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PICTURE RECORDING

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Fig. 2

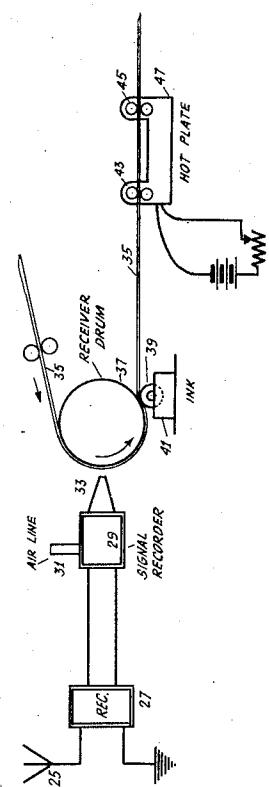
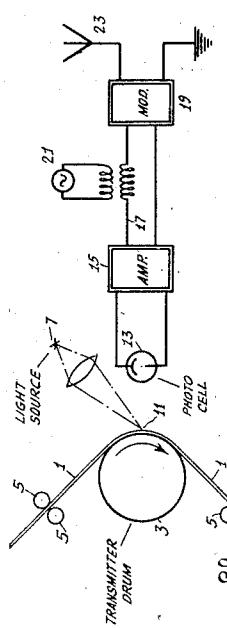


Fig. 1



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## UNITED STATES PATENT OFFICE

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## PICTURE RECORDING

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The present invention relates to the process and method for reproducing pictures and the like as received over wire or radio at a receiving point located remotely from a transmitting station of any desired character.

By the term "pictures", of course, we mean any records capable of being viewed to produce a representation which will effect the optical senses and convey information, and the term "picture" will be assumed to include views, photographs, newspaper and magazine articles, advertisements, fashion plates, checks, documents, finger prints and the like. Also, so far as the transmission of the picture is concerned this may be carried out by means of radio communication, wireline communication, or wired radio systems. We, therefore, desire to specifically state that the invention is not limited in its use to any one particular type of communication, and the term "radio" may be used to include any and all types of transmission.

One of the objects of our invention is to produce, in a manner to be hereinafter described, a system and method of recording pictures which possesses the advantage that the recorded picture will not discolor or otherwise deteriorate with age.

Another object of our invention is to provide a picture recording method and process which is more sensitive to recording actions and will, therefore, permit higher recording speeds.

Still another object of our invention is to provide a method for reproducing pictures at a distance so that the elemental marks making up the reproduced picture will have a sharper defined outline than has heretofore been customary and the marking may be a denser black, or any other suitable and chosen color, thus affording more detailed reproduction.

Still another object of our invention is to provide a method for recording pictures in which it is possible to record pictures by the use of hectographic inks, which may be used to permit the making of several copies from the first received picture in the usual manner.

Still another and further object of our in-

vention is to provide a method for reproducing pictures at a distant point in which the original reproduced picture is provided as a "latent" image of the original transmitted picture from which image a receiving operator may produce the finished picture. 55

Still another object of our invention is to provide a method for recording pictures in which the recorded or finished picture may be of any desired color. 60

Still another object of our invention is to provide a method for recording and reproducing pictures at a distant point which is relatively simple, convenient to operate, highly efficient in its use, and capable of high 65 recording speeds.

Still other and ancillary objects of our invention will become apparent from a reading of the following specification and herein-after appended claims when considered together with the accompanying drawings forming a part of our disclosure. 70

In the accompanying drawings, Fig. 1 conventionally illustrates a suitable transmitting system for use with our invention; and Fig. 2 conventionally illustrates the principle elements of a suitable receiving station for receiving pictures. 75

In accordance with our present invention a paper of any desired type may be suitably coated with a heat sensitive solution, known as a "sizing" material. In accordance with this invention we have chosen a sizing material which is repellent to water and which may consist, for example, of a substance such as wax. The wax is applied to one surface of a paper by dipping that surface into a tank containing the wax or equivalent substance in liquid form, for example, as an emulsion. 85

After the wax has been applied to one side of the paper so that there is a thin uniform coat of the wax over the entire surface, the paper is allowed to dry under ordinary atmospheric conditions. When the paper is completely dry it is necessary to surface or polish the sheet because of the fact that the coat of sizing material placed upon the paper gives it a rather dull and granular appearance. Since a polished surface is desirable 90

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the sheet or strip of paper is subjected to a buffing process, which may be produced, for example, by running the sheet over a revolving roll or drum whose outer surface is provided with some suitable detachable surfacing material such as soft felt. This will provide a comparatively high polish on the coated surface of the paper strip or sheet. The paper may then be rolled and stored until it is desired to use the same for recording received pictures.

This coating of the paper forms no part of our invention since it is old in the art of coating to supply a paper with any desired form of wax coating, but the particular type of paper when used in combination with the full and complete method of reproducing pictures does, however, form one distinct element of the entire combination.

20 The surface of the paper after being coated with the waxy substance is repellent to water and to most other aqueous solutions such as various colored inks. However, when any point on the wax coated sheet of paper is subjected to heat, the particular point subjected to heat loses its water repellent characteristics because of the fact that the coating of sizing material is melted and is absorbed into the main body of the paper stock.

This heated portion of the paper at the same time undergoes a change in appearance in that it loses its high polish and acquires a dull finish. This dull finish which is made 35 to cover portions of the surface corresponding to the original picture produces a record of the received picture which is known as the "latent image", and this image is used as a guide by the receiving operator to judge 40 the quality of transmission and reception.

In order to subject any point on the wax coated paper to heat action recourse is taken to a recording means of a character substantially similar and equivalent to that disclosed 45 in copending application of R. H. Ranger, Serial No. 128,720, filed August 12, 1926, disclosing an air operated recording system wherein a jet of heated air is projected directly against a heat sensitive record surface 50 and produces a record thereon controlled in accordance with signal impulses received from a remote transmitting station by any desired type of receiver whose output controls the supply of heated air directed as a 55 jet against the heat sensitive paper.

Now to refer more particularly to the drawings forming a part of this disclosure and illustrating, both conventionally and schematically, the principle of our invention, 60 the record strip 1 is carried over a revolving transmitting drum 3 by means of a plurality of pairs of rolls 5, 5, or an equivalent arrangement, and arranged to rest against the record drum, and, assuming that the record strip 65 1 for transmission is an opaque or semi-

opaque strip, light from a source 7 is directed through a lens system 9 so as to focus as a point source 11 on the picture surface. The light focused as a point source 11 on the picture surface is then reflected, according to the varying intensities of light and shade or tone values on the record or picture surface 1, by appropriate lens systems so as to direct itself to a photoelectric member or light valve 13.

Varying current strengths are produced through the photoelectric cell or light valve 13 in direct proportion to the varying intensities of light and shade or tone values on the picture surface, as is well known, and these currents are then amplified through an appropriate form of amplifier, conventionally shown as 15, and carried over lines 17 to a modulator 19. Carrier frequencies may be supplied from a source 21 and will be modulated according to the picture tone values in the modulator 19, and the modulated carrier may then be transmitted from the transmitting system 23.

Transmitted signals may be received upon a suitable receiving antenna system or its equivalent 25 and directed to a receiver 27, which may be arranged to direct its output energy, which is a direct current whose strength varies in direct proportion to the intensity of received signals, to a suitable recorder. According to this invention the output energy of the receiver 27 is made to actuate in any desired manner, a signal recorder 29, which is preferably of the type of the air recorder type previously identified as being disclosed by copending application of R. H. Ranger, Serial No. 128,720, filed August 12, 1926. Air under pressure from a source (not shown) is supplied to the recorder 29 through an air line 31 and is heated in any appropriate manner, either in the air signal recorder 29 itself or externally thereto. Varying current strengths reaching the recorder 29 from the receiver 27 may then be made to control the amount of heated air which passes beyond the nozzle or air jet 33 so that the amount of heated air flowing beyond the nozzle or jet 33 will bear a direct proportion to the varying strength current flow through the photo cell 13 of the transmitter.

The signal recorder 29 is so arranged that the heated air issuing from the nozzle or jet 33 is directed against a recording surface 35 of the character above described, namely, a wax coated recording paper. This recording paper is placed so as to rest upon the receiver drum 37 which rotates in the direction of the arrow in synchronism with the transmitter drum 3. The synchronizing system per se forms no part of the present invention and may be of any well known type.

As above disclosed, the heated jet of air or other gaseous substance will produce on the record surface 35 a latent or intermediate

image of the transmitted picture which has the appearance of dull white against a comparatively glossy background.

Points on the recording surface 35, which are subjected to heat so as to produce the latent or intermediate image, lose their water repellent characteristics by virtue of the fact that the paper when subjected to heat absorbs the waxy coating at parts thereof subjected to heat. It is, therefore, apparent that, if ink is supplied to the paper, only those points on the surface which were subjected to heat action by means of the heated jet of air or other gaseous substance will be sensitive to inking and that ink will not "take" on parts of the paper which have not been "heat treated" in accordance with marking pulses. For these reasons when ink is applied to the record surface 35 by means of a roller 39 having a coating of ink thereon supplied by reason of the fact that the roller runs in a trough or tank 31 containing ink a colored reproduction of the latent image will be produced. The ink used for marking the paper and retracing the latent image may be, of course, any desired color although for most purposes black ink is used, since the black and white image appears most prominent but for other purposes brown ink may be used since sepia prints are also highly desired. On many occasions it is desirable to use other colored inks for the purpose of producing other color prints as may be desired.

After the paper or record surface 35 has been subjected to the heat action for producing the latent or intermediate image and the final image has been produced by the ink roller it is desirable to "fix" the image upon the paper, meaning really that the entire surface should be rendered non-sensitive to any further heat action. The paper surface is, therefore, passed by means of rollers 43, 45 or other equivalent arrangement over a hot plate 47, or other source of mild heat, where the entire surface is subjected to heat for a moment. This last named heat action is applied over the entire surface and will transfer all traces of the sizing material from the surface of the paper to the interior body of the paper and thus reduce the tendency of the picture to gather dust or other particles of foreign matter. This step we have termed "flashing the picture".

From the above it is seen that the picture is reproduced, so far as the production of the latent or intermediate image only is concerned, in accordance with well known systems but, with an arrangement of the type above described, it will be noted that considerable advantage is gained in the fact that a paper of the type above suggested is very sensitive to heat and greater speeds of reproduction may, therefore, be attained

and, further, that it is possible to finish the pictures in various colors by substituting various colored inks in the tank 41 used to produce the finished record.

While the invention has been illustrated for the purpose of describing by way of conventional embodiments a concrete example of a particular case of transmission, it is also understood that it is possible to use transparent or semi-transparent pictures at the transmitter by merely reversing the optical system or in other words passing light directly through the picture surface. Further it is, of course, obvious to substitute an electrical spark means or other appropriate heat producing means such as a means for directing the current through the paper surface by contact points tracing a path directly upon the surface and forming an electrical connection with the recording drum which will complete the recording circuit. It is also to be understood that the inking process may not necessarily be accomplished directly at the receiver drum but, if desired, may be done after the record surface bearing the latent or intermediate image is removed from the picture drum, and it will be apparent, also, that the "flashing process" may likewise be accomplished separate from the recording action. We, therefore, believe ourselves to be entitled to make all such modifications in the invention as may be desirable and still fall fairly within its spirit and scope.

Having now described our invention what we claim and desire to secure by Letters Patent is:

1. The method of reproducing pictures transmitted from a distant point by recording the same on a heat sensitive recording surface which includes marking the recording surface in accordance with the varying intensity signals received, producing from said markings a latent image of the picture received, and coating the entire record surface with a color substance to produce a permanent coloration of only the original latent image.

2. The method of reproducing pictures transmitted from a distant point by recording the same on a heat sensitive recording surface which includes marking a recording surface in accordance with the varying intensity signals received, producing from said markings an intermediate image of the picture received, coloring the entire record surface, and producing a permanent coloration of only the original intermediate image.

3. The method of reproducing pictures transmitted from a distant point as a record on a heat sensitive record surface which includes receiving signals, marking a heat sensitive surface in accordance with the received signal pulses, producing a latent image of the received picture from said markings, coating the entire picture surface, producing by said coating a prominent outline of only the

received image, and flashing the entire record surface for producing a permanent record of the entire received picture.

4. The method of reproducing pictures transmitted from a distant point as a picture record on a heat sensitive recording surface which includes receiving signals, marking each elemental area of the heat sensitive surface in accordance with the received signal pulses, producing by said marking a latent image of the received picture, coating the entire picture surface, producing a permanent record by said coating of only the received image, and flashing the entire record surface for producing a permanent record of the entire received picture.

5. A system for reproducing a transmitted picture which includes means for receiving signals varying in proportion to the varying tone intensities of the elemental areas of a transmitted picture, a recording surface, means for producing a dull latent image of the received picture on said recording surface, means for coloring the said latent image, and means for rendering the said colored record of the picture permanent upon the record sheet.

6. A system for reproducing a transmitted picture which includes signal receiving means, a heat sensitive recording surface, a signal recording means, means for supplying heat to said signal recording means, means controlled from received signals for regulating the heat directed from recording means to said recording surface, means provided by said heat reaching said recording surface from said recording means for producing thereon an intermediate image of the received picture, means for coloring the said intermediate image, and means for independently subjecting the entire record surface to heat for producing a permanent record of the received picture.

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