

Dec. 7, 1948.

L. M. CONDAX

2,455,735

REGISTRATION OF COLOR-SEPARATION IMAGES

Filed April 12, 1945

FIG. 2.

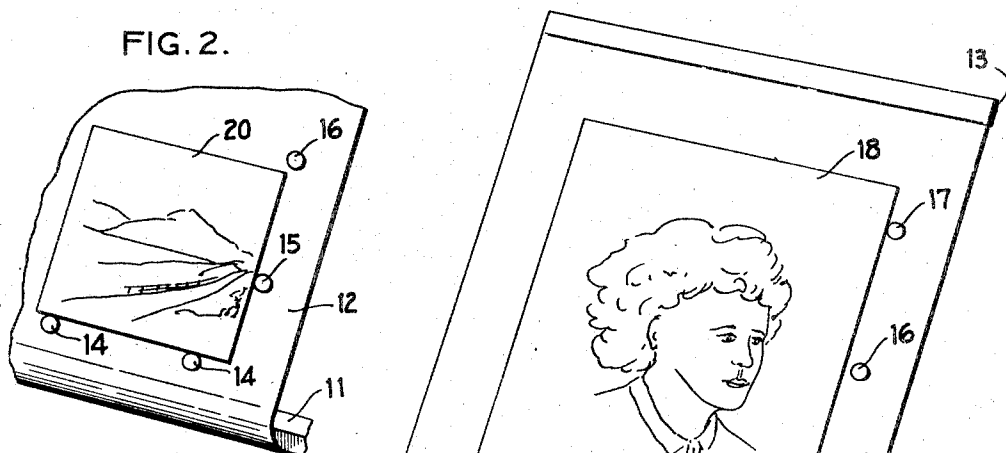


FIG. 1.

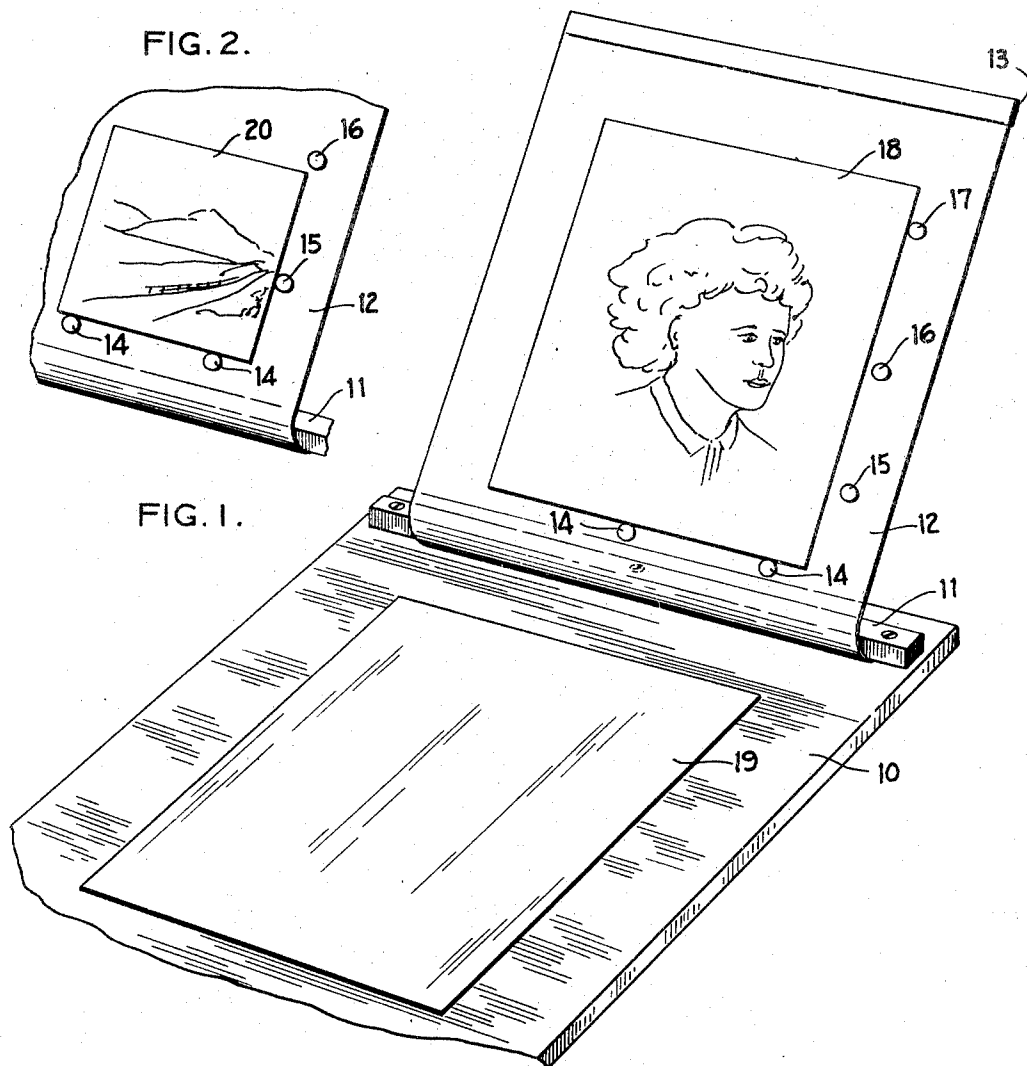


FIG. 3.

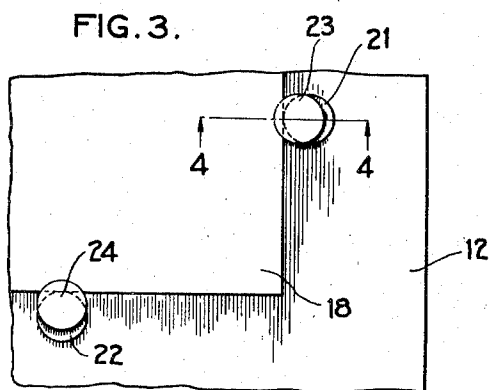
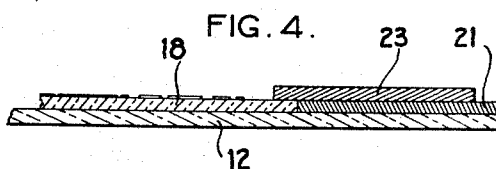


FIG. 4.



LOUIS M. CONDAX

INVENTOR

BY *Walter M. Perdue*
R. Frank Smith
ATTORNEYS

UNITED STATES PATENT OFFICE

2,455,735

REGISTRATION OF COLOR SEPARATION IMAGES

Louis M. Condax, Rochester, N. Y., assignor to
Eastman Kodak Company, Rochester, N. Y., a
corporation of New Jersey

Application April 12, 1945, Serial No. 588,013

3 Claims. (Cl. 101—211)

1

This invention relates to the dye transfer process of color photography and particularly to a registration system for color separation images.

In the dye transfer process of color photography a color image is transferred from a matrix to a blank or receiving surface. If a relief image is used as the matrix, the relief is dyed and placed in contact with the blank for a sufficient length of time to permit transfer of the dye from the matrix to the blank. When a natural-color image is desired, two or more (generally three) relief images are successively dyed and placed in contact with the transfer blank. In this process it is necessary to register all of the images, after the first, with the first image transferred to the blank.

Two methods of registration have generally been used. The first method is to interpose a thin sheet of transparent flexible material such as cellulose acetate between the transfer blank and the matrix so that no transfer will take place during registration. The matrix is held down at one end and after registration is achieved, the transparent sheet is removed and contact with the transfer blank is effected by the use of a squeegee. The disadvantage of this method is that each color matrix must be separately registered for each print. Contact of the matrix with the transparent sheet is also detrimental to the matrix so that the quality of later prints is likely to be inferior to the earlier prints.

The second method of registration which has been used is the pin system. The relief matrices are first registered over a glass or other transparent material so that registration may be achieved, and holes are then punched in two of the sides of the matrix sheet. The board on which the transfer blank is located is equipped with pins to correspond with the hole in the matrices. Each relief matrix is then dyed and placed over the pins of the transfer board and squeegeed into contact with the transfer blank. A disadvantage of this system is that the holes in the matrix sheets are easily distorted and out-of-registration prints usually result.

With both of the systems hitherto used, a squeegee is applied to the matrix to effect contact with the transfer blank and because the matrix is on the transfer blank for a few seconds prior to the application of the squeegee, bleeding of the dye is serious in many cases, particularly when dealing with large prints.

It is therefore an object of the present invention to provide a novel method for the registration of color separation images. A further object

2

is to provide a method for the registration of dyed relief images. A still further object is to provide a registration method for dyeing relief images which prevents bleeding of the dyes. Another object is to provide a registration method for dyeing relief images which avoids punching the sheets and the use of registration pins. A still further object is to provide means for registering color separation images. Other objects will appear from the following description of my invention.

These objects are accomplished by the use of the means and method hereinafter more fully described, which, in brief, consists of the use of a flexible sheet having low shrink-and-swell amplitude, to which the color separation images may be successively affixed in predetermined registered relationship.

In the accompanying drawing, Fig. I is a perspective view of the registration device of my invention;

Fig. II is a perspective view of a detail of Fig. I;

Fig. III is a plan view of a portion of the registration device of Fig. I; and

Fig. IV is a section taken on line 4—4 of Fig. III.

The essential feature of my invention is the use of a sheet of flexible material having low shrink-and-swell amplitude, to which the color separation images may be successively affixed in register, the sheet being permanently secured along one edge to the transfer board. By "low shrink-and-swell amplitude" I mean a material whose dimensions are not appreciably affected by humidity changes and by moisture. Since the color separation images are wet when applied to the registration sheet, any dimensional change in the sheet would affect the registration of the images. Materials having low shrink-and-swell amplitude, which are suitable for use according to my invention, are vinyl chloride-vinyl acetate polymers sold under the name of Vinylite by Carbide & Carbon Chemicals Corporation, such as the resin sold as Vinylite VS-1310. Other synthetic resins having low shrink-and-swell amplitude may be used, such as those described in Swan U. S. Patent 2,271,668.

My invention will now be further described by reference to the accompanying drawing.

As shown in Fig. I, the transfer board 10, which may be of any suitable rigid material such as wood, glass, Bakelite, aluminum, etc., has securely attached thereto by means of the strap 11, the sheet 12 of flexible material having low shrink-and-swell amplitude. The sheet 12 is

preferably reinforced at the outer edge as illustrated at 13 and has permanently affixed thereto the registration stops 14, 15, 16, and 17, the function of which will be more fully described hereinafter. The relief image or matrix 18 cooperates with certain of the stops 14, 15, and 16 to effect registration of the successive images. The transfer blank, or paper, which receives the final color image is represented by 19.

In order to describe the method by which registration of the images is achieved according to my invention it will be assumed that there are available three color separation matrices in relief image form. These matrices are registered one on top of the other in known manner, for example, by placing them over a glass or other transparent plate and moving them relative to each other until exact registration is obtained. The matrices are then cut along two sides with a sharp knife or other instrument, a straight line being cut along the sides. It is not necessary for the sides to be cut at exact right angles. The matrices are then dyed in the usual manner and the first matrix, represented by 18 in Fig. I of the drawing, is placed, support down, in contact with the flexible registration sheet 12. One of the straight edges is placed in contact with the stops 14, and the film 18 is then pushed over until the other edge comes into contact with one of the stops 15, 16, or 17. As illustrated in Fig. I, the film bearing the separation image 18 is of such size that it touches the stop 17.

The flexible sheet is now rotated under slight tension about the edge of the strap 11 until the matrix film 18 is almost in contact with the transfer blank 19. A heavy roller or squeegee is then run over the top of the flexible sheet 12, starting at the end nearest the strap 11 to press the film 18 into contact with the transfer blank 19. Thus, no portion of the film 18 touches the transfer blank 19 until the instant when the roller passes over it. After sufficient time has elapsed to effect transfer of the dye from the image on the film 18 to the transfer blank 19, the flexible sheet 12 is lifted and the film 18 removed. The other separation images are then placed on the flexible sheet 12 and brought into contact with the stops 14 and one of the stops 15, 16, or 17 in the same manner and the dye transferred to the blank 19.

It will be found that the wet film 18 will adhere to the flexible sheet 12 without slipping, once it has been slid into contact with the registration stops. Registration is easily accomplished and the successive relief images may be rapidly registered and the dyes which they contain transferred in register to the transfer blank 19.

The registration stops 15, 16, and 17, as shown in Fig. I, are preferably arranged on a line which is not at right angles to a line drawn through the edges of the stops 14. The reason for this is apparent from a consideration of Fig. II of the drawing. As shown in Fig. II, if a relief matrix 20 of smaller dimensions than the matrix 18 is to be registered, it will be registered by means of the stops 14 and 15. A larger matrix film would be registered by means of the stops 14 and 16 and a still larger matrix film would be registered by means of the stops 14 and 17, as shown in Fig. I. If the registration stops 15, 16, and 17 were placed on a line at right angles to the line of the stops 14, and the registration edges of the film 18 were cut at a slight acute angle, the edges of the film 18 would touch the stops 14 and 15, but not the stop 17 designed for the large size film.

A modified type of registration stop is shown in Figs. III and IV. As shown therein, the flexible sheet 12 having thereon the matrix film 18 secures registration by means of the stops 21 and 22 having the overlapping portions 23 and 24. In registering the film 18 on the flexible sheet 12, the film 18 is slid under the overlapping portions 23 and 24 of the stops 21 and 22 as shown in the sectional view Fig. IV, until the film 18 touches the stops 21 and 22. Any tendency of the film 18 to curl or lift from the sheet 12 is thus prevented by means of the overlapping portions 23 and 24 of the registration stops.

It will be seen from the foregoing description of my invention that the relief matrix is held against the flexible sheet by a film of water between them and that the registration disks or stops serve as three-point contact stops for the cut edges of the matrix film. There is no need for a glass or cover of any sort for the relief film. The flexible sheet stays flat for any length of time. The transfers can be made more rapidly because the matrix can be rinsed in a solution of lower acidity without danger of bleeding of the dyes, owing to the fact that no portion of the matrix touches the transfer blank until the instant when the roller passes over it.

It will be understood that the modifications described herein are illustrative only and that my invention is to be taken as limited only by the scope of the appended claims.

I claim:

1. The method of registering photographic transfer images which comprises producing a plurality of relief images representing different color sensation records of an object on separate supports, cutting straight lines along at least two adjacent edges of said supports when the images thereon are in register, soaking said relief images in a transfer solution, applying said supports carrying said relief images successively to a sheet of material having low shrink-and-swell amplitude, securely fastened at one end to a rigid support, and having stops cooperating with said adjacent edges of the supports to register said images, and pressing said relief images successively into contact with a receiving blank for said transfer solution on said rigid support.

2. The method of registering photographic transfer images which comprises producing a plurality of relief images representing different color sensation records of an object on separate supports, cutting straight lines along at least two adjacent edges of said supports when the images thereon are in register, soaking said relief images in a dye transfer solution, temporarily affixing said supports carrying said relief images successively to a sheet of vinyl resin having low shrink-and-swell amplitude securely fastened at one end to a rigid support, and having stops cooperating with said adjacent edges of the supports to register said images, and pressing said relief images successively into contact with a gelatin-coated receiving blank for said transfer solution on said rigid support.

3. A registration sheet for use in the imbibition process of color photography, comprising a transparent, substantially rectangular, flexible sheet of vinyl resin having low shrink-and-swell amplitude, said sheet having two flat stops projecting from one side of said sheet and substantially parallel to one edge thereof, and a series of at least 2 flat stops projecting from the same side of said sheet and near an edge adjacent to said first-mentioned edge, the stops of said series

5

being arranged in increasing distances from said last-mentioned edge, the stop nearest said first-mentioned two stops being nearest said last-mentioned edge; said stop acting to position a rectangular support bearing a relief image on said sheet, the support touching only one stop of said series of stops when positioned against said first-mentioned two stops.

LOUIS M. CONDAX.

REFERENCES CITED

The following references are of record in the file of this patent:

6

UNITED STATES PATENTS

Number	Name	Date
408,122	Megill -----	July 30, 1889
1,111,369	Dittman -----	Sept. 22, 1914
1,201,238	Batchelder -----	Oct. 17, 1916
1,976,152	Thornton -----	Oct. 9, 1934
2,029,077	LeJeune -----	Jan. 28, 1936
2,111,914	Kohlberger -----	Mar. 22, 1938
2,113,835	Gylleck -----	Apr. 12, 1938
2,384,626	Koch -----	Sept. 11, 1945