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COLOR PRINT VIEWABLE BY LIGHTS OF DIFFERENT COLORS AND PROCESS OF MAKING THE SAME.

APPLICATION FILED JAN. 20, 1920.

1,422,527. Patented July 11, 1922.

Fig. 1.

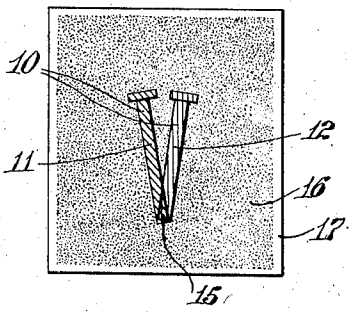

Fig. 3.

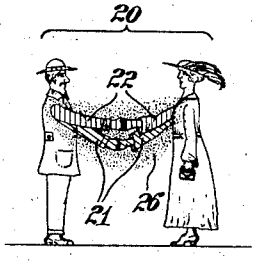

Fig. 2.

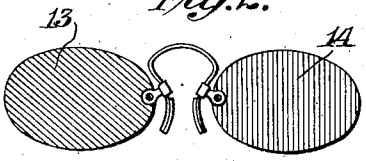

Fig. 4.

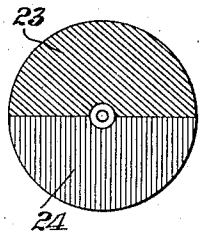

Fig. 5.

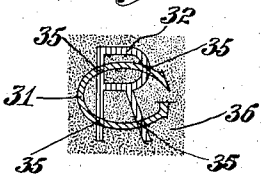

Fig. 6.

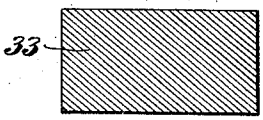

Fig. 7.

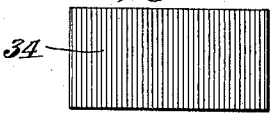

Fig. 8.

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UNITED STATES PATENT OFFICE.

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COLOR PRINT VIEWABLE BY LIGHTS OF DIFFERENT COLORS AND PROCESS OF MAKING THE SAME.

1,422,527. Specification of Letters Patent. Patented July 11, 1922.

Application filed January 20, 1920. Serial No. 352,735.

To all whom it may concern:

Be it known that I, CHRISTIAN BERGER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Color Prints Viewable by Lights of Different Colors and the Processes of Making the Same, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention is a novel color print, or plural color print, viewable by lights of different or opposite colors, and the process of making the same. By a plural color print, I mean preferably a print produced in two different strong colors in its operative areas. The selected strong colors may, for example, be red and green, by the first of which I mean orange or red or anything between them in the spectrum, and by the latter any color or mixture from blue to green; so that the two selected colors are drawn from opposite ends of the spectrum. The selected colors may be termed opposite colors, by which I mean in effect that they are substantially complementary or distinctly different, this being essential to the purposes of the present invention. By a print I mean any inscription, impression, chart or the like produced in the selected colors, whether by hand or by photographic or printing press or other methods, and whether the representation be a picture, a legend, a symbol or other representation. Prints of this general nature have been heretofore known and used for various purposes. By the expression "viewable by lights of opposite colors" I refer to the plan of examining such prints, for various purposes, by looking separately through, for example, a red screen or glass and through a green screen, or equivalently examining the same by illuminating them by throwing lights of these colors separately on the print; or other colors, as may be selected.

Various uses or embodiments of a plural color print of the nature referred to are possible, and three of such uses will be indicated in the drawings hereof, as follows. First, the simultaneous viewing of two oppositely colored superimposed images for stereoscopic purposes, such print being known as an anaglyph and the viewing apparatus an anagylphoscope. Second, the viewing in alternation or rotation of two images, to display them successively, these, for example, being correlated images for the purpose of giving the effect of motion. Third, the selective examination or viewing of a print or chart, so that according to the screen or illumination used, one or the other of the oppositely colored images will be rendered apparent. An embodiment of the last mentioned is shown in the two color chart of the measuring or weighing apparatus of my prior Patent No. 1,295,842, patented March 4, 1919.

From a practical standpoint certain objections or defects appear in the systems before mentioned, as heretofore used. This refers to the practical difficulty or impossibility in securing printing colors and color screens of precisely the right color and depth. The most advantageous colors being selected for the screens, it is impracticable or of prohibitive expense to produce and employ special printing colors so selected as to give perfection of result. When the print is viewed by the green light, the green image is supposed to disappear by blending with the background, now colored by the green light to approximately the same shade; and vice versa with the red. With a theoretically perfect apparatus and print, the viewing through the green glass would show up distinctly in black the print portion which is colored red, with complete elimination of the green portion of the print. Such perfection, however, is not practicable, and the consequence is that a decided trace is apparent of the image or portion of the print which is supposed to disappear, that is, the portion of the picture printed in what I may term the idle color. The presence of this trace or ghost of the idle color objectionably interferes in many cases with the proper perception and effect of the image of the active color, which, although predominant, is accompanied by the ghost of the image which should have disappeared.

The main purpose of the present invention is to eliminate the defect referred to. The general plan of the invention is to treat the surface of the paper or support, surrounding or contiguous to the image, with a thin or pale coloring, which I may term a tint, in such a manner that where the ghost of the

idle image would otherwise appear, the background is made to match this so as to give total elimination of the objectionable image. A further explanation and the details will appear in connection with the following description of specific embodiments of the invention.

Fig. 1 shows a two color stereoscopic picture or anaglyph.

Fig. 2 is an apparatus for viewing the print of Fig. 1, the same providing oppositely colored glasses for the two eyes, so as to render one image apparent and the other substantially invisible to each eye.

Fig. 3 is a two color print in which the oppositely colored parts are intended to be viewed in alternation, for example, so as to give the effect of motion.

Fig. 4 represents an apparatus by which the print of Fig. 3 may be viewed, first through green glass and then through red glass, or by which illumination of such colors can be alternately thrown upon the print.

Fig. 5 is a print having two inscriptions, symbols or letters printed in the two colors such that one or the other may be selectively rendered predominantly apparent.

Fig. 6 represents a glass of one of the opposite colors for effecting elimination of one of the colored letters, and Fig. 7 is an oppositely colored glass for eliminating the other letter and rendering the first apparent.

Fig. 8 is a chart showing the system of designating the colors in the other figures.

Referring first to the embodiment of Figs. 1 and 2, the print comprises a picture designated 10 as a whole, and comprising a green portion 11 and a red portion 12. These, for example, may represent an upright wire nail, the two positions being due to the different angles at which the object will be seen by the two eyes. Such a picture is known as an anaglyph. This may be viewed by a simple pair of eyeglasses comprising a green glass 13 and a red glass 14. By applying this in the relative position shown, the left eye looking through the green glass, will see only the right or red image 12, which will appear black, since the red rays are incapable of passing through the green glass. At the same time the green image 11 should theoretically disappear. The right eye, looking through the red glass 14, similarly sees only the left or green image 11, which appears in black. The result is that the images combine, giving the appearance of an upright wire nail standing vertically out of the support or paper on which the image is printed. Where the red and green images overlap, namely, at the area 15, the printing may be in black, as this area is to appear black to each eye.

Now, if the green glass and coloring are not perfectly in accordance with the theory, a ghost of the green image 11 will appear to the left eye, and if the red glass and image are not in accord, a ghost of the red image will appear to the right eye, with the consequence that the desired stereoscopic effect is to that extent spoiled by the presence of two additional, although pale, images.

With this invention this defect is overcome as follows. I apply a pale shade or tint 16 to the portions of the paper surrounding the image. The original or basic paper 17 is preferably white, as any color thereon would tend simply to degrade the images 11 and 12 without benefit. The tint 16 is applied superficially on the white paper surrounding the colored, and the exact character of the tint may be varied in accordance with the requirements.

For example, the proper tint may be determined as follows. When viewing the picture through the green glass 13, a ghost of the green image 11 appears. By applying a very pale red tint to the surrounding area, this is readily brought to a darkness to match the ghost of the image 11, and when matched the ghost disappears. If the right eye similarly see the ghost of the red image 12, a slight amount of green tint will similarly eliminate that. It is therefore only necessary to apply a mixture of pale aniline or similar dyes with the correct depth of pale green and the correct depth of pale red, so that the background will be colored somewhat with each, and thus eliminate the ghosts of both images. When the requirements are once determined for any given colors of glasses and images, the desired mixture or tint is readily determined and can be applied by printing or otherwise over the area surrounding the colored images. The tint will only be a tinge, scarcely apparent and unobjectionable, and the result is to eliminate the false images, and give the results with only imperceptible sacrifice in the resulting final image. Instead of a mixture of pale red and green colors, other tints are equally applicable. For example, a pale yellow being unable to pass in toto through either the red glass or the green glass, will tint the background as viewed through both, and thus eliminate both ghosts. Obviously, if a ghost should appear only in case of one of the images, no tinting of that color would be necessary, but only of the opposite color. In some cases a purely neutral tint such as a gray, would serve the purpose hereof. When this invention is properly applied to a stereoscopic subject, conventionally represented by Fig. 1, very pleasing and true stereoscopic effects are obtained, free from false images or ghosts.

Referring to Figs. 3 and 4, the picture 20 is shown as having general portions in neither green nor red, but in black or any

color which will appear black through both glasses. The picture also has green portions 21 and red portions 22. The result is that when seen through a green glass 23, and thereafter a red glass 24, in rapid alternation, the picture changes correspondingly, and in the case shown may give the effect of motion, namely, two persons shaking hands. The tinted area 26 surrounding the colored areas 21 and 22 wholly eliminates false images and gives a far more perfect effect. In Fig. 5, as in my prior Patent 1,245,842, before referred to, are shown two superposed symbols or characters, namely, the letter G in green, and the letter R in red. When seen through the Fig. 6 green glass, the letter G is rendered predominant. Where when seen through the red glass, of Fig. 7, the letter G is rendered predominant. Where the red and green portions overlap at 35 the print may be in either black, or in the overlapping colors. Surrounding these color portions is the tinted area 36 applied according to this invention, with the result that, when viewing the G image 31 through the red glass 34, for example, there will be no ghost or false image of the R image 32, and vice versa.

The plural colored print hereof may be produced in various ways. One simple and effective mode is to print the green portions 11, 21 or 31 with a greasy green ink, then the red portions 12, 22 or 32 with a greasy red ink. Other or black portions can be printed before or after these. Finally, the entire picture can be dipped or spread rapidly with the proper selected tint. This will be repelled by the greasy ink of the portions 11, 12, 21, 22, 31 and 32, and will slightly color to the desired extent the surrounding portions 16.

Partial embodiments may in certain situations be used, employing this invention. For example, the print may omit one of the spectrum colors and consist for example of black portions and red portions on a tinted white ground. When viewed by red light the red portions disappear, when viewed by green or white or other light, everything appears. For example, the curved parts of the letter B might be in red, the rest in black, so that, when seen through a red glass, it will appear as an E. Or the print might be wholly in red on a tinted ground, in which case the picture or character would wholly disappear when viewed by red light, and reappear with white, green or other light. Each of the prints in such cases is a plural color print in a sense, the former being red, black and tinted white, the latter red and tinted white. Another partial embodiment would be, for a red and green picture for example, to utilize the invention to eliminate the ghost of one, say the red portion, but not the other, thus leaving a trace or shadow of the green portion when viewed through a green glass, for any effect or use that may be desired.

It will thus be seen that I have described a plural color print viewable by light of opposite colors, and a process of making the same, embodying the principles and attaining the objects and advantages of the present invention. Since many matters of arrangement, design and detail may be variously modified without departing from the underlying principles, it is not intended to limit the invention thereto except in so far as specified in the appended claims.

What is claimed is:

1. A print viewable by lights of opposite colors such as red and green, for example by viewing it through color filters of said colors, said print consisting of superposed prints of the two opposite colors, such that when viewed by light of either color the appearance of the print of that color is substantially diminished, the superposed print elements being constituted of water repelling colors, and the surrounding field being tinted with a water soluble color or dye of a color which completely neutralizes any contrast with either diminished print, whereby viewing by light of either color discloses the print of the opposite color without trace of the print of the first color.

2. An anaglyph, or stereoscopic print viewable through color filters of opposite colors, the same consisting of superposed stereoscopic images of the two opposite colors, such that when viewed by light of either color the appearance of the image of that color is substantially diminished, the superposed images being of water repellant ink, and the surrounding field being tinted with a water soluble color which completely neutralizes any contrast with either diminished image, whereby viewing the print through screens of the two colors for the respective eyes gives stereoscopic effect without interfering traces of the diminished images.

3. The method of manufacturing articles of the kinds described, consisting in printing the two component prints in water repelling inks of the opposite colors upon a substantially white carrier and then washing the surface of the carrier with a water soluble color or dye of the neutralizing tint.

4. The method consisting in printing superposed prints by greasy commercial inks of opposite colors, and subsequently applying a contrast neutralizing tint by a water color or dye, whereby the surface which is not printed in said inks is tinted to the desired color, while the surface bearing the inks is preserved untinted.

5. A print viewable by lights of opposite colors such as red and green, for example by viewing it through color filters of said

colors, said print consisting of a support bearing superposed prints of the two opposite colors, such that when viewed by light of either color the appearance of the print of that color is substantially diminished, the surrounding field, but not the support beneath the printed colors, being tinted of a color which completely neutralizes any contrast with either diminished print, whereby viewing by light of either color discloses the print of the opposite color without trace of the print of the first color.

6. A print viewable by lights of opposite colors, such as red and green, for example by viewing it through color filters of said colors, said print consisting of a white support bearing superposed prints of water repelling inks of the two opposite colors, such that when viewed by light of either color the appearance of the print of that color is substantially diminished, the surrounding field, but not the support beneath the printed colors, being tinted with a water soluble color which completely neutralizes any contrast with either diminished print, whereby viewing by light of either color discloses the print of the opposite color without trace of the print of the first color.

In testimony whereof, I have affixed my signature hereto.

CHRISTIAN BERGER.