

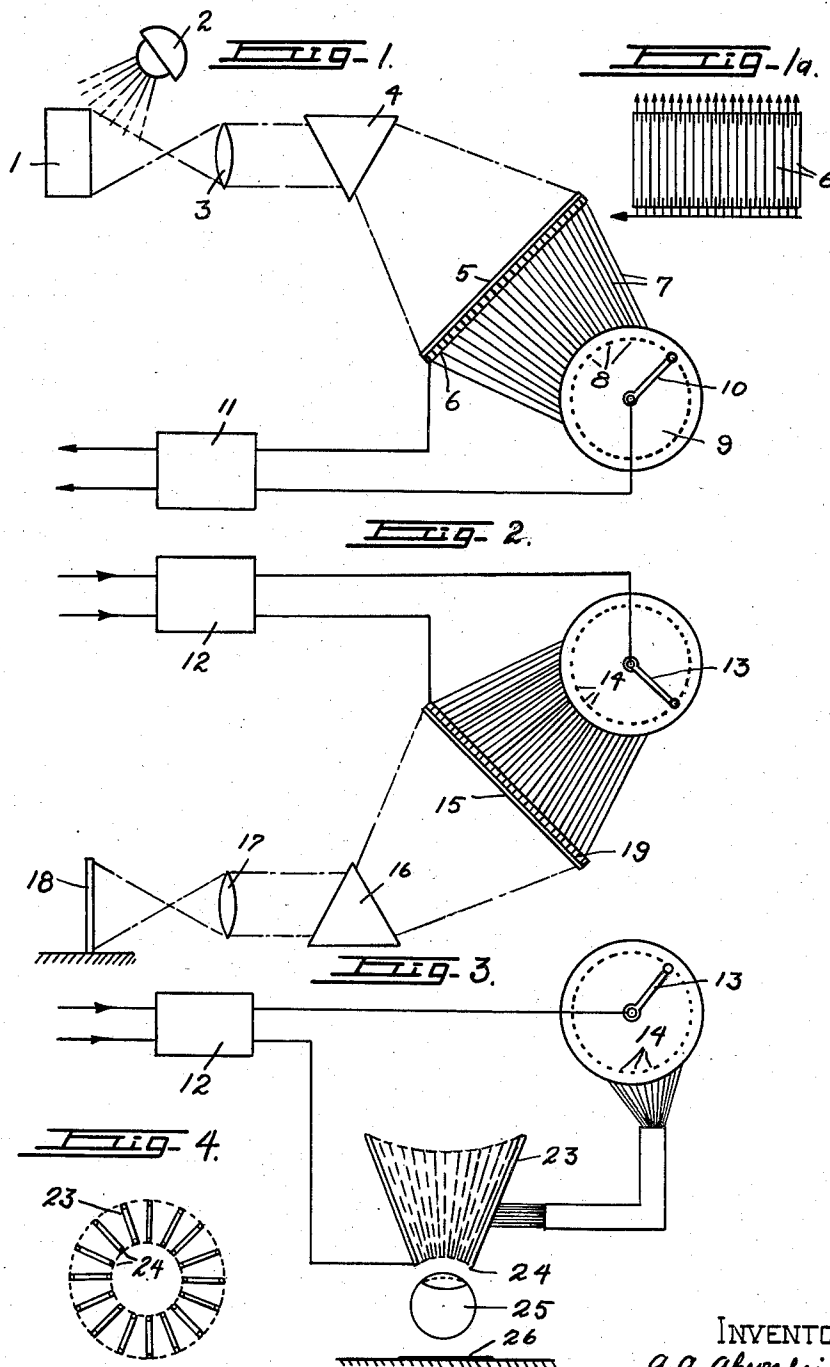
June 11, 1935.

A. A. AHRONHEIM

2,004,359

APPARATUS FOR TELEGRAPHICALLY TRANSMITTING COLORED PICTURES

Original Filed Aug. 7, 1930 2 Sheets-Sheet 1



WITNESS

H. L. Meade

INVENTOR
A. A. Ahronheim

By

Danish & Thompson
ATTORNEYS

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A. A. AHRONHEIM

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Fig. 5.

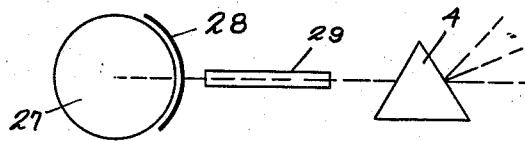


Fig. 6.

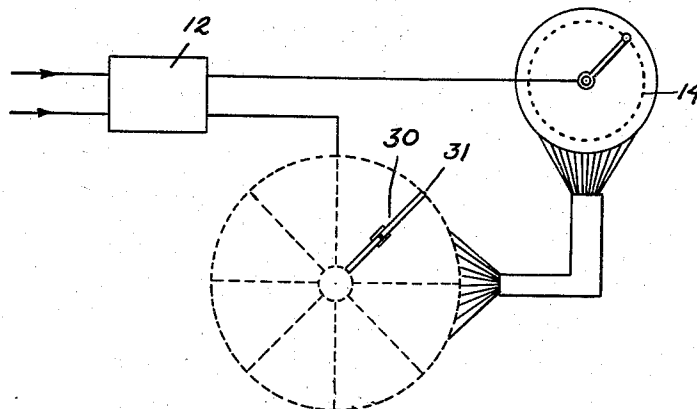
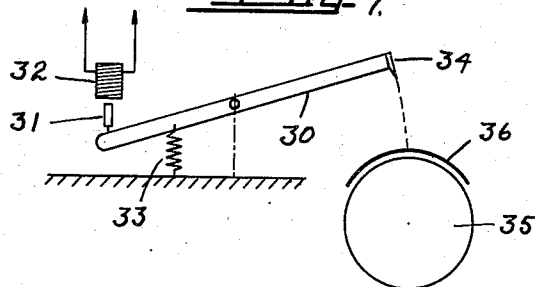


Fig. 7.



WITNESS

H. L. Meade

By

INVENTOR
a. a. Ahronheim

Denison Thompson
ATTORNEYS

UNITED STATES PATENT OFFICE

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APPARATUS FOR TELEGRAPHICALLY
TRANSMITTING COLORED PICTURESAlbert Alexander Ahronheim, Jackson, Mich., as-
signor of one-half to William Sparks, Jackson,
Mich.Original application August 7, 1930, Serial No.
473,661. Divided and this application Febru-
ary 17, 1932, Serial No. 593,518

1 Claim. (Cl. 178—5)

This invention relates to the method and apparatus for telegraphically transmitting colors and colored pictures and is a divisional application of my co-pending application, Serial No. 473,661, filed August 7th, 1930.

The main object of this invention is to provide a method and apparatus for telegraphically transmitting different colors and colored pictures by either wire or wireless so that said colors or colored pictures which are present at the transmitting station, will be faithfully reproduced at the receiving station.

As far as the mere telegraphical transmission of colors or colored pictures is concerned, this invention is based upon my discovery that it will be possible to transmit colors or colored pictures by de-composing said colors or colored pictures into the spectrum of the respective color and then transmitting several portions or bands of the spectrum. When so transmitting the colors or colored pictures, all those devices may be used which are ordinarily employed in connection with television systems for transmitting pictures in general.

According to my invention, I carry out the transmission of colors or colored pictures by de-composing the colors or colored pictures into its spectrum in the transmitting apparatus and more particularly, by throwing said spectrum upon a system of selenium cells connected in electric circuits so that the group of selenium cells which corresponds to the respective color of the spectrum, will close the respective electric circuit. By means of well-known auxiliaries such as, for instance, rotating contact disks, the colors at the transmitting station are made to co-operate with proper circuits at the receiving station and to actuate the transmitting apparatus proper. For instance, if it is desired to transmit colors to be solely visible at the receiving station, the colors may be caused to act in such a way upon the receiving apparatus that the respective colors of a white spectrum, which is drawn upon the receiving apparatus, will be caused to come into action, said colors being thrown upon a translucent plate after having been collected into a unitary color, which will then correspond to the initially transmitted color. On the other hand, if it is desired to fix the transmitted color at the receiving station, I provide containers with several colors therein, said colors being adapted to give a white spectrum while the current impulses produced at the receiving station are used for causing color to discharge from these containers which

contain the colors forming the spectrum to be transmitted.

The colors discharging from the several containers may then be united and mixed with each other to result into that color which acts upon the transmitting apparatus. Furthermore, if it is desired to transmit not only a single definite color but an entire colored picture, the latter must be divided into a greater number of points which are treated by an optical point-to-point method, and each of the rays resulting therefrom, is transmitted and faithfully reproduced at the receiving station.

At the receiving station, the colored picture is drawn up in the form of a system of points resulting in a colored picture with true reproduction of the original colors.

Other objects and advantages relate to the details of the structure and the arrangement of the various parts thereof, all as will more fully appear from the following description, taken in connection with the accompanying drawings in which:—

Figure 1 shows diagrammatically the apparatus forming part of a transmitter which serves for the transmission of a single color.

Figure 1a is a diagrammatical detail view showing the special arrangement of the selenium cells used in connection with the transmitter shown in Figure 1.

Figure 2 shows likewise diagrammatically the receiving apparatus for the transmitter represented in Figure 1.

Figure 3 shows diagrammatically a receiving apparatus which may be used in connection with the transmitting apparatus shown in Figure 1 and which includes means for fixing the color transmitted at the receiving station.

Figure 4 is a detail view showing a color receptacle or container for operating the color-mixing apparatus forming part of Figure 3.

Figure 5 is a further detail view showing how said color may be recorded on a paper at the receiving station.

Figures 6 and 7 are detail views showing an electro-magnetically actuated recording mechanism for recording the color on a paper at the receiving station.

Referring now more particularly, the transmitter apparatus shown in Figure 1 comprises a surface 1 to which the color to be transmitted is applied and a lamp 2 for illuminating said color on said surface. The colored rays which emanate from the color on surface 1 are collected by means of a lens 3 and thrown onto a prism 4,

said rays passing through said prism being decomposed into their spectrum, that is, into the spectrum which corresponds to the respective color to be transmitted.

5 The spectrum of the respective color is now projected upon a translucent pane or plate 5, and in the rear of this translucent plate is provided a system of radially arranged selenium cells 6 which are connected in electrical circuits, as indicated by the conductors 7. The other ends of conductors 7 lead to contacts 8 of a contact disk 9 provided with a rotatable contact lever 10. From contact lever 10, a conductor leads to the amplifying and transmitting apparatus 11 proper, as indicated in Figure 1.

15 The conductors which lead to the other ends of the selenium cells, are likewise connected by a conductor to said amplifying and transmitting apparatus 11.

20 The receiving apparatus shown in Figure 2 comprises a receiving and amplifying apparatus 12 from which one conductor leads to a rotatable contact lever 13 which is associated with a contact disk 14. The number of contacts on contact disk 14 is exactly in agreement with the number of contacts 8 on contact disk 9 shown in Figure 1.

25 Each contact on the contact disk 14 is connected by means of a conductor to a gas cell 19, the several gas cells being arranged in bands, the number and general arrangement of the gas cells being likewise in exact arrangement with the number and arrangement of the selenium cells 6 shown in Figure 1. A further conductor leads from the gas cells 19 to the receiving and amplifying apparatus 12.

30 A translucent plate 15 is arranged in front of the gas cells 19 and a white spectrum is drawn upon plate 15 in a longitudinal direction. Contact lever 13 is rotated in synchronism with contact lever 10 with the aid of synchronous driving equipment now well-known to the art.

35 If a definite color of the spectrum is made to appear on translucent plate 5 which forms part of the transmitting apparatus, a definite group of selenium cells positioned in rear of said plate will be energized, thus causing definite impulses of current in the amplifying and transmitting apparatus 11 for every position of contact lever 10. These current impulses conducted through the system for the various positions of contact lever 13, will cause corresponding impulses to flow in the respective conductors which lead to gas cells 19 so that a definite group of these cells will be brought to incandescence.

40 The electrical connections in this case, are so arranged, that just those gas cells will be brought to incandescence which are positioned in the rear of those colors of the spectrum which is projected onto translucent plate 15, which colors correspond to the band of transmitting spectrum. The colors that are thus produced by action of the incandescence of the gas cells 19 are collected by prisms 16 and passed through a lens system 17 and projected onto a further translucent plate 18 which will show a color identical to that which is applied to the surface 1 of the transmitting apparatus.

45 If it is desired in addition, to render the transmitted color visible and at the same time, fix the color at the receiving station, the conductors coming from the contacts 14 instead of being connected with gas cells 19, may be connected with apertures 24 of color containers 23, as indicated diagrammatically in Figures 3 and 4.

5 In this case, the current impulses produced at the receiving station are used for electro-magnetically actuating an aperture 24 of a color container 23 to an extent depending upon the strength of the respective current impulses. The containers 23 are filled with colors that correspond to the several bands of the aforementioned white spectrum and the electrical connections in the present case are likewise arranged in such a manner that those containers are opened at a given time which contain the colors corresponding to the respective selenium cells at the receiving station shown in Figure 1.

10 The colors may discharge through apertures 24 of containers 23 into a rotating container 25 in which said colors are collected and mixed. After being mixed in container 25, the colors may be passed onto a surface 26 consisting of filtering paper.

15 Figures 5, 6 and 7 show supplementary apparatus necessary at the transmitting station in case it is desired to transmit not merely a single color but an entire colored picture with faithful reproduction of all colors.

20 According to Figure 5, the picture 22 to be transmitted in color, is placed upon a drum 27 and treated by a point-by-point optical contact method. A contact device 29 may be used for this purpose which permits the several rays coming from an individual point of picture 22 to pass through prism 4 in which the colored ray will be decomposed in the usual and well-known manner into a spectrum which may be transmitted to the transmitter proper as previously described in connection with Figure 1.

25 For the reception of a picture of this kind, the conductors which lead to the receiving and amplifying apparatus 12 and to the contact disk 14, as shown in Figure 6, are again connected to color containers which result in a white spectrum in conformity with the position of the selenium cells 6. These color containers are arranged in a manner similar to the keys of a typewriter and for this particular purpose, may be made in the form of a lever 30, as shown in Figure 7, and arranged in star-shaped manner with respect to each other.

30 The conductors coming from the contact disk with the contacts 14 thereon, lead to electro-magnets 32, as shown in Figure 7. Armatures 31 of electro-magnets 32 are hinged onto the ends of levers 30 and which serve for the purpose of actuating the respective color containers. The containers are fixed in a position of rest, as shown in Figure 7, by means of springs 33. A drum 35 is arranged centrally with respect to the containers and which forms a support for the recording paper 36 adapted to receive the transmitted picture.

35 Drum 35 with record paper 36 thereon, is moved forward point by point in accordance with the position of drum 27 which forms part of the transmitting apparatus. Levers 30 are provided at their upper ends with a writing pen 34 directed towards the drum 35 and the record paper thereon which is adapted to apply the color to record paper 36 upon the actuation of lever 30.

40 In this manner, the colored pictures to be transmitted will appear with a faithful reproduction of all colors point by point upon the record paper 36. In order to prevent simultaneous actuation of levers 30, proper locking devices may be used in connection with the levers as is well-known to any one familiar with the art, so that only the

lever receiving the strongest current impulse will be actuated at a time.

It is evident that during the transmission of a white picture point, all levers will have the tendency of being actuated which may likewise be prevented by suitable locking means.

Although I have shown and described specific arrangements of apparatus as being illustrative of my invention, I do not wish to be limited by the same, as many changes and modifications may be made, without departing from the spirit and scope of the appended claim.

I claim:

Apparatus for telegraphically transmitting and receiving colored pictures comprising, a rotatable drum carrier for supporting the picture to be transmitted, means for scanning said picture, means for decomposing the scanning light rays thus produced into their spectrum, a group of photo-electric elements arranged to receive the bands of said spectrum to produce current impulses, a contact disk having a contact connected in circuit with each of said photo-electric elements, a synchronously driven contact arm, means including said contact disk and said arm for successively

transmitting said current impulses, means for receiving said current impulses including a rotatable drum carrier for supporting a recording paper, said drum carrier being adapted to be moved in synchronism with said drum carrier at the transmitter, a plurality of type bar actions corresponding in number with the number of photo-electric elements at the transmitter, an electro-magnet for actuating each of said type bar actions, a second contact disk having a contact connected in circuit with each of said electro-magnets, a second contact arm connected in circuit with said receiving means and driven synchronously with said first named arm for successively actuating said type bar actions in accordance with said received current impulses, a color container associated with each type bar action, each of said color containers having a reservoir and a constricted discharge duct adapted to be brought in contact with said record paper by its respective type bar action for depositing a color upon the record paper corresponding to the color point being transmitted.

ALBERT ALEXANDER AHRONHEIM.