

No. 775,963.

PATENTED NOV. 29, 1904.

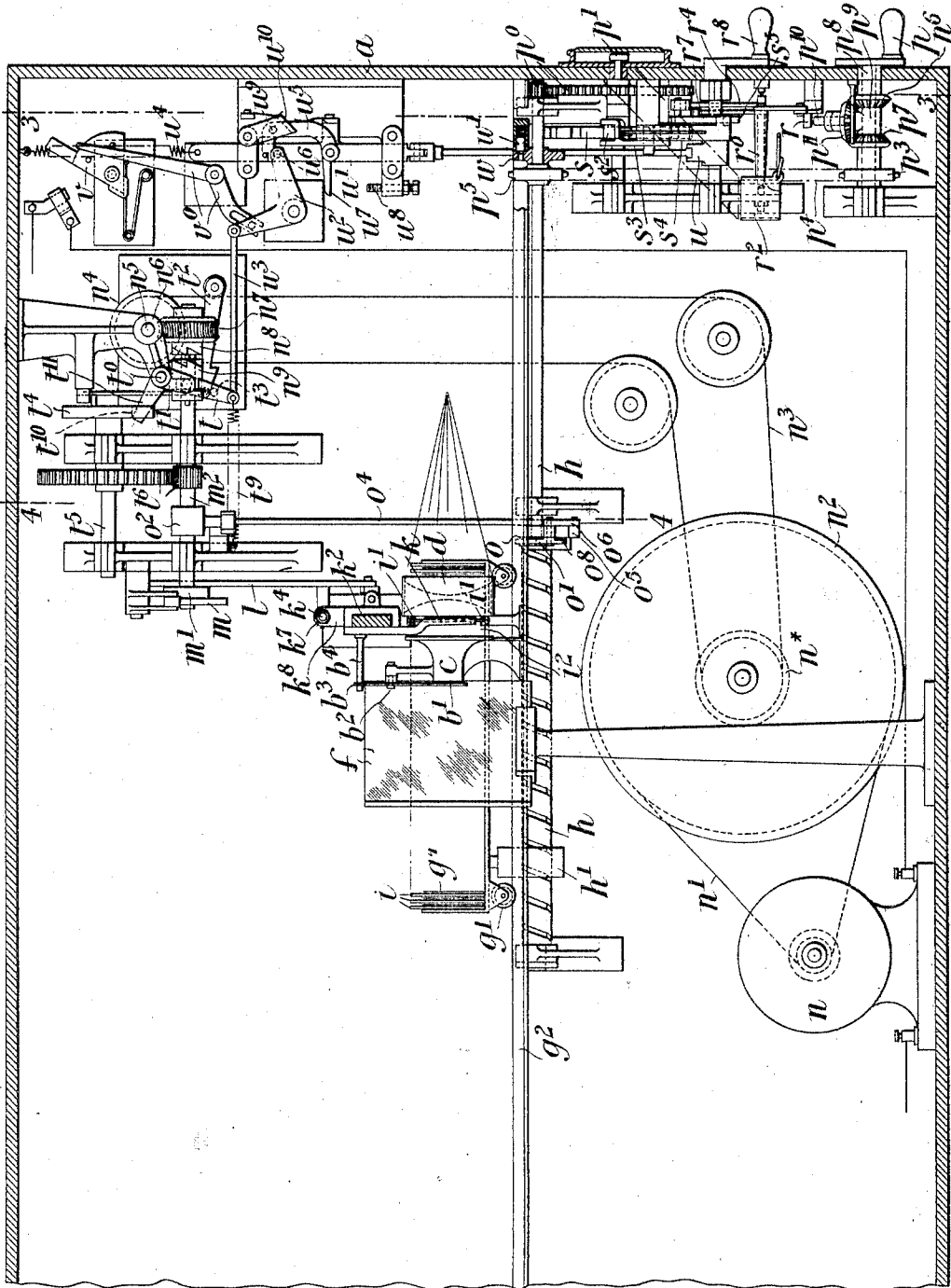
M. BENTZON.

AUTOMATIC MAGIC LANTERN APPARATUS.

APPLICATION FILED OCT. 12, 1903.

NO MODEL.

5 SHEETS—SHEET 1.



Witnesses.

J. K. Moore
J. H. K. Hubert

Fig. 1.

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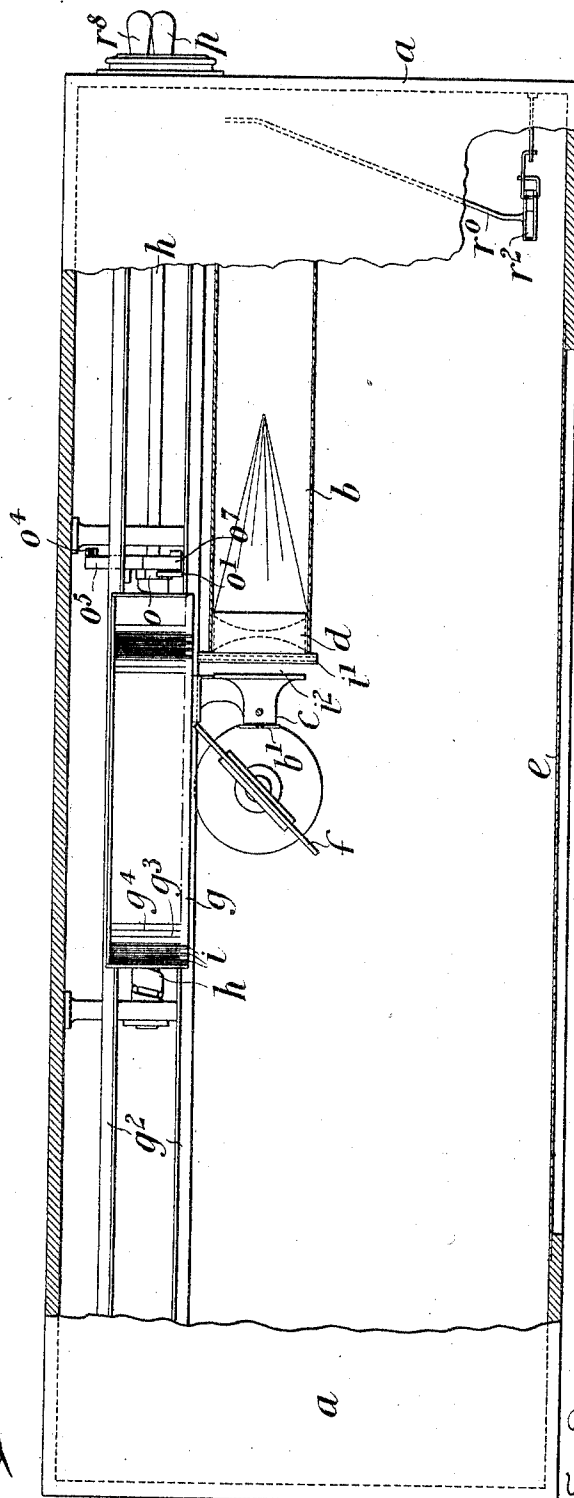
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5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

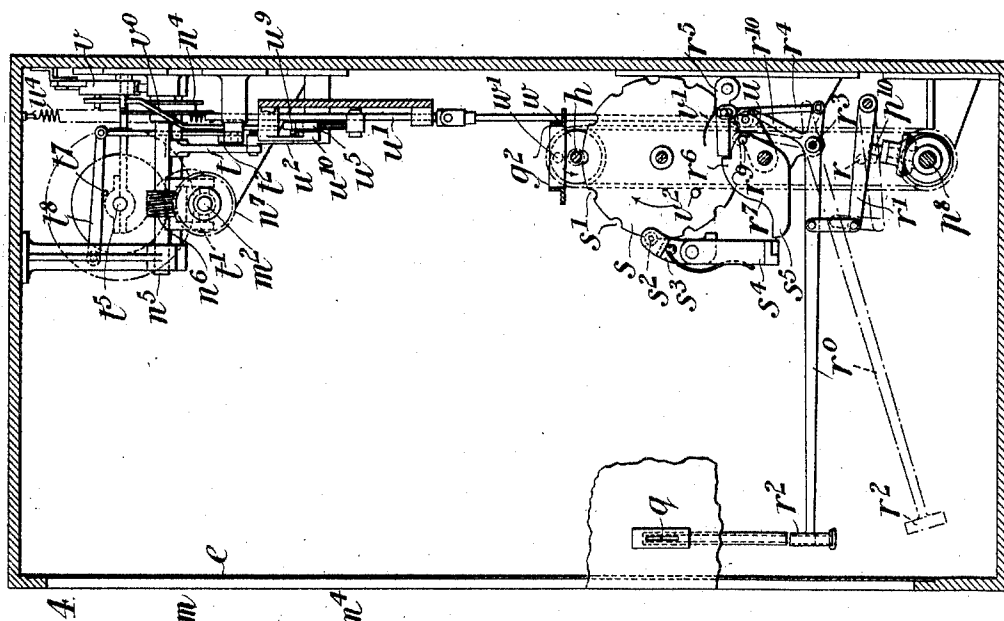


Fig. 4.

Fig. 6.

Fig. 7.

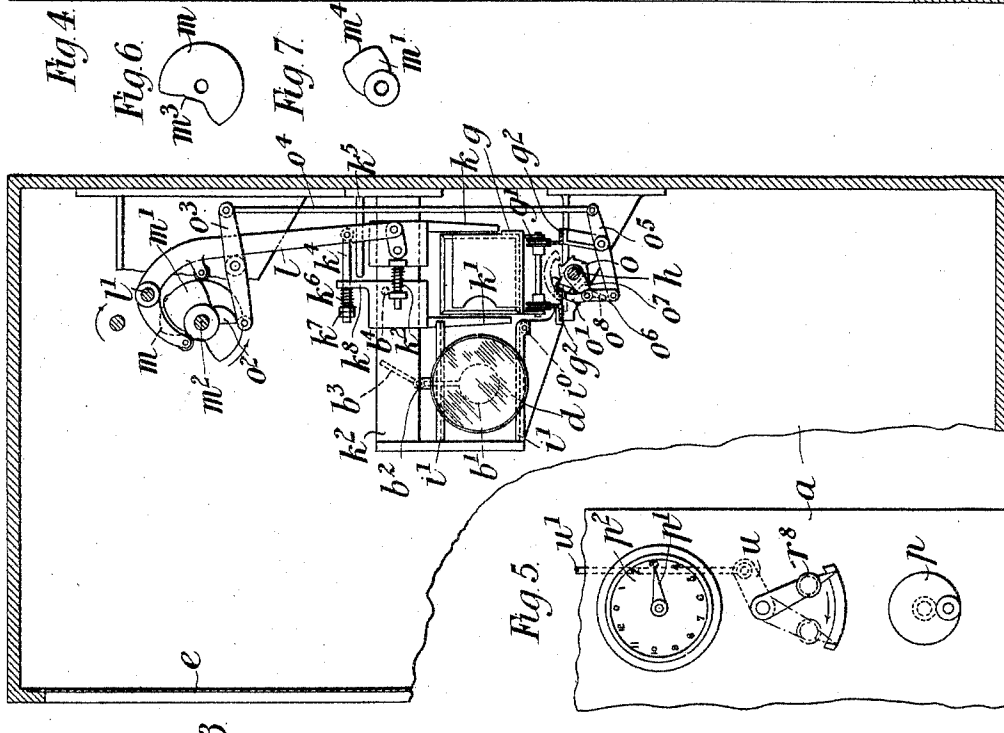


Fig. 5.

Fig. 3.

Witnesses
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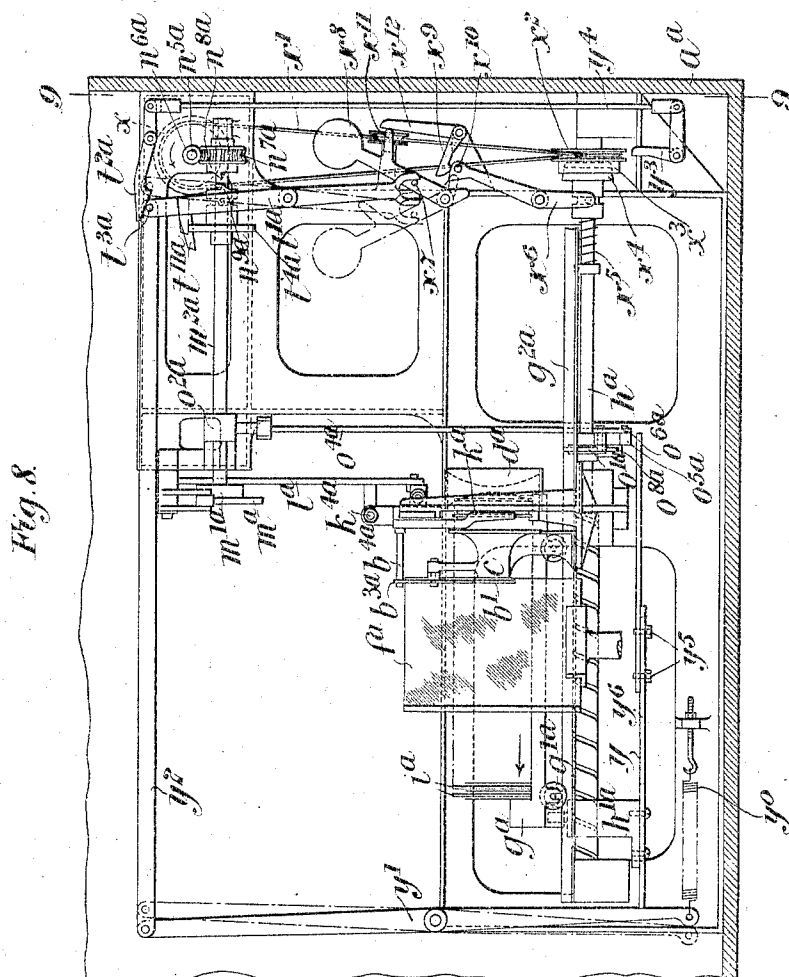
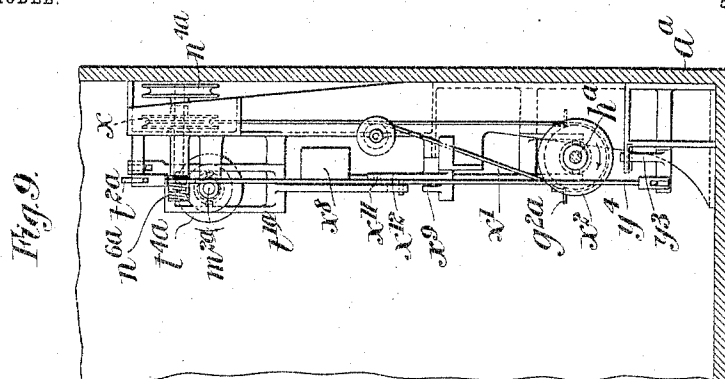
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APPLICATION FILED OCT. 12, 1903.

NO MODEL.

5 SHEETS—SHEET 4.



Witnesses

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NO MODEL.

5 SHEETS—SHEET 5.

Fig. 11.

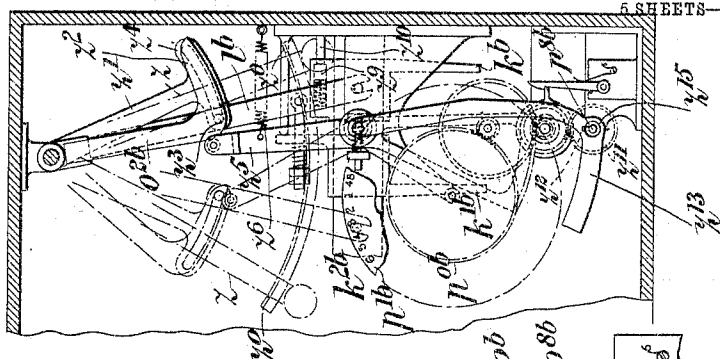


Fig. 10.

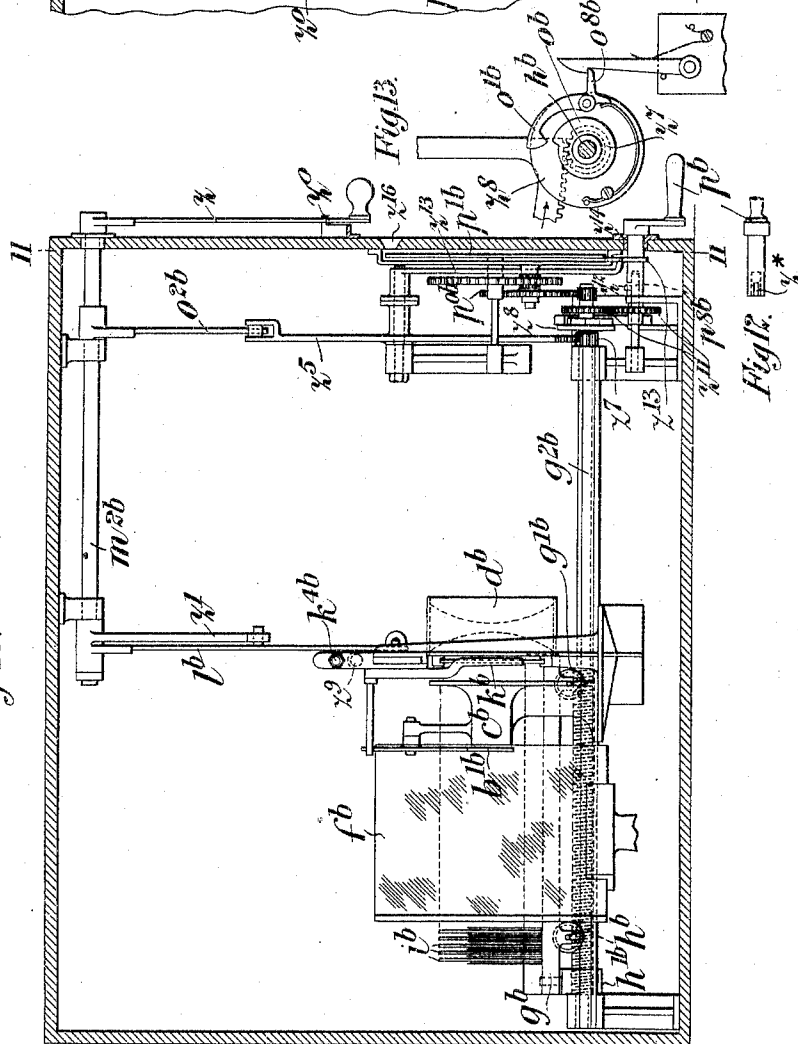


Fig. 13.



Fig. 12.



Witnesses.
J. K. Moore
S. S. Hubbard

Inventor.
Malcolm Bentzon
by
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UNITED STATES PATENT OFFICE.

MALCOLM BENTZON, OF LONDON, ENGLAND.

AUTOMATIC MAGIC-LANTERN APPARATUS.

SPECIFICATION forming part of Letters Patent No. 775,963, dated November 29, 1904.

Application filed October 12, 1903. Serial No. 176,661. (No model.)

To all whom it may concern:

Be it known that I, MALCOLM BENTZON, a subject of the King of Great Britain, residing at 126 Queen's Gate, South Kensington, London, England, have invented new and useful Improvements in Automatic Magic-Lantern Apparatus, of which the following is a specification.

My invention is for an improved apparatus whereby pictures may be projected by rays of light onto a screen after the manner of a magic lantern, and has for its object the production of novel and effective means for accomplishing this end by mechanism and devices capable of being operated by manual, electrical, or other power in such a manner that a picture, a predetermined number of pictures, or a number of series each containing a predetermined number of pictures can be automatically exhibited upon the machine being set to work by coin-freed apparatus or by other means and which may be employed for amusement, instruction, or advertising.

In the accompanying drawings, Figure 1 is a sectional front elevation of apparatus constructed according to my invention and designed to be put into operation by the insertion of a coin therein. Fig. 2 is a sectional plan thereof. Figs. 3 and 4 are respectively sections on the lines 3-3 and 4-4, Fig. 1. Fig. 5 is an end elevation of a portion of the apparatus. Figs. 6 and 7 are elevations of cams. Fig. 8 is a sectional front elevation of the apparatus designed more particularly for advertising purposes. Fig. 9 is a section on the line 9-9, Fig. 8. Fig. 10 is a sectional front elevation of the apparatus designed to be operated by hand. Fig. 11 is a section on the line 11-11, Fig. 10. Fig. 12 is a plan of a detail of the apparatus shown in Figs. 10 and 11, and Fig. 13 is an elevation of another detail thereof drawn to an enlarged scale.

Like letters indicate corresponding parts throughout the drawings.

In carrying out my invention, which I will describe first by reference to Figs. 1 to 7, I provide in a case *a*, which may be fixed against a wall or to any suitable support and may sometimes have the external appearance of a miniature stage, a lantern *b*, having objective and con-

densing lenses *c d* for projecting transparent pictures onto a screen *e*, of any suitable material. I arrange the screen preferably in the front of the case, as shown clearly in Figs. 2 to 4, and the lantern parallel therewith, a mirror *f* or other reflecting-surface being employed to reflect the pictures onto the screen. By this arrangement I provide an apparatus of less depth than would be the case if the pictures were projected directly onto the screen. Within the case *a* and near and parallel with the back thereof and with the lantern I provide a tray or platform *g*. This tray is provided with wheels *g'*, running upon rails *g''*, and is arranged to be intermittently moved longitudinally in either direction by a screw *h* engaging a nut *h'* under the said tray and contains in suitable spaces *g'''*, between equidistant vertical divisions *g''''*, a number of picture-slides *i*, the said tray being arranged to be brought into such a position by the screw *h* that one of the picture-slides *i* can be moved or slid into grooves *i'* in the usual space *i''* in the lantern for exhibiting and afterward be restored to its space or division in the tray *g* when the picture has been exposed for a given period. To insure the easy entry of each picture into the lower groove *i'*, I provide a roller *i'''*, Fig. 3. Each intermittent movement of the tray agrees exactly with the distance from center to center of the spaces *g'''*, so that whenever the tray comes to rest a slide is always in the correct position for insertion into the space *i''*. For moving the picture-slides I employ two depending arms *k k'*, Figs. 1 and 3, arranged to slide upon a bar *k''*, the arm *k* serving to move the slides from the tray into the space *i''* and the arm *k'* serving to return them to the said tray. The arm *k* is reciprocated by a lever *l*, connected to the said arm and fulcrumed at *l'*, the arm *k'* being moved by the arm *k* through the medium of a spring *k'''* when the latter arm is moved to push a slide from the tray and returned to push the slide back onto the tray by means of a rod *k''''*, connected to the lever *l*. As owing to wear and tear of the joints of the connection *l* to the arm *k* and of other cooperating parts the slides *i* might be left projecting from the side of the tray nearest the lantern, I provide for

moving the lever l farther than is actually required for returning the slide to the tray, and I arrange to stop the arm k' before the lever l has finished its movement. This is effected by the employment of a stop k^5 , with which the said arm makes contact, a spring k^6 being interposed between nuts k^7 on the rod k^4 and a lug k^8 on the said arm, through which the said rod passes. For oscillating the lever l I provide a double cam m m' on a shaft m^2 , the cam part m acting upon the lever to move the picture-slides from the tray to the lantern and the cam part m' acting upon the said lever to return the slides to the tray. The shaft m^2 is driven from a suitable motor, such as an electric motor n , Fig. 1, through the medium of the belt n^1 , pulley n^2 , pulley n^3 , belt n^4 , pulley n^5 , shaft n^6 , worm n^7 , worm-wheel n^8 , clutch part n^9 , attached to the wheel n^7 , and clutch part n^{10} , in sliding connection with the shaft m^2 . As it is essential that when each slide is returned to the tray the arms k k' should be moved slightly in the opposite direction to free the arm k' from the slide and yet not sufficient to bring the arm k back into contact with the slide in order that the tray may be free to be moved longitudinally, I provide the cam m with an elevation m^3 and the cam m' with a corresponding depression m^4 . These cams are shown detached in Figs. 6 and 7. To prevent a blank disk of light being shown on the screen during the time a slide is being moved into or out of position for exhibiting, I arrange a shutter b' in front of the objective-lens and pivoted at b^2 and provided with an arm b^3 , against which a pin b^4 on the arm k' strikes as the latter moves when a slide is passed into the space i^2 , so as to move the shutter out of line with the said lens. For intermittently moving the tray g I provide the screw h with a ratchet-wheel o , designed to be operated by a pawl o' from a cam o^2 on the shaft m^2 through the medium of a lever o^3 , rod o^4 , lever o^5 , and link o^6 , the pawl being carried on an arm o^7 , loose on the screw-shaft h . The ratchet-wheel o is so designed that each reciprocation of the pawl in one direction turns the screw h so as to move the tray a distance corresponding with that between the centers of two adjacent slides.

As already stated, my improved apparatus can be arranged so that a number of series of pictures, each series containing a predetermined number, can be exhibited. This arrangement is illustrated in Figs. 1 to 7, the apparatus containing twelve series, each consisting of six pictures, a handle p being provided for enabling the user to operate the tray g until a pointer p' , working over a scale or dial p^2 , indicates the number of the particular series he requires exhibited, the said pointer being driven by gearing p^0 from the screw-shaft h . This handle p is arranged to rotate a sprocket-wheel p^3 in the manner hereinafter described, which wheel through the medium of a chain

p^4 and sprocket-wheel p^5 actuates the screw h . As the pawl o' , however, would prevent the said screw being rotated in one direction, the said pawl is provided with a tail o^8 , the pawl when moved back over the teeth of the ratchet-wheel o after having rotated the latter to feed the tray g along being caused to move into the position indicated by the dotted lines in Fig. 3 by the tail o^8 coming into contact with the under side of one of the rails g^2 or any equivalent stop.

When my invention is used in connection with coin-freed apparatus, as in Figs 1 to 7, and which may be of any suitable kind, the mechanism is so arranged that only when a coin is passed into the coin-slot q can the handle p be operated. For this purpose the handle p is not directly connected to the sprocket-wheel p^3 , but is arranged to operate the latter by the following mechanism—that is to say, the handle and the sprocket-wheel p^3 are respectively connected to bevel-wheels p^6 and p^7 , turning upon a shaft p^8 . The latter carries a sleeve p^9 , having a spindle p^{10} , on which is mounted another bevel-wheel, p^{11} , gearing with the wheels p^6 p^7 . So long as no resistance is offered to the wheel p^{11} it will when the handle p is rotated gyrate around the shaft p^8 without moving the sprocket-wheel p^3 ; but if a stop be placed in its path, so that it can gyrate no longer, the bevel-wheel p^7 , and consequently the sprocket-wheel p^3 , will be rotated. This stop I arrange in the form of a pin r on a lever r^1 , connected to a lever r^0 , carrying the coin-receptacle r^2 , so that when the latter moves down under the weight of a coin the said pin is placed in the path of the spindle p^{10} , carrying the wheel p^{11} , so that if the handle p be turned the said spindle will come into contact with the said pin and the sprocket-wheel p^3 will be operated to move the tray g . The coin-receptacle lever r^0 is pivoted at r^3 and carries a link r^4 , which engages a pivoted pawl or stop r^5 , normally in engagement with an abutment r^6 on a pivoted stop-plate r^7 , to which is connected a handle r^8 outside the apparatus and which I term the “starting-handle.” This handle is connected with mechanism for starting the apparatus and when the apparatus is not in use is in the “off” position, (shown by the full lines in Fig. 5,) it being maintained or locked in the said position by reason of the engagement of the stop r^5 with the abutment r^6 . When, however, a coin is inserted into the coin-receptacle, the latter consequently moves down and lifts the stop r^5 out of engagement with the stop-plate r^7 and allows the starting-handle r^8 to be moved into the “on” position. (Shown by the dotted lines, Fig. 5.) When the desired number of the series to be exhibited has been obtained by the handle p , the starting-handle r^8 is then moved from the off to the on position, carrying with it the stop-plate r^7 , upon which is a pin r^9 . The coin-lever r^0 or its pivot-shaft is provided

with an arm r^{10} , which impinges against the pin r^9 when the lever r is in its lowered position. Consequently the first movement of the starting-handle r^8 will cause the coin-lever to be driven upward, and thereby discharge the coin from the bucket in a known manner and at the same time raise the pin r out of contact with the spindle p^{10} of the bevel-wheel p^{11} , so that the handle p is rendered inoperative and no further movement of the tray g and the indicator can be made.

For insuring that the first slide of a series of slides shall be always in the correct position to be moved into the lantern when the mechanism is set going I provide a wheel s , Figs. 1 and 4, having notches s' equal in number to the total number of series, and I so connect it with the indicator that unless the latter correctly points to the required series the apparatus cannot be put into action. For this purpose I provide a roller or pin s^2 , carried by a lever s^3 , to engage the said notches. The said lever carries a hinged spring extension-piece s^4 , the lower end of which can pass over a projection s^5 on the stop-plate r^7 , hereinbefore described, when the latter is in the position shown in Fig. 4. The notches s' correspond with the figures on the dial of the indicator. It will be seen, therefore, that until the roller or pin s^2 is in a groove the starting handle or lever r^8 cannot be operated. For throwing the clutch part n^9 into gear with the clutch part n^8 to start the apparatus to exhibit a series of pictures, the starting-handle r^8 is connected, through the medium of a lever u , rod u' , bell-crank u^2 , and rod u^3 , to a lever t on a shaft t^0 , carrying a fork t' , engaging the clutch part n^9 , so that when the said handle is moved from the off to the on position it will engage the said clutch parts together and drive the shaft m^2 , a pivoted hook t^2 being provided which engages a pin t^3 on the said lever t to keep the parts of the clutch engaged while the series of pictures is being exhibited. To disengage the hook when the series has been exhibited, I provide a disk t^4 on a shaft t^5 , operated by suitably-proportioned gear-wheels t^6 from the shaft m^2 , the said disk having a pin t^7 , which at a certain part of the rotation of the disk comes into contact with and moves a lever t^8 , connected to the hook t^2 , and so lifts the latter out of engagement with the pin t^3 on the lever t and allows the said lever t to disengage the clutch parts by the traction of a spring t^9 . The disk t^4 is further provided with a notch t^{10} , into which passes an arm t^{11} on the shaft t^0 , and thus instantaneously stops the apparatus. The bell-crank u^2 is arranged, as shown, to operate a tumbling (or other) switch v by a lever v^0 to complete the electric circuit, including the motor m , the circuit being again broken on the reverse movement of the bell-crank when the series of pictures has been exhibited. Where an electric lamp is employed in the lantern, it may be included in the same

circuit as the motor, so as to be cut in or out of the circuit simultaneously with the said motor. For the purpose of preventing the fraudulent use of the apparatus by retaining the starting-handle in its on position, so as to keep the clutch parts n^8 n^9 in gear, I provide the following arrangement—that is to say, the rod u' I arrange to slide in guides and connect it to a spring u^4 , which tends to draw it upward. When the rod is pulled downward by the starting-handle r^8 , a bent arm u^5 , pivoted on the rod u' , engages a pin u^6 on one end of the bell-crank u^2 , and so enables the latter to be operated, as hereinbefore described, to engage the clutch parts n^8 n^9 . The bent arm u^5 is provided with an extension u^7 , which comes into contact with a fixed stop u^8 and throws the end of the bent arm u^5 out of contact with the pin u^6 on the bell-crank. As the bent arm descends a stud u^9 thereon passes beneath an inclined tumbler u^{10} , and when it ascends it travels on the outside of the latter. By this arrangement the bent arm can only be brought into operation on the downstroke and is disengaged therefrom by the time it reaches the bottom of the stroke corresponding with the on position of the starting-handle, so as to sever the connection between the said handle and the starting-clutch n^8 n^9 . Assuming that the last series of pictures has been exhibited, (when the tray g will be at one end of its travel,) it will be necessary to turn the handle p , so as to move the tray back in order to exhibit another series, and assuming that a further coin has been inserted to operate the mechanism before the handle is so moved I provide means whereby the starting-handle is prevented from being worked (whereby the coin would be discharged from the receptacle r^2 , as hereinbefore described) until such time as the tray has been moved back to the series required. In order to accomplish this, I attach to the pawl r^5 a spring v' , and I place on the notched wheel s a pin or stud v^2 in such a position that it will come into contact with the said spring when the last series of pictures is being exhibited, so that the pawl r^5 is prevented from rising out of engagement with the abutment on the plate r^7 under the weight of the coin in the coin-receptacle. In order, however, that the coin-receptacle can move down sufficiently to place the pin r in the path of the spindle p^{10} , so that the handle p can be operated to move the tray g back to the series of pictures required, I slot the link r^4 where it engages the pin on the pawl r^5 . In order that on turning the handle p the exact position of the indicator-hand p' shall not depend on observation only, I provide on the screw-shaft h a disk w , into which a spring pin or projection w' can enter with a "click" when the screw h has made one complete revolution, so that the sense of feeling and hearing as well as sight may assist the operator in correctly placing the indicator.

In the arrangement of apparatus illustrated by Figs. 8 and 9 and which is more particularly adapted for advertising purposes, I dispense with the coin-freed starting and indicating apparatus, already described with reference to Figs. 1 to 7, and a clock or other timing mechanism may be used to switch on or off the electric current for the electric motor and lamp where such is used. The parts of the said apparatus I designate by the same signs as those used in describing Figs. 1 to 7, but with the addition of the letter *a* as or in addition to the index-sign. In this arrangement the shaft t^b and gear-wheels t^b described in connection with the arrangement illustrated in Figs. 1 to 7 are dispensed with, the disk t^{2a} being placed upon the shaft m^{2a} , so that the whole series of picture-slides on the tray g^a are exhibited in consecutive order. For automatically returning the tray g^a to its initial or starting position after all the slides have been exhibited, and so that they can again be exhibited, I provide the following arrangement—that is to say, I arrange on the worm-shaft n^{5a} a pulley x for transmitting motion by means of a belt or cord x' to a pulley x^2 , loose on the screw-shaft h^a , the said pulley being connected with the one part, x^3 , of a friction-clutch, the other part of which, x^4 , is in sliding connection with the screw-shaft h^a and is pressed toward the part x^3 by a spring x^5 , the said parts when in engagement serving to rotate the screw-shaft h^a to return the tray g^a to its starting position at a velocity relatively high as compared with that at which the shaft rotates when exhibiting the pictures. The clutch part x^4 is provided with a pivoted clutch-fork x^6 , designed to be operated to disengage the parts of the clutch, as hereinafter described. The fork t^a of the clutch part n^{5a} on the shaft m^{2a} carries the arm t^{1a} to engage the notch in the disk t^{2a} , and it also carries the pin t^{2a} , with which the pivoted hook t^{2a} engages. The said clutch-fork is also forked at its lower end and engages a pin x^7 on a tumbling weighted lever x^8 , the lower end of which serves, when the tumbler x^8 is in one extreme position, to strike the clutch-fork x^6 and disengage the clutch parts x^3 and x^4 , so as to stop the rotation of the shaft h^a and at the same time operate the clutch-fork t^a to engage the parts n^{5a} and n^{5a} of the clutch on the shaft m^{2a} and rotate the latter. In order to hold the clutch part x^4 out of engagement with the clutch part x^3 during the time the tumbler x^8 is moving out of contact with the fork x^6 when moving from one extreme position to the other, I provide a pivoted hook x^9 , designed to engage a pin x^{10} on the said fork x^6 , which hook, however, is disengaged by the tumbler during such movement, the said tumbler being provided with an arm x^{11} , which comes into contact with an upward extension x^{12} of the hook x^9 , as shown clearly in Fig. 8.

The operation of the said clutches is effected

by the tray g when at the extremes of its movement in either direction, and for this purpose I provide it with a bar or rod y , one end of which is designed to impinge against one end of a lever y' , operated in one direction by a spring y^0 , the other end of which lever is connected by a rod y^2 to the clutch-fork t^a , while the other end of the bar y is designed to impinge against one arm of a bell-crank y^3 , the other arm of which is connected by a rod y^4 to the pivoted hook t^{2a} . By this arrangement it will be seen that, assuming the parts to be in the position shown in Fig. 8, in which the tray g^a is indicated as moving back in the direction of the arrow to its initial position, when the tray arrives at the said position the bar y will impinge against the lever y' and move it and the clutch-fork t^a to the position indicated by the dotted lines, whereby the clutch parts n^{5a} and n^{5a} will be engaged to rotate the shaft m^{2a} and exhibit the slides in consecutive order and intermittently rotate the shaft h^a , as hereinbefore described, and the tumbler x^8 will also be moved to the dotted-line position to disengage the clutch parts x^3 and x^4 . When the tray g^a arrives at the other end of its movement, the bar y will impinge against the bell-crank y^3 and move the hook t^{2a} to release the clutch-fork t^a , which will be pulled back by the spring y^0 and disengage the parts of the clutch n^{5a} and n^{5a} and at the same time move the tumbler back to the position shown in full lines to release the clutch-fork x^6 and allow the clutch parts x^3 and x^4 to reengage by means of the spring x^5 , so that the screw h^a will be rotated by the pulley x^2 to again return the tray g^a to its initial position. In cases where it may be necessary to exhibit a smaller number of lantern-slides, and consequently to return the tray to its initial position before it has completed its full travel, I form the bar y so that it can be lengthened so as to operate the bell-crank y^3 earlier than would be the case if the full number of slides were used. For this purpose I form the bar in two parts which may be relatively adjusted by means such as set-screws y^5 in the one part engaging a slot y^6 in the other part.

The arrangement of apparatus illustrated in Figs. 10 to 13 is designed to be operated by hand and is intended for use more particularly in the class-room, the lecture-hall, or the home circle. The parts of this apparatus I designate by the same signs as those used in describing Figs. 1 to 7, but with the addition of the letter *b* as or in addition to the index-sign. In this arrangement the shaft m^{2b} is oscillated (instead of rotated, as hereinbefore described) by means of a handle z outside the case *a*, limited in its movement by stops z^0 . The lever l^b is loosely pivoted upon one end of the said shaft and is designed to be oscillated to move the arms l^b l^b by an arm z' , attached to the shaft m^{2b} , the said arm being

provided with a slot z^2 , engaging a pin z^3 on the lever l^b , so that assuming the parts to be in the position shown by the full lines in Fig. 11, in which the pin z^3 is located at one end of the slot z^2 , if the lever z be moved to the left it will be moved a certain distance determined by the length of the slot z^2 before the lever l^b is moved. This interval between the starting of the lever z and that of the lever l^b allows the tray g^b to be fed by the screw h^b to bring a picture-slide into position for exhibition. For effecting this feeding movement the cam o^{2b} on the shaft m^{2b} is in the form of an arm bent at the outer end to form a surface z^4 concentric with the center of the shaft m^{2b} , and I arrange a pivoted lever z^5 , one end of which bears against the said cam, as shown in Fig. 11, to be operated in one direction thereby, it being operated in the reverse direction by a spring z^6 . The other end of the lever z^5 is provided with a segment of teeth, which engage a pinion z^7 , Fig. 13, loose on the screw-shaft h^b . The pawl o^{2b} for operating the ratchet-wheel o^b (which in this arrangement has only one tooth) is carried upon a disk z^8 , fixed to the pinion z^7 . By this arrangement during the interval between the starting of the lever z and the moment when the lever l^b commences to move the cam operates the lever z^5 to rotate the shaft h^b by means of the pinion z^7 , disk z^8 , and pawl o^{2b} , the lever z^5 riding against the concentric portion z^4 of the cam, while the lever l^b is operating the arms h^b h^{2b} to move a picture-slide into the lantern.

In order to move the arm h^b slightly back out of contact with the picture-slide it has been moving in the tray, as hereinbefore described, I provide in this arrangement a spring-block z^9 , working in a guide on the arm h^b and designed to come into contact with a fixed stop z^{10} , so that directly the handle z is released after the return movement the said arm h^b will be moved slightly toward the lantern, and consequently move the arm h^{2b} clear of the slide, the pressure of the said spring-block being such that it overcomes the pull of the spring z^6 on the lever z^5 . The handle p^b in this arrangement is connected to the screw-shaft h^b through the medium of gear-wheels z^{11} and serves to move the tray, so as to bring any slide into position for exhibition, each slide having a corresponding number on the indicator-dial instead of each series, as in the arrangement illustrated in Figs. 1 to 7. In order that the shaft h^b may not be operated by the handle p^b during the movement of the handle z , I arrange the said handle p^b independent of but adapted to drive the shaft p^{2b} —for instance, by means of a slot z^{12} , Fig. 12, in the said handle engaging a pin z^{13} on the said shaft—and I provide that unless the handle p^b is removed from the said shaft the handle z cannot be operated. For this purpose I attach to the lever z^5 an arm z^{13} , the lower part of which forms a shutter curved

concentrically with the axis of the pivot of the said lever, so that during the movement of the latter it will cover the hole z^{14} , through which the handle p^b is inserted to engage the shaft. When, however, the lever z^5 is in the position shown in Fig. 11, a hole z^{15} , with which the said shutter is provided, coincides with the hole z^{14} and allows the handle p^b to be inserted and operate the tray to bring another slide into position for exhibition. The indicator in this arrangement I have shown in the form of a rotating dial p^{2b} within the case a^b , instead of a pointer working over a dial, as in the arrangement shown in Figs. 1 to 7, the number on the dial being visible through a hole z^{16} in the case a^b .

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination with an inclosing casing of less depth than width and having a translucent screen in its front face, of a lantern disposed transversely within said receptacle and a single reflecting-mirror in rear of said screen and in line with the lenses of the lantern, substantially as described.

2. The combination with an inclosing casing of less depth than width, and having a screen in its front face, of a lantern disposed transversely within said receptacle, a single reflecting-mirror in rear of said screen and in line with the lenses of the lantern, a movable picture-slide carriage located on the side of the lantern opposite the screen, means for moving said carriage longitudinally with respect to the lantern, and transferring mechanism for moving the slides from said carriage into and out of the lantern, substantially as described.

3. The combination with an inclosing casing of less depth than width and having a screen arranged centrally of its front face, or wall, of a lantern arranged within said casing and disposed transversely thereof and at one side of the center of the casing, a reflector arranged in rear of the center of said screen and in line with the lenses of the lantern, a traveling picture-slide carriage arranged on the side of the lantern opposite said screen, means for traversing said carriage longitudinally with respect to the lantern and mechanism for transferring the slides from said carriage into and out of said lantern, substantially as described.

4. In a picture-projecting apparatus, the combination with a lantern, of a longitudinally-movable carriage arranged adjacent to said lantern, mechanism for moving said carriage longitudinally to bring the picture-slides carried thereby into position to enter the lantern, a transferring mechanism for moving said slides into position in the lantern and moving them back into said carriage and hand-operated mechanism connected with said carriage-operating mechanism for moving said

carriage to bring any particular slide into operative position with respect to said transferring mechanism, substantially as described.

5. In a picture-projecting apparatus, the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side of the lantern, a feeding-screw for imparting a longitudinal movement to said carriage, mechanism for intermittently operating said screw in a predetermined manner and feeding said carriage to bring the picture-slides successively into operative position with respect to the lantern, independent hand-operated mechanism for said screw to bring any particular slide into operative position and a horizontally-reciprocating transferring mechanism for moving said slides into the lantern and restoring them to the carriage, substantially as described.

6. In a picture-projecting apparatus the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side of the lantern, a feeding-screw for imparting a longitudinal movement to said carriage, mechanism for intermittently operating said screw in a predetermined manner and feeding said carriage to bring the picture-slides successively into operative position with respect to the lantern, mechanism for operating said screw in a reverse direction and a horizontally-reciprocating transferring mechanism for moving said slides into the lantern and restoring them to the carriage, substantially as described.

7. In picture-projecting apparatus or the like the combination with the lantern of a carriage adapted to move longitudinally at one side of the lantern, of a screw engaging a nut of the carriage, means for intermittently rotating the screw a predetermined distance, a transferring device comprising arms depending from a bar upon which they slide for moving the pictures into and from the lantern, and means for operating the said transferring device independently of the carriage-traversing mechanism, substantially as described.

8. In picture-projecting apparatus the combination with the lantern of a carriage adapted to be moved longitudinally of the said lantern and to carry two or more series of pictures, of mechanism adapted to be operated by hand for bringing any one of the said series into proximity to a device for transferring the pictures into and from the lantern and of automatic mechanism for traversing the carriage for bringing the several pictures of the series successively into position to be transferred, substantially as described.

9. In a picture-exhibiting apparatus, the combination with a lantern, a longitudinally-movable picture-slide carriage arranged at one side of the lantern, mechanism for feeding said carriage longitudinally, a pair of depending arms arranged to reciprocate horizontally, for transferring the picture-slides from said car-

riage to and from the lantern and operating mechanism for said arms having provision for permitting said arms to move with respect to each other, to facilitate the releasing of the slides, substantially as described.

10. In a picture-exhibiting apparatus, the combination with a lantern, a longitudinally-movable picture-slide carriage arranged at one side of the lantern, mechanism for feeding said carriage longitudinally, a pair of depending arms arranged to reciprocate horizontally, for transferring the picture-slides from said carriage to and from the lantern, an operating-lever connected to one of said arms, a yielding connection between said lever and said second arm and a stop for arresting said second arm on its return movement to permit said arms to separate and release the slide, substantially as described.

11. In a picture-exhibiting apparatus, the combination with a lantern, a longitudinally-movable picture-slide carriage arranged at one side of the lantern mechanism for feeding said carriage longitudinally, a pair of depending arms arranged to reciprocate horizontally, for transferring the picture-slides from said carriage to and from the lantern, an operating-lever connected to one of said arms, a yielding connection between said arm and the second arm for moving it in one direction, a yielding connection between said lever and said second arm for moving it in the other direction and a stop for arresting said second arm on its return movement to permit said arms to release the slides, substantially as described.

12. In a picture-exhibiting apparatus, the combination with a lantern and a pivoted shutter for obstructing the lenses thereof, of a longitudinally-movable picture-slide carriage arranged at one side of the lantern, mechanism for moving said carriage longitudinally, a reciprocating transferring device for moving said slides from the carriage into the lantern and returning them to the carriage and a part on said transferring device for engaging said pivoted shutter and moving it out of line with the lenses of the lantern when a slide is transferred to the lantern, substantially as described.

13. In a picture-exhibiting apparatus, the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side of the lantern, a horizontally-movable transferring device for transferring a slide from the carriage to the lantern and returning it to the carriage-actuating mechanism for said transferring device, a starting-lever for said actuating mechanism and mechanism for preventing the operation of said starting-lever until one of the slides is brought exactly into operative position with respect to the transferring device, substantially as described.

14. In a picture-exhibiting apparatus, the combination with a lantern, of a longitudi-

nally-movable picture-slide carriage arranged at one side of the lantern, a horizontally-movable transferring device for transferring a slide from the carriage to the lantern and returning it to the carriage, actuating mechanism for said transferring device and for said carriage, and independent hand-operated mechanism for moving said carriage to bring a particular slide into operative relation with the transferring device, a starting-lever for said actuating mechanism and mechanism for preventing the operation of said starting-lever until a slide has been brought exactly into operative relation with the transferring device, substantially as described.

15 15. In a picture-exhibiting apparatus, the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side of the lantern, a horizontally-movable transferring device for transferring a slide from the carriage to the lantern and returning it to the carriage, actuating mechanism for said transferring device and for said carriage, and independent hand-operated mechanism for moving said carriage to bring a particular slide into operative relation with the transferring device, a starting-lever for said actuating mechanism provided with a projecting arm, a rotary disk operatively connected with the carriage-feeding mechanism and provided with a series of notches, a pivoted detent-lever having a part for engaging said notches and a part for engaging the arm connected with the starting-lever to prevent the operation thereof until a selected slide in said carriage is brought exactly into operative relation with the transferring device, substantially as described.

40 16. In a picture-projecting apparatus, the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side thereof, a transferring mechanism adapted to move the slides into the lantern and return them to the carriage, mechanism for transferring the carriage, a motor for operating said transferring mechanism and carriage-traversing mechanism, a starting device for connecting said motor operatively to the mechanisms operated thereby and devices for automatically disconnecting said starting device from the mechanism which it controls as soon as it has performed its function, substantially as described.

55 17. In a picture-projecting apparatus, the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side thereof, a transferring mechanism adapted to move the slides into the lantern and return them to the carriage, mechanism for traversing the carriage, a motor for operating said transferring mechanism and carriage-traversing mechanism, a clutch for connecting said motor with the mechanisms operated thereby, a starting device, operatively connected to said clutch and mechanism inter-

posed between a part of said starting device, and the said clutch for automatically disconnecting said parts, substantially as described.

18. In a picture-projecting apparatus, the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side thereof, a transferring mechanism adapted to move the slides into the lantern and return them to the carriage, mechanism for traversing the carriage, a motor for operating said transferring mechanism and carriage-traversing mechanism, a clutch for connecting the said motor with the mechanisms operated thereby, a switch controlling the motor, a starting device and connections between said starting device and said switch and said clutch for operating the same and automatically disconnecting said starting device therefrom, substantially as described.

19. In a picture-projecting apparatus, the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side thereof, a transferring mechanism adapted to move the slides into the lantern and return them to the carriage, mechanism for traversing the carriage, a motor for operating said transferring mechanism and carriage-traversing mechanism, a starting device for connecting said motor with the mechanisms to be operated thereby, mechanism for automatically disconnecting said starting device, and independent mechanism for traversing the carriage to bring a particular slide in line with the said transferring mechanism, substantially as described.

20. In a picture-projecting apparatus, the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side thereof, a transferring mechanism adapted to move the slides into the lantern and return them to the carriage, mechanism for traversing the carriage, a motor for operating said transferring mechanism and carriage-traversing mechanism, mechanism for connecting the motor with the parts operated thereby, a starting device including a sliding part, a pawl pivoted thereto and adapted to operatively engage a part of said connecting mechanism and a stationary part for engaging said pawl and disengaging it from the said connecting mechanism, during the movement of the slide to operate the latter, substantially as described.

21. In a picture-projecting apparatus, the combination with a lantern, of a longitudinally-movable picture-slide carriage arranged at one side thereof, a transferring mechanism adapted to move the slides into the lantern and return them to the carriage, mechanism for traversing the carriage, a motor for operating said transferring mechanism and carriage-traversing mechanism, mechanism for connecting the motor with the parts operated thereby, a starting device including a sliding part, a pawl pivoted thereto and adapted to

operatively engage a part of said connecting mechanism and a stationary part for engaging said pawl and disengaging it from the said connecting mechanism, during the movement of the slide to operate the latter, a part for engaging said pawl and causing it to pass the part of the connecting mechanism operated by it, on the return movement of said slide, and a spring for returning said slide, substantially as described.

22. In a picture-projecting apparatus, the combination with the lantern, of a longitudinally-movable carriage arranged at one side thereof, a transferring device for said slides and mechanism for traversing said carriage,

comprising a rotatable shaft provided with a level pinion, a part loosely mounted on said shaft and provided with an opposed beveled pinion, said part being operatively connected with the carriage, an intermediate part loosely mounted on said shaft and provided with a stud and a pinion mounted thereon and meshing with said opposed bevel-pinions, and a movable device for arresting said intermediate part, substantially as described.

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Witnesses:

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