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TELECINEMA TRANSMISSION
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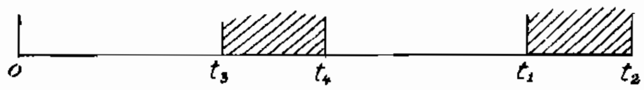

Fig.: 1

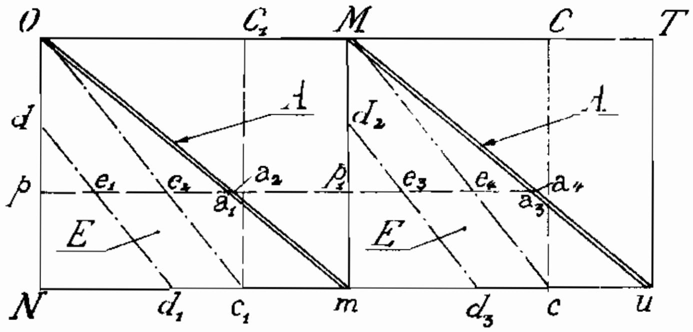

Fig.: 2

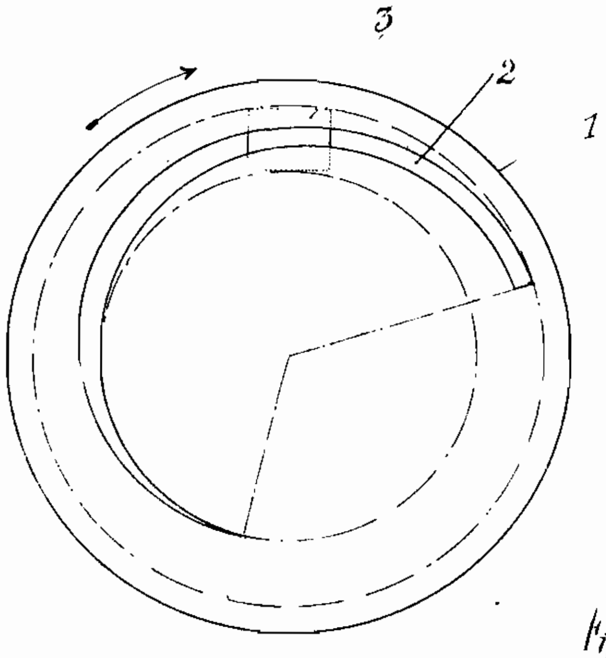

Fig.: 3

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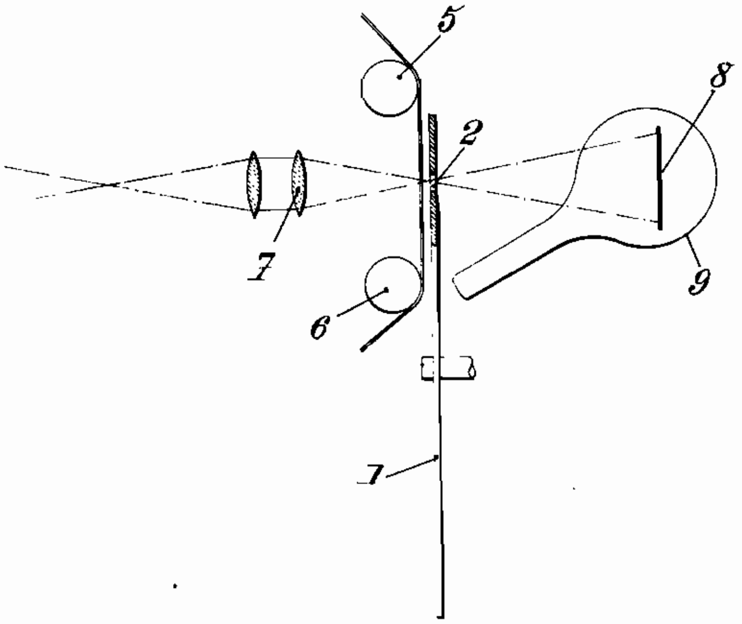
Fig. 4



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ALIEN PROPERTY CUSTODIAN

TELECINEMA TRANSMISSION

Henri de France, Lyon, France; vested in the Alien Property Custodian

Application filed January 30, 1942

The present invention relates to telecinema transmission and is especially concerned with systems in which the movement of the film is not continuous and more particularly when use is made of an analyzer.

The object of the present invention is to provide a system of this kind which is better adapted to meet the requirements of practice and in particular which improves the sharpness of the image that is transmitted.

According to an essential feature of the invention, the different portions of the image to be transmitted are successively projected onto the corresponding elements of the inconoscope mosaic or the like and said elements are analyzed when their respective illumination has ceased, the period of time corresponding to the analysis of the whole of said elements being longer than that corresponding to the illumination thereof, while coinciding partially with said period.

Other features of the present invention will result from the following detailed description of some specific embodiments thereof.

Preferred embodiments of the present invention will be hereinafter described with reference to the accompanying drawings given merely by way of example and in which:

Fig. 1 is a diagram indicating the time intervals during which there can be no illumination;

Fig. 2 is another diagram illustratng the succession of operations taking place, as a function of time, according to the present invention;

Figure 3 diagrammatically shows a portion of the projection device according to an embodiment of the invention;

Figure 4 is a diagrammatical view of the projection device embodying the elements shown by Figure 3.

In the following description it will be supposed that it is desired to obtain a telecinema transmission system of the kind in which the film is moved in a discontinuous manner.

This system proper is for instance made of a conventional construction including, in a known manner, a projection apparatus, an analyzer such for instance as an iconoscope, and a radio electric transmission station.

Concerning the method of analyzing the image it will be supposed in the following description that I make use of the so-called image interlacing method, the advantages of which are such that it is very widely used.

But this method involves an increase of certain drawbacks which are generally found in the present state of the art.

Thus, when the different elements of the mosaic are analyzed, while said mosaic is receiving the projection of the whole image of the film to be televisioned, it is necessary to stop both analysis and illumination as shown by the diagram of Fig. 1, in which Ot_2 is the time corresponding to an image of the film.

The time thus lost includes, on the one hand, the time interval t_1t_2 necessary for replacing an image of the film by the next image, that is to say about one sixth of the total time corresponding to the transmission of an image of the film and, on the other hand, a time interval t_3t_4 equal to the preceding one and imposed by the necessity of illuminating in the same manner the successive interlaced images.

The whole time that is lost thus corresponds to one third of the time corresponding to the transmission, which correspondingly decreases the sharpness of the image that is transmitted.

Another solution (called "memory method") has been proposed, in which the whole of the elements of the mosaic is very strongly illuminated during a short time corresponding to some hundredths of the time t, which is generally $^1/_{50}$ of a second, allowed to each interlaced image and at the beginning of this time period, while the analysis subsequently takes place in darkness. This method permits of effecting the analysis during substantially the whole of time period t, but on the other hand, it involves a serious drawback resulting from the gradual weakening of the luminosity between the analysis of the first elements and that of the last one.

The object of the present invention is to obviate all these drawbacks.

Its essential feature consists in successively projecting the different parts of the image to be transmitted onto the corresponding elements of the mosaic of the iconoscope or the like and analyzing said elements when their respective illumination has ceased, the period of time corresponding to the analysis on the whole of said elements being longer than that corresponding to the illumination of said whole while partly coinciding with this last period.

It is therefore possible, according to this method, to reduce, with respect to the memory method, the maximum time lag existing between the end of the illumination and the analysis of an element. Advantageously, I give this maximum time lag for each interlaced image a value equal to the time necessary for replacing an image of the film by the next one, that is to say about one third of the above mentioned time t.

I thus limit to an acceptable value the variation of luminosity existing between one part of the transmitted image and another part thereof. However, in order to distribute this variation over the whole of the image, the time interval between the end of the illumination of a mosaic element and the analysis of the same element is caused to vary according to a certain law, preferably a linear law, as a function of the rank of said element.

This way of proceeding is illustrated by Fig. 2 in which I have plotted in abscissas the times and in ordinates the ranks of the various elements of the mosaic taken in the order of analysis. In this diagram, I have limited by solid lines the analysis zones A and in dot-and-dash lines the illumination zones E. Point O, which is taken as origin for the times, coincides with the time at which the image of the film has just come into position and T is the corresponding time for the next image or picture. Point C is the time as which begins the displacement of the first image of the film and C_1 the homologous point for the first interlaced image. Point M, the abscissa of which is t, corresponds to the time separating the analysis of the two interlaced images that are considered. The latter are analyzed in the same manner.

In ordinates, point O represents the element of the mosaic that corresponds to the top left hand corner of the image of the film and point N represents the last element that is analyzed.

At points C and C_1, the respective abscissas of which are OC and OC_1, the illumination of the last element N must cease in each interlaced image.

At points m and u, the respective abscissas of which are M and T, the analysis of element N must also cease in each image. The analysis of the different elements taking place according to a linear law as a function of time, analysis zone A, for the first image for instance, will be limited for each interlaced image, by two straight lines substantially parallel to diagonal line Om, and very close to this line Om, since the analysis of each element takes place for a very short time.

As the respective times at which each element will be analyzed are known, it is possible to determine the period of illumination for each of them.

According to the invention, the whole of these illumination periods is distributed over at least a portion of the time corresponding to analysis. Preferably, for each interlaced image, the total period of illumination extends from the beginning of the period of analysis to the time corresponding, for the second interlaced image, to the beginning of the period of time that is lost for illumination as above referred to.

Zone E, which represents the illumination period, is therefore limited, in the direction of increasing abscissas, by a line which should substantially coincide with line OC_1 for the first image (Mc for the second).

On the other hand, the period of illumination for each element is caused to start at a time suitably remote from the end of said period. In the example shown by the diagram, I have thus limited zone E, in the direction of decreasing abscissas, by line Od_1d_2 for the first image (Od_3d_4 for the second) portion dd_1 (d_3d_4) being substantially parallel to line Oc_1 (Mc) and at a distance, in the direction of abscissas, of about one third of Oc_1.

Considering now an element of rank p, it will be seen that it is illuminated, from time e_1 during a period e_1e_2. Then it remains in darkness during a time e_2a_1, shorter than the lost time CIN equal to CT. Then it is finally analyzed during the very short time a_1a_2, an identical cycle taking place for the second interlaced image in $p_1e_3e_4a_3a_4$.

In order to carry this method into practice, I make use of any suitable means for projecting on each element the corresponding portion of the film during the time periods e_1e_2 respectively. Advantageously, the means in question are constituted by a movable shutter, preferably constituted by a disc 1 (fig. 3) provided with slots 2, which is interposed across the path of light rays issuing from the film image (the beams formed by said rays being at this place of a section represented by rectangle 3) and which is caused to turn about its axis.

It will be readily understood that the various elements of this device (number and shape of slots 2 and speed of revolution of disc 1) can be chosen in such manner as substantially to obtain the periods of illumination above set forth. Advantageously, the following combination will be used:

I provide a single slot 2, the outer edge of which is substantially given the shape of a logarithmic spiral, whereby, for a uniform speed of revolution, the speed of scanning is constant; and the development of this spiral is determined in such manner that scanning takes place for two thirds of one revolution of disc 1.

Finally, this disc is given a speed of revolution corresponding to t per second and in the direction indicated by the arrow, which corresponds to fifty revolutions per second if the film is moving at the rate of twenty-five pictures per second as usual.

As shown by Fig. 4, the film is being unwound from spool 5 to be wound on spool 6, the portion that is passing in front of the slot 2 of disc 1 being struck by the light beam formed by optical system 7, which light beam is directed toward the mosaic 8 of iconoscope 9.

Anyway, whatever be the embodiment that is chosen, I obtain a telescinema transmission system, the operation of which results sufficiently clearly from the preceding description for making it unnecessary to enter into further explanations. The system according to the invention has, over existing devices used for the same purpose, the advantage of substantially reducing the time lag between illumination and analysis of a given element of the mosaic and the further advantage of making it possible to utilize for analysis practically the whole of the time corresponding to each picture.

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