

Feb. 7, 1933.

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1,896,739

PRODUCTION OF COLOR PLATES

Filed June 18, 1930

Fig. 1.

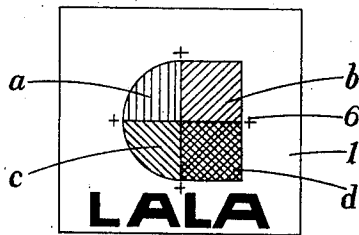


Fig. 2.

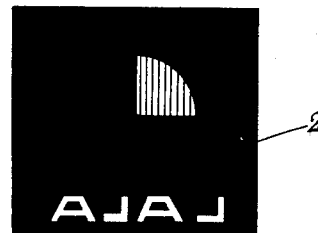


Fig. 3.

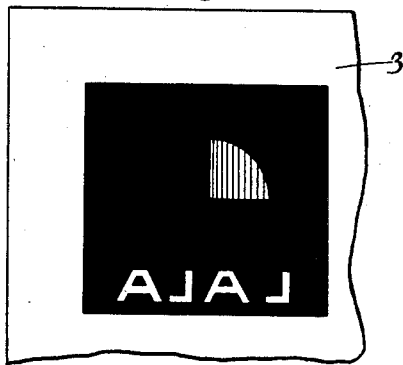


Fig. 4.

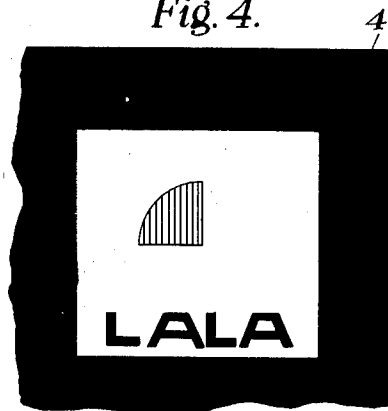


Fig. 5.

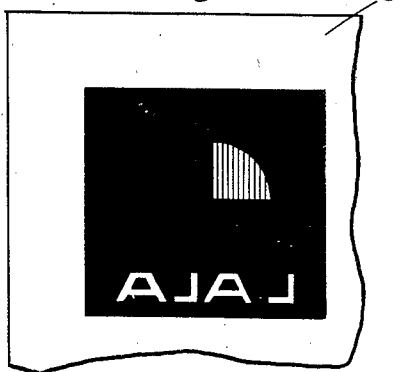
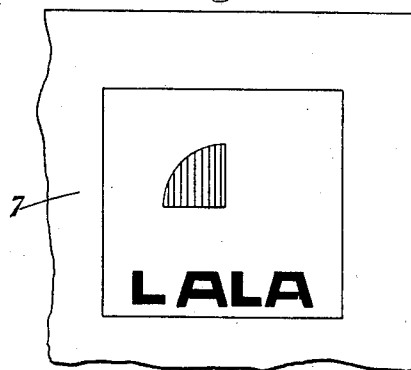


Fig. 6.



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## UNITED STATES PATENT OFFICE

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## PRODUCTION OF COLOR PLATES

Application filed June 18, 1930, Serial No. 462,134, and in Germany January 21, 1929.

I have filed an application in Germany, January 21, 1929.

The present invention relates to a process of producing photo-mechanically color printing plates of the kind used in offset and copperplate printing, lithography and photolithography.

In color printing work, the various colors are printed one upon another, and each color requires a special printing plate. These color printing plates must be carefully adapted to one another to insure perfect register of the succeeding prints with the first one, and are made by securing a negative or dia- positive film to a glass mounting plate and printing the latter photo-mechanically on to the sensitized printing plate, whereupon the second color film is secured to the mounting plate at exactly the same spot as the first film and transferred by contact print to another printing plate. This process is repeated as often as color films have been made from the original, perfect register of the various color printing plates being insured by certain marks which have the form of a cross and are arranged in exactly the same position both on the mounting plate and on the original. The marks of the original appear of course on the color films at the same spots. If the printing plate represents only one large image, it is a comparatively simple task to insure perfect register of the various plates, but the difficulties are considerable if the plate comprises a larger number of pictures, say of postcard size, each of which possesses special register marks of its own. The marks on the mounting plate are made by hand in exactly the same arrangement as the marks on the original. Obviously this transference cannot be carried out with mathematical accuracy, but there are generally certain differences even though small, so that an exact registering of the marks on the films with those on the mounting plate cannot be obtained at every point. It also happens very frequently that the films are distorted during preparation in which case they only permit of an approximate registering. These inaccuracies make themselves undesirably noticeable in the printing, for

example, the colors overlap one another somewhat or there are empty spaces between them.

The process forming the subject of the present invention is intended to simplify considerably the production of printing plates for color work in offset and copperplate printing, lithography and photolithography, to reduce further the cost of production and to increase accuracy in production to such a degree that every source of error is eliminated.

The process for the production of color printing plates according to the invention consists essentially in producing from an original a number of different color records sufficient for the printing of the various colors, securing one of said color records on a glass mounting plate, producing photographically from said last named color record on glass plates coated with a bichromated colloid a number of laterally uninverted prints, coloring said prints with dyestuffs which allow of the passage of actinic rays without hindrance, employing said prints for the mounting of the remaining color records and printing said color records photographically on to the printing plate.

The individual steps of the process according to the invention are illustrated by way of example in the accompanying drawing, in which:

Fig. 1 shows an original which is to be reproduced by printing,

Fig. 2 a color record prepared from the original,

Fig. 3 a mounting plate with the first color record attached thereto,

Fig. 4 a contact copy prepared from the plate shown in Fig. 3 on glass having a light sensitive coating (hereinafter termed an intermediate plate),

Fig. 5 a contact copy prepared from the plate according to Fig. 4 on glass having a light sensitive coating, which plate serves as a mounting plate for the attachment of a further color record, and

Fig. 6 a contact copy on the printing plate of the plate shown in Fig. 3.

In Fig. 1 the reference numeral 1 denotes

an original which is to be reproduced and which contains a design in four colors. For example, the field *a* and the lettering may be colored red, the field *b* blue, the field *c* yellow and the field *d* green. This original is first of all photographed but with a color filter, which allows light of every color except red to pass, inserted in front of the objective of the camera. In this way there is produced the negative 2 for the red color component record shown in Fig. 2, which is the so-called first color record.

In the ordinary way the color record illustrated in Fig. 2 would also faintly show the fields *b*, *c* and *d* of the original (Fig. 1). The formation of images of these fields can, however, be suppressed to a considerable extent by the choice of a light sensitive material and weak images of the said fields may be removed during development.

From the original there are then prepared further records using a filter which allows no blue rays to pass and a filter which allows no yellow rays to pass respectively in front of the objective of the camera, thus producing the second and third color records. Although the design is in four colors a fourth color record need not be made since, as green is composed of blue and yellow, the green field *d* is produced partly in the second and partly in the third color records.

The first color record is now secured to a glass mounting plate 3 of the usual kind (Fig. 3) and from this is made a contact copy on a glass plate 4 which has been previously coated with a bichromated colloid. The print on this plate is at first scarcely visible and for this reason the plate 4 is dyed with a so-called anti-actinic dyestuff, that is to say, a dyestuff which does not permit the passage of light rays through the dyed parts of the plate. This anti-actinic dyestuff takes only on the parts which have been acted upon by light and is washed away from the remaining portions of the plate. In this manner is produced the plate shown in Fig. 4 which may be termed the intermediate plate.

From this intermediate plate are now prepared also a number of contact copies on glass plates 5 which have likewise been coated with a bichromated colloid. The prints on these plates are likewise at first scarcely visible and the plates are therefore also dyed, but with a so-called actinic dyestuff, that is to say, a dyestuff, such as a light blue dyestuff, which offers practically no hindrance to the passage of chemically active rays. This dyestuff again takes only on the parts of the plate which have been exposed and after the plate has been washed the design is clearly visible in actinic dyestuff (see Fig. 5).

The plates 5 prepared in this manner are absolutely true copies of the mounting plate

shown in Fig. 3 for the first color record, that is to say in the example being considered, for the red record. Each one of these plates 5 serves as a mounting plate for the securing of one of the remaining color records, that is to say in the example according to the drawing the blue color record is secured on the one plate 5 and the yellow color record on the other plate 5. The blue and yellow color records are certainly somewhat different in appearance from the red color record shown in Fig. 2 and the prints thereof on the mounting plates 5. Nevertheless the plates 5 as shown in Fig. 5, on each of which is a print of the red color record, provide very good guiding marks for indicating how the blue and yellow color records respectively must be secured to the plates 5 so that they occupy exactly the same position on these plates as the red color record on the plate 3. In the example being considered the contour lines of the individual fields of the design or the lettering near the design may be used as guiding marks.

Of course special crosses 6 may also be provided on the original, which are reproduced on all the color records of the original and consequently on the auxiliary plate 4 and the final mounting plates 5. But these crosses alone do not provide absolutely certain guiding marks for the mounting of the second and third color records on the plates 5, since the material on which the second and third color records are made, particularly if this is a film, may be distorted. For this reason the crosses 6 are only used as rough guiding marks for the second and third color records on the plate 5, the contours of the second and third color records then being compared with the contours of the design on the plates 5.

Since the mounting plates 5 are dyed with actinic dyestuff, only the design of the color records secured to the plates 5 and not the design on the plates 5 themselves will be transferred to the zinc plates 7 in the course of the preparation of contact copies of the plates 5 on the zinc plates, since the light rays pass unhindered through the actinic dyestuff.

Before photographically printing the color records secured on the plate 5 on to the printing plate 7, it is preferable to stick non-transparent material, for example tin-foil, on to the plate 5 all round the design, in order to avoid exposure of the printing plate at undesirable places.

The preparation of the mounting plates 5 from the intermediate plate 4 is required since in the contact copy a laterally uninverted design is first produced whilst the mounting plates 5 must be laterally inverted. Under certain conditions, however, the employment of an intermediate plate 4 may be avoided if the red color record is secured to the glass plate 3 in a laterally inverted position, that is to say with the sensitized side

of the color record adjacent to the glass plate and not situated on the outside as is usual. From the glass plate with the attached laterally inverted color record may then be prepared on glass plates sensitized with a bichromated colloid, as many contact copies as there are color records. These contact copies are then likewise dyed with actinic dyestuff for the mounting of the individual color records. Thus in the example being considered the red color record is mounted on one contact copy, the blue on a second and the yellow on a third. These glass plates are now indeed not negatives as shown in Fig. 5 but diapositives. But this is of no importance for the process since the diapositives provide quite as good guiding marks for the securing of the color records, as the negatives. In this process the glass plate on which the first color record is mounted in a laterally inverted position may be termed an auxiliary plate since it is not used again after the preparation of the contact copies.

It will be understood from the above description that it is completely immaterial which color record is used as the starting point, that is to say as the first color record. Preferably the first color record chosen is that which shows the greatest number of characteristic features of the original which is to be reproduced by the printing. The original shown in Fig. 1 of the accompanying drawing is of the simplest possible form and it will be realized that the more contours and contrasts possessed by the picture, the greater will be the detail in the mounting plates shown in Fig. 5 which are prepared by contact printing.

The essential feature of the invention lies in the fact that for the mounting of the individual color records glass plates are employed which carry, according to the circumstances, incomplete prints of the original to be printed, these prints being in a color which is completely transparent. It is of no importance in itself whether these prints are negatives or diapositives and likewise whether the color records themselves are negatives or diapositives. This is governed essentially by the printing processes or by the further treatment of the zinc plate, the stone, the copper cylinder or the like on which the mounting plates with the color records are copied.

The process according to the invention has also a further advantage. Since different mounting plates are employed for securing the different color records these mounting plates with attached color records may be kept until the printing has been completed. If during the printing operation a printing plate should for any reason become unusable, a new printing plate can at once be prepared from the corresponding mounting plate which has been retained. This was not pos-

sible with the former processes in which the color records were secured one after another to one and the same mounting plate since the attached color records had to be removed from the mounting plate after the copying on to the corresponding printing plate, so that the mounting plate could be used for the attachment of the next color record.

I claim:

1. A process for the production of color printing plates, consisting in producing from an original a number of different color records sufficient for the printing of the various colors, securing one of said color records on a glass mounting plate, producing photographically from said last-named color record on glass plates coated with a bichromated colloid a number of laterally uninverted prints, coloring said prints with dyestuffs which allow of the passage of actinic rays without hindrance, employing said prints for the mounting of the remaining color records and printing said color records photographically on the printing plate.

2. A process for the production of color printing plates, comprising in steps: producing from an original a number of different color records sufficient for the printing of the various colors required; securing one of said color records on a glass mounting plate; producing photographically from said last-named color record a print on an intermediate glass plate having a light sensitive coating; coloring said print with dyestuff which does not allow of the passage of actinic rays; producing photographically from said print by contact printing a number of other prints on glass plates; coloring said last-named prints with dyestuff which allows of the passage of actinic rays without hindrance; employing said last-named prints for the mounting of the remaining color records; and printing said color records photographically on to the printing plate.

3. A process for the production of color printing plates, comprising in steps: producing from an original a number of different color records sufficient for the printing of the various colors required; securing one of said color records in a laterally inverted manner on a glass mounting plate; producing photographically from said last-named mounted color record a number of prints on sensitised glass plates; coloring said prints with dyestuffs which allow of the passage of actinic rays without hindrance; employing said prints for the mounting of the remaining color records; and printing said color records photographically on to the printing plate.

In testimony whereof I have affixed my signature.

RUDOLF BRESLAUER.