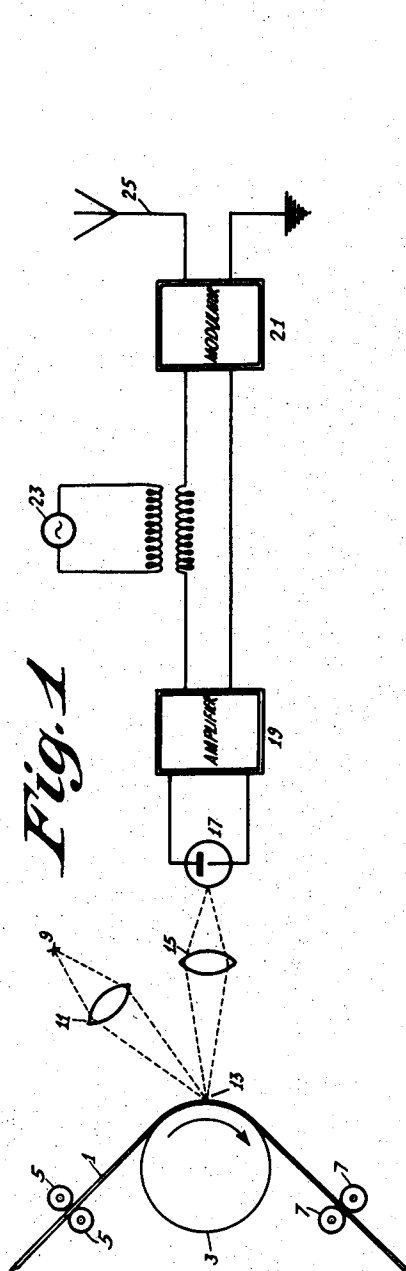
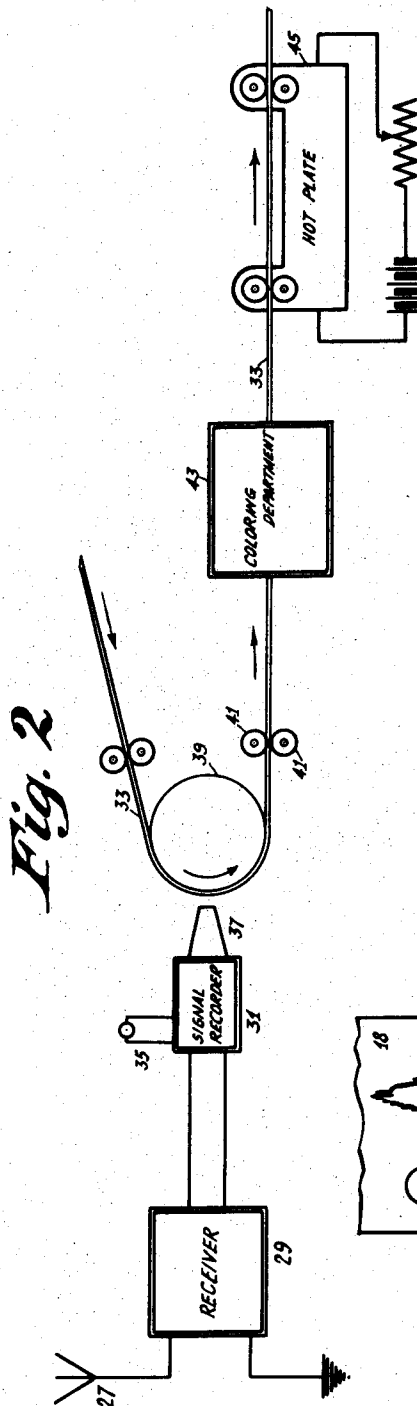
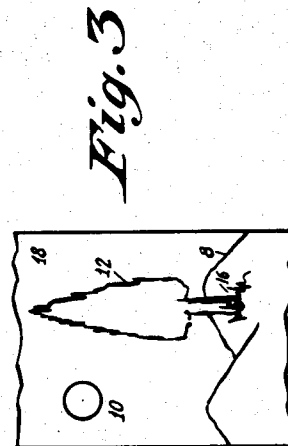


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F. G. MOREHOUSE
COLORED FACSIMILE SYSTEM

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COLORED-FACSIMILE SYSTEM

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The present invention relates to a process and method for reproducing pictures and the like transmitted from a distant point by means of radio, wire lines, or wired radio systems, as a finished picture in a plurality of colors, corresponding approximately to the original colors of the transmitted picture.

An object of my invention is to provide a method and system for recording pictures such that when pictures are transmitted it may be possible to reproduce them in a plurality of colors, which is highly desirable especially for use in connection with the transmission of the simpler designs or subjects, for example, in transmitting and receiving by photoradio processes or the like Christmas cards which are sent to or received from distant and remote points, so that these cards or greetings may be delivered to the addresses in approximately original colors in contrast to the black and white or brown and white heretofore used, as well as, for example, transmitting to and receiving from a remote point an exact copy of financial statements, printed notices, or advertisements as well as fashion designs, showing the goods in solid colors with the trimmings in contrasting colors, where parts of the statements, advertisements, or notices and the like and equivalent are printed in different colored inks for the purpose of making certain parts thereof stand out prominently.

It is another object of my invention to provide a method wherein it is possible to determine at the receiving point the approximate color for each of the different colored portions of the received picture, advertisement, statement, report, or the like.

Other and ancillary objects of my invention will at once become apparent from a reading of the following specification and claims when taken in connection with the following claims and the accompanying drawings which form a part of this application.

By the accompanying drawings:

Fig. 1 conventionally illustrates one form of transmitting apparatus showing a reflection type of transmitter;

Fig. 2 shows a conventional embodiment of

a receiving system according to my invention; and

Fig. 3 shows the type of picture arranged for transmission and corresponding to the single dull white color of the "latent" or intermediate image produced at the receiver, and shows a numbering system for determining the color of individual parts of the picture.

This invention in so far as it relates to the type of recording surface used and the method of producing a record thereon which takes the form of a "latent" or intermediate image has been more particularly described and claimed in my copending application Ser. No. 324,421, filed jointly with R. H. Ranger on even date. However, for the purpose of briefly describing this invention in so far as the production of the latent or intermediate image is concerned I provide a recording surface in the form of a paper strip or record or the like which has one surface thereof coated with a waxy substance or its equivalent which is repellent to water and most other aqueous solutions, for example, various colored inks.

Recording may be accomplished upon this paper by the means of a signal controlled jet of heated air or other gas actuated by any desired type of signal recorder, as has been disclosed by copending application of R. H. Ranger, filed August 12, 1926, Serial No. 128,720.

In the present invention it, however, is desired to transmit and receive pictures in such a manner that the color tone in each elemental area of the received picture approximately corresponds to the color tone of a corresponding elemental area of the original picture. Therefore, at the transmitting end of the system the subject, meaning a picture, print, photograph, or the like presented for transmission in examined, preferably by a "color operator," who is provided with a color chart showing a very large number of shades of a great many different colors. This "color operator" matches the colors appearing on the subject for transmission with the colors on his chart and writes upon the face of the subject in any convenient place external or along-

side of the design in any convenient space a set of color specifications as, for example, "Candle red No. 20," "Black No. 1," "Brown No. 7," etc. or merely arbitrary numbers or letters identifying each individual color. If space upon the original subject is not available for these directions the specifications may be written on a separate sheet attached beneath the original and transmitted after the original picture.

Now making reference to the accompanying drawings, if a reflection type of transmitter is used, as shown on the drawings, a positive photographic print 1 in black and white is made from the colored original subject, print, or picture and black and white print is then placed upon a drum 3 of a transmitting machine and is guided across the rotating drum 3 by means of rollers 5, 5 and 7, 7.

Light issuing from a source 9 is directed by means of a lens system 11 to focus as a point source 13 on the record surface or photographic print 1 and from this surface it is reflected back through a second lens system 15 so as to influence a photo cell 17. The light which reaches the photo cell is, of course, varied directly in proportion to the varying tone intensity in each elemental area of the picture or record surface 1. As shown, the transmitting system has been illustrated as one in which the light source and photo cell together with their associated lens systems travel back and forth longitudinally of the drum 3 and after each single longitudinal path the drum is advanced a distance corresponding to the line advance of the picture, in a direction indicated by the arrow. While the reciprocating type of transmitter has been illustrated, it is, of course, recognized that the continuously rotating type for tracing a spiral path about a picture surface attached thereto is also within the scope of the invention and, in a similar manner, if it is desired to use a negative print prepared in a similar manner to that described for the positive print this negative print may be placed upon the transmitting machine or drum 3 in the usual manner and the light source will be reversed and so arranged as to project the light through the drum 3, which will then be a cylindrical glass drum, and influence the photo cell in the same manner as has been above described in connection with a reflection type of transmitter.

Varying light intensities reaching the cell 17 produce a varying electric current flow therethrough and these currents are suitably amplified in any desired form of amplifier 19 and directed to a modulator 21 to which a carrier frequency is also supplied from a source 23. The picture signals modulate the carrier in the usual manner and the modulated carrier may then be transmitted from any desired type of transmitter as shown at 25.

At the receiving end of a system suitable

for use in connection with the arrangement as shown by Fig. 1 I have provided a thermic receiver of the general type disclosed in co-pending application of R. H. Ranger, Serial No. 128,720, filed August 12, 1926. Signals are received in an arrangement of this character by any desired form of signal pick-up 27 and directed to a receiving element 29 where they are suitably amplified and rectified so that they may be used for actuating a single recorder 31. An arrangement of this character preferably uses a heat sensitive recording surface 33, since the recorder 31 is conveniently arranged as a hot air jet controlled as to its action on the heat sensitive paper by incoming signals. Air is supplied to the recorder 31 through an air inlet 35 and the supplied air may be heated either within or externally to the recorder and be directed through a jet 37 against the surface of the recording surface carried by the drum 39. The drum 39 is rotated at the end of each recording line a distance equal to one line advance in the picture in the direction shown by the arrow. The drum is regulated as to this motion by suitable synchronizing means (not shown) so that the transmitter and receiver drums are always maintained in synchronous relationship, both as to their angular position and as to the position of the light spot of the transmitter and the signal recorder of the receiver.

A reproducing system of this general type provided with the special type of heat sensitive paper above described and so arranged as to produce a latent or intermediate image of the received picture as has been described and claimed in my above named application Ser. No. 324,421, filed jointly with R. H. Ranger on even date herewith. The latent or intermediate image produced on the recording surface 33 provides a recorded image which has a dull white appearance against a comparatively glossy background of the picture surface. This latent or intermediate image, which is visible enough to permit the receiving operator to judge the quality of the transmission and reception, is then passed beyond the recorder to a "color operator's department." By the term "color operator's department" I intend to indicate that it is at this point in the operation that the received picture is colored by a manual coloring process so as to make it agree approximately with the color of the originally transmitted picture. The "color operator" or, in other words, the person stationed at the receiver to color the picture, determines by means of a set of directions corresponding, for example, to those above described, placed on the picture or separately therefrom, exactly what color should be placed upon the various parts of the received picture to make it approximately correspond as to its coloring with the original.

To explain this coloring process in further detail assume, for example, that a Christmas card of various colors is being transmitted. In this case the "color operator" at the receiving station by examining or viewing the latent image produced by the signal controlled air recorder acting upon the heat sensitive paper would, of course, know that portions of the received picture corresponding to a Christmas tree, for example, should be colored green in accordance with the color numbering appearing on the chart accompanying the received picture or in accordance with a number appearing on the chart accompanying the received picture or in accordance with a number appearing adjacent the tree. This latter indicating scheme has been shown, for example, by Fig. 3 of my accompanying drawings wherein, for example, the numeral 12 might indicate the particular color of green for the tree. Similarly, parts of the received picture, still assuming that the Christmas card is being received, corresponding to candles placed upon the Christmas tree might be colored red, green, blue, yellow and other colors, in accordance to a similar coloring schedule.

In the coloring department 43 the "color operator" selects the colors referred to by the schedule or numbers on the received intermediate image and colors this portion of the image with a small brush. It is, however, to be noted that the color operator does not paint the picture as would an artist in making a painting or a sketch because the colors with which the color operator paints or coats the intermediate image will not "take" upon the picture surface anywhere except upon those parts of the surface which have been subjected to heat from the signal recorder 31 so as to produce the latent or intermediate image. In other words, assume a case of putting the specified color on Old English letters, then the operator need not attempt to draw each letter carefully for all he must do is to merely paint or color the image and brush this coloring across the paper surface, for the distribution of the particular color on the paper has already been determined, fixed and definitely limited by the action of the receiver which renders the paper recording surface receptive to the coloring matter only at points where heat had been applied and entirely repellent to coloring matter wherever heat had not been applied.

It is, of course, to be understood that the "color operator" at the receiver must not color the numbers appearing adjacent the particular parts of the picture as shown by Fig. 3, since these are merely used for convenience in defining the various colors used on this particular type of picture. When the color operator leaves these numbers blank in the coloring process the color specification numbers will remain as latent or intermediate

images on the recording paper. These images, however, must be removed from the paper prior to producing the finished picture and for this purpose a "flashing" process has been found to be quite effective. The flashing process consists in passing the entire record surface 33 over a hot plate member 45 or other suitable source of mild heat which changes the entire surface, not already colored by coloring materials, so that it appears as a latent image. This makes an even distribution of primary coloration upon the sheet and the color directions or specifications become quite invisible since they at once blend into the uncolored background. The finished picture is now ready for delivery.

This "flashing" process is also of considerable value in producing a permanent picture, since the wax or other suitable coating for rendering the recording surface sensitive to heat has been entirely removed or absorbed into the paper stock and the picture will not now discolor or otherwise deteriorate with age.

Having now described my invention what I claim and desire to secure by Letters Patent is:

1. A method for reproducing transmitted pictures in colors corresponding to those in an original which includes receiving impulses corresponding to the varying intensities of light and shade of the various elemental areas on a picture surface, producing from said received impulses a latent image on a record surface, and coloring the latent image in accordance with a definite predetermined color scheme indicated as a part of the latent image.

2. The method for producing received records of transmitted pictures in colors approximating those of an original which includes receiving impulses corresponding to the light intensities of successive elemental areas of a transmitted picture, producing from said impulses markings on a recording surface in the form of a latent image of the transmitted picture, coloring the received latent image of the transmitted picture in accordance with a prearranged color scheme, and flashing the entire colored picture for rendering the colored record permanent.

3. The method for producing received records of transmitted pictures in approximately the original colors which includes receiving signalling impulses corresponding to point for point light intensities on a transmitted picture, producing from said received impulses markings on a recording surface in the form of a latent image of the transmitted picture, marking the record surface as a second latent image with designations identifying the color of various portions of the latent image produced, coloring the recorded latent image of the transmitted picture in accordance with said prearranged color design-

nations, and heat treating the entire colored picture for eliminating the designations of the color schedule of marking.

4. A method for reproducing transmitted pictures in approximately the original colors which includes receiving signal impulses corresponding to the varying intensities of light and shade on a picture surface, producing from said received impulses a latent image record of the received picture, and coloring the latent image record in accordance with a definite predetermined color schedule indicated as a part of the latent image.

5. The method of preparing a picture for transmission for indicating the varying colors thereof which includes producing from the picture to be transmitted a black and white duplicate, examining the original picture point for point for determining the color intensity and varying colors thereon, and marking on the black and white duplicate a color schedule corresponding to the point for point coloration of the original picture.

6. The method of preparing a picture for transmission for indicating the varying colors thereof which includes producing from the picture to be transmitted a black and white duplicate, examining the original picture point for point for determining the color intensity and shading thereof, and marking adjacent the design of the picture on the black and white duplicate a color schedule corresponding to the point for point coloration and shading of the original picture.

7. The method of producing colored records of received pictures which includes receiving signalling impulses corresponding to the point for point tone intensities of an original picture transmitted and color schedule thereof, producing from said received signalling impulses a single color intermediate image of the received picture, marking adjacent the intermediate image of the received picture color designations also received as signalling impulses, coloring the received intermediate image to make it correspond point for point to the color schedule, and heating the entire record for eliminating the color schedule designations.

8. The method of producing colored records of received pictures which includes receiving signalling impulses corresponding to the point for point tone intensity of an original picture transmitted, producing from said received signalling impulses a single color intermediate image of the received picture, receiving signalling impulses corresponding to a schedule of designations of the color and shade of the picture, marking adjacent the intermediate image of the received picture the color and shade designations as received by said signalling impulses, coloring the received intermediate image to make it correspond point for point to the color and shade

schedule, and heating the entire record for eliminating the color schedule designations.

9. A system for reproducing pictures in colors approximately corresponding to the colors of an originally transmitted picture which includes means for receiving signalling impulses corresponding to the point for point intensity of light and shade in a transmitted picture, receiving signal impulses corresponding to a predetermined color schedule for the point for point intensities of light and shade, means for producing from said received signals an intermediate record of the received picture and accompanying color schedule, means provided by said color schedule for determining the coloration of the point for point colors on said intermediate image, and means for heat treating the entire record after the same has been colored according to the color schedule for eliminating the designations of the color schedule, whereby the received image appears as a colored record approximately corresponding to the coloring of the transmitted picture.

10. The method of reproducing transmitted pictures in colors corresponding to those of an original as transmitted between a transmitter and a receiver which includes producing from received impulses a latent image including color indicia of the picture on a record surface and coloring the latent image in accordance with said indicia.

11. The method for producing received records of transmitted pictures in approximately the original colors from signalling impulses received from a distant transmitting station which includes producing from the received impulses markings on a record surface in the form of a latent image of the transmitted picture, marking the record surface as a second latent image with designations identifying the color of various portions of the first found latent image, and producing a color record from latent image of the transmitted picture in accordance with the said prearranged color designations.

12. The step in the method of reproducing transmitted records in natural colors which comprises producing a latent image and color indication of the transmitted record.

13. The step in the method of reproducing transmitted pictures in natural colors which comprises producing a latent picture image including characters indicative of color values.

14. The method of preparing a picture for transmission for indicating the varying colors thereof which includes producing from the picture to be transmitted a black and white duplicate and marking on the black and white duplicate characters indicative of the point for point color values of the original picture.