

2 Sheets—Sheet 1.

MAGIC LANTERN.

Patented July 14, 1896.



INVENTORS

Horace L. Hastings
Kindred Russell

(No Model.)

2 Sheets—Sheet 2.

H. L. HASTINGS & W. RUSSELL.
MAGIC LANTERN.

No. 564,177.

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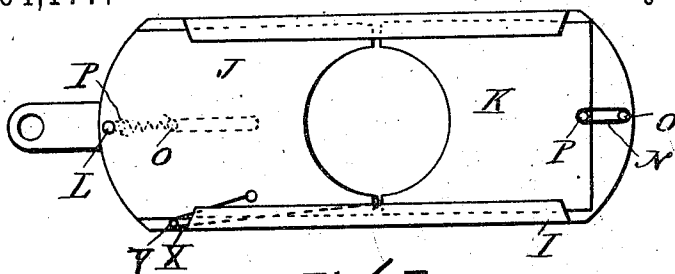


Fig. 2.

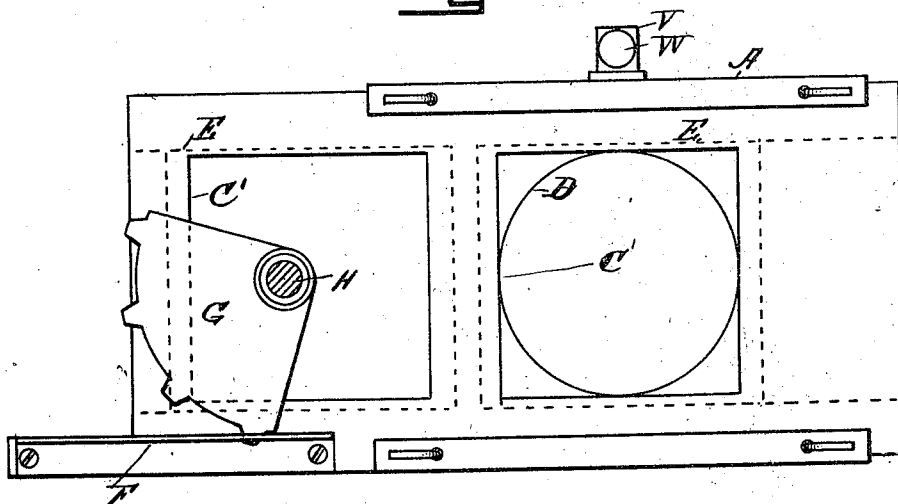


Fig. 3.

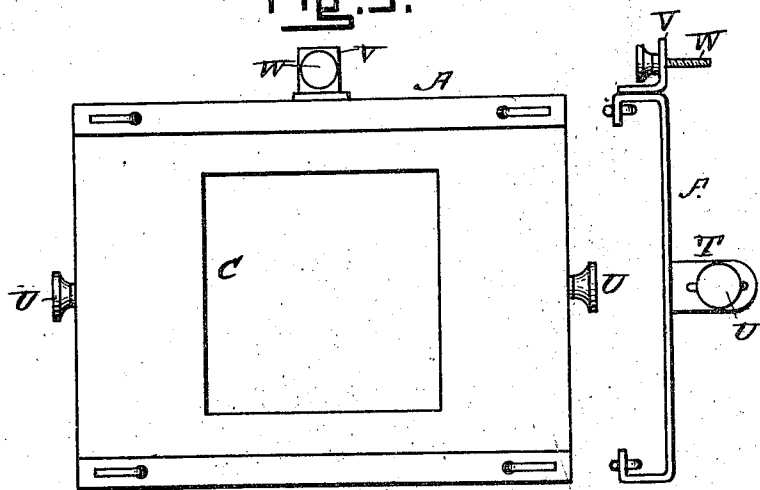


Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

HORACE L. HASTINGS AND WINDLOW RUSSELL, OF CHELSEA, MASSACHUSETTS; SAID RUSSELL ASSIGNOR TO SAID HASTINGS.

MAGIC LANTERN.

SPECIFICATION forming part of Letters Patent No. 564,177, dated July 14, 1896.

Application filed June 16, 1893. Serial No. 477,819. (No model.)

To all whom it may concern:

Be it known that we, HORACE L. HASTINGS, a citizen of the United States, and WINDLOW RUSSELL, a subject of the Queen of Great Britain, residing in the city of Chelsea, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Magic Lanterns, of which the following is a specification.

Our invention relates to a class of optical instruments known in their various forms as "magic lanterns," "stereopticons," "sciopticons," &c.

There arise incidents in the use of a single lantern in connection with the change of pictures, such as the passing of dark shadows and the visible motion of pictures across the screen, or, in the use of opaque shutters to hide these objectionable movements, alternations of bright light and intense darkness, which are wearisome to the audience, who should be restfully instructed or amused by the exhibition of the pictures, and, in the use of the dissolving view produced by two lanterns in alternate use, the unpleasant fizzing noise of reheating the calcium, often breaking it and involving halting the exhibition and darkness till it is repaired, the extra cost of the second lantern, and of the attendant always needed to work the instruments, and of transportation.

It is to do away in a practical manner with all these disadvantages and difficulties that our device has been invented, and in order that our invention may be easily understood and made with facility we accompany this specification with drawings, which constitute a part of it, in which—

Figure 1 is a plan of our device. Fig. 2 is a front elevation of the shutter-carrier. Fig. 3 is a front elevation of the picture-carrier, and Fig. 4 is a front and end elevation of the picture-carrier guide.

The letters and designatory signs in either figure are the same for the same parts in all the figures, and with the following descriptive specification.

Our invention consists of a method and devices to use translucent or semi-opaque shutters of sufficient opacity to gradually obscure or break up the definition or form of the pic-

ture on the screen, producing an effect with one lantern by this device quite analogous to the "dissolving" produced by two lanterns, as before described, while at the same time that the picture disappears a field of sufficient light remains on the screen where the picture was to entirely remove the tiresome and hurtful alternations of light and darkness above described, these shutters being so connected with a picture-carrier, properly fitted for the purpose, that while the picture is obscured by the movement of the shutters across the cone of light the operator by the instrument shall, while the obscuration continues, remove the picture which has been shown and put the picture next to be shown in the position to be seen when the shutters are withdrawn and the obscuration removed. This may be understood by referring to the drawings connected with this specification, wherein—

A, Fig. 1, is a guide or support in which the picture-carrier B is caused by our invention to move across the cone of the lantern light. B, represented partly by continuous and partly by dotted lines, is the picture-carrier. The guide A has a square aperture C, which stands always so that the light from the lantern shining through the lenses constituting the "condenser" D and the "objective" E may pass through it centrally. The picture-carrier B has two square apertures C', whose centers are distant from each other equal to the necessary distance between the centers of two pictures. The picture-carrier B has also two recesses for holding pictures, represented by the parallelogram dotted lines E, concentric with the squares C'. The circles D represent the position of the condenser and objective of the lantern. It is obvious that this picture-carrier B will hold two pictures, so that by sliding it endwise they can be alternately placed in the cone of light passing through the lenses of the lantern and projected on the screen. Now F shows a rack attached to the picture-carrier B, and G shows a segmental gear attached to the end of the shaft H, the center of which is at such a distance from the rack F that when the gear is rotated its cogs will mesh with the rack and cause the carrier to take

such motion as is needed to move either picture from the field of exhibition and move the other into that position. I is a shutter-carrier attached to the outer end of the objective cell. The continuous and dotted lines J and K are two semiopaque or translucent shutters, which are held in the carrier I, and are caused to pass across the field of the objective D', and this operation may be performed by the hand by grasping the pin L, which is inserted in the shutter J, and pushing the shutter across the face of the objective, or it may be done by the action of cam M, which is borne on the shaft H. This cam, when the shaft is rotated, comes in contact with the pin L, and by forcing it farther from the shaft pushes the shutter J across the opening of the field of the objective to cover full one-half its aperture, while the shutter K is attached to the shutter J by the flexible connection X, which passes around roller Y and gives shutter K motion in a direction opposite to shutter J. Thus shutter K is by the same pressure of the hand or cam made to move across the aperture of the objective to a like distance with the other shutter, thus completely covering the field of the lenses. N represents elastic springs, which being attached to pins O in the shutter-carrier I and to pins P, one in each shutter, cause the shutters to open when the pressure that shuts them is removed. Q is a handle by which the shaft H can be rotated. R is a bearing of the shaft H, attached to the shutter-carrier. S S are bearings of the shaft H in the top of a stand, by which our device is attached to the base on which the lantern is fixed. As in halls of different sizes the distance between the condenser-lens and the objective has to be varied to give the right focus of the lantern to produce a clear picture on the screen, the shaft H is splined and made capable of being telescoped on itself, so as to allow obtaining the needed distances of those parts.

In Fig. 2, I is the shutter-carrier, J K are the semiopaque shutters, N are the elastic springs, O are the pins in the shutter-carrier, and P are the pins in the shutters to which these springs attach. L is the pin in the shutter J, by which the shutters are moved. X is the flexible connection uniting the shutters. Y is the roller around which this connection passes.

In Fig. 3, A is the carrier-guide. B is the picture-carrier. C' C' are the square apertures. D is the condenser. The dotted lines E are the recesses for holding the pictures. F is the rack. G is the segmental gear. H is the shaft.

In Fig. 4, A is the carrier-guide. C is the square aperture. T are ears to connect it to the lantern at the side. U are screws for making this connection. V is the ear for attaching it to the lantern at the top. W is the screw for making this connection.

As it often happens that the lantern cannot

be set exactly in front of the center of the screen on which the picture is shown, but in some audience-rooms must be set above, below, or on one side. In this case the picture in the lantern is not parallel to the screen, and for that reason one portion of the picture on the screen will be dim, while the others are distinct, this effect resulting from the fact that a portion of the screen from its want of parallelism with the picture is not at the proper focal distance from the picture in the picture-carrier, a difficulty which has hitherto necessitated the readjustment of the screen in such a position that the screen will be exactly parallel to the front of the objective. To avoid this difficulty, we have devised means in the arrangement and construction of the picture-carrier guide A, by which the picture can be adjusted exactly parallel to the screen, (see Fig. 4,) which gives a front and end elevation of the picture-carrier guide A. The carrier-guide is so made that it is attached to the lantern by ears T in the horizontal line, having slots in them through which the screws U are inserted, and by an ear V in the vertical line in which the screw W is inserted. The carrier-guide can be swung around to the necessary position on the vertical axis supplied by the screw W by loosening the screws U and readjusting them in their slots, and it can be also swung on a horizontal axis supplied by the screws U by readjusting the screw W. By this means the picture-carrier is made to hold the pictures parallel to the screen, all parts being in accurate focus on the screen.

Now it will be manifest that, all the parts of this device being properly adjusted, if the shaft H be caused to rotate by the handle Q, the cam M will press the semiopaque shutters J and K across the field of the lantern and obscure the picture on the screen, by causing it gradually to fade out, while the screen still has a field of white light, and at the same time the picture is obscured the gear G will connect with the rack F and cause the carrier B to slide in the guide A, and will thus carry the picture to be removed out of the field of the lantern and place the new picture in the field, when, the rotation being continued, the cam M will retreat and leave the shutters J and K free to open, and the new picture will then gradually appear on the screen. The pictures are thus so changed that their motion is unseen, and the above-described faults and imperfections of operation are avoided. As the shaft does not form rigid attachments to the shutters J and K and the carrier B, these are also operated independently by hand when it is desirable to produce various effects, the semiopaque shutters being still used and necessary to produce the disappearance or dissolving of the picture.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

In a device of the character described, the

combination of a picture-carrier guide ad-
justable to the plane of the screen on which
the picture is shown, a picture-carrier having
a rack attachment, a segmental gear meshing
5 with the picture-carrier rack, a segmental-
gear shaft having a longitudinal adjustment,
a cam on the shaft which forms connection
with the semiopaque material of the shutter-
carrier fixed to the front of the objective, and
10 means of imparting a rotating movement to

the shaft adapted to give automatically a re-
ciprocating motion to the picture-carrier, and
shutters, for the purpose shown and described.

In testimony whereof we sign this specifi-
cation in the presence of two witnesses.

HORACE L. HASTINGS.
WINDLOW RUSSELL.

Witnesses:

J. D. BROWN,
FRANK G. PARKER.