

[54] **PHOTOMECHANICAL PROCESS**

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3,152,899	10/1964	Marx.....	96/30
3,617,267	11/1971	Kinney.....	96/41
3,802,882	4/1974	Kopyloua.....	96/30

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[56] **References Cited**

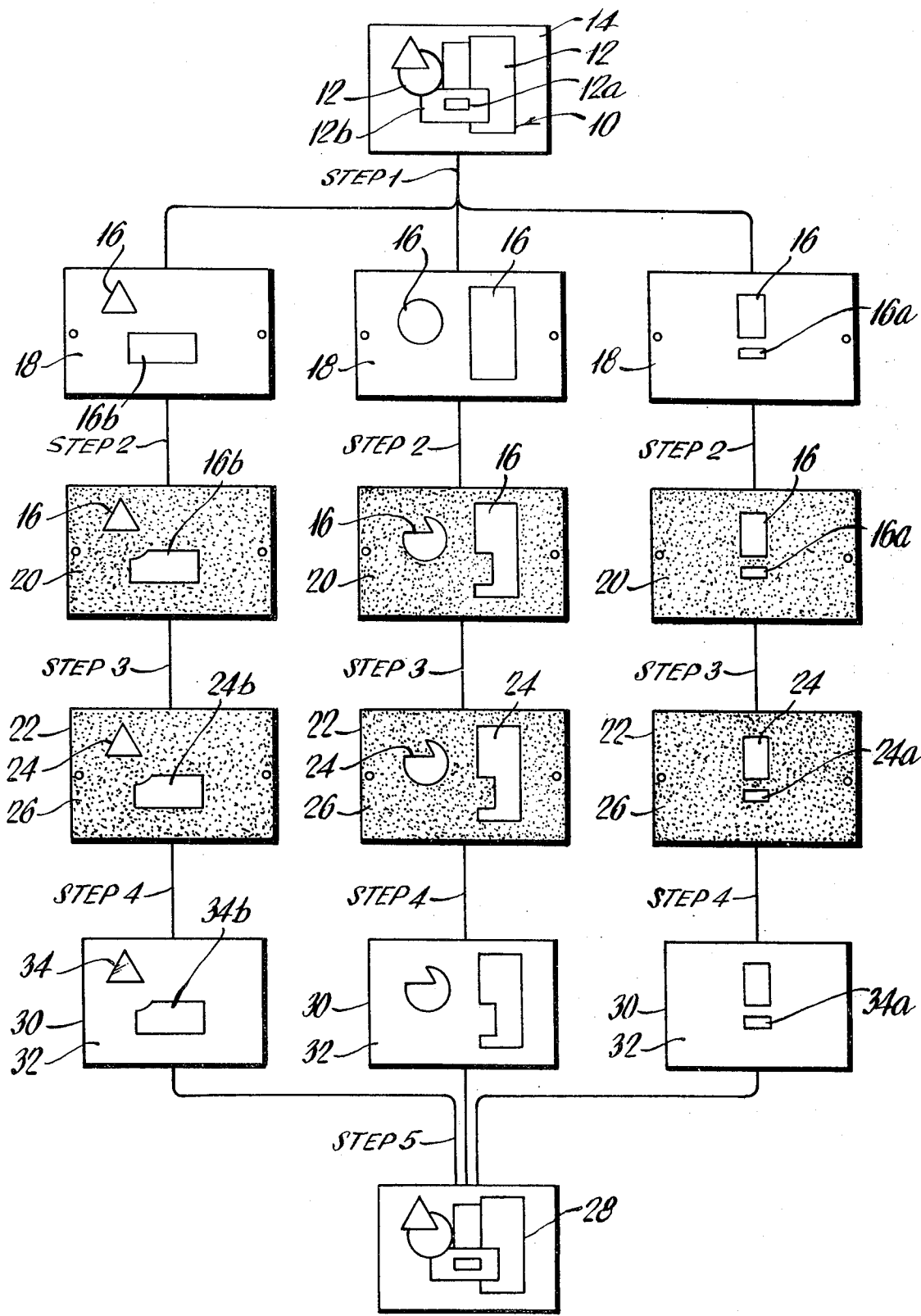
UNITED STATES PATENTS

2,046,326	7/1936	Hapke.....	96/30
2,319,783	5/1943	Murphy	96/30
3,025,627	3/1962	Misturini.....	96/30
3,133,814	5/1964	Pohl.....	96/41
3,148,058	9/1964	Land et al.....	96/41

[57] **ABSTRACT**

A method for preparing a composite color transparency photograph containing all of the colors in an original source layout from which the film is produced; the color transparency incorporating a plurality of images that in accordance with the desired layout are to be assembled on a printing surface ultimately, with one or more of the images inserted within or abutting or overlapping at least one of the other images of the layout.

11 Claims, 1 Drawing Figure



PHOTOMECHANICAL PROCESS

BACKGROUND OF THE INVENTION

When a variety of colored art work is to be assembled on a photographic plate for use in forming a color printing surface, the art work is assembled as a layout and photographed using three filters corresponding in color and light transmission to one of the additive primaries, blue, green and red, to produce negatives from which are produced the corresponding positives, the cyan, magenta and yellow printers respectively. In addition, a black printer is prepared to overcome the limitations in the colors of the inks. When the foregoing positives or printers are combined and printed, the result is a faithful reproduction of the original layout.

Where a series of separate images are to be assembled in an integral layout of inserts or overlapping relationships the images may be manually cut and made to abut in the desired manner before the color separation negatives are made.

The cutting and registry of the component images in the desired layout is however very difficult to achieve without some overlap or hiatus occurring between the borders of the images or subjects; and further the original component subjects of the layout are so decimated as to be without utility should other and variant layouts achieving slightly or materially different effects be desired.

An alternative method more commonly employed ostensibly to avoid the foregoing difficulties involves making color separation negatives of each of the component images or sets of images of the layout in the relative positions occupied by the images in the layout; opaquing out those portions of the negatives which are to be omitted from the final composite assembly in accordance with the original layout and making the positive cyan, magenta, yellow and black printers therefrom which are thereafter combined in a single reproduction of the desired layout. This procedure results in a large number of negatives and positives requiring careful registry and alignment, a task which is, in practice, extremely arduous, and the results of which are likely to fall short of the desired result in the absence of expensive mechanical equipment.

SUMMARY OF THE INVENTION

It is the general object of this invention, therefore, to provide a method whereby a single positive color transparency is prepared of a composite layout of abutting, overlapping and inserted images.

It is a further object of this invention to prepare from the foregoing color transparency separation negatives and sequentially the subtractive primary and black printers in the course of producing a printing surface.

It is accordingly a particular objective of the invention to reduce materially, even where only a small number of overlapping, abutting images or inserted subjects are involved, the number of color separation negatives and printers which would otherwise have to be made, registered and aligned before a satisfactory printing surface is secured.

Another object of this invention is to provide a method for preparing a color printing surface wherein the original images of the layout need not be marred for the purpose of effecting a reproduction of the overlapping elements or images of the layout.

A still further object is to provide a method of producing a color printing surface which reduces the amount of time necessary to achieve the desired product and, in addition, eliminates the criticalness in treatment of the substrates by providing means whereby any single mistake in handling can be readily corrected in a renewed attempt using the same projected layout of the customer.

Accordingly, the present invention involves a method in the formation of a printing surface, the steps of which comprise generally assembling a composite layout of abutting, overlapping and inserted images; making original positive transparencies of those component images of the proposed layout which are, at least, neither abutting or overlapping one another; imposing opaquing masks about the foregoing component separated images so as to define and fit snugly about the contour of said images with invasion of the images by the opaquing material to the extent that a portion of the image is overlapped or replaced by a further image of those forming the layout incorporating the resulting adjusted profiles of those portions of the images as seen in the original layout; the resulting negatives comprising an opaqued region corresponding to the opaqued regions of the corresponding mask and a transparent region corresponding to and coming within the profile of the one or more images outlined in each of the masks; imposing the foregoing negatives on the appropriate original transparencies so that the emulsion surface of the original transparencies will be in register with and within the corresponding but modified profile thereof reproduced by the transparent region defined in the foregoing negatives and making individual color reversal positive transparencies of said negatives with said original color transparencies positioned within the profiles defined in said negatives and thereafter combining the foregoing positives in registry to produce at least a single positive composite color transparency therefrom constituting a faithful reproduction of the original layout.

The foregoing and other objects, features and advantages of the invention which will become more apparent from the description appearing hereinafter in conjunction with the accompanying drawings forming part of this application.

BRIEF DESCRIPTION OF THE DRAWINGS

The FIGURE is a flow sheet depicting semi-diagrammatically the steps involved in the practice of the photomechanical process of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The method of this invention will be more readily understood from a consideration of the following description taken together with the accompanying drawing in which the steps of the method or process are shown diagrammatically from the sensitized or emulsion side of the various films and the surfaces of the original art work. The opaqued areas of any film in the foregoing sequence as reproduced in the drawing are identified by stippling. The images or that portion of an image retained in any particular step of the FIGURE and any environment surrounding the aforesaid image not opaqued is indicated by a white coloration.

Accordingly, the original art work or composite layout 10 formed of the images 12 (and including where

not otherwise expressly indicated those particular images designated 12a and 12b as well) is positioned desirably on a lighted layout table 14. To secure the advantages of this invention one or, as appears in the FIGURE, several of the images abut, overlap or are inserted within other of the images. For the purpose of this invention the expressions "abutting," "overlapping" and "inserted within" and grammatical variations thereof are embraced within the word "touching" and its grammatical variations.

Those images 12 which are not intended to be in touching relationship whether in the composite transparency or consequently in the ultimate printing plate to be prepared are then photographed in the standard manner, with film used conventionally to produce color transparencies, for example, the slide transparency films sold by Eastman Kodak Corporation, Rochester, N.Y., under the trade names EKTACHROME and KODACHROME, and by way of further illustration that designated KODAK EKTACHROME Film 6115, Daylight Type (Process E-3) and 6116, Type B (Process E-3) For this purpose the non-touching or isolated images 12 are left or re-disposed in their relative positions on the light table 14 and photographed in the manner indicated without opaquing of any portion of the image. In this way the original transparencies may be used in any variety of combinations of layouts with the same or other images in touching or non-touching relationships. The resulting original transparencies 16 are positioned using a standard registered pin system or other known register marking means on a clear piece of cellulose acetate 18, such illustratively, as that distributed by Nation Wide Plastics, Long Island City, N.Y. under the trade name GOLDEN PLAST DISTAY Acetate 005 or equivalent transparent film, on the layout table 14. The number of acetate registered original photographic transparencies 16 will vary with the number of isolated images making up the original layout 10. As shown, illustratively, under the designation "Step 1" in the FIGURE three such transparencies are prepared of the six images appearing in the composite layout 10. The image 12a when fully incorporated within the image 12b can be so retained optionally in the original transparency 16 or rendered separately as shown, by way of illustration, by the original transparencies 16a and 16b corresponding to the images 12a and 12b respectively, occurring in Step 1 of the FIGURE.

The transparencies 16 including those designated 16a and 16b of the isolated images 12 are then retained in registry upon the acetate mounted upon the layout table 14 and superimposed thereon are masking or opaquing film 20 formed most desirably of a polyester base of 3 to 7 mils to which is secured by a pressure sensitive adhesive, a layer of dyed cellulosic material of about 1 to 2 mils and preferably about 1.75 mils. This latter layer contains in a preferred embodiment a red dye which serves to render the film opaque in that region of light transmitted where orthochromatic film is sensitive, i.e., below about 5800 angstroms (A).

A commercially available product responding to this characterization is red "light-safe" stripping film sold under the trade name RUBYLITH by the Ulano Companies, Brooklyn, N.Y. and bearing the grade designations RM3-Red, DM3-Red, 5DM-Red, 75DM-Red, D3R-Red and 5DR-Red.

The mask 20 is first laid upon the original layout disposed upon the light or layout table 14 and where a portion of an image is overlapped, for example, in the composite layout the cellulose acetate layer of the masking film is defined manually by cutting with a swivel knife or sharp blade to conform to the invasion of the overlapped portion of the image. The masking film 20 is then removed to the acetate-registered original transparency 16, the emulsion side of which is faced upwardly and is in contact with the polyester base of the masking or opaquing film. The outline of the remainder of the image which is visible and unmodified in the original layout 10 is then also defined by cutting as aforesaid. The cut is made to penetrate only the cellulose acetate ply and not the polyester base ply of the masking film. That portion of the dye-infused opaquing cellulose acetate disposed over an original transparency or portion thereof to accord with the original layout 10 in pin registry with the original transparency 16 in each instance and combined within the foregoing outline in the surface of the acetate ply is then removed preferably by first lifting a corner thereof with blade tip or stripping tweezers to avoid marring the clear nonopaque polyester base of the masking film or the original transparency disposed thereunder. The original transparency 16 positioned in registry or stripped in position on the clear acetate 18 is thus clearly visible through the polyester base of the masking film 20 of Step 2 and the remainder of the acetate 18 surrounding the original transparency is masked with the red-infused cellulose acetate film opaque to orthochromatic film. The masking film 20 is then removed in each instance from registry with the underlying elements comprising the clear acetate 18 and original transparency 16. A piece of unexposed orthochromatic film 22, for example, Eastman Kodak Kodalith MP high speed duplicating film 2565 or 4565, having a thickness of 0.004 inch or 0.007 inch respectively, is placed in contact with the opaquing or masking film 20 and exposed according to standard procedures in emulsion-to-emulsion contact therewith in Step 3 of the process according to the invention, for example, a pin register system over a lighting table in which the intensity of the light source is reduced normally, or in a contact printing frame, illustratively, a pressure back frame, or most desirably a vacuum frame using a point source light to secure the greatest possible definition and exclusion of undercutting. The resulting negative 22 secured in each instance is opaque in those regions 26 where the underlying masking film 20 was present during exposure and transparent 24 where the image outlines 16 had been removed from the opaquing portion of the masking film 20 prior to exposure. The polyester base or ply where present in the masking film 20 may optionally and normally be retained during the foregoing exposure.

It should be noted that while a masking film 20 as described hereinabove is preferred, and indeed significantly so, other conventional opaquing films may also be employed. Indeed, if a lesser degree of opacity is permissible in a particular instance, a material similar to the polyester-cellulose laminate described above but in which the red dye is replaced by a less opaque amber dye, may be employed; for example, that film sold by the Ulano Companies under the trade name AMBERLITH and AMBERLITH A3A.

The individual contact negatives 22 formed in Step 3 incorporate negative reproductions 24 of only those

portions of the images 12 appearing in the original transparencies 16 as modified by the contour of the outlines defined in the masking film 20 to omit those portions of the images 12 not visible in the original layout 10 and so that these negative reproductions 24 are transparent only within that portion of each image 12 that is to appear in the final composite transparency 28 discussed hereinafter. The masking film 20 may be laid aside or discarded at the conclusion of Step 3.

Each of the original transparencies 16 is then positioned on the clear acetate 18 and the negative 22 is then punched in matched register thereto and mounted in a contact frame such as described with respect to Step 3, e.g., a pressure back or vacuum frame with a point source light, most desirably, and with an orthochromatic color reversal sheet film capable of rendering high quality duplicate positive color transparencies, most desirably KODAK EKTACHROME Duplicating Film 6120 (Process E-3) or, though less desirably, KODAK EKTACHROME Duplicating Film 6119.

This film must be handled, prior to exposure, in total darkness. When exposure is completed in this Step 4 in accordance with known and standard techniques, preferably in a contact frame as described illustratively above, the resulting color reversal positive transparencies 30 will not have an opaque environment surrounding the positive reproductions 34 (including 34a and 34b corresponding to the original transparencies 16a and 16b respectively as modified in contour by the masking film 20 in each instance) of the original transparencies 16, but rather a clear area 32. As a result, the plurality of positive transparencies 30 (as illustrated in the drawing there are three), may be placed in pin registry one atop the other and a single positive reproduction 28 made by conventional contact exposure techniques in a contact frame, as referred to hereinabove, this latter step being that designated Step 5 of the drawing using the same color duplicating film upon which the isolated color reversal positives 30 were produced. The resulting composite positive transparency 28 reproduces the original layout 10, which is, in turn, photographed to provide the separation negatives and printers or positives incident to production of a printing plate by conventional photomechanical means; that is, the composite positive transparency is photographed employing in any sequence and separately a red, green, blue, and black filter to provide the corresponding separation negatives thereof and which are thereafter converted to the corresponding positive cyan, magenta, yellow and black printers, which are then combined to form a color printing surface.

The original transparencies 18 are put aside for such further use as may be desired or necessary at the conclusion of Step 4; for example, as indicated above, the provision of a variety of other artist layouts for use in composite printing plates.

The individual contact negatives 22 incorporating the negative reproductions 24 are employed to provide the reverse color transparent positives 32 with a clear background which will be retained in the composite positive transparency 28.

In order to add color to the background of the final composite positive transparency, an additional positive transparency of the desired color is mounted in matched registry using a pin register system within the contact frame preferably under or behind the assembled several positive transparencies 30 the topmost of

which is in emulsion-to-emulsion contact with the duplication film upon which, with completion of exposure, the final composite positive transparency 28 is to be produced.

It will be evident that the terms and expressions which have been employed are used as terms of description and not of limitation. There is no intention in the use of such terms and expressions of excluding equivalents of features shown and described or portions thereof and it is recognized that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. A process for preparing a composite color transparency photograph reproducing a layout containing a plurality of colored images and in which at least two images are touching, that comprises assembling said colored layout, making a plurality of positive colored transparencies of the complete component images of said layout in isolation from any other images of said layout with which said images maintain touching engagement therein, each of said images being maintained in the same position in making each of said transparencies as it has in said layout; mounting said transparencies in registry on a clear transparent film; defining in an opaquing film an outline of each of said images of said layout; said outline invading the contours of each of said images to the extent that any portion of said images are omitted from said layout; removing those portions of said opaquing film contained within said outline; placing said opaquing film containing said outline in matched register with orthochromatic photographic film and exposing said film to provide negatives wherein the portions of said orthochromatic film in contact with the opaque portion of said opaquing film are themselves rendered opaque and the remainder of said orthochromatic film is rendered transparent; placing said plurality of positive colored transparencies of the complete images of said layout in contact with said negatives and within the portions thereof conforming to the outlines thereof as modified by said layout and placing in registry with said plurality of positive colored transparencies and said negatives and in emulsion-to-emulsion relationship thereto color duplicating film to secure positive color transparencies of each of said original transparencies, the contours of which are modified according to the outline defined in said masking film and said negatives to accord with said original layout; assembling said positive transparencies of said isolated images in register and mounting in register therewith an unexposed color duplicating film in emulsion-to-emulsion contact with the foremost of said assembled positive transparencies and exposing said unexposed film to provide a composite positive photographic color transparency of the isolated images reproduced in each of said positive transparencies; said composite transparency faithfully and accurately reproducing the original layout of said assembled images.

2. The process of claim 1 wherein each of the exposures subsequent to production of the original transparencies is undertaken in a contact frame.

3. The process of claim 2 wherein each of said exposures is effected in a vacuum frame with a point source of light.

4. The process of claim 2 wherein said masking film comprises a clear base film ply and adhering thereto an opaque film ply; and wherein the outline of the image

of the original layout is defined solely in said opaque ply; and solely that portion of said opaque ply within the aforesaid outline is removed thereafter.

5. The process of claim 4 wherein said opaque ply is opaque to light transmission below about 5800 angstroms.

6. The process of claim 2 wherein the film employed to produce duplicate contact negative transparencies reproducing the outline of each of the isolated images of the original transparencies with the outline defined by said masking film to accord with the original composite layout is an orthochromatic film.

7. The process of claim 5 wherein said base film ply is polyester and said opaque ply is red dye-infused cellulose acetate.

8. The process of claim 7 wherein said base film ply has a thickness of about 3 to about 7 mils and said opaque ply has a thickness of about 1 to about 2 mils; said plies being made to adhere one to the other by means of a pressure sensitive adhesive which upon removal of said opaque ply from said base film ply will adhere solely to said opaque ply.

9. The process of claim 2 wherein there is mounted in matched register with the assembled positive transparencies of said isolated images with contours modified to accord with those portions of the images visible in the original composite layout, a transparency which is of a desired color and from which has been severed that portion of the film corresponding to the outline of the original layout, said transparency being produced on color duplicating film identical to that upon which said positive transparencies are produced and being positioned most remote from the emulsion-to-emulsion contact of one of said assembled color transparencies of isolated images and said unexposed color duplicating film from which the composite positive duplicate transparency of said original layout is secured upon exposure, to provide a colored background about the composite of said images present in said transparency.

10. In the process of producing a color printing from a layout containing a plurality of colored images and in which at least two images are touching, the steps comprising making a plurality of positive colored transparencies of the complete component images of said lay-

out in isolation from each other, each of said images being maintained in the same relative position in each of said transparencies as it has in said layout; mounting said transparencies in registry on clear transparent film; defining in an opaquing film an outline of each of said images of each layout, said outline invading the contours of each of said images to the extent that any portion of said images are omitted from the layout; removing those portions of said opaquing film contained within said outline; placing said opaquing film from which said portions thereof have been removed to define an outline corresponding to that portion of each image retained in the layout and placing said opaquing film containing said outline in matched registry with orthochromatic photographic film and exposing said film to provide negatives in each instance wherein the portions of said orthochromatic film in contact with the opaque portions of each of said opaquing films are themselves rendered opaque and the remainder of said orthochromatic film coming within the outline from which the opaquing film is removed is rendered transparent; placing said plurality of positive colored transparencies of the complete images of said layout in contact with each of the corresponding negatives wherein each of said outlines is modified by said layout and placing in registry with said plurality of positive, colored transparencies and said negatives and in emulsion-to-emulsion relationship thereto color duplicating film to secure positive color transparencies of each of said original transparencies, the contours of which are modified according to the outline defined in said masking film and said negatives to accord with said original layout; assembling said positive transparencies of said isolated images in register and mounting in register therewith an unexposed color duplicating film in emulsion-to-emulsion contact with the foremost of said assembled positive transparencies and exposing said unexposed film to provide a composite positive photographic color transparency of the isolated images reproduced in each of said positive transparencies.

11. The process as claimed in claim 10 wherein said orthochromatic photographic film is exposed over a point source light.

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