grams—	100
Methyl Cellosolve	milliliters—	300

This coating solution does not adhere easily to certain surfaces such as glass. The addition of small amounts of a non-conductive oil soluble wetting agent or plasticizer, such as "Lindol" may be necessary to aid adherence and mechanical properties of this coating. It may also be necessary to "sub" the backing by undercoating with an extremely thin coating of a relatively conducting material such as plasticized gelatin or polyvinyl alcohol, which will adhere both to the base and to the cellulose acetate binder.

A "clearing" solution for the lead iodide-cellulose acetate coating consists of:

Sodium hydroxide	grams—	8
Water	milliliters—	100

Ethyl alcohol	milliliters—	40
Tergitol O8	do—	.01

There have been described improved methods and means of producing monochromatic and polychromatic photographic transparencies. The method and means of the invention utilize an improved electrostatic printing process where the desired photographic image is produced directly upon the final support.

What is claimed is:

1. An electrostatic printing process which comprises providing a substantially transparent backing having on one surface thereof a coating of a photoconductive insulating material comprising a photoconductor dispersed in an organic, substantially transparent, film-forming binder, producing an electrostatic image on the surface of said photoconductive insulating material developing said electrostatic image with a finely-divided developer substance, fixing said finely divided developer substance substantially in situ, dissolving substantially all of said dispersed photoconductor from said photoconductive insulating material with a reagent which is a solvent for said photoconductor but not for said binder so as to render the remainder of said coating substantially transparent, said organic film-forming binder and said fixed developer substance being substantially unaffected by said reagent.

2. An electrostatic printing process which comprises providing a substantially transparent backing having on one surface thereof a coating of a photoconductive insulating material comprising a photoconductor dispersed in an organic, substantially transparent, film-forming binder, producing an electrostatic image on the surface of said photoconductor insulating material, developing said electrostatic image with a finely-divided developer substance, fixing said finely divided developer substance substantially in situ, dissolving substantially all of said dispersed photoconductor from said photoconductive insulating material with a reagent which is a solvent for said photoconductor and functions to soften said binder, said organic film-forming binder and said fixed developer substance being substantially unaffected by said reagent, and then consolidating the remaining organic, film-forming binder to improve the transparent properties thereof.

3. An electrostatic printing process comprising providing a substantially transparent backing having on one surface thereof a coating of a photoconductive insulating material comprising a photoconductor dispersed in an organic, substantially transparent, film-forming binder, producing an electrostatic image on the surface of said photoconductive insulating material, developing said electrostatic image with a finely-divided developer substance, fixing said finely divided developer substance substantially in situ, dissolving substantially all of said dispersed photoconductor from said photoconductive insulating material with a reagent which is a solvent for said photoconductor but not for said binder, said organic film-forming binder and said fixed developer substance being substantially unaffected by said reagent, and then heating the remaining organic, film-forming binder to soften said binder.

4. An electrostatic printing process comprising providing a substantially transparent backing having on one surface thereof a coating of a photoconductive insulating material comprising a photoconductor dispersed in an organic, substantially transparent film-forming binder, producing an electrostatic image on the surface of said photoconductive insulating material, developing said electrostatic image with a finely-divided developer substance, fixing said finely divided developer substance substantially in situ, dissolving substantially all of said dispersed photoconductor from said coating material with a reagent which is a solvent for said photoconductor but not for said binder, said organic film-forming binder and said fixed developer substance being substantially

unaffected by said reagent, applying a thin layer of a solvent for said film-forming binder, said fixed image being substantially insoluble in said solvent and then removing said solvent.

5. In an electrostatic printing process comprising providing a substantially transparent backing having on one surface thereof a coating of a photoconductive insulating material comprising a photoconductor dispersed in an organic, substantially transparent, film-forming binder, producing an electrostatic image on said photoconductive material, developing said electrostatic image with a finely-divided developer substance and fixing said finely divided developer substance substantially in situ, the steps subsequent to said fixing comprising dissolving substantially all of said dispersed photoconductor from said photoconductive insulating material with a reagent which is a solvent for said photoconductor but not for said binder, said organic film-forming binder and said fixed developer substance being substantially unaffected by said reagent, and then consolidating the remaining film-forming binder to improve the transparent properties thereof.

6. In an electrostatic printing process comprising providing a substantially transparent backing having on one surface thereof a coating of a photoconductive insulating material comprising a photoconductor dispersed in an organic, substantially transparent, film-forming binder, producing an electrostatic image on said photoconductive material, developing said electrostatic image with a finely-divided developer substance and fixing said finely divided developer substance substantially in situ, the steps subsequent to said fixing comprising dissolving substantially all of said dispersed photoconductor from said photoconductive insulating material with a reagent which is a solvent for said photoconductor but not for said binder, said organic film-forming binder and said fixed developer substance being substantially unaffected by said reagent, and then heating the remaining film-forming binder to soften said binder.

7. In an electrostatic printing process comprising providing a substantially transparent backing having on one surface thereof a coating of a photoconductive insulating material comprising a photoconductor dispersed in an organic, substantially transparent, film-forming binder, producing an electrostatic image on said photoconductive material, developing said electrostatic image with a finely-divided developer substance and fixing said finely divided developer substance substantially in situ, the steps subsequent to said fixing comprising dissolving substantially all of said dispersed photoconductor from said photoconductive insulating material with a reagent which is a solvent for said photoconductor but not for said binder, said organic film-forming binder and said fixed developer substance being substantially unaffected by said reagent, applying a thin layer of a solvent to soften said film-forming binder, said fixed image being substantially insoluble in said solvent and then removing said solvent.

8. A method for producing a photographic transparency comprising providing a substantially transparent backing having on one surface thereof a coating of a photoconductive material comprising about 100 parts by weight of zinc oxide dispersed in about 39 parts by weight of a substantially transparent silicone resin, producing an electrostatic image on said photoconductive material, developing said electrostatic image with a finely-divided thermoplastic resin, fusing said resin to said coating substantially in situ and then dissolving substantially all of said dispersed zinc oxide from said photoconductive material with a solution containing:

Parts by volume

Glacial acetic acid	1
Water	5
Ethyl alcohol	4

9. A method for producing a photographic transparency comprising: coating a substantially transparent backing with a mixture comprising about 100 parts by weight of zinc oxide dispersed in 65 parts by weight of a solution containing 60% of a substantially transparent silicone resin, drying said coating, providing a blanket electrostatic charge on said coating, exposing said charged coating to a light image containing the desired photographic information thereby producing an electrostatic image corresponding to said light image, applying a finely-divided resin to said electrostatic image thereby producing a visible image corresponding to said electrostatic image, fusing said resin to said coating substantially in situ, dissolving substantially all of said dispersed zinc oxide from said coating with a solution containing:

Parts by volume

Glacial acetic acid	1
Water	5
Ethyl alcohol	4

and then heating to consolidate said remaining coating.

10. A method for producing a photographic transparency comprising: coating a substantially transparent backing with a mixture comprising about 100 parts by weight of zinc oxide dispersed in 65 parts by weight of a solution containing 60% of a substantially transparent silicone resin, drying said coating, providing a blanket electrostatic charge on said coating, exposing said charged coating to a light image containing the desired photographic information thereby producing an electrostatic image corresponding to said light image, applying a finely-divided resin to said electrostatic image thereby producing a finely divided resin corresponding to said electrostatic image, fixing said visible image substantially in situ, dissolving substantially all of said dispersed zinc oxide from said coating with a solution containing:

Parts by volume

Glacial acetic acid	1
Water	5
Ethyl alcohol	4

applying under pressure a thin layer of alcohol to consolidate said remaining coating and then removing said alcohol.

11. An electrostatic printing process comprising providing a substantially transparent backing having on one surface thereof a coating of a photoconductive material which comprises lead iodide dispersed in cellulose acetate, producing an electrostatic image on said photoconductive material, developing said electrostatic image with a finely-divided developer substance, fixing said finely divided developer substance substantially in situ and then dissolving substantially all of said dispersed lead iodide from said photoconductive material with an alkali which is a solvent for said lead iodide but not for said cellulose acetate, said cellulose acetate and said fixed developer substance being substantially unaffected by said alkali.

12. A method for producing a photographic transparency comprising providing a substantially transparent backing having on one surface thereof a coating of a photoconductive material which comprises 100 parts by weight of lead iodide dispersed in 10 parts by weight of cellulose acetate, producing an electrostatic image on said photoconductive material developing said electrostatic image with a finely-divided thermoplastic resin, fixing said finely divided thermoplastic resin substantially in situ and then dissolving substantially all of said dispersed lead iodide from said photoconductive material with a solution containing:

Parts by weight

Sodium hydroxide	8
Water	100
Ethyl alcohol	40

13. A method for producing a photographic transparency comprising: coating a substantially transparent backing with a mixture comprising about 10 parts by weight of lead iodide dispersed in a solution containing 10 parts by weight of cellulose acetate, drying said coating, providing a blanket electrostatic charge on said coating, exposing said charged coating to a light image containing the desired photographic information thereby producing an electrostatic image corresponding to said light image, applying a finely-divided resin to said electrostatic image thereby producing a visible image corresponding to said electrostatic image, fixing said finely divided resin substantially in situ, dissolving substantially all of said dispersed lead iodide from said coating with a solution containing:

	Parts by volume
Glacial acetic acid	1
Water	5
Ethyl alcohol	4

and then heating to consolidate said remaining coating.

14. A method for producing a photographic transparency comprising: coating a substantially transparent backing with a mixture comprising about 10 parts by weight of lead iodide dispersed in a solution containing 10 parts by weight of cellulose acetate, drying said coating, pro-

viding a blanket electrostatic charge on said coating, exposing said charged coating to a light image containing the desired photographic information thereby producing an electrostatic image corresponding to said light image, applying a finely-divided resin to said electrostatic image thereby producing a visible image corresponding to said electrostatic image, fixing said finely divided resin substantially in situ, dissolving substantially all of said dispersed lead iodide from said coating with a solution containing:

	Parts by volume
Glacial acetic acid	1
Water	5
Ethyl alcohol	4

applying under pressure a thin layer of alcohol to consolidate said coating and then removing said alcohol.

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