No. 897,815. PATENTED SEPT. 1, 1908.

C. L. A. BRASSEUR.

MAKING PHOTOGRAPHIC PRINTS.

APPLICATION FILED JULY 20, 1906.

Fig. 1.

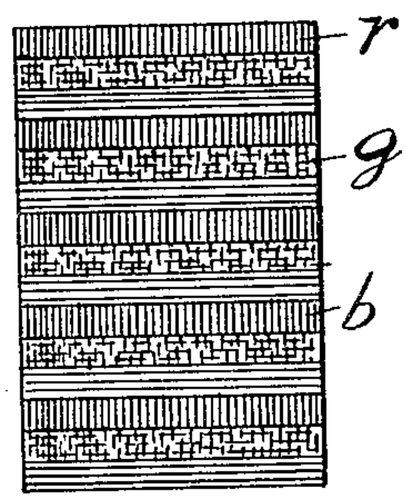


Fig. 2.

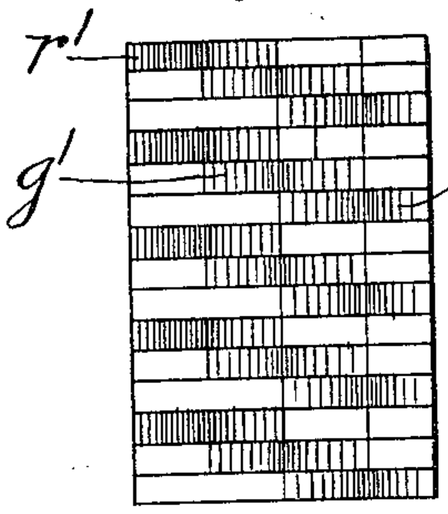


Fig. 3.

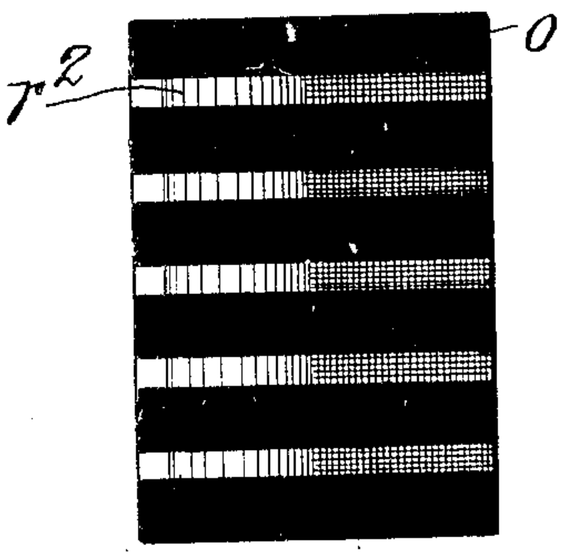


Fig. 4.

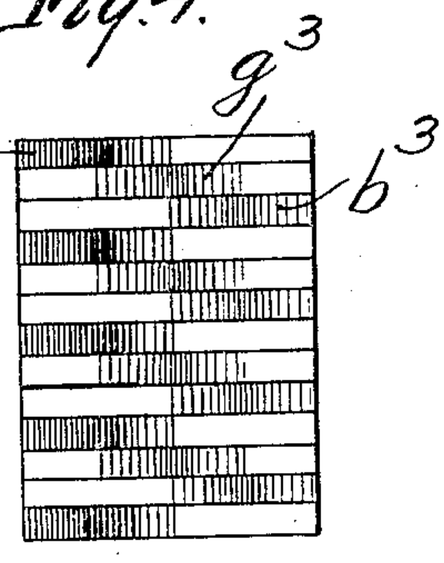


Fig. 5.

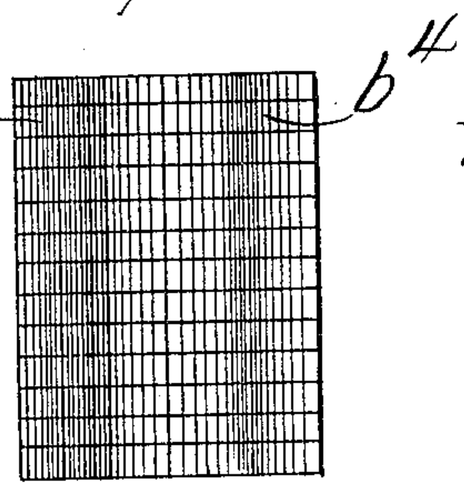
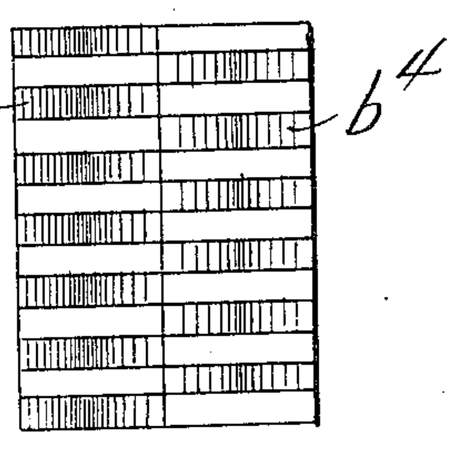


Fig. 6.



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UNITED STATES PATENT OFFICE.

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MAKING PHOTOGRAPHIC PRINTS.

No. 897,815. Specification of Letters Patent. Patented Sept. 1, 1908.

Application filed July 20, 1906. Serial No. 326,975.

To all whom it may concern:

Be it known that I, CHARLES L. A. BRASSEUR, a citizen of the United States, and a resident of the city, county, and State of New York, have invented a certain new and useful Improvement in Making Photographic Prints, of which the following is a specification.

This invention relates to the preparation of plates for use in polychrome printing, and has for object the obtention or obtainment of results true or approximately true, in the print, to nature. Theoretically, the trichromatic method of color printing should secure the desired results, but the difficulty of securing uniformity in the printing has led to the use of four or more colors to obtain desirable and uniform results. The fourth plate is usually known as the "tone plate."

In Letters Patent No. 571,314, dated November 10, 1896, is set forth a method of forming printing surfaces from a subdivided photograph.

The present invention relates to the formation of a tone plate from a subdivided photograph.

The invention consists of the method hereinafter described and more particularly pointed out in the appended claims.

The figures of the accompanying drawing, forming part hereof, are diagrams illustrative and explanatory of the invention.

In the drawing—Figure 1 is an enlarged view illustrative of the linear partycolored screen used in taking the subdivided photographs; Fig. 2 is a similar view illustrating a negative of the spectrum taken behind a screen such as is illustrated in Fig. 1; Fig. 3 is a similar view showing a black and white screen laid upon a subdivided photograph and covering two of the partial images thereof; Fig. 4 is a similar view showing a negative of the spectrum, taken from such a positive as is shown in Fig. 3, but with unequal times of exposure for the three partial images; Fig. 5 is a like view showing two partial images (the red and the blue) on one plate; and Fig. 6 shows two juxtaposed partial images on one plate.

In Fig. 1, the reference characters *r g b* mark the lines of the partycolored taking screen, while in Fig. 2, the references r^1 g^1 b^1 represent negatives (partial images) of the spectrum taken behind the screen shown in Fig. 1, the points of maximum density of silver deposit being indicated by crowding the lines together and falling in the orange, the yellowish-green, and in the blue regions of the spectrum. In a positive made from such a negative, the points of maximum clearness or whiteness fall in the same regions, and the "red" partial image of such a positive is shown in Fig. 3 at r^2. It will be observed that, in Fig. 2, the densities of deposit are practically the same in the "red," the "green", and the "blue" partial images, r^1 g^1 b^1, this being required in order that white light may be had by synthesis and also that correct color values may be secured on combining the positive with a "viewing screen." But it is evident that the same positives, if used only as black and white photographs, will not be orthochromatic in value, as both the green and the blue, in a photograph of the spectrum have the same luminosity as the red (reddish-orange).

What is true of the spectrum is true to a certain extent of all the negatives obtained by this method. If, therefore, it is desired to obtain from negatives which are correct for color synthesis, black and white prints more satisfactory in color-values, or to make a tint plate for color-printing in which the different colors will appear to have about the correct luminosities, it is best to proceed as follows, towit: First, make a diapositive by contact-printing from the original negative; then place the positive in the copying camera in close contact with a black and white screen ruled as shown in Fig. 3, where the black or opaque lines *o* are twice as wide as any of the lines *r g b* of Fig. 1; that is, the lines *o* cover two of the partial images while leaving the third partial image exposed, as shown in Fig. 3. If this diapositive is copied in the copying camera, by exposing the "red" image for say thirty (30) units of time, and then moving the black and white screen so as to expose the green image (the "red" and the "blue" being covered) and without moving the negative plate on which the "red" has already been impressed, for, say, twenty (20) units of time; and then again moving the black and white screen to expose the "blue" while covering the "red" and the "green," but without moving the negative plate on which the "red" and the "green" have now been separately impressed, and exposing the "blue" for, say, ten (10) units of time, then the resulting negative will appear as in Fig. 4, where r^3 g^3 b^3 represent the three partial images, instead of as in

Fig. 2 where the corresponding images are represented by r^1 g^1 b^1.

The positive print from the negative shown in Fig. 4 will show the orange region of the spectrum quite luminous, the green less, and the blue least luminous—which is as it should be in good orthochromatic photography. It is preferred, while making the three exposures for this second negative (that shown in Fig. 4), to move the negative plate (or, what amounts to the same thing, to move the black and white screen and the positive as one thing) the width of two lines in a direction at right angles to the lines *o*, during the exposure of each partial image of the positive, so that each of the three partial images will be copied upon those portions of the plate which correspond to the other two partial images. This procedure has the effect of a more brilliant negative than is the case where such shifting is not done. It should be understood that the motion of the negative plate (or its described equivalent, the motion of the black and white screen and the positive) is in the plane of the said plate. The purpose of this motion, which, as above stated, is repeated while copying each of the partial images, is to convert the original negative, made up of three partial images, into one negative made up of three superposed images. As a result, there is no appearance of lines, the resulting fringes being absolutely negligible, and if the relative exposures have been correctly timed, the result obtained is the same as if the negative had been obtained in the first instance through three plain unruled monochrome screens, with the exposures so timed as to secure correct orthochromatic effects. In proceeding in this manner, care must, however, be taken to bring the plate (or screen and positive) back to its (or their) original position, after making one exposure, before beginning the next exposure, or the exposure of another partial image.

It is to be noted that the essential difference between the present method and that described in said Letters Patent 571,314 is, that in the new method, two or more images (preferably three) of the original negative are copied on one plate, while the old method describes each of the three partial images constituting the original negative as copied on a different plate, or a separate plate for each partial image. Further, by the new method, the relative luminosities of the different images are made to differ from that which they had in the original negative.

By varying the periods of exposure in copying the diapositive, the operator is enabled to vary at will the color values of the different parts of the negative corresponding to the different colors and to obtain thereby a desired effect. Moreover, any of the three colors can be eliminated and the remaining two colors be grouped at will by correspondingly shifting the negative plate and the screen in copying the diapositive. For instance, Fig. 5 shows a negative in which the "red" and the "blue" images are each shifted, in the copying, as above described, so that the two images, r^4 b^4, may be said to be placed one on the other, or, rather, each complements the other on the same linear spaces. In Fig. 6 is shown a negative in which the red and blue are placed in juxtaposition. The green partial images are omitted from both Fig. 5 and Fig. 6.

It is evident that any desired or predetermined combination of color values can be obtained by accordingly combining the different negatives and giving suitable exposures, as, for instance, for making the usual fourth plate, or any supplementary plates provided with special suitable colorations.

By the term "fourth plate" is meant the plate which, in chromo-photographic processes, is printed in a gray or neutral color. Theoretically, this plate is unnecessary, but its use is becoming more and more widespread, as it is undoubtedly helpful as a compensation for the irregularities of tri-chromic printing. As this gray tone must not tarnish or subdue the bright or light colors, it is essential that the negative from which it is made shall have the color values necessary to attain that end. This result is obtained, in the present method, by giving exposures of different lengths while copying the three partial images.

The foregoing description applies to color-printing in the colors of nature, but it is evident that in producing prints which are merely decorative, any combination of images can be made to obtain desired color effects.

The "fourth plate" is made from the photograph described, in any usual or suitable manner, as will be understood.

It will be observed, in Figs. 4 and 5, that each partial image has its own place, and in Fig. 5, that each partial image is printed over the whole of its own portion of the photograph, as indicated by the references r^4 and b^4. It will be observed further that, in a positive from a negative such as is shown in Fig. 4 (and from one in which each partial image covers the whole of its portion of the plate), there is a decrease in luminosity toward the blue end of the spectrum, and an increase in luminosity toward the red end of the spectrum. It will also be observed that the described method enables one to secure a photograph with but one point of maximum density of silver deposit instead of three such points or two such points.

What I claim as new and desire to secure by Letters Patent of the United States is—

1. The method, substantially as hereinbefore set forth, of obtaining from a subdivided

photograph (negative or diapositive) another photograph (positive or negative), containing a plurality of partial images, in which the color values or luminosities of the different partial images are differently rendered, consisting in printing the selected partial images unequally.

2. The method, substantially as hereinbefore set forth, of obtaining from a subdivided photograph another photograph, containing a plurality of partial images, in which the color-values or luminosities of different partial images are rendered in ratios different from that of the original, consisting in printing the selected partial images unequally and each over the whole of its portion of the photograph.

3. The method, substantially as hereinbefore set forth, of obtaining a "fourth plate" for use in polychrome printing consisting in printing, from a subdivided photograph, another photograph in which the color values or luminosities of the selected partial images are rendered in a ratio differing from that of the original, and in making the plate from the second photograph mentioned.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES L. A. BRASSEUR.

Witnesses:
A. T. STOUTENBURGH,
R. W. BARKLEY.