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A. G. HAPKE

2,046,326

COLOR REPRODUCTION PROCESS

Filed March 8, 1935

Fig. 1

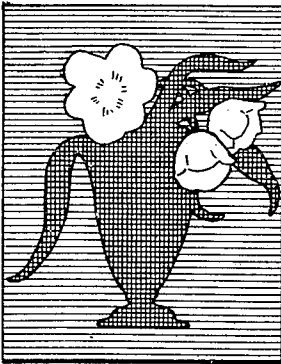


Fig. 2



Fig. 3

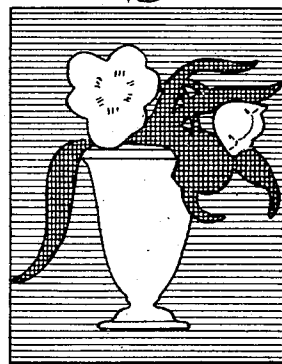
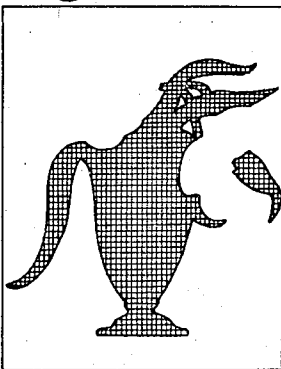
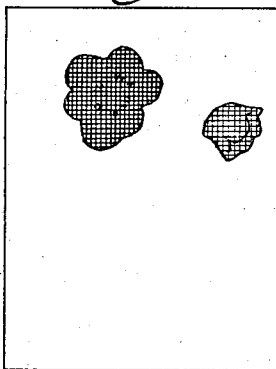


Fig. 4



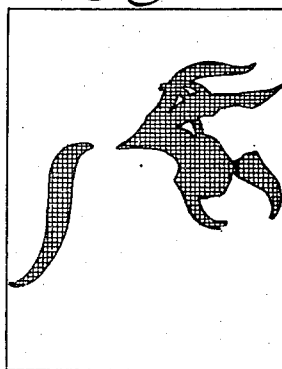
BLUE COLOR

Fig. 5



RED COLOR

Fig. 6



YELLOW COLOR

Fig. 7

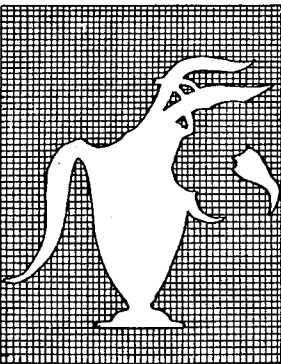


Fig. 8

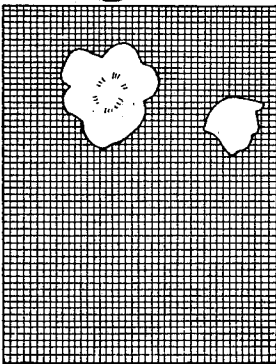
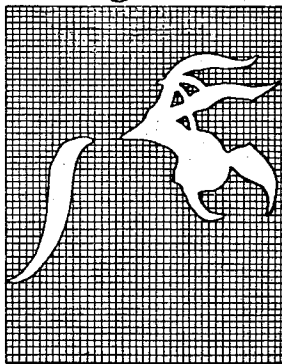


Fig. 9



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COLOR REPRODUCTION PROCESS

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7 Claims. (Cl. 95-5.1)

This invention relates to instrumentalities and processes for use in connection with color printing, or color reproduction, and to the method of printing in colors by running the paper or other material through the printing press one or more times, such, for example, as three times for a three color printing job, of the well known character.

Generally stated, the object of the invention is to provide certain novel steps in a color printing process or method of color reproduction of this character, for the purpose of reducing the cost of color printing, more particularly work of this kind in which two or more colors are employed, in the production of colored pictures or ornamental work, thereby to not only reduce the cost of production, but also to insure, in some ways, more satisfactory and effective results than heretofore.

It is also an object to provide certain details and features tending to increase the general efficiency and the desirability of a color printing process or method of this particular character.

To the foregoing and other useful ends, the invention consists in matters hereinafter set forth and claimed and shown in the accompanying drawing, in which—

Fig. 1 shows a positive print from the negative of the picture which it is desired to reproduce by color printing, with certain alterations therein made by hand, with respect to one of the colors to be used in printing.

Fig. 2 is a similar view showing another identical positive print altered by hand with respect to one of the other colors to be used in the printing of the desired picture.

Fig. 3 is a similar view showing another identical positive print altered by hand with respect to the third color of the three color printing process by which the desired picture is to be reproduced.

Fig. 4 shows the print 1 with everything washed off except the portions that were treated by hand in Fig. 1.

Fig. 5 is a similar view of what is shown in Fig. 2, with everything washed off except the portions that were touched up or altered by hand.

Fig. 6 is a similar view bearing a similar relation to Fig. 3 of the drawing.

Fig. 7 is a photographic negative of what is shown in Fig. 4.

Fig. 8 is a similar negative of what is shown in Fig. 5.

Fig. 9 is a similar negative of what is shown in Fig. 6 of the drawing.

As thus illustrated, referring to Figs. 1, 2, and 3, it will be understood that these are positive prints made from a photographic negative, each the same as the others, initially, upon the completion of each print. These prints are made on plates, of any suitable character, as hereinafter more fully appears, which plates have been sensitized in a manner that will hereinafter more fully appear. In Fig. 1, the portions that are desired to be blue in the ultimate picture have been blacked or darkened by hand by a brush or other instrument. In Fig. 2, those portions which are desired to be in red in the ultimate picture have been similarly treated with a brush or other instrument. In Fig. 3, the portions of the ultimate picture that are desired to be in yellow have been blacked or darkened by a brush or other instrument.

Fig. 4 shows the plate shown in Fig. 1, but with everything washed off except the portions that were altered or treated by hand, leaving nothing but these portions on a white background. Fig. 5 is the plate shown in Fig. 2, similarly treated, leaving only the portions that were altered or treated by hand on a white background. Fig. 6 bears the same relation to Fig. 3, showing the plate washed up to remove everything except the portions that are shown darkened by hand in Fig. 3 of the drawing.

The next step is to photograph, through a screen, each of a standard angle for its separate color, each of the three plates shown in Figs. 4, 5, and 6 of the drawing. Fig. 7, therefore, shows a photographic negative of the plate shown in Fig. 4 of the drawing. Fig. 8 similarly shows a photographic negative of the plate shown in Fig. 5 of the drawing. Similarly, Fig. 9 shows a photographic negative of the plate shown in Fig. 6 of the drawing.

From here on, the process or method is substantially the same as that employed in three color printing work, which is as follows: The negative shown in Fig. 7 will be used to produce a print on a zinc etching block, or other similar block for printing, and everything will be etched away except what is shown in white in Fig. 7 of the drawing. A similar printing block will be made from the negative shown in Fig. 8 of the drawing, and a third one from the negative shown in Fig. 9 of the drawing. The block made from the negative shown in Fig. 7 will be used to apply the blue color to the picture; the plate made from the negative shown in Fig. 8 will be

employed to apply the red color desired for the ultimate picture; and, similarly, the plate made from the negative shown in Fig. 9 of the drawing will be employed to apply the yellow color to the picture. Three runs through the printing press, or through three separate processes, will thus be necessary, in the usual manner.

With the pictures such as shown, where some of the yellow is applied over the blue, a fourth color is obtained, green, for the leaves and some of the stems of the flowers, as shown in the drawing. In Fig. 4, for example, the vase has been blacked or shaded, as well as the leaves and some of the stems of the flowers, thus providing for the ultimate blue of the vase, and the ultimate green of the leaves and some of the flower stems, when the yellow color provided by the treatment shown in Fig. 6 is applied over the leaves and some of the flower stems, but not over the vase shown in the drawing. Obviously, as indicated in Fig. 6, one of the flowers will be shown yellow, while, as indicated in Fig. 8, one of the flowers will be dark red, while the smaller flower will be a lighter shade of red, or even a light pink. Obviously, some of the flowers, by leaving merely the outline thereof, can be white, or substantially so, as may be desired.

It will be understood, of course, that after the three printing blocks have done their work, and produced the picture in the desired colors, the dark or other background can then be applied by another suitably made printing block, as well as any black lining or other shading on top of the colors, whereby all the black necessary for portions of the picture is put on last, after the different colors have been applied, leaving the vase and the flowers and leaves of the picture shown with a black or colored background, as may be desired, in the well known manner.

In this way, by making inexpensive prints from the original negative, on as many metal plates as there are colors to be applied to the picture, a considerable reduction in the cost of production is obtained, as these prints on metal plates are then treated by hand, by blacking or darkening the parts that are to be colored, with one color or another, and the remainder of the picture is then washed off, leaving only those portions which have been darkened or treated by hand, whereby the process is simple and comparatively inexpensive, as comparatively simple and cheap materials are employed, as well as only a minimum of manual labor and hand work. The three prints on metal plates are, in fact, blue prints, made from the one photographic negative, which latter is merely an outline affair, with lines for shading, such as would produce a print on ordinary blue print paper. But the method of treating the three metal plates, to obtain practically blue print impressions thereon, is preferably as follows:

The plates shown and described may be stainless metal plates of one kind or another, but preferably they are metal plates covered with white enamel, as the white enamel has a definite and well understood photographic value. The plates may be made of any inflexible and waterproof material having a hard white surface. These plates are sensitized with a solution comprising the regular blue print formula, but with the addition of albumin and gelatin, thereby forming an emulsion, the albumin for holding the blue print on the surface of the enamel, and the gelatin for binding all together and harden-

ing by means of the alum in the development bath. For the development of the exposed plates, they are placed in hot water and fixed in a bath of potassium bichromate and alum in the following proportions: one ounce of potassium bichromate, one ounce of alum, and twenty ounces of water. The plates are dried, and the color equivalent is applied to each in the various shades of gray, as indicated in the drawing, and as previously described, which shades are well known. Each of these shades has a specific dot formation when photographed through a screen. The color tone of each of these dot formations is known, and may be registered on a scale made for that purpose. Of course, very obviously, with this method, it is easy to reproduce every color combination in the spectrum. The color scale, every shade of gray as applied to one color, is combined with every shade of gray as applied to each of the other colors, including black, each of two other colors, and each of three other colors, and each color so made being numbered for each shade of gray being used in the respective color of the combination. Each shade of gray, of course, has a different dot formation in this well-known half-tone method of photography. When a lined drawing is reproduced, a lined negative is made thereof; but if the copy is a wash drawing or photograph, a screen negative is made thereof. The sensitizing solution on the plates turns a blue color, the photographic value of which is known and can be utilized in the color process. Such blue areas, when not used for color value, can be removed with a damp cloth, as previously explained, leaving these portions of the plate white. The use of metal or ceramic plates insures against stretching or shrinkage, as the final negatives must be in perfect register. By the use of the color scale, the gray paint, from practically white to black, every color can be reproduced exactly, so that anyone unaccustomed to the use of color can match the shade. Also, it is important to observe that the solution employed for sensitizing the metal plate results, when the plate is developed, in an almost non-photographic shade of blue.

Of course, while the method shown and described is useful in connection with color printing, it will be easily understood that the method can be used in a number of different ways to produce color reproduction, in the graphic arts.

Thus the final negatives are made by directly photographing the prints, after the latter have been treated with a brush, in the manner explained, and each original print is made from the original negative on a smooth white waterproof surface which has been sensitized to produce a blue print positive on said surface, as the direct result of the exposure of said surface to light through the original negative. Each original print, as originally made, directly from the original negative, is visible to the naked eye, very plainly, when the print is developed, and does not need anything more thereafter, except the touching up with a brush in the manner shown and described.

What I claim as my invention is:

1. A process for use in color printing or color reproduction, comprising the use of an ordinary photographic negative, of the picture or other thing to be reproduced, to obtain a positive visible print of said negative on the smooth white surface of a waterproof plate, said white surface having been sensitized to produce a blue

print positive which is practically of non-photographic value, blacking or shading the portions of the print that are desired to appear in a certain color on the ultimate picture, washing off or removing all other portions of the print, leaving only the treated portions thereof on a white background, and producing a photographic negative of the print thus treated, by directly photographing said print, from which negative the zinc etching or other printing block, for this particular color, is then made.

2. A process as specified in claim 1, comprising the use of a plurality of prints of the character specified, with a different treatment for each print, whereby the ultimate photographic negative of each print will be for a different color.

3. A process as specified in claim 1, comprising a plurality of prints from said original negative, with each print treated to represent a different color, whereby there are then three ultimate negatives, each for use in making a different printing block with one print treated to produce a block for blue, another for red, and

another for yellow, whereby the ultimate picture may include blue and yellow and green, as well as dark and light shades of red.

4. A process as specified in claim 1, said print being made on a smooth metal plate, said plate having white enamel thereon, to provide said white surface upon which the print is made.

5. A process as specified in claim 1, said print being made on a white sensitized blue print surface, directly from said negative, so that the resulting print is immediately an almost non-photographic shade of blue.

6. A process as specified in claim 1, said sensitized surface being made by using an emulsion involving albumin and gelatin.

7. A process as specified in claim 1, comprising the development of the said print by immersion thereof in a solution of potassium bichromate and alum and water in the following proportions, to-wit: one ounce of potassium bichromate, one ounce of alum, and twenty ounces of water.

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