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2,223,008

PROCESS FOR THE DETERMINATION OF PRINTING LIGHT INTENSITIES FOR THE
PRODUCING OF COLORED PHOTOGRAPHIC PRINTS

Filed March 9, 1937

2 Sheets-Sheet 1

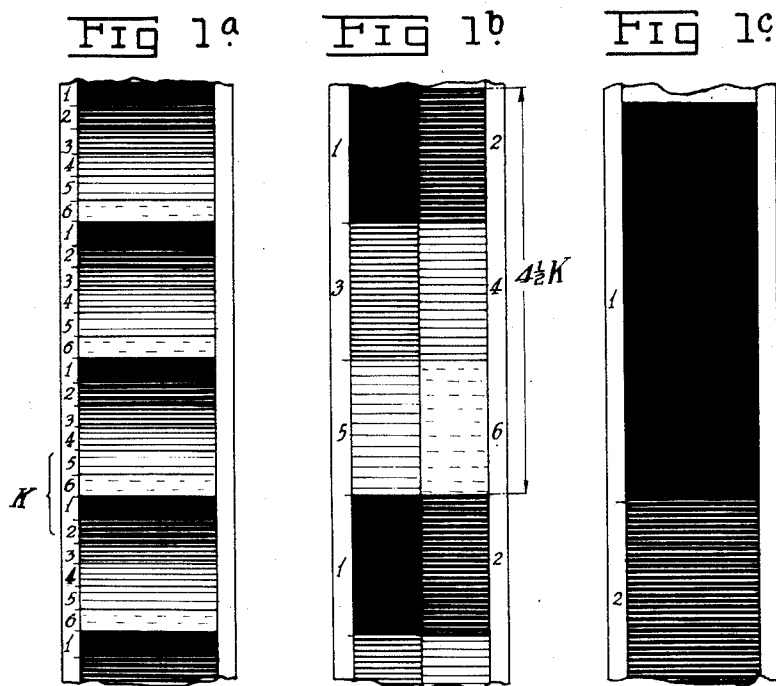


Fig. 2

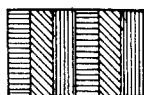
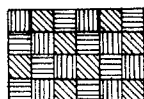


Fig. 3



Red

Green

Blue

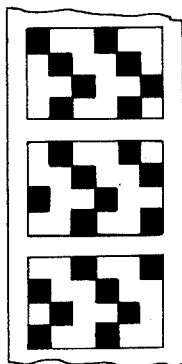
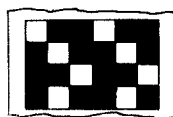
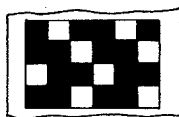


Fig. 4.

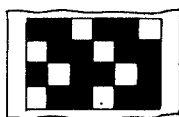
Fig. 5a Fig. 5b Fig. 5c



Red



Green



Blue

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2 Sheets-Sheet 2

Fig. 6

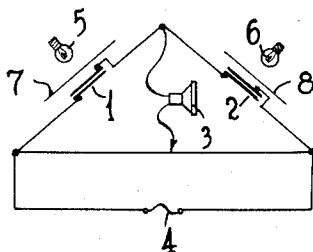


Fig. 7.

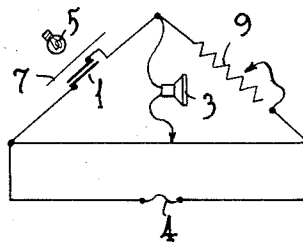
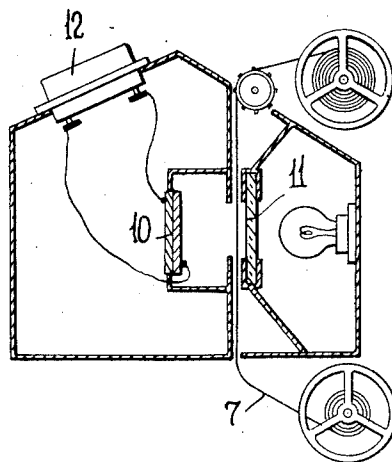


Fig. 8.



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PROCESS FOR THE DETERMINATION OF
PRINTING LIGHT INTENSITIES FOR THE
PRODUCING OF COLORED PHOTO-
GRAPHIC PRINTSWalter Michaelis, Brussels-Forest, Belgium, as-
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In Germany March 9, 1936

13 Claims. (Cl. 95—2)

The present invention relates to a method for determining the proper printing light intensities for producing colored photographic prints.

In producing colored photographic copies, especially if the printing is done on material bearing several emulsions of different sensitivity it is of great importance to adjust individually the printing lights acting on each individual layer.

Since in colored multi-layer material variations in sensitizing of the various layers are noticed which result from the process of fabrication and from storage, the printing lights must be adapted to these variations. In addition, the printing lights must be adjusted from scene to scene, according to the quantities of the original image (master image), in order to obtain a print which reproduces the original coloring with the greatest possible precision.

The adjustment and adaptation of the printing lights was hitherto attained by experimenting in a more or less awkward manner. Usually a color-chart was photographed simultaneously with the object or scenes. Thereafter the partial color separation images of this chart were printed as a trial by use of printing lights of variable intensity in order to obtain a print which resembled the original color-chart as closely as possible. The respective color separation images of the object or film were then printed by the lights determined in this manner.

The trying out of several more or less arbitrarily chosen combinations for each individual printing light requires a good deal of time and means tedious work which can only be performed by trained persons. In addition to that, this method requires a considerable quantity of experimenting material in order to obtain the best color-reproduction.

According to the present invention the determination of the intensities of the printing lights required for the different color separation images in producing colored prints is considerably simplified. In accordance with the invention, practically all possible combinations of the partial-color printing lights available are formed and the trial prints obtained by use of these lights are systematically analysed. This testing is done by way of relatively simple means, and the partial-color printing light intensities producing a correct print may be read off numerically on the test-film.

In accordance with the prior practice, I use a color chart for determining the proper intensities of the various printing lights which are

to be used for printing the partial pictures of the film. In order to determine the proper intensities, the composition of the printing light is varied according to my invention systematically by keeping the intensity of the source of light constant and by printing each partial separation image of the color-chart behind a graded density wedge, the transparencies of the individual gradations of which correspond to the light-intensities used finally for printing. Thus according to my invention, prints of the test color chart are made with all possible combinations successively.

For a better understanding of my invention, reference is made to the attached drawings in which Figures 1a, 1b and 1c represent graded density wedges for the three printing lights used in connection with a three-color film. Figures 2 and 3 are color test charts; Figure 4 illustrates the negative color separation images of Figure 3, and Figures 5a, 5b, and 5c illustrate the corresponding positive color separation images. Figures 6, 7 and 8 illustrate diagrammatically apparatus for testing the color prints electrically. If three partial color separation images are present, in other words if the three-color process is employed, and if for instance six different grades of intensity of the three printing lights are available, $6^3=216$ printing light combinations are imaginable.

In case of a three-layer material and three copying lights of six different grades of intensity, the 216 combinations of the copying lights are produced in the following manner: 216 images of the same contents, for instance of a color test chart or a similar object, are printed on the three-layer printing material, which is to be tested, by successively printing the three color separation images of the color test charts on this material.

Various methods for obtaining the 216 test prints are described hereafter. In a first modification, I use graded density wedges in which the density varies similar to the arrangement of Figure 1a, each density gradation, however, occupying at least the area of a standard size picture. The length of such picture is represented by the letter K in Figure 1a. The area of such standard size picture will hereinafter be called an image square.

In printing the first color separation image, the printing light is led thru a graded wedge consisting of a film showing transparencies T_1-T_6 each transparency occupying one of six

consecutive image-squares. This succession is either repeated 36 times or otherwise the film representing the graded wedge is arranged in such a manner as to form a loop in which six

5 differently transparent image-squares reappear in rhythmical repetition.

The second color separation image is printed by appropriate light, that is to say a light which is of a different color from the light used for

10 printing the first color separation image, and a graded wedge is used, the transparency of which does not change from image to image but only after every 6th image. This succession is repeated 6 times, beginning after the 36th, 72nd,

15 108th, 144th, and 180th image. In the same manner as above, the graded wedge may form a loop, comprising in this case 36, 72, etc., images.

20 Finally, the third color separation image is printed by use of appropriately colored printing light behind a third graded wedge, the transparency of which changes only after every 36th image. The change of transparency therefore occurs after the 36th, 72nd, 108th, 144th, and

25 180th image. In this manner, all possible combinations attainable for each of the printing lights by employment of six different grades of intensity are registered on a comparatively short strip

30 of film. After having converted these records into colored pictures by means of the same process as that applied thereafter in the producing plant, the most satisfactory print can easily be selected.

35 The larger the number of combinations is chosen, that is to say the more finely the individual light intensities are graded, the greater is the probability of finding a print reproducing the colors in their exact original shades.

40 On the other hand, however, the number of combinations augments very quickly in ratio to the increase in the number of intensities used. Therefore the method described in the preceding example is bound to certain limits in its practical

45 execution. If instead of six light intensities 12 different light intensities are available, 1728 combinations are possible. That is to say, that about 40 metres of film are needed for the test.

50 The modification which I shall now describe allows the producing and testing of a large number of printing-light combinations without requiring a large amount of film material. This is attained by printing a plurality of sections of a color-chart or a plurality of several identical

55 color-charts to one single image-square of the printing film by use of priming-light of different intensities. For this purpose, graded wedges are used, as above, however, several densities of at least one of them are arranged within the normal image-area.

60 This arrangement will be better understood by reference to the drawings. Assuming again a three-layer material and three light sources with six light intensities each, then by the use of the wedges shown in Figures 1a, 1b, and 1c, the 216 combinations can be produced on 27 image-squares, in other words on a little more than 1/2 metre of film.

65 In the first graded wedge which is shown in Figure 1a, the six transparencies numbered 1, 2, 3, 4, 5 and 6 are distributed over 1 1/2 image-squares, and this succession is repeated 18 times.

70 In the second graded wedge shown in Figure 1b and for use with the printing light of the sec-

ond color the six grades of transparency are arranged in such a manner that vertically each grade extends over 1 1/2 squares, whereas horizontally only half a square is covered by each grade. In this way, only 4 1/2 squares are covered

5 by the six transparencies 1, 2, 3, 4, 5, 6. This arrangement is repeated 6 times, so that the second wedge also covers a total of 27 image-squares.

The third graded wedge shown in Figure 1c has six transparencies each occupying the area of 10 4 1/2 image squares.

The numbers of the density gradations of the wedges are marked on the border of the film or between the individual image-squares so that the attained combinations of printing-light intensi-

15 ties may be rapidly and reliably identified by the markings which appear in different color on the print.

The photographed test objects whose three color separation images are to be printed under

20 the graded wedges illustrated in Figures 1a, 1b, and 1c, consist in this case either of six vertical stripes of which two are red, two are green, and two are blue, as shown in Figure 2, or of colored squares as shown in Figure 3. The negative color

25 separation images of this chessboard-like color-chart are shown in Figure 4, whereas the positive color separation images are shown in Figures 5a, 5b, and 5c. When either of the color charts of Figures 2 or 3 is printed through the wedges, a

30 print of eight different light combinations is obtained. Each of these eight sections in each image-square contains the colors red, green, and blue but of different intensity in each section. For example: The top row of

35 Figure 3 contains from left to right, the colors red, green, blue, red, green, blue. If the color chart of Figure 3 is placed with respect to the wedges of Figures 1a, 1b and 1c, in such a position as to occupy the square indicated by

40 letter K in Figure 1a and if then a print is made through the superimposed wedges, the three colors of the left half of the top row are reproduced with the light combination 5 of Figure 1a;

45 5 of Figure 1b and 1 of Figure 1c. The three colors at the right half of the top row are reproduced with the light combination 5 of Figure 1a, 6 of Figure 1b and 1 of Figure 1c. The left side of the second row is reproduced with the light

50 intensity 6 of Figure 1a, 5 of Figure 1b and 1 of Figure 1c. The eight sections, of Figures 2 or 3 each having three colors are reproduced with the following eight light intensity combinations in accordance with the markings of Figures 1a-1c:

5 5 1	5 6 1
6 5 1	6 6 1
1 1 2	1 2 2
2 1 2	2 2 2

55 Since the total scale of densities in the three wedges occupies twenty-seven image squares and since each square gives eight sections of different light intensity, 216 combinations are obtained with the comparatively short film strip of twenty-seven image squares.

60 The arrangement described for six intensity values of the three printing lights may similarly be used for a different number of intensity values.

In case, for instance, 12 printing-light intensities are combined with each other, instead of six, the distribution of the intensities would be correspondingly changed. Instead of the six horizontal intensities of Figure 1a, twelve grades will be provided occupying together three image squares as follows:

1st wedge

1st image-square shows horizontal graduation J₁ J₄
 5 2nd image-square shows horizontal graduation J₅ J₈
 3rd image-square shows horizontal graduation J₉ J₁₂
 Total: 3 image-squares.

10 This sub-division repeated 72 times results in 216 image-squares being covered.

Similarly, instead of the six density values of Figure 1b, twelve different values are provided, each occupying vertically three image squares and horizontally $\frac{1}{2}$ of a square so that the twelve values occupy together eighteen image squares as follows:

2nd wedge

	At the right	At the left
20 3 image-squares	J ₁	J ₂
3 image-squares	J ₃	J ₄
.....	..	..
.....	..	..
25 3 image-squares	J ₁₁	J ₁₂
Total: 18 image-squares.		

In repeating the same order 12 times, 216 image-squares are covered

3rd wedge

30 18 image-squares	J ₁
18 image-squares	J ₂
.....	..
.....	..
35 18 image-squares	J ₁₂
Total: 216 image-squares.	

By printing the charts of Figures 2 or 3 through these wedges and converting the prints in the usual way into colored images each chart gives eight different intensity combinations within one image square so that with the 216 image squares 1728 possible reproductions of the test colors are obtained on a film about 5 metres in length, the printing-light combination required for the production of each of these prints being exactly designated by marks next to each individual image.

When the color test prints have been made according to any of the above described methods, the print representing the nearest resemblance to the original image may be detected in the following manner: the obtained prints are successively projected on a screen placed next to another screen on which the original is projected. In this manner the print representing an optimum can easily be detected by running off the obtained prints in a rather rapid succession as the human eye is very sensitive to differences in color-tints, and as usually only a relatively small number of images has to be examined carefully.

60 The comparison is facilitated by super-projecting the prints and the original in the following manner: one half of each of the two images is prevented from being projected by means of a suitable grate, for instance a striped grate. One half of each of the images is then projected into the half of the image-square which is left uncovered by the other. The nearer the appearance of the original is approached by one of the printing light combinations, the easier it is to determine the optimal print. But even if, for instance, the theoretically correct print is the one produced by printing light of an intensity lying in the exact middle of the three printing lights employed, this optimum is closely approached by a maximum of 75 not more than 8 prints.

If for instance the theoretically correct print requires intensities: $3\frac{1}{2}$, $4\frac{1}{2}$, and $2\frac{1}{2}$, this print is approached the nearest by the following combinations among the 216 images:

3 4 2	4 4 2	5
3 4 3	4 4 3	
3 5 2	4 5 2	
3 5 3	4 5 3	

The above comparison of prints and original may be carried out by using a photo-electric device, for instance a photo-cell such as an alkali cell, or a resistance cell.

If the colored original is projected on a photo-electric device, the light is more or less intensely absorbed by the various colors, so that a certain total light current and a corresponding photo-current are produced. If the original is replaced by an identical print, the absorption of light remains the same, in other words the same photo-current is produced by the photo-electric device.

If however the print is not identical to the original, a change in the current usually takes place because the partial colors of the print which differ from the colors of the original produce a different photo-electric effect.

In extremely rare cases however the three light currents added together, altho they are individually different from the currents produced by the original, will result in the same total current as that produced by the original. This possibility may easily be eliminated by choosing the transparency grades of the graded wedges in such a manner as to give them unequal unity values. Another way of proceeding is to retest by use of differently colored projection light the prints which have been designated by the photo-electric organ as being identical to the original. At this second test only the print actually identical to the original will produce the same current.

There are various ways of arranging the photo-cell testing-apparatus. In the hook-up shown in Figure 6, two photo-cells 1 and 2 are inserted in the two branches of a Wheatstone bridge. 4 is a buzzer and 3 an earphone. The two cells 1 and 2 are exposed to two lamps 5 and 6 respectively, two identical originals or two prints which have beforehand been found to be exact reproductions of the original being placed in front of the cells. By shifting the slide, the phone is made currentless. Thereupon one of the originals is replaced by the series of images which is to be tested. If a sound is heard in the phone, the print is not correct. On the other hand, if no current passes thru the phone, that is to say if the phone does not buzz, the print in question is identical to the original.

In the hook-up shown in Figure 7, the photo-cell upon which the original is projected in the above-mentioned arrangement is replaced by a resistance 9. After having projected the original on the photo-cell 1, the electric bridge is brought to a balance by regulation of the rheostat 9. Thereafter the original is removed and the images on the test film are successively projected on the cell in its place. In the same way as above, if no buzz is heard in the phone, the tested image is identical to the original.

In Figure 8 a photo-cell 10 is hooked up with a measuring instrument 12. Thereafter the original or a color-true print is projected on to the photo-cell, the current produced being registered by the instrument 12. It is thereafter an easy matter to find the print which produces the smallest deviation from the registration of the

instrument caused by the original or no deviation at all. 11 represents a shifter by means of which it is possible to expose at will either only the right half of the film or only the left half. The opening of this shifter is not larger than one of the eight individual images lying within the normal image-frame, that is than the left or right half of a horizontal row of Figure 3. Similar shifters or image-frames may be employed in connection with the arrangements shown in Figures 6 and 7. The shifter may be provided with a colored window by means of which one of the colors making up the color-chart may be excluded. In this way, after having determined the print which is the closest approach to the original, the individual color-regions may be tested as to their conformity with the original. The film is advanced each time by one perforation-hole assuming that when printing 4 perforation-holes are used for advancing the film by one image and that each image-square is divided into four horizontal stripes of different transparency.

In accordance with the idea of this invention the test-film may be examined not only as concerns the total light-current transmitted by it but also as concerns the partial-color light-currents transmitted. For instance, by use of a ray-dispersion system such as a prism, semi-transparent mirror, etc., two photo-cell hook-ups may be influenced, which, as has been described above, do not show the right registration simultaneously unless the tested image corresponds exactly to the original. In this way the analysis of the print is rendered very much more exact without prolonging the time necessary for the test.

Another method of testing the prints consists in interposing a color-filter between the testing medium, i. e., the eye or photo-cell, and the print. The surface of this filter is partitioned into individual areas, the size and arrangement of which correspond to the tested print, the color transmission qualities of which, however, are exactly complementary to the color transmission qualities of the corresponding areas of the original. If therefore the original is regarded thru this filter, the colored area appears completely colorless in consequence of the fact that the light rays transmitted by the original are completely absorbed by the respective complementary areas of the filter. A print which does not exactly conform to the original produces a sensation to the eye or the photo-cell which increases in proportion to the deviation of the print from the original.

The correct prints may be designated by the tester by stamping or printing marks on the border of the film. The testing arrangement may also be provided with an auxiliary light-source operated by a contact-switch and by which the marked number of the image which is just within the testing-window is photographed on a paper strip. This strip is advanced after each marking. The exposure of the marking need not necessarily take place within the testing-window of the shifter. In this case, it is advisable to shift the numbers on the graded wedges by the same amount as the printing device is shifted in comparison to the image field under test.

Instead of using color-charts as shown in Figures 2 and 3 as testing objects a grey-scale or a grey-scale combined with a color-chart may also be used. If such a grey-scale is exposed during exposure of the scene color separation images of the grey scale are produced. These are printed in superposition behind the graded wedges as described in connection with the color charts of

Figures 2 and 3. Assuming, for example, that the different stripes of the testing object shown in Figure 2, represent different shades of a neutral grey, three more or less identical color separation images will be obtained. These are exposed under the sets of graded wedges in superposition, the different silver images thus obtained being transformed thereafter into colored part images by means of the same process as that applied in the producing plant. The combination of printing light intensities which will give the most satisfactory print can now easily be selected, because the preponderance of any single printing light will result in a colored print, whereas the optimal combination of printing light intensities will give a print of neutral grey.

What I claim is:

1. In a method for determining the proper printing light intensities for printing the various layers of a multi-layer film, which comprises printing with different time intensity product light values a series of test images, developing and converting said images into color images, the steps of printing one color separation image of a color test object into a plurality of different areas of one layer of said film by a light source of uniform intensity and for the same time through a plurality of gradations of a graded density wedge, equal densities of said wedge being used to print at least two of said areas, and printing the other color separation images of said color test object into their corresponding layers in superposition with the prints of said first color separation, the areas into which said first color separation is printed through gradations of equal density being superimposed to areas into which another color separation is printed with lights of unequal time intensity product values.

2. In a method for determining the proper light intensities for printing the various layers of a multi-layer film, which comprises printing with different time intensity product light values a series of test images, developing and converting said images into color images, the steps of printing one color separation image of a color test object by a light source of uniform intensity through a plurality of gradations of a graded density wedge with equal times of exposure into different areas of one layer of said film, equal densities of the wedge being used to print at least two of the areas and printing the other color separation images of said test object by a light source of uniform intensity through differently graded density wedges with equal times of exposure into their corresponding layers in superposition with the prints of said first color separation, the areas into which said first color separation is printed through gradations of equal density being superimposed to areas into which another color separation is printed through gradations of unequal density.

3. In a method of printing a series of color test images under various light combinations into a multi-layer film comprising three light-sensitive layers by printing three color separation images in register into superimposed areas of the multi-layer film and by successively changing the time intensity product value of the printing lights for the respective layers, which includes printing series of each of the three color separation images of the multi-color image into adjacent areas of the respective layer of the said film with a plurality of different time intensity product values of such printing light, the time inten-

sity product light value used in printing the second color separation image being kept unchanged over the length of the film covered by one series of prints of the first color separation image produced by the said different time intensity product light values used for printing said first series, and the time intensity product light value used in printing the third color separation image into the third layer being kept unchanged over the length of the film occupied by one series of prints of the second color separation image produced by the said different time intensity product light values used for printing said second series, the change of the time intensity product light value used in printing at least one series of color separation images being effected by printing with constant time intensity product light values through different gradations of a graded density wedge.

4. A method of printing a series of color test images under various time intensity product value printing light combinations into a multi-layer film adapted to record three color separation images by selectively printing with colored printing light each of the three color separation pictures of a test image into corresponding areas of the three superimposed layers of the film and printing the same color separation pictures with colored light of different time intensity product value into adjacent areas of the film, which comprises printing one of the color separations into one layer with printing light of a time intensity product value changed step by step between the adjacent areas of the film and continuing the printing in the same manner several times over the length of the film, so as to form several identical series of color separation prints, printing in superposition with the prints of said series a second color separation image with printing light of a time intensity product value changed step by step and being kept unchanged over the length of the film covered by one series of prints of the first color separation image, continuing the printing in the same manner several times over the length of the film, so as to form identical series of color separation prints of the second color separation, printing in superposition with the prints of said other series the third color separation images into the third layer of the film with printing light of a time intensity product value changed step by step and being kept unchanged over the length of the film occupied by one series of groups of the second color separation image, the change of the time intensity product value of the light used in printing at least one series of color separation images being effected by printing through different gradations of a graded density wedge.

5. A method of making color test prints including three different colors which includes repeatedly printing into a multi-layer film adapted to record three color separation images a series of color separation images of one color of a color test image including three different colors, each image of each of said series being printed with a different time intensity product value of printing light, repeatedly printing into a second layer of said film in superposition a second series of color separation images of another color of said color test image, a group of images within said second series corresponding in length to the length of said first series of images being printed with one time intensity product value of the printing light and each successive group of images within said second series being printed with a different and constant time intensity product

value of printing light, and printing into a third layer of said film in superposition a third series of color separation images of a third color of said color test image a group of images within said third series corresponding in length to the length of said second series of images being printed with one time intensity product value of the printing light and each successive group of images within said third series being printed with a different and constant time intensity product value of printing light.

6. A method of making color test prints in three different colors which includes printing into a film adapted to record in three superimposed layers three color separation images of a color test image which comprises forming in one of the layers of the multi-layer film a plurality of identical series of prints of one color separation of the color test image, each of these identical series comprising a plurality of color separation prints produced by graded printing time intensity product light values forming in one of the other layers of the multi-layer film, in superposition with the said first series, a plurality of series of prints of a second color separation, each of these series comprising a plurality of groups of identical prints each group covering the same area of the film as one series of the first color separation prints, each group within each series being produced by a printing light of a time intensity product value which is constant and different from that used for printing the other groups of said series, and forming in a third layer of the multi-layer film in superposition with the two other series of prints a series of prints of a third color separation, this series comprising a plurality of groups of identical prints each group covering the same area of the film as one of said series of the said second color separation, each group of said third series being produced by printing light of a time intensity product value which is constant and different from that used for printing the other groups.

7. In a method of printing a color test object with different printing light combinations into a multi-layer film by successively changing the time intensity product values of the printing lights for the various layers, the step of printing a series of images from one color separation image of said object through different gradations of a graded density wedge for the same time upon adjacent areas of one of said layers, gradations of said wedge which have the same density being used to produce a plurality of prints in different areas of the same layer and printing in superposition into another layer of said multi-layer film a series of images from another color separation image of said object through different gradations of another graded density wedge for the same time gradations of said last-mentioned wedge which have unequal densities being used to print into areas exposed through equal density gradations of said first-mentioned wedge.

8. A method of printing into a multi-layer film a series of color test pictures with different time intensity product value printing light combinations which includes repeatedly printing through a graded density wedge sets of color separation images of one color of a color test object successively upon adjacent areas of one layer of said film in such a way that each set is identically graded in density, repeatedly printing in superposition through a second graded density wedge sets of color separation images of a second color of said test object successively

upon adjacent areas of a second layer of said film in such a way that each set is identically graded in density and that each single gradation of said second set extends over the whole of one of said first sets, and printing in superposition through a third graded density wedge a set of color separation images of a third color of said test object on said third layer of said film in such a way that each gradation in density of said third set extends over the whole of one of said second sets and over as many of said first sets as the second graded density wedge has different gradations longitudinally of the film.

9. A set of graded density wedges arranged on a transparent film for photographic printing, from color separation pictures a series of registered test prints under various time intensity product value printing light combinations, said set of wedges comprising a first graded density wedge the gradations of which lie in adjacent areas longitudinally thereof, a second graded density wedge, the gradations of which lie in adjacent areas longitudinally thereof, the length of each density gradation of said second wedge being the same as the total length of said first wedge; and a third graded density wedge with gradations longitudinally thereof, the length of each density gradation corresponding to the total length of said second wedge.

10. A set of wedges according to claim 9, in which at least one graded wedge is graded longitudinally thereof and differently graded transversely thereof.

11. A multicolor multilayer film strip containing a series of multicolor test prints of a color test object each multicolor test print of the series comprising differently colored color separation images, each color separation image of said color test object being printed on one layer respectively of said multilayer film in superposition with the other color separation prints, each single normal picture area of said film strip comprising a plurality of said multicolor test prints,

the areas which in one layer carry prints of identical color, identical color density, and identical color density graduation carrying in at least one other layer colored prints different from each other as regards their color density graduation.

12. A multicolor multilayer film strip containing a series of multicolor test prints of a color test object each multicolor test print of the series comprising differently colored color separation images, each color separation image of said test object being printed on one layer respectively of said multilayer film in superposition with the other color separation prints, each single normal picture area of said film strip comprising a plurality of said multicolor test prints, the areas which in one layer carry prints of identical color, identical color density, and identical color density graduation carrying in at least one other layer colored prints different from each other as regards their color density graduation, the different areas of the layers having marks printed thereon corresponding to the color density graduation of the color separation pictures printed into the respective area of the different layers.

13. In a method for determining the proper light intensities for printing the various layers of a multilayer film which comprises printing with different time intensity product light values a series of test images, developing and converting said images into color images, the step of printing each of the different color separations of a color test object into a plurality of different sections of a normal picture area of said film, each color separation being printed into its corresponding layer and in superposition with the other color separations, the time intensity product light values used in printing at least one color separation into said different sections of a normal picture area of said film being different from each other and the time intensity product light values used in printing another color separation into the same sections being equal to each other.

WALTER MICHAELIS.

CERTIFICATE OF CORRECTION.

Patent No. 2,223,008.

November 26, 1940.

WALTER MICHAELIS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 56, before "to" insert --on--; line 57, for "priming-light" read --printing-light--; page 5, second column, line 22, claim 6, after "values" insert a comma; line 60, claim 7, after the word "time" insert a comma; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of March, A. D. 1941.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.