

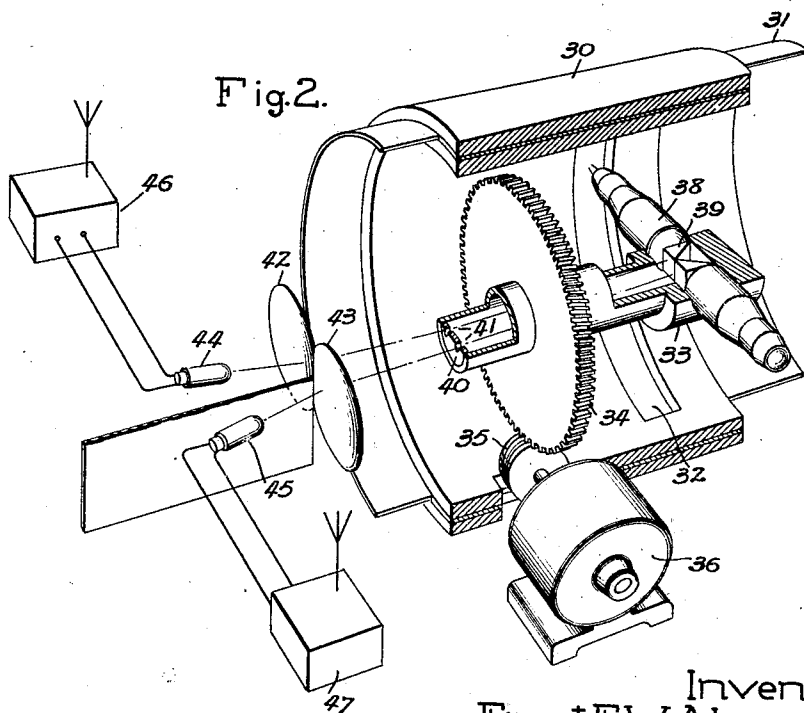
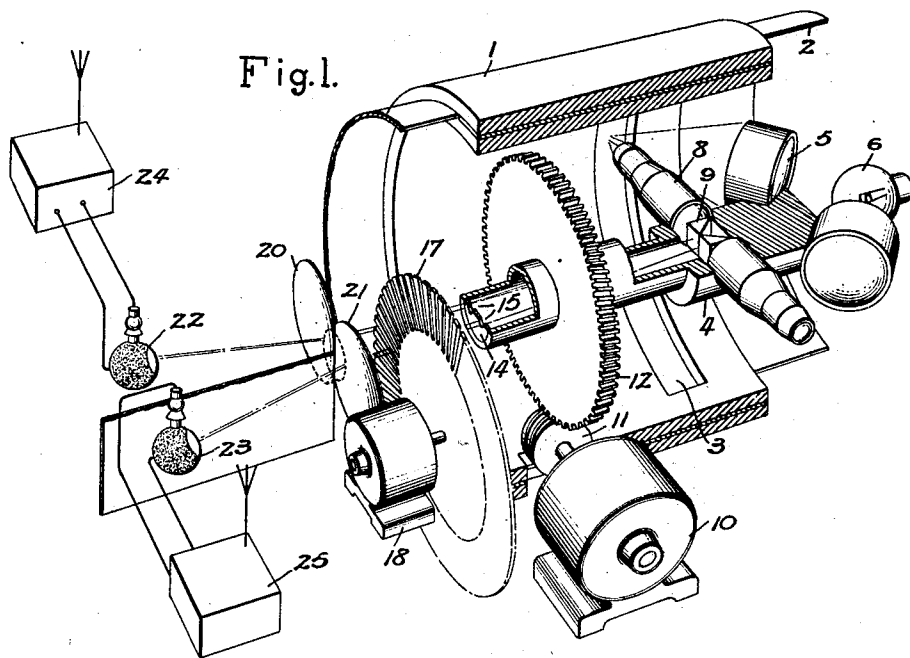
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PICTURE TRANSMISSION

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PICTURE TRANSMISSION

Application filed June 5, 1930. Serial No. 459,366.

My invention relates to the transmission of pictures, and it has for its object the provision of improved apparatus for this purpose which without being operated at higher mechanical speeds permits of higher picture transmission speeds than heretofore.

In my copending application Serial No. 264,714, filed March 26, 1928, now Patent 1,792,264, Feb. 10, 1931, I have disclosed and claimed a form of picture transmission apparatus, the sending part of which scans the picture to be sent a single line at a time, the successive impulses produced in accordance with the shades of the unit areas of the picture in such line being transmitted by radio to the receiver. At the latter a light sensitive member is exposed one line at a time to light which is modulated in accordance with the received signal.

In accordance with my present invention which is an improvement over the above-mentioned invention, the picture to be sent is scanned simultaneously in a plurality of scanning lines, impulses corresponding with the shades of the unit areas in the plurality of scanning lines are transmitted simultaneously and at the receiver the light sensitive member is exposed simultaneously in a plurality of parallel lines.

My invention will be better understood from the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

In the drawings, Figs. 1 and 2 represent those portions of the apparatus involving my invention respectively for sending and receiving a transmitted picture.

Referring first to Fig. 1, I have shown at 1 a support of cylindrical form, although not necessarily a complete cylinder, for the paper or other member 2 bearing the picture to be transmitted which in passing through the support is bent to a form which preferably is approximately semi-cylindrical. As my invention is equally applicable where the picture is bent through various smaller arcs, I intend that the term semi-cylindrical as used in the claims shall apply to all such cases. Likewise the term "cylindrical" as applied

to the support does not necessarily mean that the support must be in the form of a complete cylinder. In the form illustrated the paper 2 extends through an arc of a little less than 180°. Any suitable means may be provided for drawing the paper in an axial direction through the support at a uniform, slow speed. In the support 1 is the narrow window 3 through which the picture is scanned. Arranged axially of the support 1 is the shaft 4, one end of which is hollow and at the other end of which is supported the condensing lens 5 which serves to focus on the picture at the proper point light from the lamp 6. Extending radially from the shaft 4 is the lens member 8, the outer end of which is arranged to pass longitudinally over the window 3 and at the inner end of which is the prism 9. The shaft is shown adapted to be rotated by motor 10 connected therewith by the worm 11 and the worm wheel 12, which is fixed to the shaft. At the opposite end of the shaft 4 is the diaphragm 14 having therein two small holes 15 on which the lens member 8 in conjunction with the prism 9 focuses images respectively of unit areas of the picture lying in two adjacent scanning lines. In front of the diaphragm 14 I have shown the chopper 17, which is provided with teeth of sufficient length to interrupt the light rays passing through both holes 15. The chopper is shown driven by a separate electric motor 18, the speed of which governs the frequency of the audio carrier wave which by way of example may be 3000 cycles per second. In front of the diaphragm 14 and beyond the chopper are the two similar spherical lenses 20 and 21 each of which has a segment removed therefrom with the remaining portions juxtaposed. At or approximately at the focal points of lenses 20 and 21 are respectively the photo-electric cells 22 and 23. The output circuits of these cells are shown connected respectively with the radio transmitters 24 and 25, each provided with an antenna and adapted to transmit on two radio waves which differ from each other by a relatively very small amount. For example, the transmitter 24 may transmit signals at a fre-

quency of 17,300 K. C. and the transmitter 25 may transmit at a frequency of 17,310 K. C.

As the chopper and scanning device rotate, the light rays from two adjacent scanning lines pass through the two openings 15, are interrupted by the chopper 17 and thereafter pass through the respective lenses 20 and 21 into the respective cells 22 and 23. As the shaft rotates the light rays passing the two openings 15 describe semicircles on the two lenses 20 and 21 respectively, as shown by the dotted lines thereon, and since the photoelectric cells 22 and 23 are arranged at or approximately at the focal points of these lenses, the light rays always reach the cells.

Referring now to the receiving part of the apparatus shown in Fig. 2, I have shown a support 30, which is similar to the support 1 of the sending apparatus through which a light sensitive member 31 is adapted to be drawn with a uniform slow movement by any suitable means not shown. Member 31 like the picture 2 is bent preferably to form approximately a semi-cylinder but if desired may form a smaller arc, the term semi-cylindrical as used in the claims being intended to apply in such cases. Support 30 like support 1 is provided with the narrow window 32. Similar also to the construction shown in Fig. 1, is the hollow shaft 33 having the worm gear 34 thereon meshing with the worm 35 driven by the motor 36, which by suitable means is caused to rotate at a speed corresponding with the speed of the motor 10 of the sending apparatus. Shaft 33 also supports the lens member 38 and prism 39 as in the previously described construction and at the opposite end, the shaft is provided with the diaphragm 40 having therein two holes 41. In front of the diaphragm are the two spherical lenses 42 and 43, which as before have segments removed therefrom with the remaining portions in juxtaposed relation. At the focal points of lenses 42 and 43 are arranged respectively the discharge lamps 44 and 45, which preferably are lamps having a concentrated source of light which is susceptible to high frequency modulation. I have shown the lamps 44 and 45 connected to radio receivers 46 and 47 respectively, each having an antenna and tuned to receive the signals transmitted respectively from the transmitters 24 and 25.

In operation the separate signals or impulses being received by the two receivers 46 and 47, cause the operation of the respective lamps 44 and 45. Since these lamps are arranged at the focal points of the lenses 42 and 43, the light rays from each lamp illuminate the entire diaphragm 40. The two openings 41 in the diaphragm 40 now become in effect two light sources which by means of the lens member 38 and the prism 39 are focused as separate adjacent spots on the light sensitive member 31. As the

shaft rotates the two spots trace two adjacent parallel lines on the light sensitive member, each spot being varied independently of the other in accordance with the signals received by the respective receivers 46 and 47.

While I have shown and described apparatus for scanning the picture simultaneously in two adjacent lines, and likewise in reforming the picture by exposing it simultaneously in two lines, it will be understood that my invention is not limited to such but applies also to apparatus by which the picture may be scanned simultaneously in a greater number of lines, and likewise reformed simultaneously in a like greater number of lines.

I have chosen the particular embodiment described above as illustrative of my invention and it will be apparent that various modifications may be made without departing from the spirit and scope of my invention, which modifications I aim to cover by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. Picture transmitting apparatus comprising a cylindrical member adapted to support a picture to be sent, a scanning lens member rotatably supported coaxially with said cylindrical member, a plurality of fixed light responsive devices, and means cooperating with said lens member for directing simultaneously toward a plurality of fixed points occupied by said devices the light rays respectively from adjacent areas in separate scanning lines of the picture.

2. Picture transmitting apparatus comprising a cylindrical member adapted to support a picture to be sent, a scanning lens member rotatably supported coaxially with said cylindrical member, a plurality of photoelectric devices, and a plurality of light refracting members between the lens member and said devices arranged to direct simultaneously toward the fixed points occupied by the respective devices light rays from separate scanning lines of a picture of approximately semi-cylindrical form.

3. Picture transmitting apparatus comprising a cylindrical member adapted to support a picture to be sent, a scanning lens member rotatably supported coaxially with said cylindrical member, a plurality of fixed photoelectric cells, and a plurality of fixed light refracting members between the lens member and said cells arranged to direct simultaneously into the cells light rays respectively from adjacent areas in separate scanning lines of the picture.

4. Picture transmitting apparatus comprising a cylindrical member adapted to support a picture to be sent, a scanning lens member rotatably supported coaxially with said cylindrical member, a plurality of fixed photoelectric cells, separate transmitting apparatus connected with each cell, a plurality

of fixed light refracting members associated therewith and arranged to direct into the cells light received respectively from each of a plurality of separate scanning lines of a picture of approximately semicylindrical form.

5. Picture transmitting apparatus comprising a cylindrical member adapted to support a picture to be sent, a hollow rotatable shaft having a scanning lens member and a diaphragm provided with a plurality of light openings therein, a plurality of fixed photoelectric cells, a light refracting member associated with each of said cells and a single light chopper for light passing both of said openings, the arrangement being such that the cells simultaneously receive light respectively from separate scanning lines of the picture.

6. Picture transmitting apparatus comprising a cylindrical member adapted to support a picture to be sent, a hollow rotatable shaft having a scanning lens member and a diaphragm provided with a plurality of light openings therein, a plurality of fixed photoelectric cells, and a plurality of fixed lenses arranged in cooperation with said scanning lens member to project simultaneously into the respective cells light from each of a plurality of separate scanning lines of the picture.

7. Picture transmitting apparatus comprising a cylindrical member adapted to support a light sensitive member, a plurality of fixed sources of modulated light and means including a lens member rotatable concentrically of said cylindrical member for projecting light simultaneously from each of said sources in the same direction in parallel paths on the light sensitive member.

8. Picture transmitting apparatus comprising a cylindrical member adapted to support a light sensitive member, a plurality of fixed sources of light, means for separately modulating the light from each source, a lens member rotatable concentrically of said cylindrical member, and fixed means cooperating said lens member for causing the light from said sources simultaneously to expose the light sensitive member of semi-cylindrical form respectively in a plurality of parallel paths.

9. Picture transmitting apparatus comprising a cylindrical member adapted to support a light sensitive member, a plurality of fixed sources of light, means for separately modulating the light from each source, a lens member rotatable concentrically of said cylindrical member, a plurality of fixed lenses at the focal point of each of which is arranged one of said light sources, and a diaphragm rotatable with said lens member and arranged to be illuminated by all of said sources, said diaphragm having a plurality of openings therein arranged to be simultane-

ously imaged by the lens member on the light sensitive member.

10. Picture transmitting apparatus comprising a cylindrical member adapted to support a picture to be transmitted, means rotatable coaxially with said member for scanning an approximate semi-cylindrical picture simultaneously in a plurality of parallel lines, a plurality of fixed light responsive devices and means in cooperation with said scanning means for directing to the several light responsive devices respectively the light from the several parallel scanning lines.

11. Picture transmitting apparatus comprising a cylindrical member adapted to support a light sensitive sheet, means rotatable coaxially with said member for scanning an approximately semi-cylindrical sheet simultaneously in a plurality of parallel lines, a plurality of fixed sources of modulated light, and means in cooperation with the scanning means for directing light from the several light sources respectively to the several parallel lines.

In witness whereof, I have hereunto set my hand this 4th day of June, 1930.

ERNST F. W. ALEXANDERSON.

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