United States Patent [19]

Land

[11] **3,899,336**

[45] **Aug. 12, 1975**

[54] **PROCESSING COMPOSITION FOR DIFFUSION TRANSFER COLOR PROCESS CONTAINING POLYETHYLENE GLYCOL**

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[73] Assignee: **Polaroid Corporation,** Cambridge, Mass.

[22] Filed: **Nov. 29, 1973**

[21] Appl. No.: **420,098**

Related U.S. Application Data

[62] Division of Ser. No. 247,023, April 24, 1972, Pat. No. 3,793,023.

[52] **U.S. Cl.** ..... **96/66 R;** 96/76 C; 96/200

[51] **Int. Cl.** **G03c 5/30;** G03c 1/48

[58] **Field of Search** ..... 96/3, 29 D, 76 R, 76 C, 96/77, 66 R, 66.3; 206/84

[56] **References Cited**

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2,531,832	11/1950	Stanton	96/66.3
3,158,483	11/1964	Lowe et al.	96/66.3
3,702,244	11/1972	Bloom et al.	95/84 R
3,793,023	2/1974	Land	96/66 R

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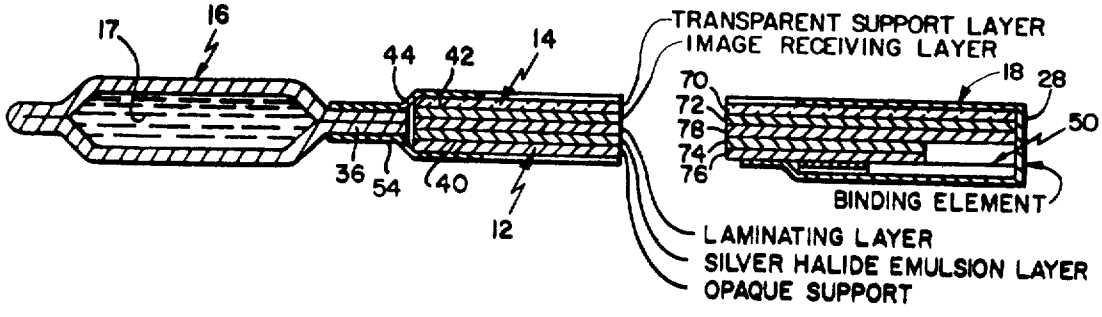
[57] **ABSTRACT**

Diffusion transfer film units are disclosed which include a polyethylene glycol. In preferred embodiments, the film units utilize dye developers to form multicolor transfer images.

A processing composition containing a polyethylene glycol and adapted for use in performing color diffusion transfer processes is releasably contained in a rupturable container.

8 Claims, 5 Drawing Figures



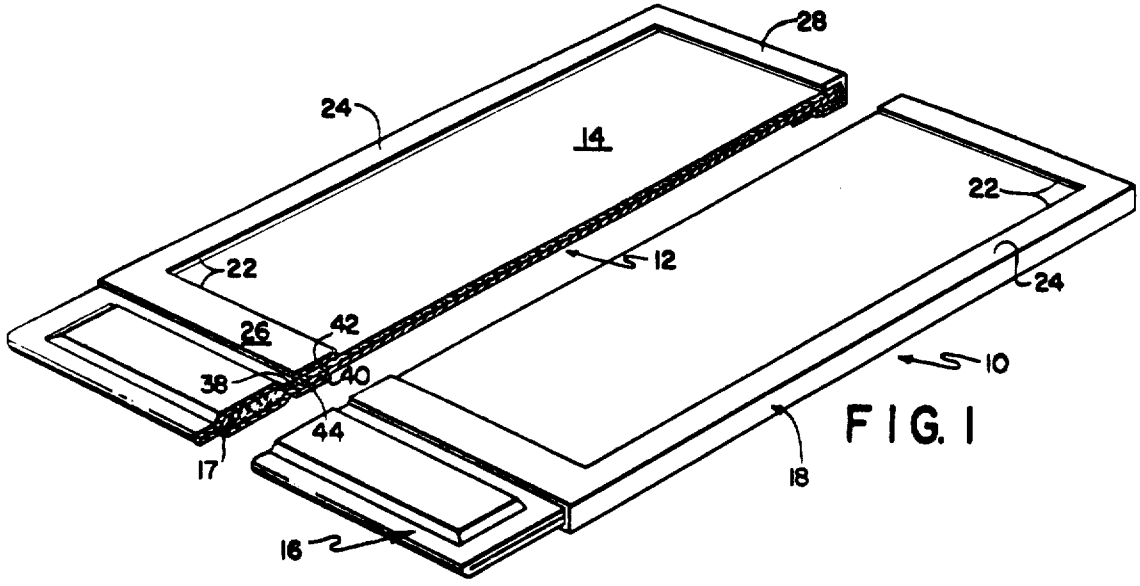

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FIG. 1

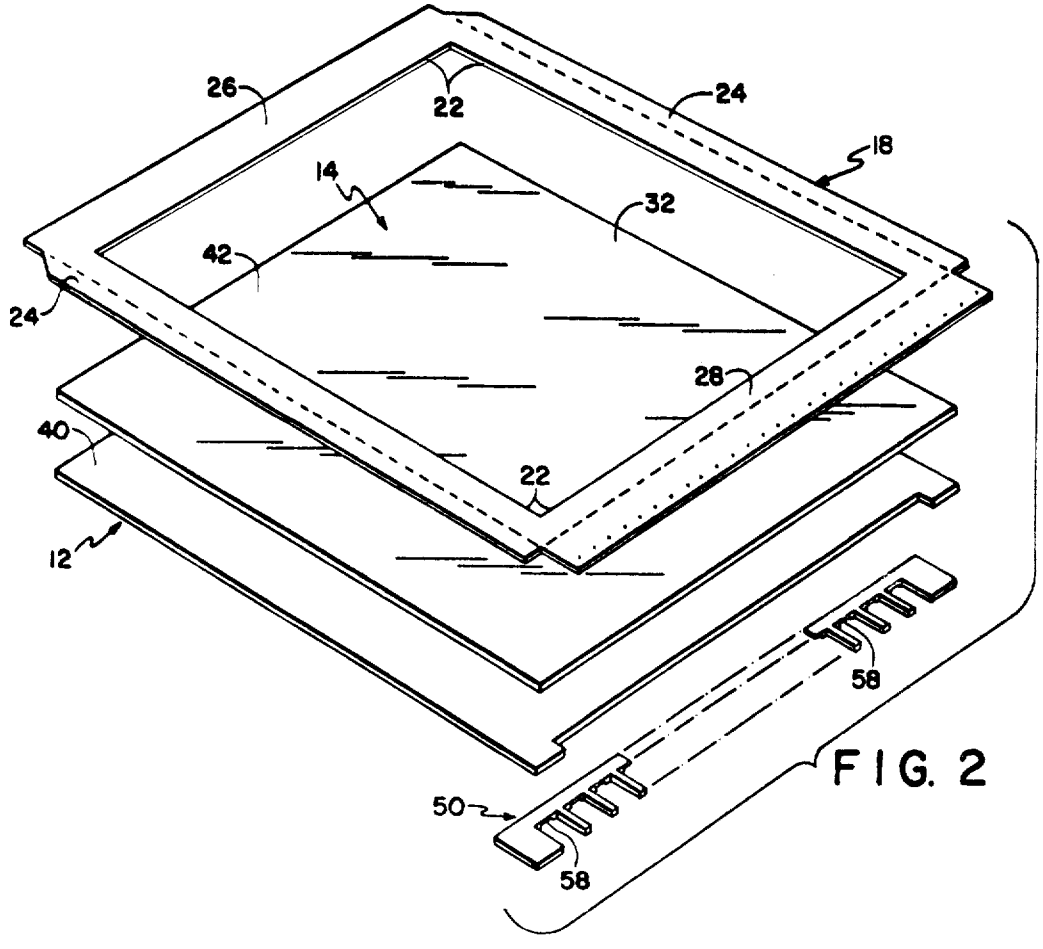
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FIG. 2

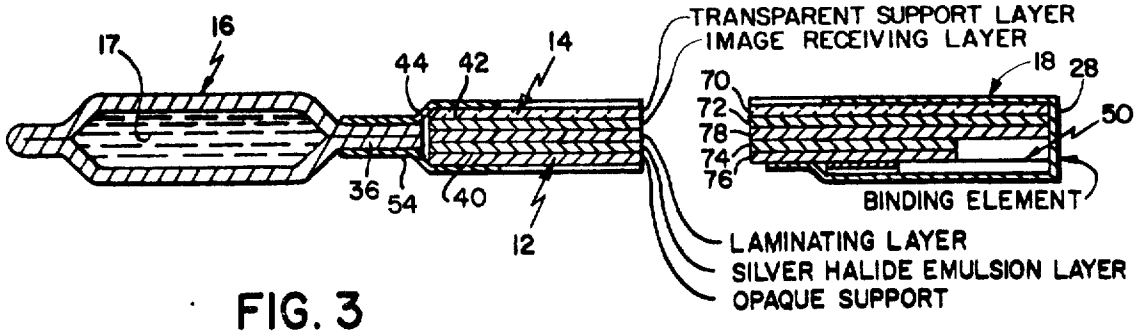


FIG. 3

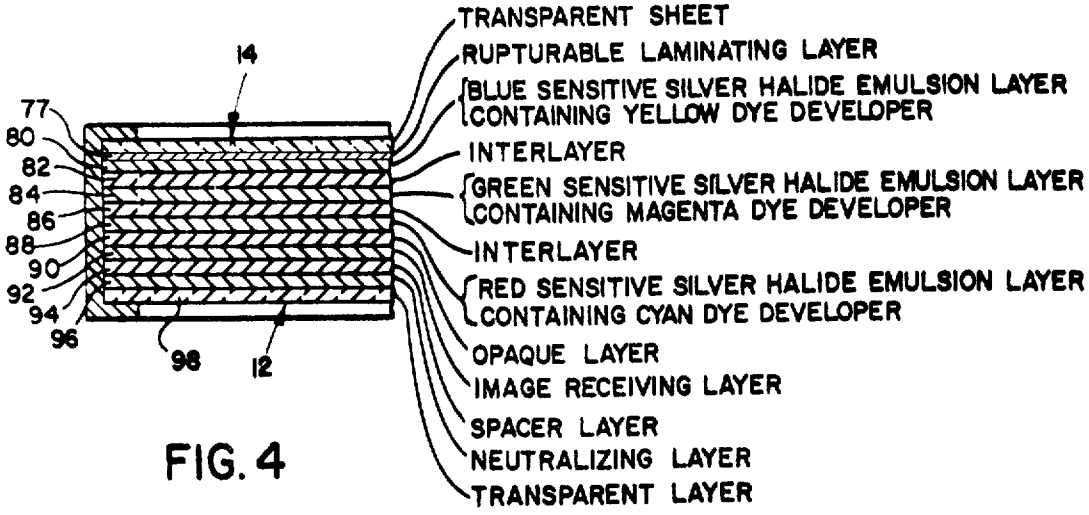


FIG. 4

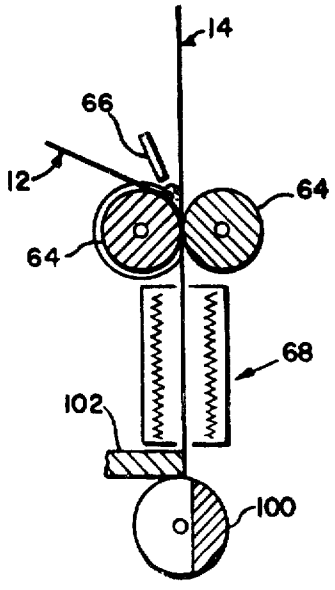


FIG. 5

PROCESSING COMPOSITION FOR DIFFUSION TRANSFER COLOR PROCESS CONTAINING POLYETHYLENE GLYCOL

This application is a division of copending application Ser. No. 247,023 filed Apr. 24, 1972 (now U.S. Pat. No. 3,793,023 issued Feb. 19, 1974).

This invention is concerned with photography and, more particularly, with the formation of images in color by diffusion transfer processing.

A number of diffusion transfer photographic processes have been proposed wherein the resulting photograph comprises the developed silver halide emulsions retained with the dye-image carrying layer as part of a permanent laminate. The image-carrying layer is separated from the developed silver halide emulsions in said laminate by a light-reflecting layer, preferably a layer containing titanium dioxide. Illustrative of patents describing such products and processes are U.S. Pat. No. 2,983,606 issued Mar. 9, 1961 to Howard G. Rogers, U.S. Pat. Nos. 3,415,644, 3,415,645 and 3,415,646 issued Dec. 10, 1968 to Edwin H. Land, U.S. Pat. Nos. 3,594,164 and 3,594,165 issued July 20, 1971 to Howard G. Rogers, and U.S. Pat. No. 3,647,347 issued Mar. 7, 1972 to Edwin H. Land.

Referring more specifically to the aforementioned U.S. Pat. No. 3,415,644, said patent discloses photographic products and processes employing dye developers wherein a photosensitive element and an image-receiving layer are maintained in fixed relationship prior to photoexposure and this fixed relationship is maintained after processing and image formation to provide a laminate including the processed silver halide emulsions and the image-receiving layer. Photoexposure is made through a transparent (support) element and application of a processing composition provides a layer of light-reflecting material to provide a white background for viewing the image and to mask the developed silver halide emulsions. The desired color transfer image is viewed through said transparent support against said white background.

While film units of the foregoing type basically comprise two separate sheet-like elements, a number of advantages can be realized by laminating the two elements together during the manufacture and assembly process. Following photoexposure, the elements are delaminated by the distribution of a fluid processing composition which, upon solidification, bonds the elements together to form the desired permanent laminate. Procedures for forming such prelaminated film units wherein the two elements are temporarily laminated together prior to exposure are described, for example, in U.S. Pat. No. 3,625,281 to Albert J. Bachelder and Frederick J. Binder and in U.S. Pat. No. 3,652,282 to Edwin H. Land, both issued Mar. 28, 1972. A prelaminated integral film unit is easier to handle and manipulate during assembly and during exposure and processing within the camera; it is more compact and hence, permits smaller and less bulky film packs and cameras; and it is less subject to buckling and distortion due to temperature and humidity changes and more likely to lie flat and remain planar during exposure. Since the elements are in contact throughout the entire extent of their facing surface, every portion of each element is exposed to substantially the same ambient conditions so that each portion has the same physical and chemical properties as every other portion and the elements produce uniform results, the photographically active layers of the film unit are not only protected against mechanical damage, but are additionally protected against changes in ambient conditions which may also effect their function. Moreover, processing, specifically, spreading of the processing liquid within the film unit, is facilitated since there is little or substantially no air between the sheets to interfere with liquid distribution.

A primary object of this invention is to provide a novel and improved method of laminating a multilayer photographic element including a photosensitive medium to another element in a manner which does not interfere with exposure of the photosensitive medium, enables the two elements to be delaminated rapidly and easily in response to mechanical forces exerted during spreading of a processing liquid between the two elements, does not interfere with spreading of the processing liquid, insures that delamination will occur cleanly between particular layers without damage to the latter, and does not interfere with subsequent processing and lamination of the elements; and to provide a novel and improved film unit structure as the product of this method.

Another object of this invention is to provide a novel and improved method of laminating a multicolor photosensitive element to another element using as the laminating medium a material which will cooperate in the diffusion transfer processing of the resulting film unit.

Yet another object of this invention is to provide diffusion transfer color processes employing dye developers wherein improved results are obtained by performing said process in the presence of a polyethylene glycol.

Another object of the invention is to provide a processing composition containing a polyethylene glycol, said composition being releasably retained in a rupturable container or "pod."

Other objects of the invention will in part be obvious and will, in part, appear hereinafter.

The invention accordingly comprises the method involving the several steps and the relation and order of one or more of such steps with respect to each of the others and the product possessing the features, properties and the relation of components which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view, partially in section, showing a typical photographic film unit embodying the invention;

FIG. 2 is an exploded perspective view of the film unit of FIG. 1;

FIG. 3 is a somewhat schematic, longitudinal, sectional view of another embodiment of the film unit, the thickness of the materials being exaggerated for purposes of clarity of illustration;

FIG. 4 is a diagramatic, enlarged, cross-sectional view of a portion of a typical film unit illustrating in detail the arrangement of layers comprising the laminate; and

FIG. 5 is a schematic view illustrating the method of manufacturing the film units of FIGS. 1–4.

Reference is now made to FIGS. 1 and 2 of the drawings wherein there is illustrated a typical film unit of the type embodying the invention and comprising the materials described in the aforementioned patents and applications. The film unit, designated **10**, generally includes a photosensitive or image-recording sheet **12**, a second sheet **14** and a rupturable container **16** holding a quantity of processing liquid **17**. The two sheets and processing liquid preferably include all of the materials and reagents required to produce a full-color photographic print by a process such as described in the aforementioned patents. These patents describe film units adapted to produce full-color image by diffusion of a dye transfer image-forming material to an image-receptive layer associated with a silver halide layer. These references also describe in detail the composition and arrangement of the various layers or strata which comprise the two sheet-like elements of the film unit and the composition of the aqueous alkaline liquid employed to initiate visible image formation.

As disclosed in U.S. Pat. No. 2,983,606, a preferred full-color image forming process involves the use of a photosensitive element containing a silver halide emulsion and a dye developer, that is, a dye which is a silver halide developing agent. The photosensitive element is adapted, following exposure, to be wetted by a liquid processing composition in the absence of light and then superposed with a sheet-like support element which may be utilized as an image-receiving element in a preferred embodiment. The liquid processing composition is applied to the photosensitive element as a substantially uniform layer as the photosensitive element is brought into superposed relation with the image-receiving element by moving the two elements between a pair of juxtaposed members. The liquid processing composition is introduced and spread between the two elements for permeation into the photosensitive layer to initiate development of the latent image formed therein. The dye developer is immobilized or precipitated as a consequence of the development of the latent image while in unexposed and partially exposed areas of the emulsion, the dye developer is unreacted and diffusible and thus provides an imagewise distribution of unoxidized dye developer dissolved in the liquid processing composition as a function of the point-to-point degree of exposure of the silver halide emulsion. At least part of this image-wise distribution of unoxidized dye developer is transferred by diffusion to a superposed image-receiving layer to form reversed or positive color image of the developed image.

The image-receiving layer may be provided on a sheet-like support element separate from another support for the photosensitive layer in film structures such as disclosed in U.S. Pat. Nos. 3,415,644, 3,415,645, **3,415,646** and 3,473,925. Alternatively, as disclosed in U.S. Pat. No. 3,594,146, the film unit may comprise a sheet-like laminate including a dimensionally stable transparent support carrying a dyeable polymeric layer (i.e., image-receiving layer) a processing composition permeable opaque layer, and a photosensitive silver halide layer having associated therewith a dye transfer image-forming material. A film unit incorporating such a single, combination photosensitive and image-receiving element will also include another dimensionally stable sheet substantially coextensive and adapted to be superposed with the exposed area of the other (photosensitive) sheet and has, as its primary function, cooperation with the photosensitive sheet to aid in the distribution of a viscous processing liquid between the sheets.

The basic construction of the film unit **10** shown to illustrate the invention is the same regardless of the location of the image-receiving, e.g., dyeable polymer, layer. The essential distinctions will be found in the nature of the support sheets, that is, whether one or both are transparent, and composition of the various layers and strata coated thereon. For purposes of illustration, the film unit shown and described herein possesses a physical structure adapted for producing a diffusion transfer image in an image-receiving layer supported on a transparent sheet which is separate from (although it may be laminated to) the photosensitive sheet. In this particular embodiment, the photosensitive layer is exposed and the image is viewed through the second sheet **14** which, accordingly, is transparent.

In addition to photosensitive sheet **12**, second sheet **14** and container **16**, film unit **10** includes a mask or binding sheet **18**, a trapping element **50**, and a sealing strip **54**. Sheets **12** and **14** are preferably rectangular, are substantially equal in width and arranged in superposed face-to-face contact with one another with the lateral edges of the sheets substantially in alignment. Second sheet **14** is preferably substantially longer than sheet **12** and includes a leading end section extending beyond the leading edge of sheet **12** by a distance slightly in excess of the shorter dimension of container **16**; and a trailing end section extending a relatively short distance beyond the edge of sheet **12** in a preferred embodiment of the film unit. Although sheets **12** and **14** may be separate and distinct sheets, they are preferably laminated to one another throughout substantially the entire area of their facing surfaces except for a narrow region adjacent the leading edge of sheet **12**. This provides for a more stable and easier to handle structure while eliminating the problem of air between the sheets.

Sheets **12** and **14** are secured in face-to-face relation at their lateral and trailing end margins by a binding sheet **18** which is generally rectangular in shape and formed with a rectangular exposure opening **22** slightly smaller than sheet **12** and defining the area of the photosensitive sheet adapted to be exposed. Binding sheet **18** is preferably formed of a light opaque, white material such as, for example, a laminate including a layer of paper, a polymer, and an opaque layer such as a metallic coating and/or pigment carried on or within a layer of sheet **18**. The mask or binding sheet **18** is larger than second sheet **14** and includes a leading end section **26**, a trailing end section **28**, and lateral marginal sections **24** adapted to be folded along the broken lines shown in FIG. **2**. Sheet **18** is adhered to the outer surface of sheet **14** substantially over the entire area of the facing surface of the two sheets surrounding exposure opening **22**. Lateral marginal sections **24** of sheet **18** are folded around the lateral edges of sheets **12** and **14** and secured to the margins of sheet **12**. Trailing end section **28** of sheet **18** is folded around the trailing edge of sheet **14** and secured to the outer surface of photosensitive sheet **12** near the trailing edge thereof.

Container **16** is of the type shown in U.S. Pat. No. 2,543,181 and is formed by folding a rectangular blank of a fluid impervious sheet material medially and seal-

ing the marginal sections of the blank to one another to form a cavity for containing processing liquid **17**. The seal between longitudinal marginal sections **36** of container **16** is weaker than the seals at the ends of the container so that upon the application of a predetermined compressive force to the walls of the container in the region of the liquid-filled cavity, there will be generated within the liquid hydraulic pressure sufficient to separate the longitudinal marginal sections **36** throughout the major portion of their length except in the regions of the end seals, to form a passage extending throughout the length of the cavity and the width of exposure opening **22**.

Container **16** is mounted adjacent the leading edge of sheet **12** in position to discharge its liquid contents between the photosensitive and second sheets. Container **16** is retained in place by portions of lateral edge section **24** secured to the ends of the container and leading end section **26** of binding sheet **18** which is folded around the leading edge of sheet **14** and secured to a longitudinal edge of the container. Sealing strip **54** is secured to a longitudinal marginal section of the container and the leading end margin of photosensitive sheet **12** and cooperates with the container and sheets to bridge the gap between the container and the photosensitive sheet and form a conduit for conducting the liquid from the container between the photosensitive and second sheets.

In the processing of the film unit shown, the film unit is advanced, container foremost, relative to and between a pair of pressure-applying members. The pressure-applying members, e.g., rollers, initially apply compressive pressure to the container to eject its liquid contents as a mass between the photosensitive and second sheets and then distribute the mass of liquid between the sheets toward the trailing ends thereof to form a layer of substantially uniform predetermined thickness which is continuous and at least coextensive with the area defined by exposure opening **22**. While it is desirable to provide a minimum of liquid within the container, sufficient processing liquid should be present to form a layer of the requisite area and thickness between the sheets.

The film unit includes trapping means for collecting and retaining excess processing liquid overrun so that it does not escape from the film unit. In the form shown, these means comprise trapping element **50** shown as a narrow strip of a relatively thick sheet material formed with perforations and indentations **58** which occupy a large, e.g., 45 to 55 percent, portion of trapping element **50**. The trapping element is secured between the trailing end section **28** and the trailing end margins of sheets **12** and **14** with the perforations and indentations **58** cooperating with sheets **12, 14** and **18** to provide spaces for collecting and retaining excess processing liquid overrun. The trapping element functions as a spacer as the trailing end portion of the film unit passes between the pressure-applying members preventing the processing liquid from being further advanced thereby in the direction of spreading.

Reference is now made to FIG. **3** of the drawings wherein there is illustrated a modified embodiment photographic film unit **10** showing the various layers which comprise the laminate with the thickness of the materials being exaggerated to facilitate understanding. FIG. **3** is intended to illustrate the various layers of a typical film unit in which sheet **14** supports an image-receiving layer and the liquid is spread between the image-receiving and photosensitive layers while also illustrating a somewhat modified physical structure. Film unit **10** is basically the same as previously described including a photosensitive element **12** and a rupturable container **16** holding a quantity of processing liquid **17**. The basic structural differences include a sheetlike structure in which the elements **12** and **14** are arranged in superposed face-to-face contact with their leading edges aligned with one another, and binding element **18** is secured to the two sheets at the lateral and one end margins thereof for retaining the sheets in superposed relation and container **16** is attached to the photosensitive and image-receiving elements at the edges thereof opposite binding element end portion **28**, preferably with the longitudinal edge of the container located closely adjacent the edges of the elements and with the discharge passage of the container aligned at least approximately with the edges of those facing surfaces of the elements between which the liquid is to be distributed.

Sheets **12** and **14** include, respectively, leading end marginal portions **40** and **42** and the means for coupling the container to the sheets include end portion **44** of binding element **18** secured to end marginal portion **42** of sheet **14** and longitudinal marginal sections **36** of the container so as to bridge the container and sheet **14**; and strip **54** secured to end marginal portion **40** of sheet **12** and the other longitudinal marginal section **36** of the container to bridge the gap between the container and sheet **12**. The binding element and strip **54** cooperate to provide a liquid-tight seal between the marginal sections of the container defining the discharge mouth thereof and sheets **12** and **14**; and form a conduit for conducting the liquid from the container between the sheets at end marginal portions **40** and **44** thereof. Trapping of excess processing liquid overrun is achieved by a trapping element **50** secured between end section **28** of binding element **18** and the outer surface of sheet **12**.

The embodiment of the film unit illustrated and described in FIG. **3** is adapted to be exposed and processed to produce a multicolor dye transfer image in a dyeable polymeric layer located between a transparent film on which the dyeable polymeric layer is supported and an opaque layer located between the image and the photosensitive medium. This opaque layer comprises the liquid contents **17** of container **16** provided in sufficient quantity to form a layer of predetermined thickness, e.g., of the order of 0.004 inch, when distributed uniformly between the sheets over an area at least coextensive with opening **22** in binding element **18**. The photosensitive element designated **12** includes a dimensionally-stable support layer **76** formed of a sheet material such as cellulose triacetate, and a photosensitive layer **74**, the latter, in the preferred form, comprising a plurality of strata including differently sensitized silver halide emulsions and appropriate dye developers. The second, and in this embodiment, image-receiving element, **14** includes a dimensionally stable support layer **70** formed of an actinic radiation transparent sheet material such as cellulose triacetate on which is coated image-receptive layer **72**.

The image-recording and image-receiving elements may incorporate other strata and coatings commonly employed in photographic products of this type such as optical coatings for preventing halation and reflection

and otherwise improve the optical properties of the sheet material and to facilitate and improve exposure and viewing of the final image. Such layers are known to be provided for protecting underlying layers during manufacture and assembly of the film unit and/or to inhibit or prevent the transfer of reagents between photosensitive and image-receiving layers of the invention. For further details and examples of the composition and structure of image-recording and image-receiving sheets suitable for incorporation in the film unit of the invention, reference may be had to the previously noted U.S. patents.

FIG. 4 illustrates an embodiment of the film unit such as described in U.S. Pat. Nos. 3,594,164 and 3,594,165 in which element **12** includes both the photo-sensitive and image-receiving layers. Second element **14** functions primarily to aid in the spreading of the processing liquid. Other layers such as a neutralizing layer and a spacer or barrier layer formed of an aqueous processing liquid soluble or permeable polymer may be provided as part of element **12,** or in the alternative, may comprise layers coated on second element **14.** Alternatively, element **14,** formed of an actinic radiation transparent sheet material, may be coated with an aqueous processing solution soluble or permeable layer to promote lamination of the first and second elements during manufacture and subsequent to processing. The photosensitive element **12** of the film unit or laminate includes, in order, a rupturable laminating layer **77** to be described hereinafter; a photosensitive layer comprising a plurality of strata such as previously described including a blue-sensitive silver halide emulsion layer and associated yellow dye developer **80,** an interlayer **82,** a green-sensitive silver halide emulsion layer and associated magenta dye developer **84,** an interlayer **86,** a red-sensitive silver halide emulsion layer and associated cyan dye developer **88**; an opaque layer **90**; an image-receiving layer **92**; a spacer layer **94**; a neutralizing layer **96**; and a transparent support layer **98.**

As previously noted, there are a number of advantages to be realized from laminating elements **12** and **14** to one another during manufacture and assembly. For example, it should be apparent from the foregoing discussion that air between the elements may interfere with spreading of the processing liquid and that there will be little or no air between elements which are laminated in face-to-face relation and sealed at their edges to one another and to a container of processing liquid. It has been found that prelaminating the elements may further facilitate spreading of the processing liquid which, as it is being advanced as a mass between the elements, causes the elements to be forced apart from one another ahead of the mass of liquid due to the structural strength of the elements, thereby causing rupture of the bond between the elements immediately ahead of the mass of advancing processing liquid. The separation of the elements as the bond is ruptured provides a region of reduced pressure, into which the processing liquid is drawn in the direction in which it is being spread. Moreover, by adhering the sheets in face-to-face relation, a thinner, more compact structure is obtained in which there can be no motion of the sheets relative to one another, the sheets are secured in optical contact and distortion or buckling of the sheets is prevented. These latter three factors are especially important during exposure through one of the sheets when the photosensitive sheet is required to be located with a substantial degree of preciseness in the image plane of the camera lens and particularly when a number of stacked film units are involved with the foremost film unit being urged by means at the opposite side of a stack into position for exposure with the second sheet of the film unit located against the positioning means. Another significant result of prelamination is that all areas of facing (laminated) surfaces of the two elements are subjected to essentially the same ambient conditions. Thus, every part of the photosensitive layer or image-receiving layer is contacted by the same substance in the same manner as every other part, and image-formation will not be effected by differences in ambient conditions within different regions of the film unit. Still another important feature of prelamination is that it facilitates handling of the sheets during subsequent manufacturing and assembly steps by retaining the sheets in predetermined fixed relationship.

U.S. Pat. No. 3,053,659 suggests utilizing the inherent adhesive properties of the photosensitive layer, i.e., gelatin, polyvinyl alcohol, etc., to laminate the sheets of the film unit to one another thereby establishing and maintaining an aqueous system free of organic solvents. However, this may be impractical when the photosensitive element comprises a multiplicity of layers including a photosensitive layer which itself comprises a number of selectively sensitized photosensitive strata as well as other strata and a second element, which may also include a plurality of strata including a water-soluble, image-receiving (dyeable) polymer. A major problem to be solved is separation of the sheets at the proper strata or layers during and in response to spreading of the processing liquid. Obviously, separation of photosensitive strata from another strata of the same photosensitive layer cannot be tolerated, and it is difficult to vary the adherent properties of strata to insure proper separation when the strata, although differently sensitized, are essentially the same physically.

The answer to this problem has been found to lie in distributing another material, specifically, a water-soluble, polymeric film-forming material, that is, a material capable of forming a thin layer, between the layers at which delamination is to occur, one or both of which layers is a water-soluble polymer having adhesive properties activated by water. Such a film-forming material has been found to modify the water-activated adhesive properties of the layers of the two photographic elements to form a bond having a strength that is less than the bond between any other pair of layers or strata and equally importantly, remains constant for extended periods despite changes in temperature, humidity and the moisture content of the film unit. In the preferred embodiment, distribution of an aqueous solution of a polymeric film-forming material as a laminating layer produces a bond between the adjacent layers of the two elements that is weaker than the bond which would otherwise be formed if the layers were laminated by a solvent such as water capable of activating the inherent properties thereof. A polymeric, film-forming system suitable for use with photosensitive and image-receiving elements of the type represented by the example given, should possess certain desirable physical characteristics including resistance to blocking at high humidities, resistance to blushing, inertness and compatibility with the materials of the photosensitive and image-receiving layers and the processing liquid so as not to interfere with image formation; and mechanical

and optical stability despite changes in ambient temperature and humidity.

In the manufacturing and assembling of a film unit according to the invention, the photosensitive and second or image-receiving elements are laminated to one another as a step which is performed early in the assembly process. For example, photosensitive and second elements **12** and **14** such as described in the foregoing examples, are manufactured by coating the appropriate layers on elongated support strips by conventional continuous coating practices, including baking the coated strips to form integral, finished laminates that can be handled and/or utilized (without change) as photosensitive and second or image-receiving elements. To summarize, the water-soluble film-forming polymer distributed as a laminating solution between the sheets to effect the lamination thereof and to insure delamination by the processing liquid at the desired layers, is required to contribute to the formation of an adhesive bond by a mass production method, which bond is of predetermined strength and does not vary substantially with time or as a result of changes in humidity or temperature. The polymer must be inert or at least compatible with all of the materials of the film unit; it should form a solid laminating layer; and it should not blush or otherwise interfere with the optical properties of the laminate.

In accordance with this invention, such a laminating layer is provided by a water-soluble polyethylene glycol. It has further been found that the presence of a water-soluble polyethylene glycol during diffusion transfer processing is beneficial in obtaining improved sensitometric properties, particularly when a dye developer process is performed at temperatures of 95° F. or higher. In a particularly useful embodiment, the processing composition contains a polyethylene glycol which may be the same as or different from the polyethylene glycol forming the laminating layer. The beneficial effects of incorporating a polyethylene glycol in the processing composition also are obtained if the components of the film unit are not prelaminated together; in this less preferred embodiment, it may be desirable to use somewhat higher concentrations of the polyethylene glycol in the processing fluid.

A laminating solution particularly suited for laminating a gelatin topcoat (a water-soluble polymer) of a photosensitive element to a polyvinyl alcohol topcoat (also a water-soluble polymer) of an image-receiving element or to an aqueous processing solution soluble or permeable coating on a second element employed primarily in spreading the processing liquid, comprises 5 parts of water to 1 part (by weight) of polyethylene glycol having a molecular weight range of about 6000 to 7500 and commercially available from Union Carbide Corporation under the trade name "Carbowax 6000." It has been found that suitable bonds may be obtained between gelatin and polyvinyl alcohol containing layers by distributing approximately 80 to 200 mg./ft^2 of the above solution between said layers as they were brought into face-to-face, laminating relationship e.g., at the nip of a pair of pressure-applying rollers.

The quantity of polyethylene glycol coated per square foot will depend in part upon the molecular weight of the polyethylene glycol used and in part upon the bond strength desired. Other factors determinative of both the quantity of polyethylene glycol coated per square foot as well as the bond strength include the speed of sheet movement relative to solution flow rate to the nip, the pressure applied by the rollers to achieve lamination and the solution concentration. These factors may be readily determined by simple routine tests utilizing the polymers being bonded to produce a stable bond which does not grow stronger or weaker with changes in ambient conditions. For example, it has been found that the bond strength is increased by reducing the quantity of polyethylene glycol while an increase in the amount of polyethylene glycol will reduce the bond strength. Polyethylene glycol has been found to be unique and especially useful in that it not only controls the bond strength within narrow limits, but that it is a stable, hygroscopic solid material which insures constant bond strength despite changes in temperature and humidity which would ordinarily alter, e.g., strengthen, a direct bond between two water-soluble, polymeric layers. Polyethylene glycol having a molecular weight in excess of 6000 is preferred because it is a solid at ordinary temperatures, whereas lower molecular weight polyethylene glycol tends to be less solid and more fluid. An advantage of the solid form of polyethylene glycol is that the adherence between the elements is almost immediate and is sufficient to permit the handling and manipulation of the laminated sheets associated with further assembly steps in the formation of the film unit, thus eliminating delays required for drying and bond strengthening.

By way of example, the coated photosensitive element and the second or image-receiving element can be laminated or bonded to one another by advancing the elements (or elongated strips) between a pair of pressure-applying rolls while introducing an aqueous solution of polyethylene glycol laminating agent between the elements at the nip of the rolls. As illustrated in FIG. **5**, the photosensitive and second or image-receiving sheets **12** and **14** are advanced into superposition at the nip of a pair of laminating rolls **64**, one of which may be provided with flanges at its ends for containing the laminating liquid which is introduced between the sheets at the nip of the rolls through a tube **66** where the liquid is permitted to form a meniscus. The liquid is distributed in contact with the sheets and the sheets are pressed together so as to adhere them to one another over substantially their entire facing surfaces.

The remaining steps in the manufacture and assembly process illustrated may include advancing the laminated sheets from laminating rolls **64** into and through an oven **68** where they are baked to evaporate the solvent of the laminating liquid and thence to cutting means such as rotary knife **100** and anvil **102** where the individual sandwiches are cut to length. The remaining assembly steps include adhering binding element **18** to the sandwich comprising photosensitive and second sheets **12** and **14** and attaching a container of processing liquid thereto. An added advantage of employing polyethylene glycol as described is that the two sheets need not be heated following lamination but may be subjected immediately to the manipulation and handling involved in assembling the film units according to processes disclosed, for example, in U.S. patent applications, Ser. Nos. 135,539, filed Apr. 20, 1971; 140,537, filed May 4, 1971; and 102,447, filed Dec. 29, 1970, in which the laminate is severed into individual film unit-sized sections at a latter stage in the assembly process.

In an embodiment of the film unit such as disclosed in FIGS. 1 and 2, one of the two sheets which are laminated together by distributing a layer of polyethylene glycol between the sheets as they are pressed into superposition may be wider than the other sheet and/or the lamination may extend to a line spaced inwardly a short distance from the edge of one of the sheets, i.e., the narrower sheet, to provide an unlaminated region adjacent the leading edge of the laminate at which separation of the laminate is initiated by spreading of the processing liquid between the laminated sheets.

It will be seen from the foregoing that high molecular weight polyethylene glycol is unique in its ability to provide a constant strength bond between two layers of a multi-color photographic film laminate, particularly when the layers designed to be delaminated by spreading a processing liquid therebetween both include water-soluble polymers and lamination is effected by employing an aqueous solution of the laminating polymer. The various parameters including molecular weight, concentration, lamination speed and lamination pressure can be easily controlled to provide a bond strength having relatively narrow tolerances which remain constant despite changes in temperature, humidity and/or moisture content of the film laminate and is effective to bond the sheets together so that they may be employed immediately in a film assembly process without separation or rupture of the bond and/or movement of laminated sheets relative to one another. The small quantity of the film-forming agent employed to form laminating layer **78** has been found to contribute to the formation of a bond between the sheets that is secure under normal conditions encountered in manufacture, storage, and use, and yet ruptures readily, easily, and cleanly without disturbing the adherence between other layers of the laminates comprising the photosensitive and second or image-receiving elements and leaving these layers intact, when subjected to tension as by spreading a mass of liquid between the sheets.

As noted above, a polyethylene glycol advantageously may be provided as a component of the processing fluid, whether or not the positive and photosensitive components are laminated prior to photoexposure and distribution of the processing fluid. In this embodiment, lower molecular weight polyethylene glycols may be useful than would be preferred for use as a laminating layer in the above-discussed embodiment. Beneficial results have been obtained using such polyethylene glycols as polyethylene glycol having a molecular weight range of about 6000 to 7500 and methoxy polyethylene glycol having a molecular weight range of about 715 to 785; these polyethylene glycols are commerically available from Union Carbide Corporation under the trade names "Carbowax 6000" and "Carbowax 750", respectively. The polyethylene glycol incorporated in the processing fluid should be alkali-soluble if it is not completely water-soluble. In general, concentrations of about 0.25 to 1.5 percent, by weight, have been found to be useful in multicolor dye developer processes, with a concentration of about 0.5 to 1.0 percent, by weight, being preferred. The inclusion of a polyethylene glycol in the processing composition at a concentration of 1 percent, by weight, will provide approximately 80 mgs./ft.^{2} if said processing composition is distributed in a layer about 0.0025 inch thick. By comparison, approximately 15 mgs./ft.^{2} of polyethylene glycol is provided when a 5:1 aqueous solution thereof is applied at a rate of 125 to 140 mgs./ft.^{2} to laminate the film unit in the previously described embodiment. The most useful concentration for a particular polyethylene glycol in a particular color process may be readily determined by routine tests.

In the preferred embodiment, the use of polyethylene glycol having a molecular weight range of about 6000 to 7500 has been found to give multicolor diffusion transfer dye developer images which exhibit improved yellow and magenta separation and saturation, and overall sensitometry more nearly alike over a wide temperature range than if the polyalkylene glycol were omitted. In particular, a decrease in "blue speed" was observed in pictures processed above room temperature in the absence of the polyethylene glycol.

The following example is given to illustrate this embodiment.

EXAMPLE

A photosensitive element was prepared by coating a gelatin-subcoated 4 mil opaque polyethylene teraphthalate film base with the following layers:

1. a layer of cyan dye developer dispersed in gelatin and coated at a coverage of about 100 mgs./ft.^{2} of dye and about 80 mgs./ft.^{2} of gelatin;

2. a red-sensitive gelatino silver iodobromide emulsion coated at a coverage of about 140 mgs./ft.^{2} of silver and about 70 mgs./ft.^{2} of gelatin;

3. a layer of a 60–30–4–6 copolymer of butylacrylate, diacetone acrylamide, styrene and methacrylic acid and polyacrylamide coated at a coverage of about 150 mgs./ft.^{2} of the copolymer and about 5 mgs./ft.^{2} of polyacrylamide;

4. a layer of magenta dye developer dispersed in gelatin and coated at a coverage of about 112 mgs./ft.^{2} of dye and about 100 mgs./ft.^{2} of gelatin;

5. a green-sensitive gelatino silver iodobromide emulsion coated at a coverage of about 100 mgs./ft.^{2} of silver and about 50 mgs./ft.^{2} of gelatin;

6. a layer containing the copolymer referred to above in layer **3** and polyacrylamide coated at a coverage of about 100 mgs./ft.^{2} of copolymer and about 12 mgs./ft.^{2} of polyacrylamide;

7. a layer of yellow dye developer dispersed in gelatin and coated at a coverage of about 70 mgs./ft.^{2} of dye and about 56 mgs./ft.^{2} of gelatin;

8. a blue-sensitive gelatino silver iodobromide emulsion layer including the auxiliary developer 4'-methylphenyl hydroquinone coated at a coverage of about 120 mgs./ft.^{2} of silver, about 60 mgs./ft.^{2} of gelatin and about 30 mgs./ft.^{2} of auxiliary developer; and

9. a layer of gelatin coated at a coverage of about 50 mgs./ft.^{2} of gelatin.

(The three dye developers employed were the ones recited above.)

A transparent 4 mil. polyethylene teraphthalate film base was coated, in succession, with the following layers to form an image-receiving component:

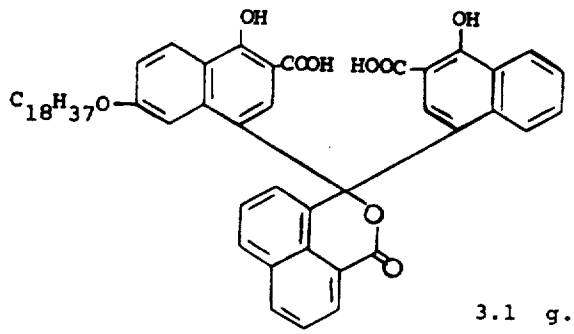
1. as a polymeric acid layer, the partially butyl ester of polyethylene/maleic anhydride copolymer at a coverage of about 2,500 mgs./ft.^{2};

2. a timing layer containing about a 40:1 ratio of a 60–30–4–6 copolymer of butylacrylate, diacetone acrylamide, styrene and methacrylic acid and polyacrylamide at a coverage of about 500 mgs./ft.^{2}; and

3. a polymeric image-receiving layer containing a 2:1 mixture, by weight, of polyvinyl alcohol and poly-4-

vinylpyridine, at a coverage of about 300 mgs./ft.^{2}. The two components thus prepared were then taped together, in laminate form, at their respective edges to provide an integral film unit, with a rupturable container retaining an aqueous alkaline processing solution fixedly mounted on the leading edge of each of the components, by pressure-sensitive tapes, so that, upon application of compressive pressure to the container to rupture the container's marginal seal, its contents were distributed in a layer approximately 0.0026 inch thick between the image-receiving layer and the gelatin overcoat layer of the photosensitive component. The aqueous alkaline processing composition comprised:

Potassium hydroxide (85%)	5.3 g.
N-benzyl-α-picolinium bromide (50% solution in water)	1.3 g.
N-phenethyl-α-picolinium bromide	0.775 g.
Sodium carboxymethyl cellulose (Hercules Type 7H4F providing a viscosity of 3000 cps. at 1% in water at 25°C.)	0.59 g.
Titanium dioxide	44.9 g.
6-methyl uracil	0.63 g.
bis-(β-aminoethyl)-sulfide	0.045 g.
Lithium nitrate	0.1 g.
Benzotriazole	0.6 g.
6-methyl-5-bromo-4-azabenzimidazole	0.03 g.
Colloidal silica aqueous dispersion (30% SiO_2)	1.96 g.
Lithium hydroxide	0.2 g.
6-benzylamino-purine	0.42 g.
Polyethylene glycol (molecular weight 6000)	0.58 g.

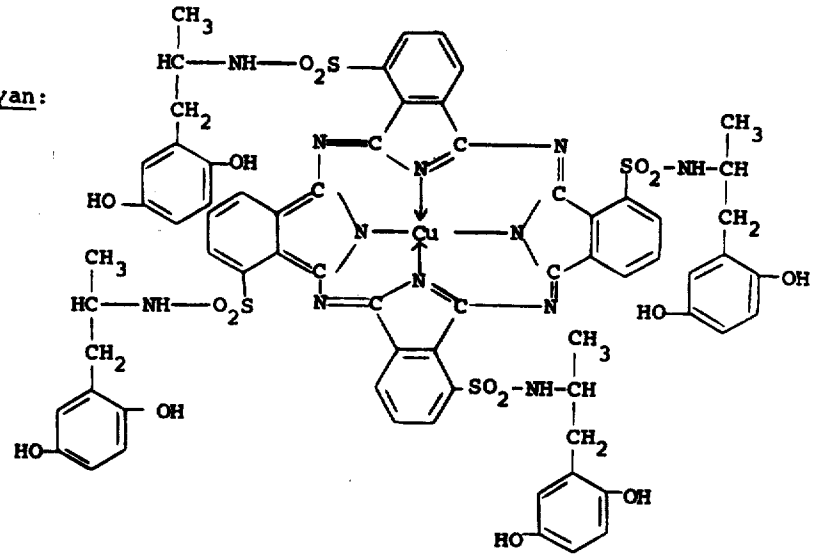


3.1 g.

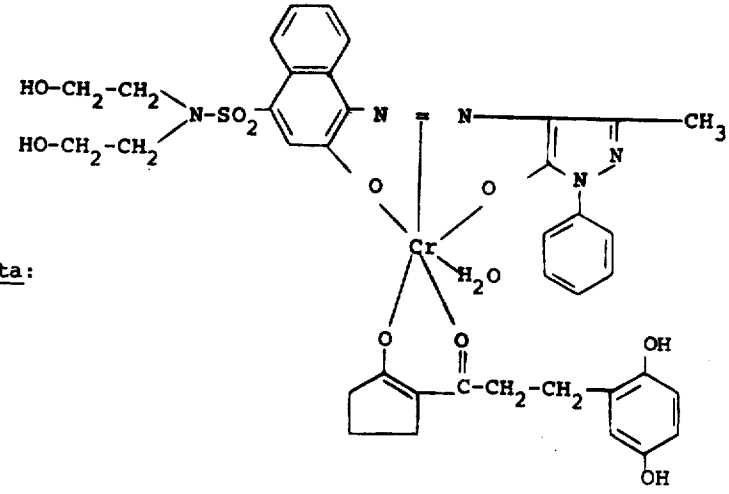
Water to make 100 g.

The dye developers used were:

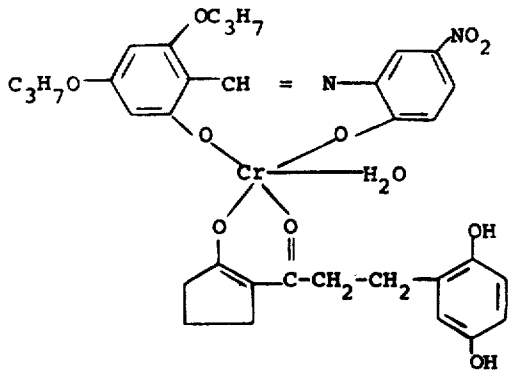
cyan:



magenta:



yellow:



The photosensitive element was exposed through the transparent support and the layers thereon, the processing composition distributed by passing the film unit between a pair of pressure-applying rolls and into a lighted area. The laminate obtained by distribution of the processing composition was maintained intact to provide an integral negative-positive reflection print which exhibited good color quality and separation over a wide temperature range.

The use of colloidal silica in the processing composition is the subject of the copending application of Edwin H. Land, Ser. No. 247,025, filed concurrently herewith.

If the film unit is to be processed outside of a dark chamber, i.e., if it is to be removed from the camera prior to image completion and while the film is still photosensitive, appropriate opacifying reagents and/or layers should be provided. A particularly useful opacifying system for film units providing integral prints of the type shown in FIG. 1 and in the aforementioned U.S. Pat. No. 3,426,644 utilizes a color dischargeable reagent, preferably a pH-sensitive optical filter agent or dye, as is described in detail in U.S. Pat. No. 3,647,437 issued Mar. 7, 1972 to Edwin H. Land. In the film unit wherein photoexposure is effected from the side opposite the side from which the image is viewed, an appropriate opaque layer is provided over the silver halide emulsion layers. This may be done by distributing a processing composition providing an opaque layer, e.g., containing carbon black, between the photosensitive layers and the transparent support. Alternatively, light protection may be provided by an opaque layer (not shown) superposed over the photosensitive layer after exposure.

In the preferred film structures for obtaining integral negative-positive reflection prints of the type shown in FIG. 1, photoexposure is effected through the same transparent support through which the final dye transfer image is viewed.

The image dye-providing materials which may be employed in such processes generally may be characterized as either (1) initially soluble or diffusible in the processing composition but are selectively rendered nondiffusible in an imagewise pattern as a function of development; or (2) initially insoluble or nondiffusible in the processing composition but which are selectively rendered diffusible or provide a diffusible product in an imagewise pattern as a function of development. These materials may be complete dyes or dye intermediates, e.g., color couplers. The requisite differential in mobility or solubility may, for example, be obtained by a chemical action such as a redox reaction or a coupling reaction.

As examples of initially soluble or diffusible materials and their application in color diffusion transfer, mention may be made of those disclosed, for example, in U.S. Pat. Nos. 2,774,668; 2,968,554; 2,983,606; 2,087,817; 3,185,567; 3,230,082; 3,345,163; and 3,443,943. As examples of initially non-diffusible materials and their use in color transfer systems, mention may be made of the materials and systems disclosed in U.S. Pat. Nos. 3,185,567; 3,443,939; 3,443,940; 3,227,550; and 3,227,552. Both types of image-dye providing substances and film units useful therewith also are discussed in the aforementioned U.S. Pat. No. 3,647,437 to which reference may be made.

In any of these systems, multicolor images are obtained by employing a film unit containing at least two selectively sensitized silver halide layers each having associated therewith an image dye-providing material exhibiting desired spectral absorption characteristics. The most commonly employed elements of this type are the so-called tripack structures employing blue-, a green- and a red-sensitive silver halide layers having associated therewith, respectively, a yellow, a magenta and a cyan image dye-providing material, as disclosed in U.S. Pat. No. 3,345,163 issued Oct. 3, 1967 to Edwin H. Land and Howard G. Rogers.

A particularly useful system for forming color images by diffusion transfer is that described in U.S. Pat. No. 2,983,606, employing dye developers (dyes which are also silver halide developing agents) as the image dye-providing materials. In such systems, a photosensitive element comprising at least one silver halide layer having a dye developer associated therewith (in the same or in an adjacent layer) is developed by applying an aqueous alkaline processing composition. Exposed and developable silver halide is developed by the dye developer which in turn becomes oxidized to provide an oxidation product which is appreciably less diffusible than the unreacted dye developer, thereby providing an imagewise distribution of diffusible dye developer in terms of unexposed areas of the silver halide layer, which imagewise distribution is then transferred, at least in part, by diffusion, to a dyeable stratum to impart thereto a positive dye transfer image. Multicolor images may be obtained with a photosensitive element having two or more selectively sensitized silver halide layers and associated dye developers, a tripack structure of the type described above in various patents including the aforementioned U.S. Pat. Nos. 2,983,606 and 3,345,163 being especially suitable for accurate color recordation of original subject matter.

In such color diffusion transfer systems, color transfer images are obtained by exposing a photosensitive element, sometimes referred to as a "negative compo-

nent," comprising at least a light-sensitive layer, e.g., a gelatino silver halide emulsion layer, having an image dye-providing material associated therewith in the same or in an adjacent layer, to form a developable image; developing this exposed element with a processing composition to form an imagewise distribution of a diffusible image dye-providing material; and transferring this imagewise distribution, at least in part, by diffusion, to a superposed image-receiving layer, sometimes referred to as a "positive component," comprising at least a dyeable stratum to provide a color transfer image. The negative and positive components initially may be carried on separate supports which are brought together during processing and thereafter retained together as the final integral negative-positive reflection print, or they may initially comprise a unitary structure, e.g., integral negative-positive film units wherein the negative and positive components are part of a photosensitive laminate or they may otherwise be physically retained together in superposed relationship prior to, during and after image formation. In either instance, the positive component is not removed from the negative component for viewing purposes. The preferred film units comprise a plurality of essential layers including a negative component comprising at least one light-sensitive silver halide and associated dye image-providing material and a positive component comprising a dyeable stratum. These components may be laminated together or otherwise secured together in physical juxtaposition as an essentially integral structure. Film units intended to provide multicolor images comprise two or more selectively sensitized silver halide layers each having associated therewith an appropriate image dye-providing material providing an image dye spectral absorption characteristics substantially complementary to the light by which the associated silver halide is exposed. The most commonly employed negative components for forming multicolor images are of the tripack structure and contain blue-, green- and red-sensitive silver halide layers each having associated therewith in the same or in a contiguous layer a yellow, a magenta and a cyan image dye-providing material respectively. Interlayers or spacer layers may, if desired, be provided between the respective silver halide layers and associated image dye-providing materials or between other layers. In addition to the aforementioned essential layers, such film units further include means for providing a reflecting layer between the dyeable stratum and the negative component in order to mask effectively the silver image or images formed as a function of development of the silver halide layer or layers and also to mask image dye-providing material which is not transferred, thereby providing a background, preferably white, for viewing the color image formed in the dyeable stratum, without separation, by reflected light. This reflecting layer may comprise a preformed layer of a reflecting agent included in the film unit or the reflecting agent may be provided after photoexposure, e.g., by including the reflecting agent in the processing composition. The dye transfer image is then viewable through a dimensionally stable protective layer or support. Most preferably another dimensionally stable layer or support, which may be transparent or opaque, is positioned on the opposed surface of the essential layers so that the aforementioned essential layers are between a pair of dimensionally stable layers or support members, one of which is transparent to permit viewing therethrough of the color transfer image. A rupturable container of known description contains the requisite processing composition and is adapted upon application of pressure to release its contents for development of the exposed film unit, e.g., by distributing the processing composition in a substantially uniform layer between a pair of predetermined layers. In film units providing an integral negative-positive reflection print of the type illustrated in FIG. 1, a processing composition containing a white pigment may be distributed between the dyeable stratum and the negative component to provide the light-reflecting layer.

A preferred opacification system to be contained in the processing composition to effect processing outside of a camera is that described in the above-mentioned U.S. Pat. No. 3,647,437, and comprises a dispersion of an inorganic light-reflecting pigment which also contains at least one light-absorbing agent, i.e., optical filter agent, at a pH above the pKa of the optical filter agent in a concentration effective when the processing composition is applied, to provide a layer exhibiting optical transmission density > than about 6.0 density units with respect to incident radiation actinic to the photosensitive silver halide and optical reflection density < than about 1.0 density units with respect to incident visible radiation.

In lieu of having the light-reflecting pigment in the processing composition, the light-reflecting pigment used to mask the photosensitive strata and to provide the requisite background for viewing the color transfer image formed in the receiving layer may be present initially in whole or in part as a performed layer in the film unit. As an example of such a preformed layer, mention may be made of that disclosed in U.S. Pat. No. 3,615,421 issued Oct. 26, 1971 and in U.S. Pat. No. 3,620,724 issued Nov. 16, 1971, both in the name of Edwin H. Land. The reflecting agent may be generated in situ as is disclosed in U.S. Pat. Nos. 3,647,434 and 3,647,435, both issued Mar. 7, 1972 to Edwin H. Land.

The dye developers (or other image dye-providing substances) are preferably selected for their ability to provide colors that are useful in carrying out subtractive color photography, that is, the previously mentioned cyan, magenta and yellow. They may be incorporated in the respective silver halide emulsion or, in the preferred embodiment, in a separate layer behind the respective silver halide emulsion. Thus a dye developer may, for example, be in a coating or layer behind the respective silver halide emulsion and such a layer of dye developer may be applied by use of a coating solution containing the respective dye developer distributed, in a concentration calculated to give the desired coverage of dye developer per unit area, in a film-forming natural, or synthetic, polymer, for example, gelatin, polyvinyl alcohol, and the like, adapted to be permeated by the processing composition.

Dye developers, as noted above, are compounds which contain the chromophoric system of a dye and also a silver halide developing function. By "a silver halide developing function" is meant a grouping adapted to develop exposed silver halide. A preferred silver halide development function is a hydroquinonyl group. Other suitable developing functions include ortho-dihydroxyphenyl and ortho-and para-amino substituted hydroxyphenyl groups. In general, the development function includes a benzenoid developing func-

tion, that is, an aromatic developing group which forms quinonoid or quinone substances when oxidized.

The image-receiving layer may comprise one of the materials known in the art, such as polyvinyl alcohol, gelatin, etc. It may contain agents adapted to mordant or otherwise fix the transferred image dye(s). Preferred materials comprise polyvinyl alcohol or gelatin containing a dye mordant such as poly-4-vinylpyridine, as disclosed in U.S. Pat. No. 3,148,061, issued Sept. 8, 1964 to Howard C. Haas. If the color of the transferred image dye(s) is affected by changes in pH, the pH of the image layer may be adjusted to provide a pH affording the desired color.

In the various color diffusion transfer systems which have previously been described and which employ an aqueous alkaline processing fluid, it is well known to employ an acid-reacting reagent in a layer of the film unit to lower the environmental pH following substantial dye transfer in order to increase the image stability and/or to adjust the pH from the first pH at which the image dyes are diffusible to a second (lower) pH at which they are not. For example, the previously mentioned U.S. Pat. No. 3,415,644 discloses systems wherein the desired pH reduction may be effected by providing a polymeric acid layer adjacent the dyeable stratum. These polymeric acids may be polymers which contain acid groups, e.g., carboxylic acid and sulfonic acid groups, which are capable of forming salts with alkali metals or with organic bases; or potentially acid-yielding groups such as anhydrides or lactones. Preferably the acid polymer contains free carboxyl groups. Alternatively, the acid-reflecting reagent may be in a layer adjacent the silver halide most distant from the image-receiving layer, as disclosed in U.S. Pat. No. 3,573,043 issued Mar. 30, 1971 to Edwin H. Land. Another system for providing an acid-reacting reagent is disclosed in U.S. Pat. No. 3,576,625 issued Apr. 27, 1971 to Edwin H. Land.

An inert interlayer or spacer layer may be and is preferably disposed between the polymeric acid layer and the dyeable stratum in order to control or "time" the pH reduction so that it is not premature and interfere with the development process. Suitable spacer or "timing" layers for this purpose are described with particularity in U.S. Pat. Nos. 3,362,819; 3,419,389; 3,421,893; 3,455,686; and 3,575,701.

While the acid layer and associated spacer layer are preferably contained in the positive component employed in systems wherein the dyeable stratum and photosensitive strata are contained on separate supports, e.g., between the support for the receiving element and the dyeable stratum; or associated with the dyeable stratum in those integral film units, e.g., on the side of the dyeable stratum opposed from the negative components, they may, if desired, be associated with the photosensitive strata, as is disclosed, for example, in U.S. Pat. Nos. 3,362,821 and 3,573,043. In film units such as those described in the aforementioned U.S. Pat. Nos. 3,594,164 and 3,594,165, they also may be contained on the spreader sheet employed to facilitate application of the processing fluid.

As is now well known and illustrated, for example, in the previously cited patents, the liquid processing composition referred to for effecting multicolor diffusion transfer processes comprises at least an aqueous solution of an alkaline material, for example sodium hydroxide, potassium hydroxide, and the like, and preferably possessing a pH in excess of 12, and most preferably includes a viscosity-increasing compound constituting a film-forming material of the type which, when the composition is spread and dried, forms a relatively firm and relatively stable film. The preferred film-forming materials disclosed comprise high molecular weight polymers such as polymeric, water-soluble ethers which are inert to an alkaline solution such as, for example, a hydroxyethyl cellulose or sodium carboxymethyl cellulose. Additionally, film-forming materials or thickening agents whose ability to increase viscosity is substantially unaffected if left in solution for a long period of time are so disclosed to be capable of utilization. As stated, the film-forming material is preferably contained in the processing composition in such suitable quantities as to impart to the composition a viscosity in excess of 100cps. at a temperature of approximately 24° C. and preferably in the order of 100,000 cps. to 200,000 cps. at that temperature.

It is recognized that polyethylene glycols have been proposed for use in photographic products, particularly as a silver halide sensitizer, and as an additive for specific developer solutions (see, for example, U.S. Pat. Nos. 2,581,832 and 3,158,483). It will be readily apparent, however, that such prior disclosures in no way suggest the use of polyethylene glycols as temporary bonding layers, nor do such disclosures lead one to expect that the use of polyethylene glycols in color diffusion transfer processes would give more uniform quality color transfer images over a wide temperature range, and color transfer images having increased color saturation and less loss of film speed when performed at elevated temperatures.

It will be understood that dye transfer images which are neutral or black-and-white instead of multicolor may be obtained by use of a mixture of dyes of the appropriate colors, the transfer of which may be controlled by a single layer of silver halide, in accordance with known techniques. It is also to be understood that "direct positive" silver halide emulsions may also be used, depending upon the particular dye image-providing substances employed and whether a positive or negative color transfer image is desired.

Since certain changes may be made in the above product and method without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A rupturable container releasably holding a processing composition adapted for use in forming diffusion transfer dye developer images, said processing composition comprising an aqueous alkaline solution of a film-forming, viscosity-providing polymer having a light-reflecting pigment dispersed therein, said composition further including a water-soluble polyethylene glycol.

2. A rupturable container as defined in claim 1 wherein said polymer is hydroxyethyl cellulose or an alkali metal carboxymethyl cellulose.

3. A rupturable container as defined in claim 1 wherein said pigment is titanium dioxide.

4. A rupturable container as defined in claim 1 wherein said polyethylene glycol has a molecular weight of about 6000 to 7500.

5. A rupturable container as defined in claim 1 wherein said processing composition includes an optical filter agent which is colored at the pH of said processing composition, said optical filter agent being adapted to be rendered colorless by reducing said pH.

6. A rupturable container as defined in claim 5 wherein the pH of said alkaline solution is in excess of 12, and said alkalinity is provided by an alkali metal hydroxide.

7. A rupturable container as defined in claim 1 wherein said polyethylene glycol is present in a concentration of about 0.25 to 1.5 percent by weight of said composition.

8. A rupturable container as defined in claim 7 wherein said concentration of said polyethylene glycol is about 0.5 to 1.0 percent by weight of said composition.

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