

UNITED STATES PATENT OFFICE.

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PRODUCTION OF PICTURES BY THE TRANSFER PROCESS.

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The invention relates to the production of pictures by the transfer of coloring matter from one layer into another layer in contact therewith. The invention is based on the production of positive, transparent or otherwise by a mordant color process, the diapositives in three color work in respect to their color intensity being capable of harmonization when registered one upon the other.

For mordant color processes basic coloring matters are mainly used because the close affinity of acid colors to gelatine causes them to affect the "lights" and that renders them generally unsuitable, even if they are well adapted to the mordants in the gelatine. The basic character of colors used in mordant color processes generally has the effect that such colors are not absorbed when associated with the usual mordants and squeezed against moist, gelatinized paper or the like, whereas absorption does take place in the case with acid colors.

According to my invention such absorption is caused to take place by using as copy layer or copy sheet a sheet plate or film showing a greater affinity towards the basic or acid mordant colors used than is borne by the mordant or mordants on the original.

In the first instance copy sheet may be a collodion or like sheet, which has pronounced affinity to the principal basic colors, so that many basic mordant colors can by intimate, moist contact be transferred from the mordants to collodion and like substance.

This characteristic of basic colors has been utilized for partially (but only partially) transferring basic colors from a washed relief, whereas according to my invention the operation can be carried out with each mordant color process.

A better effect is obtainable, in respect of the general character of the picture and the wider selection of available paper a. s. o., by using as copy sheet or copy layer a sheet or layer containing a mordant or mordants to which the picture is finally or provisionally transferred whose attraction, in respect of the colors used, is greater than that of the mordant or mordants in the original mordant picture. Thus one can secure, by suitable selection of the respective mordants, a complete transfer of the color. This is important not only in regard to transferring

the full strength of color, but also in regard to copying exactly the tones and shades of the original.

In order fully to utilize the possibility of harmonize it is of advantage to use transparent and nearly colorless or white mordants. Of course the mordants should in general be capable of binding and transferring nonfading colors.

In selecting mordants for the original and the copy respectively, it is generally important to use mordants whose chemical constitution and binding power is not detrimentally affected by the moisture and pressure applied, so that they will or may serve for repeated colorings and transfers, enabling a series of exact copies to be made of one picture. It is, therefore also necessary to have an original which is permanent and does not become obscure in the light.

In the case of the copy it is not so important that the mordant or mordants should be transparent and nearly colorless, if they can be removed from the copy by some treatment which does not detrimentally affect the colors.

The improved process is applicable to series of pictures in one color (for example anaglyphs), or in several colors; also for reproduction by two-color and three-color methods and so on, and in general for making series of uniform pictures, transparent or otherwise, in true natural colors, with subtractive color selection and reproduction. The process also allows of rapidly and conveniently making duplicates of photographs made with multi-color screens. Using an anti-chromatic multi-color screen negative having been fixed by dissolving the unreduced haloid of silver or having been only treated for instance with a dilute acid in order to stop development, positives of selected colors may be made by reproduction or printing by contact and may then be converted dyed and used for transferring.

It is an important advantage that if the mordants in the original and the copy are suitably selected the transfer is not excessively rapid, so that there is no difficulty in accurately registering the sheets when superimposed transfers are made. Another advantage is that transparent pictures can be made by transfer on to films or the like, so that subsequent shifting of the partial pictures in relation to each other is avoided. It

is sufficient to make a single colored printing set, which saves much time, labor and material.

According to the purpose for which the colored picture is required the mordant may be left in the picture (window picture) or removed (subject projection picture).

The following is a specific example illustrating the process:

10 A silver picture converted by known means into a picture consisting chiefly of ferrocyanide of uranium is by known means converted into a dyed picture.

15 This dyed or colored picture, in a moist state, is placed in intimate contact, with or without substantial pressure, with a sheet (paper or film) containing the colorless CuCNS as mordant so that the coloring matter associated with the mordant in the picture is transferred to the mordant in the blank.

25 The picture may be dyed repeatedly, to make repeated transfers. The mordant may remain in the copy, or be removed therefrom.

A picture in natural colours may be made by the three color method, using three pictures of selected colors.

30 A copy-layer as mentioned in this specific example represents the "incorporation-type" within this special case-one mordant substance.

35 The "incorporation-type" may be substituted by another type, which is characterized in using a copy-layer a sheet which as such shows the necessary condition.

40 Example: A sheet of collodion, which because of its pronounced affinity towards basic colors enables the transfer of basic mordant colors.

The excellent mordant CuCNS shows affinity towards basic and certain acid mordant colors.

45 What I claim as my invention and desire to secure by Letters Patent of the United States is:

1. The process of producing color prints by the dye-transfer process consisting in using moist mordant dye-images for printing purposes in most intimate contact with 50 copy-sheets or layers showing a greater affinity towards the dye-stuffs used than is borne by the mordant printing images.

2. The process of producing color prints with a set of mordant color positives produced by means of partial negatives made by selective color photography, the transfer being made from said positives successively onto a single sheet or layer showing a greater affinity towards the dye-stuffs used 60 than is borne by the mordant printing images.

3. The process of producing color prints with a set of positives made by the selective color method from a negative image made 65 with a multi-color screen, the positives being printed successively onto a single sheet or layer showing a greater affinity towards the dye-stuffs used than is borne by the mordant printing images. 70

4. The process of producing color prints with a set of positives made from a multi-color screen negative by the selective color method by using a multicolor screen negative, which has not been fixed by dissolving 75 the unreduced haloid of silver, but has been made stable by eliminating rests of all reducing substances, the positives being printed successively onto a single sheet or layer showing a greater affinity towards the 80 dye-stuffs used than is borne by the mordant printing images.

5. In the process of producing color prints, when performed with a mordant compound or mordant compounds on the 85 copy-sheet or layer, removing the said compound or compounds after the printing by chemical treatment whereby the colors are not affected.

In witness whereof I have signed this 90 specification.

DR. RUDOLF VON ARX.