Jan. 2, 1940. W. G. H. FINCH 2,185,806

COLOR PICTURE TRANSMISSION SYSTEM

Filed April 28, 1937 2 Sheets-Sheet 1

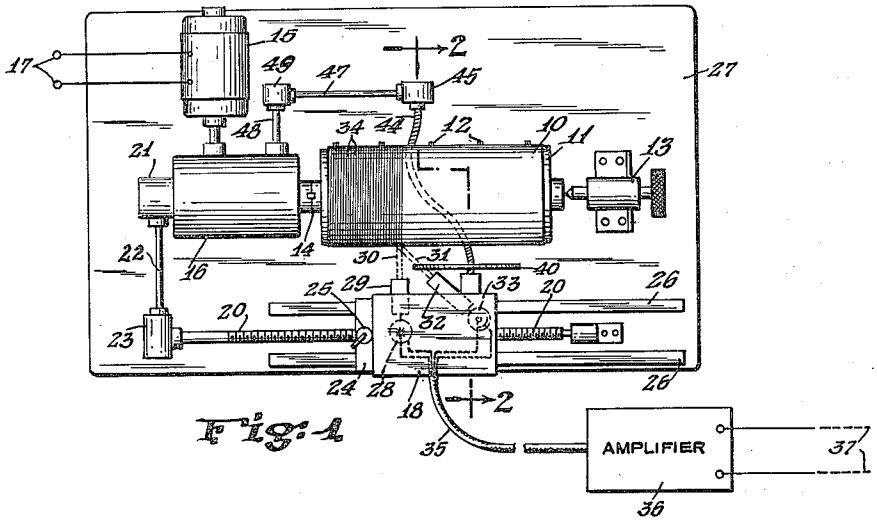



Fig. 1

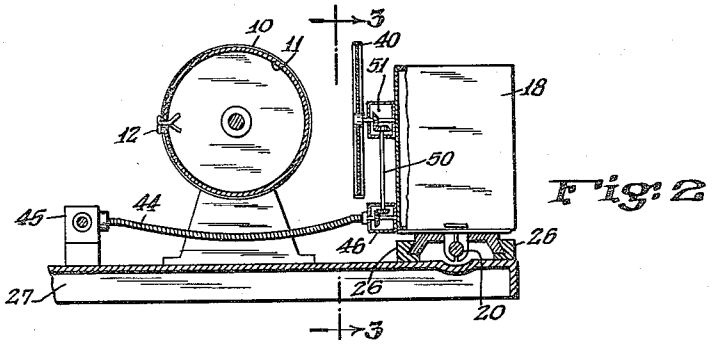


Fig. 2

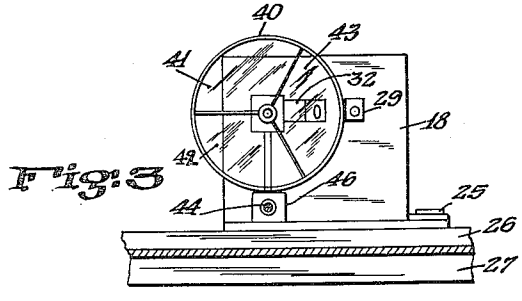


Fig. 3

INVENTOR.
William G. H. Finch
BY
Samuel Ostrolenk
ATTORNEY.

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COLOR PICTURE TRANSMISSION SYSTEM

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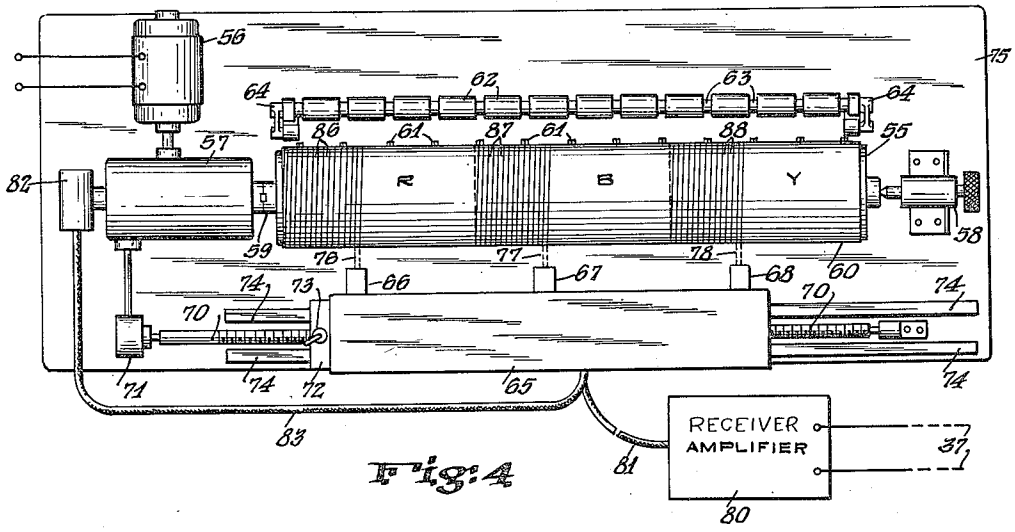



Fig. 4

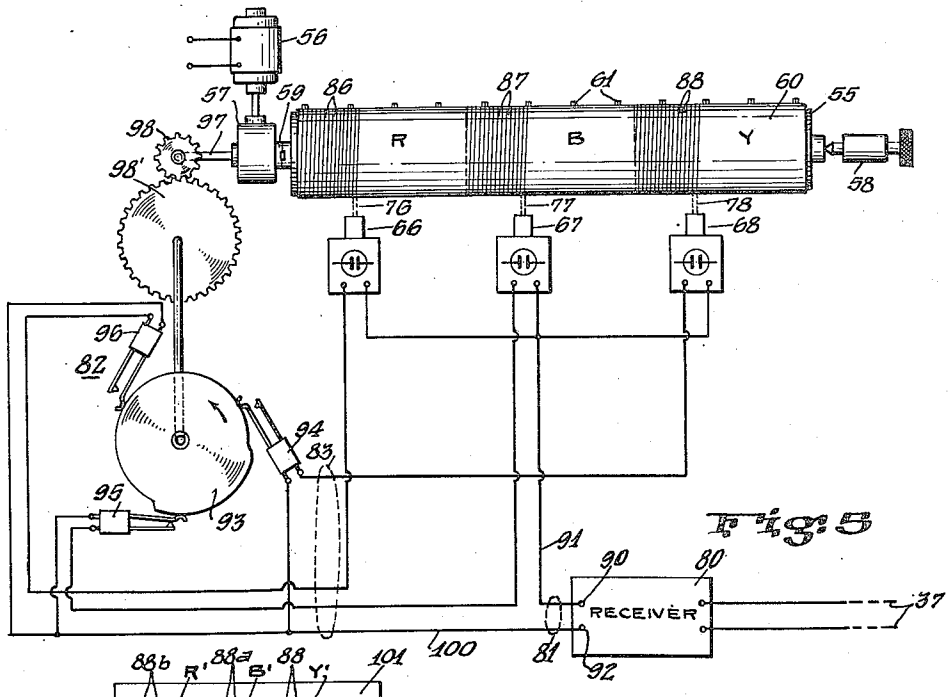



Fig. 5

Fig. 6

INVENTOR.
William G. H. Finch
BY
Samuel Ostrolenk
ATTORNEY.

Patented Jan. 2, 1940 2,185,806

# UNITED STATES PATENT OFFICE

2,185,806

## COLOR PICTURE TRANSMISSION SYSTEM

William G. H. Finch, Spuyten Duyvil, N. Y.

Application April 28, 1937, Serial No. 139,365

14 Claims. (Cl. 178—5.2)

This invention relates to electrical transmission of color pictures.

The electrical transmission of pictures is of particular commercial importance to news services such as newspapers where picture transit time between offices of the organization is an important factor. Electrical picture transmission has heretofore been principally restricted to black and white pictures due to the relatively complex technique and mechanism required to obtain reasonably satisfactory colored facsimiles. Prior practise individually transmitted a plurality of primary color prints formed of the colored scene or picture by conventional color separation photography. The problems of synchronous reception and superposition of the primary color prints have rendered such procedure impractical.

In accordance with my invention disclosed in my co-pending application Ser. No. 138,683, filed April 24, 1937, the three primary color separation prints are placed in substantial parallel alignment for transmission by ordinary black-white facsimile apparatus. Although excellent color pictures are obtained by such method, it is necessary to first obtain the color separation prints by delicate color photography cameras, and then reduce the size of the picture so that the three prints will suitably fit in a parallel arrangement upon the transmitter drum.

In accordance with my present invention, the color picture to be transmitted is mounted upon the transmitter drum and scanned in somewhat the same manner as in ordinary black-white picture scanning. I provide color filters which are automatically and successively interposed between the scanning beam and the photo-electric cell in order to directly produce the electrical equivalent of the primary color separation prints. The color picture to be transmitted is placed directly upon the drum and the successive line-by-line scanning thereof through light filters results in the required color separation prints at the receiver. The superposition of the primary color separation prints received and properly tinted, reconstructs the original color picture in accurate detail and color.

The receiving system of my present invention comprises a triple electro-optical recording unit coacting with a drum of triple length. Synchronous switching means is also provided to impress the respective color filtered signals from the transmitter in synchronism upon the plurality of scanners so that monochrome facsimiles corresponding to the primary color values will be accurately composed. The respective rates of scanning at the transmitter and receiver is proportional so that for each revolution of the drum, the transverse movement of the scanner with respect to the record sheet is a predetermined fraction of the width of the scanning lines. The results and effect of the progressive and overlapping scanning is that the color prints produce a facsimile in accurate alignment, with substantial absence of color streaks as will be hereinafter described in detail.

With my present invention, newspaper services are enabled to readily transmit any kind of color picture or drawing such as the colored comic sections, colored advertisements and colored copy for newspapers, magazines and the like. The electrical transmission of the colored pictures are performed directly from the color picture, without intermediate color photography processes. The received pictures are the actual primary color separation prints to be used for producing the printing plates for the color printing operations as will be hereinafter described.

It is accordingly an object of my present invention to provide a novel method of scanning a color picture to produce primary color separation prints for composing a color facsimile of the picture.

Another object of my present invention is to provide a novel method of electrically transmitting a color picture.

A further object of my present invention is to provide a novel apparatus for electrically transmitting and receiving a color picture.

These and further objects of my present invention will become apparent in the following description taken in connection with the drawings, in which:

Figure 1 is a plan view of a preferred embodiment for the color facsimile transmitter of my present invention.

Figure 2 is a cross-sectional view taken along 2—2 of Figure 1 illustrating the mechanical drive for the color filter at the transmitter.

Figure 3 is an elevational view of my novel color picture scanner and corresponds to a view along 3—3 of Figure 2.

Figure 4 is a plan view of a preferred embodiment for a telepicture receiver for translating the transmitted color picture signals.

Figure 5 is a schematic diagram of the color facsimile receiver of Figure 4.

Figure 6 illustrates how the primary color separation prints of my present invention are combined to form a facsimile of the transmitted color picture.

A color photograph, picture, drawing, record or the like may be resolved into three individual monochrome prints coresponding to the three primary colors, red, blue and yellow. However, my invention is not limited to these colors but more or less than such primary prints may be employed as will be evident to those skilled in the photographic art. The color scheme may be photographed by conventional color photography methods. A photograph of still-life may be made by taking three successive photographs of the scene using correspondingly proper light filters to produce the colored picture thereof. For action scenes, a single-exposure camera employing reflecting mirrors is used to simultaneously snap the three primary colored prints. The color filter used for each individual primary color print absorbs all the color components of the light except light of the color to be printed. Thus, for example, in producing the negative photograph corresponding to the red shades of the picture, a green filter is used; for the blue shades, an orange filter; and for the yellow shades, a violet filter.

In accordance with my present invention, the actual color picture, photograph or drawing is directly mounted in the telepicture transmitter for generating the primary color picture signals necessary to compose the color facsimile. My invention is particularly applicable to the transmission of colored paintings, drawings and the like since the use of color photograph apparatus to produce a color reproduction thereof at the transmitter is rendered unnecessary. Thus, newspapers can directly transmit colored comic sections, colored advertisements, paintings, etc. by directly inserting the originals in my novel color telepicture transmitter as will be evident in the description following. When the primary color separation prints are available for a color photograph to be transmitted, the method disclosed in my co-pending application Ser. No. 138,683 above referred to may be used. The present invention is particularly adapted where the original color record is available.

The color record or picture 10 is mounted upon the transmitter drum 11 of the transmitter shown in Figure 1. Sheet clamps 12 grip opposite edges of the sheet 10 to hold it in position on the drum. Drum 11 is rotatably supported between the tail stock 13 and the shaft 14. Drum 11 is removable to facilitate mounting and demounting of the picture 10. Drum 11 is rotated at a predetermined speed by means of the electrical motor 15 mechanically coupled thereto by reduction gearing enclosed within housing 16. Motor 15 is preferably of the synchronous type connected to a constant frequency alternating current source by lead 17, preferably a commercial sixty-cycle system. Drum 11 of the preferred embodiment is rotated at one-hundred revolutions per minute.

The electro-optical scanning mechanism is located in the carriage 18 which is moved parallel to the axis of rotatable drum 11. Scanner carriage 18 is driven at a predetermined rate by means of the feed screw 20 mechanically coupled to the motor 15 by reduction gearing located at 21 and 23 interconnected by rod 22. Feed screw 20 is coupled to a worm lock located beneath extension plate 24 and operated into engagement and disengagement with the feed screw 20 by cam lever 25. Scanner carriage 18 is accurately guided in its transverse movement by tracks 26—26. The system is mounted upon a heavy cast-iron base 27 to minimize vibrational effects.

The mechanical arrangement of the transmitter apparatus described to this point is similar to that disclosed in my Patent No. 2,047,863 which issued on July 14, 1936, entitled "Telecommunications system", and also disclosed in my copending application Ser. No. 84,426, filed June 10, 1936, entitled "Telepicture scanning systems". As disclosed in these cases, the electro-optical scanner 18 comprises an intense source of light schematically shown at 28 which is focused by a lens system 29 to a beam 30 to produce a spot of light upon the record sheet 10. Light is refracted from the sheet 10 along path 31 to the lens system 32 which focuses the refracted light upon a photoelectric cell contained within the carriage 18 as schematically shown at 33. As drum 11 rotates, carriage 18 moves transversely thereto at a predetermined speed to the right, scanning the record sheet 10 along a helical path indicated by the scanning lines 34.

The photoelectric cell 33 accordingly receives light varying in intensity in accordance with the elemental shading and coloring of the portions of the picture being scanned. The anode of photoelectric cell 33 is connected to a suitable high voltage and generates electrical currents varying in accordance with the light impinging thereon as is well known in the electrical art. The cell 33 is shown schematically connected by the electrical cable 35 to the amplifier unit 36. The operating voltages and potentials for the photoelectric cell 33 and source of light 28 are introduced through the cable 35 as will be evident to those skilled in the art and as described in my Patent No. 2,047,863. Electronic amplification of the signals generated at the photoelectric cell 33 may be performed within the carriage 18 to facilitate faithful reproduction of the signal variation in the cell by amplifier 36. The picture signals are amplified at 36 and relayed to a remote receiving station across a transmission channel 37. The picture signals fall in the audio range and may be translated by modulating a radio frequency carrier wave or by modulating an audio frequency carrier for transmission across a telephone line as described in my patent above referred to.

In accordance with my present invention, the color picture 10 is scanned with overlapping scanning lines and the scanning beam is successively passed through individual filters to resolve the colored scanning variations into individual sets of color records. The scanning beam 30 is focused to a spot .01 inch wide in order to trace a scanning path across the picture .01 inch in width. I prefer to employ three primary color prints to compose the color facsimile at the receiving station. The scanner carriage 18 is moved one-third of an inch per minute. Since the drum 11 is rotated at one hundred revolutions per minute, the scanning lines 34 will overlap as will now be evident. If the carriage 18 were operated at one inch per minute, the scanning lines 34 would form a contiguous helical path without overlapping and uniformly traversing the sheet 10 as is ordinarily performed in black-white picture scanning. However, the scanning of the colored picture is such as to cause overlapping of the successive scanning paths formed at each revolution of the drum.

The refracted beam of light 31 is shown pass-

ing through a color filter disk 40 before being focused upon the photoelectric cell 33. As illustrated in Figure 3, the filter disk 40 contains three sections 41, 42 and 43, of individual color filters. These filters are either designed to individually pass through or transmit a primary color component of the colored light beam 31 and absorb the other components, or to individually absorb a primary color and transmit the remaining components. The former design employs red, blue and yellow filters, and produces signals corresponding to photographic "positives" of the primary color separation prints; for the latter design, green, orange and violet filters are used to produce signals corresponding to photographic "negatives" of the primary color separation prints. The light filter disk 40 may alternatively be interposed in the constant light beam 30 to carry out the principle of my invention.

Thus, when the refracted beam 31 is passed through a green filter, all the red color components of the picture 10 are absorbed thereby, and any remaining color components pass through to variably affect the cell 33. The light passing through the filter varies inversely in accordance with the degree of a particular primary color in the elemental portion of the picture being scanned. Variations in the intensity of the red light absorbed by the green colored filter causes corresponding current variations to be transmitted as picture signals. Similarly, an orange filter will absorb the blue picture shading and a violet filter will absorb the yellow picture components. The color record 10 being transmitted is accordingly automatically resolved into three monochrome color separation signal groups for translation at the receiver unit. These signal groups correspond to photographic "negatives" of the primary colors blue, red and yellow. The receiver may be designed to produce either "positives" or "negatives" from the signal as will now be evident to those skilled in the art.

The color filter disk 40 is rotated in synchronism with the rotation of drum 11 and at one-third the speed thereof. As shown in Figures 1 and 2, disk 40 is mechanically coupled to the gearing system contained within housing 16 and which drives drum 11. The preferred method for synchronously driving color filter disk 40 utilizes a flexible shaft 44 connected between the stationary gear box 45 mounted on the base 27 and the movable gear box 46 mounted on the scanner carriage 18. Gear box 45 is connected to gearing at 16 by rods 47 and 48 coupled at right angles by gearing box 49. The color filter disk 40 is connected to gear box 46 by rod 50 and gear box 51. The gear boxes 45, 46, 49 and 51 may contain bevelled gears for translating the drive ninety mechanical degrees.

The tortional cable or flexible shaft 44 permits continuous mechanical engagement of the disk 40 and the drum 11 even though the carriage 18 supporting the disk 40 is moved a considerable distance during the scanning operation. The gear box 45 is preferably centrally located with respect to the position of drum 11 so that the flexible shaft 44 will be moved through a minimum displacement and distortion. The color filter disk 40 is accordingly directly mechanically coupled with drum 11 and rotates in phase synchronism therewith at one-third the speed thereof. This arrangement causes each of the color filters 41, 42 or 43 to move past refracted beam 31 in a manner such that for each revolution of drum 11, an individual filter obstructs or remains in the path of the beam 31. Thus while the drum 11 rotates once, one filter, for example the green filter, will remain interposed across beam 31 so that only the red shading components of the picture are impinged upon photo-electric cell 33.

The scanning beam 30 being .01 of an inch wide, causes picture signals to be produced in amplifier 36 as though a red monochrome of the color picture 10 were being scanned during the particular revolution described. During the next revolution of the drum 11, the next adjacent color filter automatically intercepts the beam 31 due to the revolution of filter disk 40 in synchronism therewith and at one-third the rate of drum 11. This second color filter may, for example, be the orange filter so that the blue shading of the color picture 10 varies the light which impinges upon the photo-electric cell 33. However, the scanner carriage 18 has only moved one three-hundredths of an inch during the previous revolution since the carriage is geared to this rate. Accordingly, the second scanning line being described will overlap the first line by two-thirds of the previous scanned line since the scanning lines are .01 of an inch wide due to the width of beam 30, and the advance of the scanner was only one-third this amount. Continuing, with the third revolution of drum 11, the third or violet filter will be automatically moved into the path of the beam 31 and the scanning line upon picture 10 will overlap one-third of the first scanning line and two-thirds of the second scanning line as will now be evident, to transmit the yellow monochrome primary color "negative" values of picture 10.

For each three revolutions of drum 11, the scanner carriage 18 moves a distance equal to the width of a scanning line, namely .01 of an inch. Thus, during the fourth revolution of drum 11, the light beam 30 will not overlap the first scanning beam but will be contiguous therewith as though the picture were being scanned in the ordinary manner for black and white picture transmission. The green or first mentioned filter will be again interposed at the reflected beam 31 and the red components of the color picture 10 will be translated into picture signals. Continuing, the fifth rotation of drum 11 brings the orange filter into view and the scanning operation is contiguous with the second scanning line formed during which the orange scanner was also used to form the blue picture signals. Similarly, the sixth operation is similar to the third described scanning operation and the violet filter comes into operation to translate the yellow components of the picture into electrical signals.

It will accordingly be evident that the principle of my present invention depends upon successive overlapping scanning for the plurality of primary colors for the color picture. Although I prefer to use three colors, two or four or more colors may instead be employed to recompose the color picture. Where three color pictures are used, the scanning is such that every third scanning line across the picture will be contiguous and, in effect, continuously scan the picture. Furthermore, each successive line between the three scanning operations overlap and are used to generate individual primary color separation prints. The primary color separation prints are individually received and translated as will be hereinafter described in detail.

Figure 4 is a plan view of a preferred telepicture receiver for translating the electrical signals

from the translator to produce the individual color separation prints corresponding to the primary colors red, blue and yellow. The drum 55 is preferably of the same diameter as the transmitter drum 11 and three times as long. Receiver drum 55 is rotated in synchronism with the transmitter drum by means of motor 56 through reduction gearing enclosed within housing 57. Synchronizing apparatus responsive to transmitted cyclic synchronizing signals is used to maintain the rotation of drum 55 in phase synchronism with transmitter drum 11. Since the present invention is not concerned with the synchronizing system, it is not illustrated but reference is made to my Patent No. 2,047,863 for a preferred synchronizing system. Drum 55 is removably supported between tail stock 58 and the shaft 59, and is rotated at one hundred revolutions per minute.

A photo-sensitive film 60 is mounted upon receiver drum 55 by sheet clamping mechanism 61. A plurality of smooth surfaced rollers 62 are rotatably mounted on a common shaft 63 supported in brackets 64 parallel to the axis of drum 55. The rollers 62 are moved against the surface of drum 55 to assist in mounting the long sensitive sheet 60 smoothly upon drum 55. My preferred sheet mounting mechanism forms the basis of my Patent No. 2,049,169, patented July 28, 1936, to which reference is made for further details thereof.

The electro-optical scanner carriage 65 mounted to move parallel to the axis of drum 55 contains an individual translating unit 66, 67 and 68 for each of the primary color separation signals transmitted. The scanner carriage 65 is motivated by a feed screw 70 connected through gear box 71 driven by the gearing within housing 57. The feed screw 70 is attached to the carriage 65 by a worm lock located beneath the extension plate 72 attached to carriage 65 and operated by cam lever 73. Carriage 65 is accurately guided in tracks 74—74 to maintain a predetermined orientation with respect to the rotatable drum 55. The receiver apparatus is mounted upon a cast-iron base 75 to minimize any vibrational characteristics of the mechanism.

The translating members 66, 67 and 68 focus a beam of light 76, 77 and 78 respectively upon three separate portions of the sensitive sheet 60. The beams 76 to 78 may be produced by a light valve which is magnetically controlled to transmit light varying in accordance with the intensity of the received picture signals or may be generated by a crater or neon lamp with intensity varying in accordance with the picture signal intensity. Such light generating means are well known in the electrical art. An electro-optical translating system employing a constant intensity light source which is formed into a beam of intensity varying in accordance with the telepicture signals forms the basis of my co-pending application Ser. No. 94,730 filed August 7, 1936, entitled "Telepicture recording systems". The method of employing a neon or crater lamp for producing the recording beams 76 to 78 is disclosed in my Patent No. 2,047,863 hereinabove referred to.

In accordance with my present invention, the individual recording means 76, 77 and 78 are alternately connected to the telepicture receiver 80 in synchronism with the generation of the individual color separation scanning operations of the transmitter. The transmitted signals across channel 37 from the amplifier 36 of Figure 1 are received, amplified and detected at receiver 80. The output of receiver 80 is connected to the electro-optical carriage 65 and alternately connected by cable 81 to the scanner mechanisms 66, 67 and 68 in a manner to be described in connection with Figure 5. The synchronous switching of the output of receiver 80 to the translating units 66 to 68 is performed by switching means enclosed within housing 82 and connected thereto by flexible electrical cable 83.

The individual recording beams 76 to 78 are made one one-hundredth of an inch wide to scan the sensitive film by contiguous sets of scanning lines 86, 87 and 88. The drum 55 rotates at one hundred revolutions per minute in synchronism with the transmitter drum 11. The receiver scanner 65 is moved parallel to the drum 55 at a rate of three hundred lines per inch or one-third inch per minute. The overlapping successive scanning operations described in connection with the transmitter of Figure 1 are synchronously segregated across the long record sheet 60 to form the individual monochrome color separation prints R, B and Y corresponding to the primary colors red, blue and yellow respectively. The principle of my invention depends upon the overlapping scanning at the receiver to effectively scan the colored picture 10 to be transmitted by three sets of overlapping scanning operations and synchronously separating these signals at the receiver to form three independent color separation prints. Every third rotation of drum 55 corresponds to a particular color originally filtered at the transmitter and placed adjacent the corresponding previous line scanned of the scanning groups 86, 87 and 88 on sheet 60. For each third revolution of drum 55, scanner carriage 65 will be advanced one one-hundredth of an inch corresponding to the width of the scanning beams 76, 77 and 78 so that the successive switching of these beams upon the record sheet will cause a continuous spiral to be scanned for the individual R, B and Y prints as will now be evident. The intensity of the reproducing beams 76 to 78 varies in accordance with the primary color component of the elemental portion of the picture being scanned as filtered through the individual color screen or filter of filter disk 40 as hereinabove described in connection with Figure 1.

Figure 5 is a schematic diagram illustrating a preferred method for synchronously switching the independent translating mechanisms 66, 67 and 68 upon the light sensitive record sheet 60. I have schematically indicated a neon lamp for the individual translating mechanisms although any other conventional light valve may instead be used. One terminal 90 of receiver 80 is connected to a common terminal of each of the recording units 66 to 68 by connection lead 91. The other terminal 92 of receiver 80 is successively connected to the other terminals of the translating mechanisms 66 to 68 through synchronous switching mechanism 82.

The synchronous switching mechanism 82 comprises 120° cam 93 which successively closes each of three cam switches 94, 95 and 96 disposed 120 mechanical degrees about cam 93. Cam 93 is directly driven by shaft 97 coupled to the member 59 which drives drum 55, and through the gearing 98—98'. Gears 98—98' are designed to reduce the speed of cam 93 by 3 to 1 so that the cam 93 rotates once for every three revolutions of the receiver drum 95. After each revolution of drum 55, one of the cam switches is opened and the next successive cam switch is closed to correspondingly switch the

output of receiver 92 successively between the picture translating units 66 to 68. One terminal of each of the cam switches 94 to 96 is connected to a corresponding terminal on the recording units 66 to 68. The other terminal of these cam switches is connected to the common connection lead 100 connected to the terminal 92 of receiver 80.

The operation of the receiver system of my present invention is such that each of the color separation prints R, B and Y are built up line by line, which lines are successively transmitted and recorded. The line sensitive film 60 is ordinary monochrome light sensitive film such as a silver salt film which is sensitive to the varying light intensities from the recorder units 66 to 68. The monochrome color separation prints corresponding to the primary colors in the original color picture 10 are recorded on film 60 which is developed in the conventional manner for black-white pictures. The R, B and Y prints are preferably made as positives upon the translucent or transparent film 60 so that tinting and superpositioning thereof will directly form a color facsimile of the transmitted color picture 10.

The tinting of coloring of the individual R, B and Y prints to red, blue or yellow is performed by first bleaching the film in a manner well known in the art and then dyeing them with an aniline dye or toning them with metallic salt solutions which combine with the silver retained in the print as well known in the photographic art. Toning the film brings out the high lights in the final picture in a better manner than the dyeing process does. The tinted monochrome color separation prints R', B' and Y' are accurately superimposed one upon the other and made integral with a suitable transparent cement or paste.

Figure 6 illustrates how the tinted prints R', B' and Y' are superimposed upon an opaque white backing sheet 101. This illustration corresponds to Figure 6 of my co-pending application Ser. No. 138,683 filed April 24, 1937. The scanning lines are drawn in Figure 6 to illustrate an important advantage of my present invention. The scanning lines 88 upon the Y' print correspond to the original scanning lines of .01 inch width. The scanning lines 88*a* as viewed beneath the B' print show how corresponding lines 88 of the Y' print overlap and are displaced relative to those of the B' print. Similarly the scanning lines are viewed through the top or R' print contains the three sets of scanning lines all overlapped due to the particular system of scanning hereinabove described. In the preferred example, the width of the individual scanning lines is .01 of an inch and their overlapping is one-third or two-thirds of the width of the scanning lines.

In accordance with my present invention, the plurality of color separation prints are produced with corresponding portions of the picture perfectly parallel and successively scanned with overlapping of adjacent color separation scanning lines. The overlapping of the scanning lines as viewed through the superposition of the prints at 88*b* of Figure 6 evens out or tones the final image so as to effectively dissolve or cause any possible outline of the individual scanning lines which may be apparent in an individual print to disappear in the final color print. This result is an important advantage in commercial telepicture operation since slight inaccuracies which may creep into an ordinary black-white picture without being objectionable, will cause color streaks and color distortions when three color separation prints, transmitted and received in a different manner are superimposed. The parallel orientation of the respective scanning lines and their overlapping minimizes such distortions since successive scanning lines of any one color print are not successively received but are recorded every third revolution of the drum. Similarly, phasing inaccuracies described in the same application will not distort the respective color prints of the present invention since corresponding portions of the picture are successively scanned and result in reproductions which may be accurately superpositioned.

In accordance with my present invention, colored photographs, pictures, drawings, and paintings of any character may be economically transmitted to remote points. Such transmission is particularly important to newspaper and magazine chains where rapid and accurate transmission between points is paramount. Such transmission may be carried out with the skill and precaution ordinarily required with black-white picture transmission. Colored pictures and drawings for comic sections, special feature sections, or advertisements may thus be economically transmitted without special precautions to avoid inherent commercial picture distortions. The colored pictures are transmitted without requiring the intermediate color separation prints such as produced by color photography processes. By suitably choosing the color filter of the filter disk at the transmitter or by suitably biasing or electrically connecting the transmitter and/or receiver circuits, the receiver can directly produce "positives" corresponding to the primary color separation prints for the color picture transmitted. In a similar manner, negatives of these pictures may be produced at the receiver. It is feasible to directly engrave the primary color separation prints upon the metallic plate for use with the conventional color printing process. The receiver translating unit corresponding to Figures 4 and 5 may be at the same location as the transmitter and be used to translate the picture signals generated directly from the color photograph 10 into the primary color separation prints necessary for color photoengraving and thus avoid the requirement for intermediate color photography. Modifications of my present invention will be evident to those skilled in the art and accordingly I do not intend to be limited except as set forth in the following claims.

I claim:

1. The method of transmitting a colored picture which comprises the steps of scanning the picture by line by line scanning operations, causing successive lines to overlap, filtering out different colors of the light beam on successive overlapping lines to produce light intensities varying in accordance with predetermined color components of elemental portions of the picture, scanning for a separate color for each full successive scanning line, generating electrical signals in accordance with the varying light intensities of each of the color components, and translating the electrical signals to produce individual color separation prints.

2. The method of electrically transmitting a colored picture which comprises the steps of scanning the picture at a predetermined rate by line by line scanning operations, causing succes-

sive lines to overlap, filtering out different colors of the light beam on successive lines to produce light intensities varying in accordance with primary color components of elemental portions of the picture, scanning for a separate color for each full successive scanning line, generating electrical signals in accordance with the varying light intensities of each of the color components, transmitting the electrical signals to a receiving station, translating the electrical signals, and successively scanning record sheets corresponding to each of the primary color components with substantially contiguous scannings to produce individual monochrome primary color separation prints.

3. The method of transmitting a colored picture which comprises the steps of scanning the picture by line by line scanning operations, causing successive lines to overlap, filtering out different portions of the light beam on successive lines to produce light intensities varying in accordance with primary color components of elemental portions of the picture, scanning for a separate color for each full successive scanning line, generating electrical signals in accordance with the varying light intensities, transmitting the electrical signals to a receiving station, synchronously segregating the signals for successive line scannings corresponding to the differently filtered beams, translating the segregated signals into respective substantially contiguously scanned individual monochrome primary color separation prints, and superimposing the prints to produce a color facsimile of the transmitted picture.

4. A facsimile transmitter comprising means for electro-optically scanning a color picture line by line, means for causing successive scanning lines to overlap; and means in synchronism with the line by line scanning operations for differently filtering the scanning light beam on successive lines of scanning and for scanning for a separate color for each full scanning line, and means for successively producing electrical signals varying in accordance with individual color components of the picture.

5. A facsimile transmitter comprising means for electro-optically scanning a color picture; and means for differently filtering the scanning light beam on successive lines of scanning and for scanning for a separate color for each full scanning line, and means for successively producing electrical signals varying in accordance with individual color components of the picture including a plurality of color screens, and means for successively moving a different one of said screens into the path of said scanning light beam at the completion of each line of scanning.

6. A facsimile transmitter comprising means for electro-optically scanning a color picture with successively line by line scanning operations; means for causing successive scanning lines to overlap and means for differently filtering the scanning light beam on successive lines of scanning and for scanning for a separate color for each full scanning line, and means for successively producing electrical signals varying in accordance with individual color components of the picture including a plurality of color screens, and means for successively moving a different one of said screens into the path of said scanning light beam in synchronism with each line of scanning.

7. A facsimile transmitter comprising a rotatable drum, means for driving said drum, and a transversely movable scanner carriage for electro-optically scanning a color picture mounted on said drum; means for differently filtering the scanning light beam on successive lines of scanning and for scanning for a separate color for each full scanning line,and means for successively producing electrical signals varying in accordance with individual color components of the picture including a plurality of color screens mounted on said scanner carriage, and means operable from said drum driving means for successively moving said screens into the path of said scanning light at the completion of each line of scanning.

8. A facsimile transmitter comprising means for electro-optically scanning a color picture by overlapping line by line scanning; means for filtering the scanning light beam and for scanning for a separate color for each full scanning line, and means for successively producing electrical signals varying in accordance with individual color components of the picture; and means for translating said electrical signals comprising means for carrying a record sheet, a plurality of recording units and means for synchronously switching said signals at the completion of each line of scanning successively line by line to said recording units to group the recorded lines of scanning on corresponding sections of the sheet to produce individual contiguous line scanned facsimiles.

9. A facsimile transmitter comprising means for electro-optically scanning a color picture with successively overlapping line by line scanning operations; means for filtering the scanning light beam and for scanning for a separate color for each full scanning line, and means for successively producing electrical signals varying in accordance with individual color components of the picture; and means for translating said electrical signals comprising means for carrying a record sheet, a plurality of recording units, and means for switching said signals at the completion of each line of scanning successively line by line to said recording units in synchronism with said scanning operation including a switch individual to each of said units, and means for selectively operating each switch to group the recorded lines of scanning on corresponding sections of the sheet whereby an individual contiguous line scanned facsimile coresponding to said individual color components is produced.

10. A facsimile transmitter comprising means for electro-optically scanning a color picture line by line with successively overlapping line by line scanning operations; means for filtering the scanning light beam and for scanning for a separate color for each full scanning line, and means for successively producing electrical signals varying in accordance with individual color components of the picture; and means for translating said electrical signals comprising a rotatable drum for carrying a record sheet, a plurality of recording units spaced along and cooperative with said record sheet, and means for switching said signals at the completion of each line of scanning successively line by line to said recording units in synchronism with said line by line scanning operation including a switch individual to each of said units, and means for selectively operating each switch, and mechanism mechanically connected to said drum for motivating said switch operating means to group the recorded lines of scanning on corresponding sections of the sheet whereby an individual contiguous line scanned facsimile corresponding to said individual color components is produced.

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11. A method of transmitting a multichrome picture comprising the steps of light beam line by line scanning of said picture, causing successive lines to overlap, selecting a predetermined color component of the light beam for each scanning line, and of alternate color components for successive lines in accordance with the number of colors to be transmitted, generating electrical signals in accordance with the varying light intensities of each of the color components selected as it is successively selected and translating such signals to produce individual color separation prints.

12. In a telepicture system comprising a transmitting means for scanning a multichrome picture line by line, means for filtering different colors in successive scanning lines, and for transmitting impulses of varying intensity as to each color component, a receiving means for forming color separation prints comprising a plurality of recording units and switching means for operating the recording unit as to each color in synchronism with the impulses for said color.

13. In a telepicture system comprising a transmitting means for scanning a multichrome picture line by line, means for filtering different colors in successive scanning lines, and for transmitting impulses of varying intensity as to each color component, a receiving means for forming color separation prints comprising a plurality of recording units, and switching means for operating the recording unit as to each color in synchronism with the impulses for said color, said switching means comprising a cam rotating in synchronism with the color filtering means of the transmitter, said cam comprising a member rotatable therewith and successively closing appropriate switches in synchronism with appropriate impulses as to each color.

14. The method of transmitting a multichrome picture comprising: line by line scanning of said picture; the causing of successive lines to overlap; the scanning for a specific color on each specific scanning line; the scanning for a different color on the preceding overlapping scanning line and the succeeding overlapping scanning line; producing light intensities varying in accordance with the intensity of the specific color present in the elemental portions of the picture scanned on each specific line; generating electrical signals in accordance with the varying light intensities; and translating the electrical signals to produce individual color separation prints.

WILLIAM G. H. FINCH.