

904,212.

Patented Nov. 17, 1908.
2 SHEETS—SHEET 1.

FIG. 2.

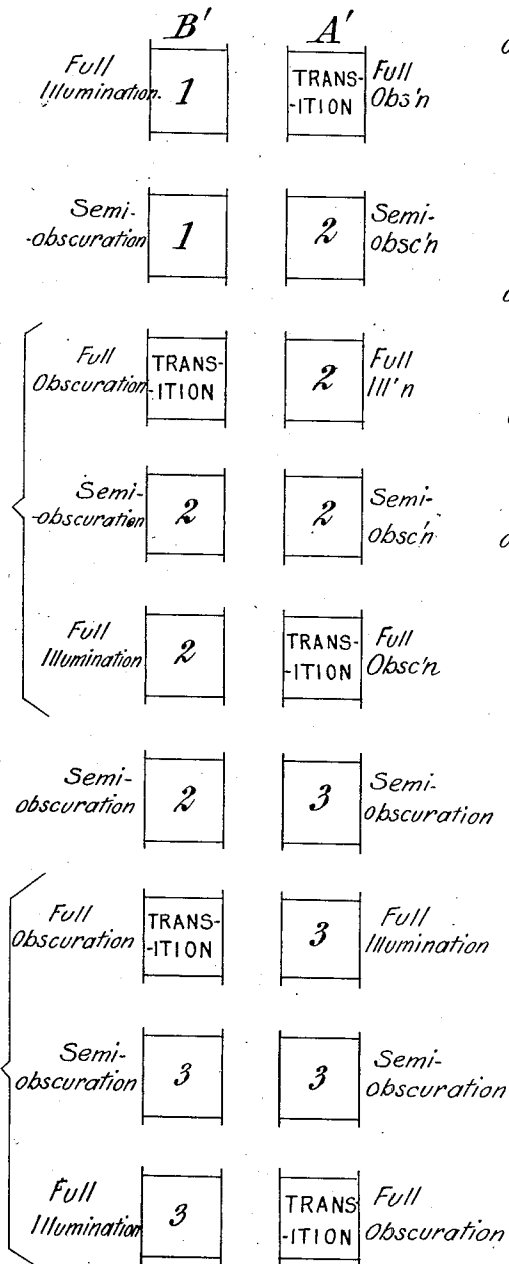
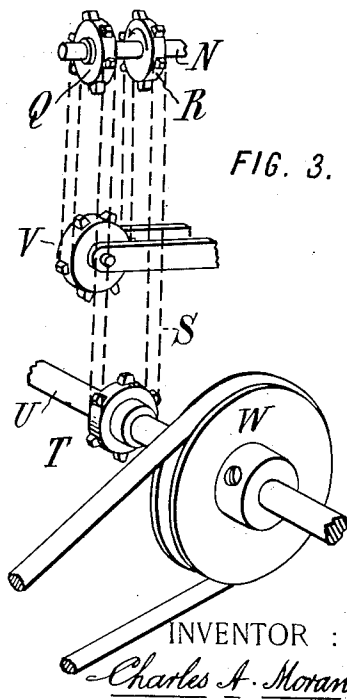
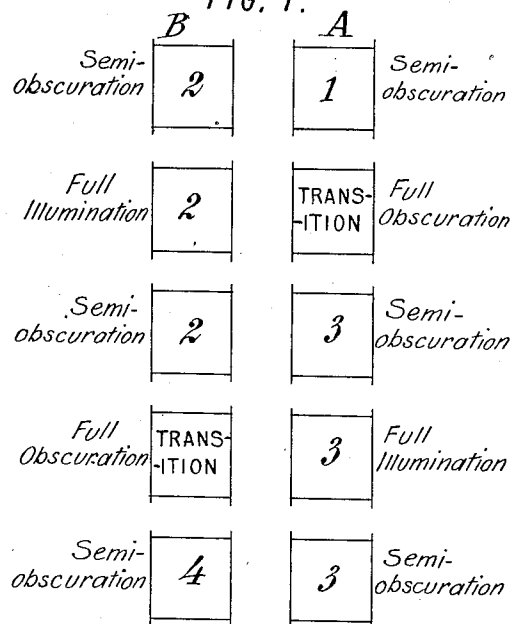


FIG. 1.



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904,212.

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MOVING PICTURE MACHINE.
APPLICATION FILED DEC. 6, 1906.

Patented Nov. 17, 1908.
2 SHEETS—SHEET 2.

FIG. 4.

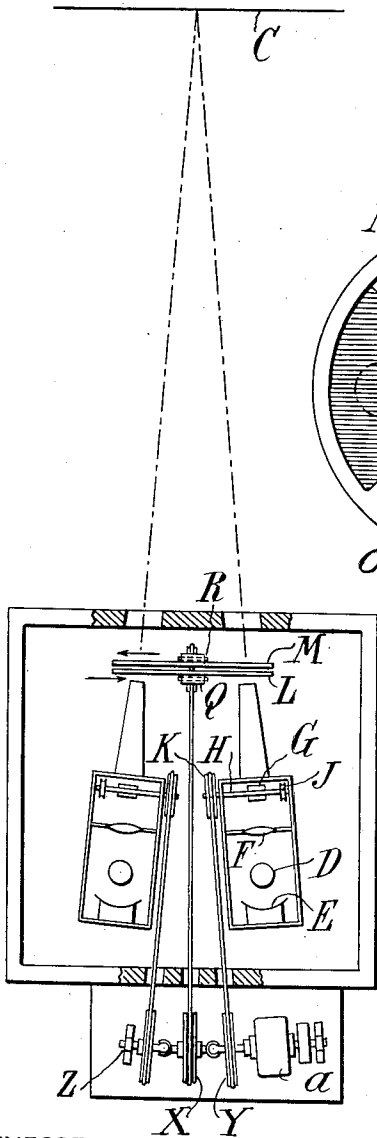


FIG. 6.

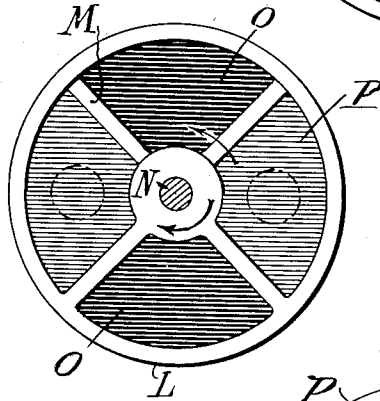


FIG. 5.

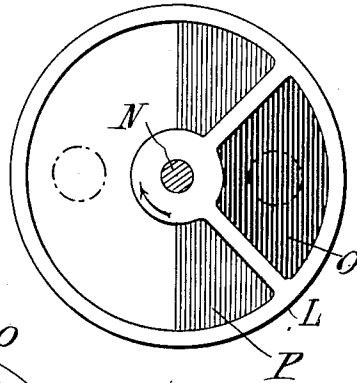
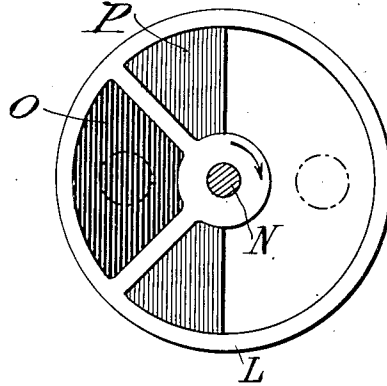


FIG. 7.



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UNITED STATES PATENT OFFICE.

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MOVING-PICTURE MACHINE.

No. 904,212.

Specification of Letters Patent.

Patented Nov. 17, 1908.

Application filed December 6, 1906. Serial No. 346,639.

To all whom it may concern:

Be it known that I, CHARLES A. MORAN, a citizen of the United States, residing at Bernardsville, in the county of Somerset and State of New Jersey, have invented certain new and useful Improvements in Moving-Picture Machines, of which the following is a specification.

This invention aims to provide an improved moving picture machine which shall permit the throwing of the successive impressions or pictures upon a screen at a slow rate, without disclosing the transition from one impression to the next, and which shall thus avoid the effect of exaggerated rapidity which spoils the illusion to such a great extent with machines now in use. By the same comparatively slow movement the objectionable rapid flashes of light which take place with present machines, will be avoided or measurably eliminated.

Other advantages are referred to in detail hereinafter.

The accompanying drawings illustrate an embodiment of the invention.

Figures 1 and 2 are diagrammatic illustrations of a pair of films showing the exposure and positions of the parts during successive subdivisions of the interval between the successive impressions. Fig. 3 is a detail of mechanism employed for operating certain screens. Fig 4 is a diagrammatic plan view of a complete apparatus. Figs. 5, 6 and 7 are elevations of the obscuring device in different positions.

The invention is shown as applied to films moved in the ordinary way, that is to say, exposed in a fixed position for a certain length of time and then quickly shifted to the next fixed position, and so on. In previous apparatus, in order to avoid the making of a noticeable break during the transition from one impression to the next, the successive transitions must be effected very rapidly. The period of transition, although very short, is of considerable extent compared with the period of display of each impression.

My invention obviates the difficulty referred to by using a second film and displaying an impression thereof during the period of transition of the first film. The second film may be an exact duplicate of the first, so that during the transition period of one film the second film is displaying the same impression which was previously dis-

played by the first; or the second film may have impressions which alternate in point of time with those of the first film, so that while the first film is in the transition period, the second film will be displaying an impression succeeding that which has just been displayed by the first film. Preferably also the apparatus is arranged to gradually obscure the display of each film as the transition period approaches, and to gradually lighten it after the transition period is passed; which causes a gradual merging of one impression into the next, the succeeding impressions being so nearly alike that there is little or no disturbance of the effect of continuity. For example Fig. 1 shows in succession the positions of two films A and B, the degree of illumination or of obscuration being also indicated. The film A contains the odd-numbered impressions of the motion picture to be displayed, being numbered 1, 3, &c. The film B contains the even-numbered impressions of the same picture, 2, 4, &c. In the first position shown, impression 2 is stationary and is changing from full obscuration toward full illumination, being in a condition of semi-obscurity. At the same time impression 1 is changing from a condition of full illumination toward that of full obscuration, being therefore in the same condition as impression 2, that is, in condition of semi-obscuration. Two impressions are fixed, and are both projected upon the same point of the screen, so that they appear as one picture. The outlines of this composite picture will not be as fine as in the case of a single impression, but the successive impressions are so nearly alike that the lack of sharpness of outline will not be seriously noticeable. At the next period impression 2 on film B has remained stationary and is receiving full illumination. At the same time film A is fully obscured and this period, or a portion of it, is utilized to effect a transition from impression 1 to impression 3. Film B then passes toward obscuration while film A is passing toward full illumination, so that the impressions 2 and 3 are thrown together upon the screen each in semi-obscurity. This is followed by a full obscuration of film B and a full illumination of film A, so that impression 3 alone is projected on the screen and the transition of film B from impression 2 to impression 4 occurs without effect. This is followed by the exposure of impressions 3 and 4 simul-

taneously, each in semi-obscurity; and so on. Throughout the exposure the total amount of light cast upon the screen is the same, which will produce an effect much easier on the eyes, and will also heighten the illusion of continuous movement.

It is not essential that the two films shall contain alternate impressions. The films may be duplicates of each other as shown at 10 A' B' (Fig. 2). In this case impression 1 of film B' will be shown in full light while film A' is shifting; impressions 1 and 2 will then be thrown together on the screen; impression 2 on film A' will be shown in full light while 15 film B' is shifting from impression 1 to 2; impression 2 on both films will be shown at the same time each in semi-obscuration; impression 2 of film B' will be shown in full light while film A' is being shifted; and so 20 on, the total amount of light on the screen being always the same. This arrangement has the advantage of showing a single impression, as impression 2 in the diagram, during three successive intervals, for one interval in which two impressions, as 1 and 2 in the diagram, are displayed simultaneously. That is to say, the sharply defined figure is shown for a period three times as long as the figure whose outline is more or less obscure by reason of its being a composite of two successive impressions. On the other hand the actual movement of the figures on the screen will be twice as slow with this arrangement of films as with the arrangement 35 shown in Fig. 1 (for a given speed of the machine). The arrangement shown in Fig. 1 will pass from impression 1 to impression 5 in the same length of time that the arrangement shown in Fig. 2 will pass from impression 1 to impression 3. Consequently to produce the same rate of motion in the picture thrown on the screen, the films in Fig. 2 will have to be moved at a rate twice as rapid as that of the films in Fig. 1. The arrangement 45 of Fig. 1 is preferable for representing rapid action, and that of Fig. 2 for slow action.

It is conceivable that more than two films (and a corresponding number of lanterns) might be employed in one machine, while 50 utilizing the principle of this invention, and in describing the use of a pair of films I am not to be understood as excluding a greater number than two.

The means for projecting the successive 55 impressions on the screen and for bringing into play the proper degree of obscuration and illumination, may be largely varied. A suitable mechanism is shown in Figs. 3 to 6. A pair of lanterns of ordinary type are directed to a common point upon a screen C. Each lantern may comprise any usual or suitable devices such for example as a lamp 60 D backed by a reflector E, a lens F, and a pair of rolls one above the other and carrying a straight stretch of film between them, these

devices being represented at G. The shaft H for operating the film spools has a connection at J with the shaft of one of the spools so as to give the film an intermittent movement, while the shaft H rotates continuously. 70 Any usual or suitable mechanism may be employed for this purpose. A pulley K is used for driving the film-operating shaft H.

The lamp D may burn steadily, and a screen be used for effecting the desired degree of obscuration. I have provided a device for this purpose which is entirely outside of the individual lanterns, and may therefore be conveniently used with any type of lantern. It will be understood, however, 80 that the screen may be arranged at any point in advance of the lamp.

In the mechanism illustrated, a pair of half-round screens L and M are employed, rotating in opposite directions and centered 85 upon a common shaft N. Each of the two screens has a portion O which is opaque or nearly so, and equal in area to about a quadrant of a circle; portions P which are semi-opaque and equal each to approximately 90 one-eighth of a circle; a half circle of each screen being entirely open to the light. The area of the several portions of the screen, and the degree of transparency of each portion, may be varied according to the necessity shown by experiment in a particular case. Likewise the material or materials 95 used in the screen may be largely varied. I have found a brass frame with sectors of oiled paper to be satisfactory. Starting from the position shown in Fig. 5 with the darkest portion of the two screens in conjunction in line with the right hand lantern (during which position the film in this lantern will be shifted), the screen L passes 105 around to the lower position shown in Fig. 6, while the screen M passes to the upper position, giving a medium quantity of light from both lanterns. As the movement of the screens continues, they come to the position of Fig. 7, completely obscuring the left hand lantern by a conjunction of the two screens, and completely illuminating the right hand lantern (during which period the left hand film will be shifted). There 110 is then a return to the position of Fig. 5 through an intermediate position similar to Fig. 6, that is with both films partially obscured, the screen L being uppermost and the screen M lowermost. 120

The movement of the two screens constituting the obscuring device may be conveniently effected by the mechanism shown in detail in Fig. 3. The shaft N carries a pair of sprocket-wheels or other suitable pulleys 125 Q R carrying the respective screens L M, the sprockets Q R being driven in opposite directions by means of a chain S which passes over a sprocket T upon a driving shaft U and over an idler V. The screens L and M 130

and the shifting devices of the films may be synchronized, so that the screens will always be in the position of Fig. 5 when the right hand film is shifted, and in the position of Fig. 7 when the left hand film is shifted. The driving of the screens and of the films is preferably effected by means of belts or chains running from a pulley W on the shaft U, and from the pulleys K on the film-shifting shafts to pulleys X and Y upon a common shaft Z at the rear, which may be provided with joints to lie over the slight angular divergence of the driving belts, and which may be driven by an electric motor *a* or other suitable driving means. The usual screens for obscuring the lamps during transition periods may be omitted, the opaque portions of the screens L and M rendering them unnecessary.

Though I have described with great particularity of detail certain specific embodiments of my invention, yet it is not to be understood therefrom that the invention is restricted to the specific apparatus described.

Various modifications thereof in detail and in the arrangement and combination of the

parts, may be made by those skilled in the art, without departure from the invention.

What I claim is:—

A moving picture machine including in combination a pair of lanterns directed to a common point, and means for obscuring the rays from said lanterns alternately, said obscuring means comprising a pair of screens L and M rotating in opposite directions in front of said lanterns and each comprising a substantially opaque portion, a semi-opaque portion, and a substantially transparent portion, said screens being geared to each other in such a relation that the opaque portion of one is in line with the rays of its lantern when the corresponding portion of the other is out of line with the rays of the other lantern.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES A. MORAN.

Witnesses:

DOMINGO A. USINA,
FRED WHITE.