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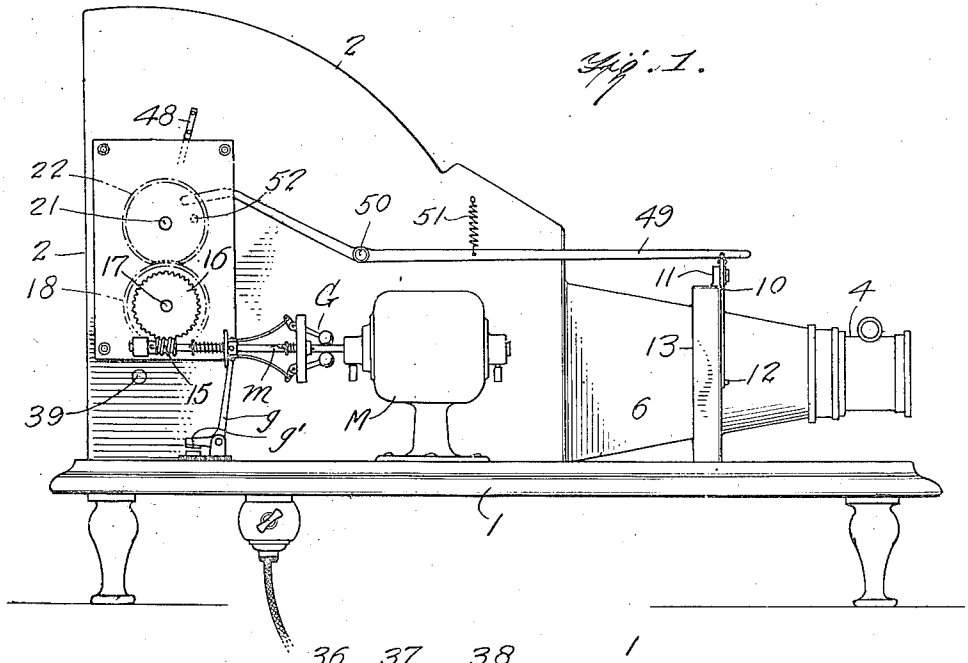
AUTOMATIC LANTERN SLIDE PROJECTOR.

APPLICATION FILED JAN. 26, 1915.

1,247,608. Patented Nov. 27, 1917.

4 SHEETS—SHEET 1.

Fig. 1.



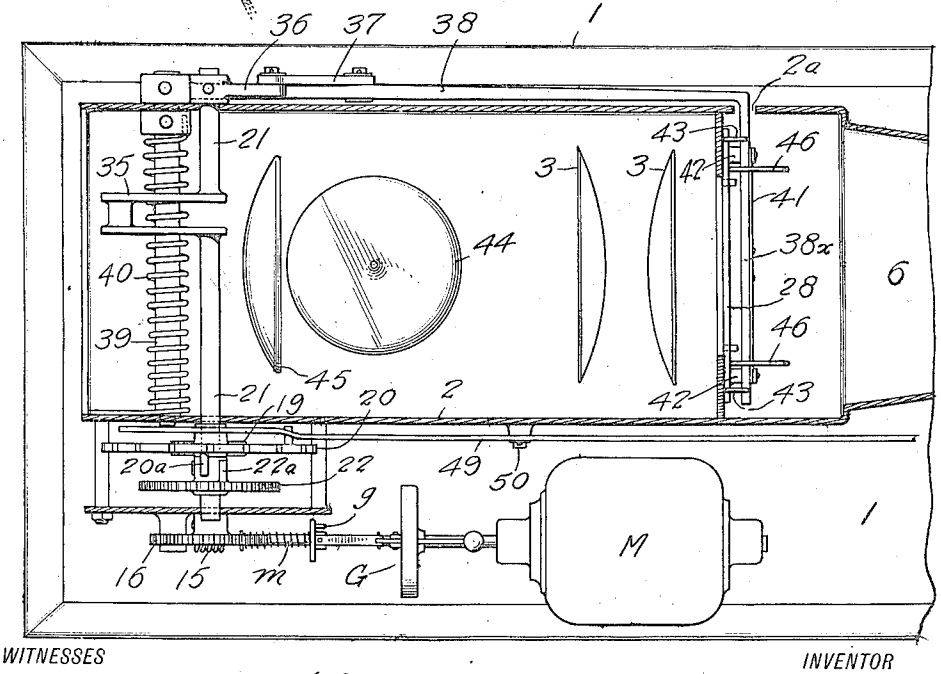


Fig. 2.

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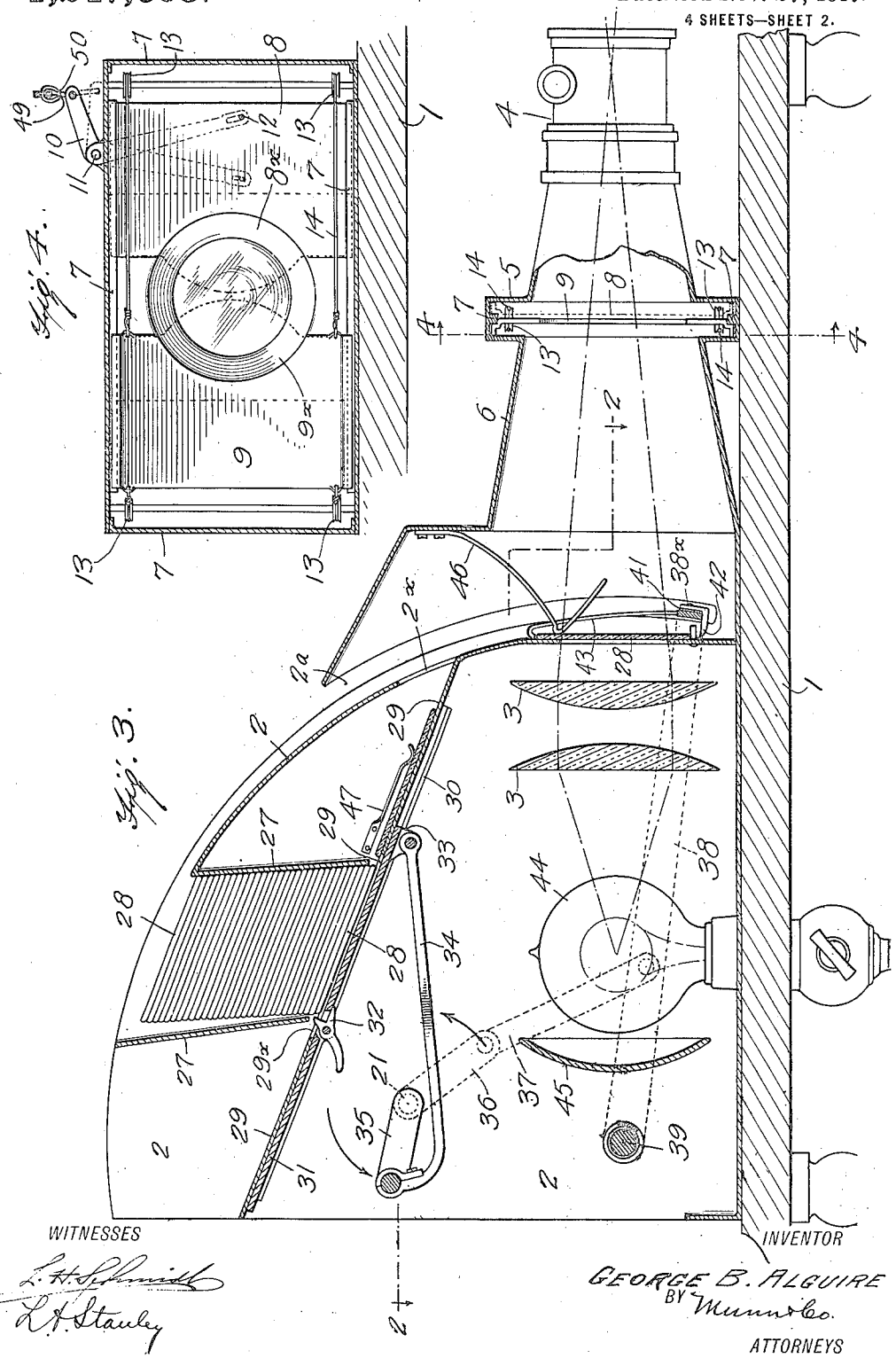
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4 SHEETS—SHEET 3.

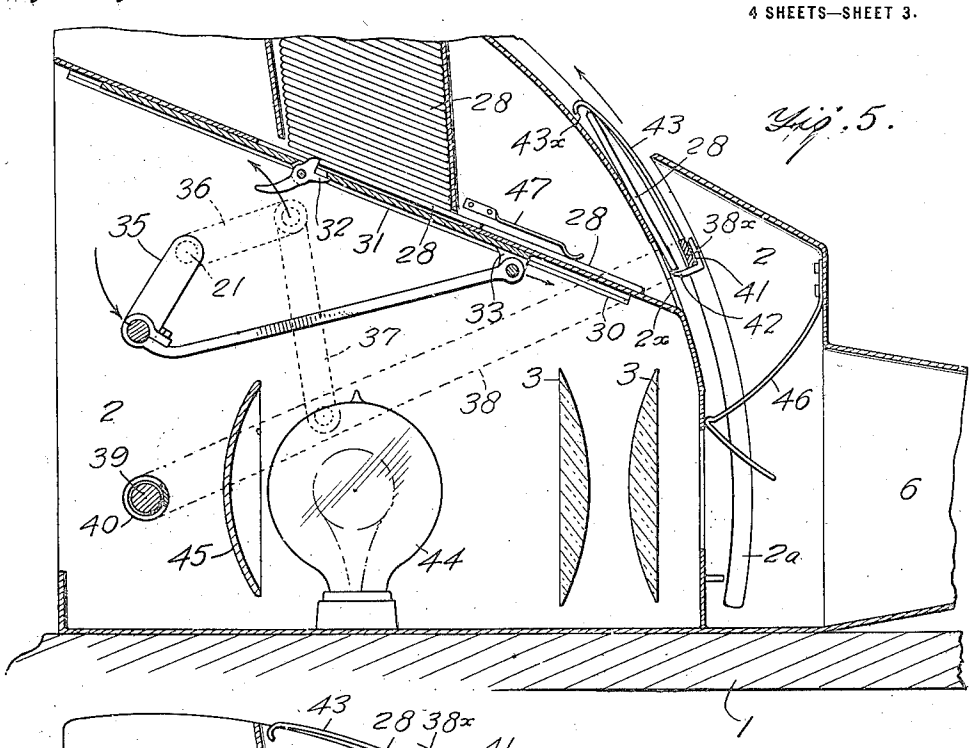


Fig. 5.

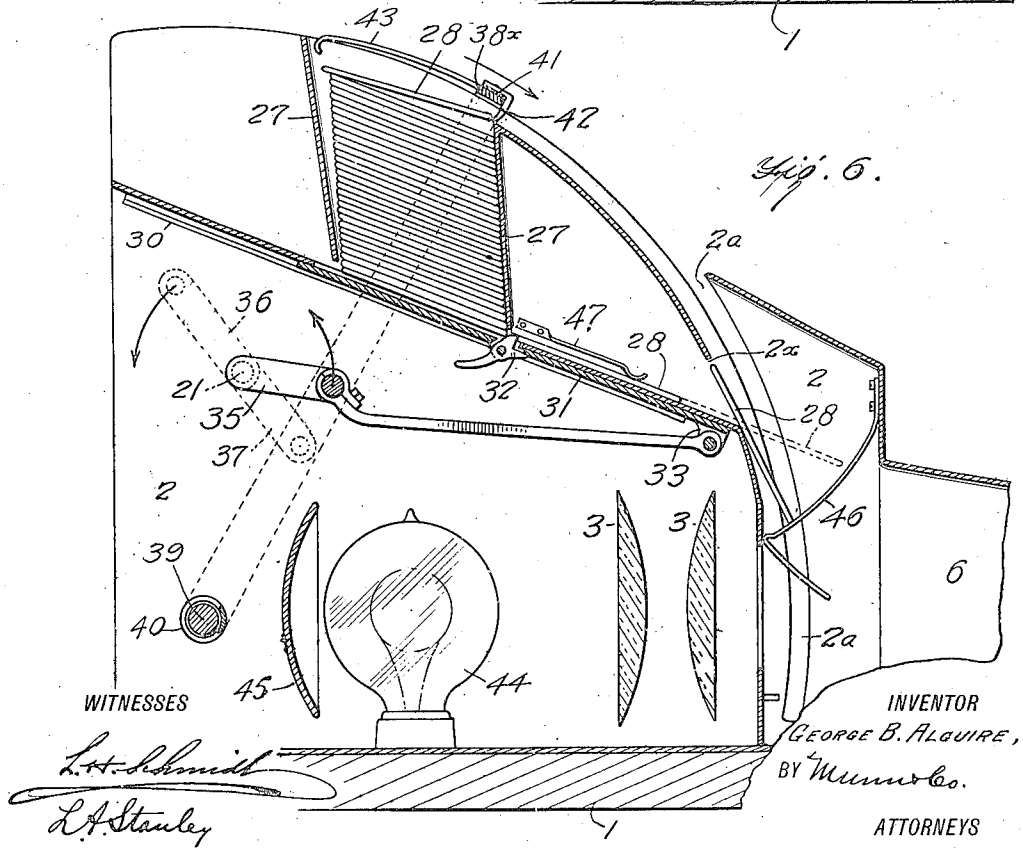


Fig. 6.

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4 SHEETS—SHEET 4.

Fig. 7.

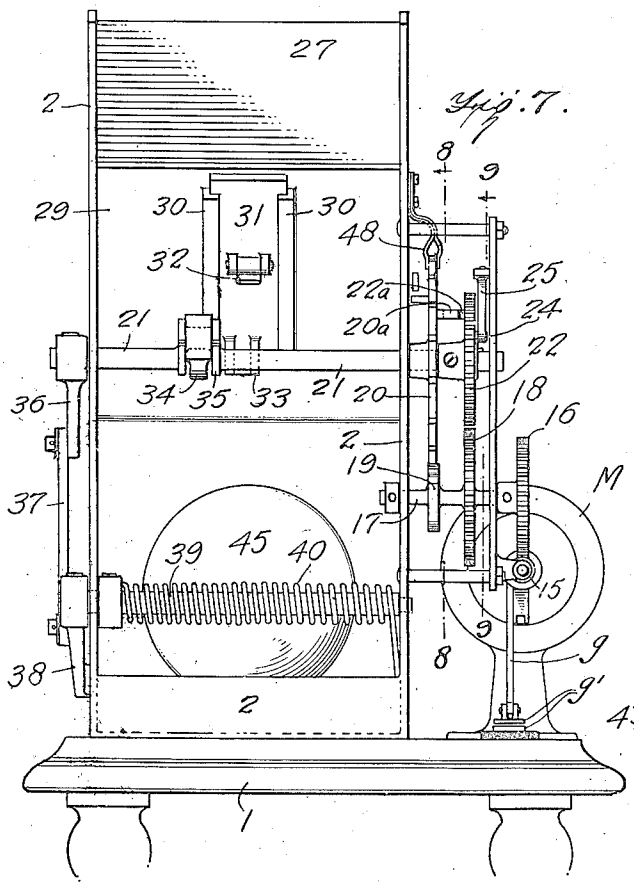


Fig. 8.

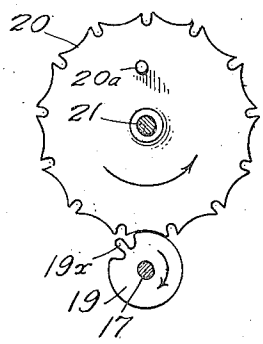


Fig. 9.

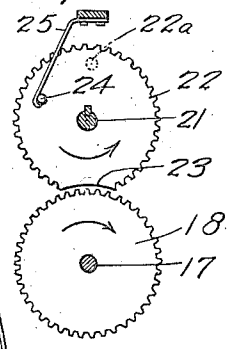
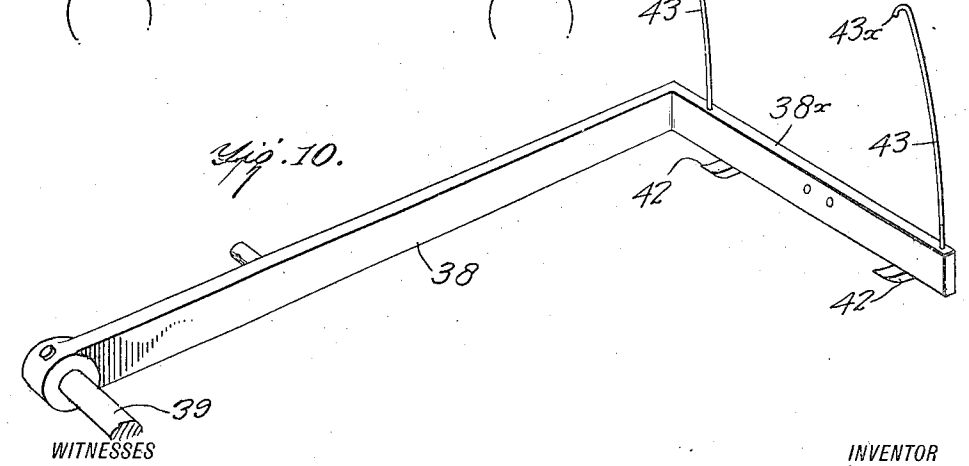


Fig. 10.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC LANTERN-SLIDE PROJECTOR.

1,247,608. Specification of Letters Patent. Patented Nov. 27, 1917.

Application filed January 26, 1915. Serial No. 4,448.

To all whom it may concern:

Be it known that I, GEORGE BURT ALGUIRE, a citizen of the United States, and a resident of Chickasha, in the county of Grady and State of Oklahoma, have made certain new and useful Improvements in Automatic Lantern-Slide Projectors, of which the following is a specification.

My invention relates to improvements in projecting apparatuses, especially for projecting pictures or advertisements on lantern slides, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of my invention is to provide a device by means of which a series of lantern slides may be automatically brought into position for display and may be left in this position for a given length of time and thereafter be removed and replaced in original order so that the operation of the machine may be continuous.

A further object of my invention is to provide a device of the type described which necessitates only a minimum amount of space for holding the slides since they are designed to be piled directly one upon the other.

A further object of my invention is to provide a device of the type described in which the slides are carried in a holder being placed on top of one another and in which means is provided for automatically withdrawing the bottom slide, bringing it in position for projection upon the screen and then replacing it on the top of the pile of slides.

A further object of my invention is to provide a device of the type described in which a movable carrier serves the common purpose of bringing a slide in position to be displayed and of removing it and depositing it in the holder.

Other objects and advantages will appear in the following specification and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this application in which—

Figure 1 is a side view of the device,

Fig. 2 is a section along the line 2—2 of Fig. 3,

Fig. 3 is a longitudinal sectional view through the device,

Fig. 4 is a section on the line 4—4 of Fig. 3,

Fig. 5 is a section of a portion of the device similar to Fig. 3 but showing the parts in a different position,

Fig. 6 is a similar section showing the parts in a third position,

Fig. 7 is a rear view of the device,

Fig. 8 is a sectional view on the line 8—8 of Fig. 7,

Fig. 9 is a sectional view on the line 9—9 of Fig. 7, and

Fig. 10 is a perspective view of the rock arm.

In carrying out my invention I make use of a base 1 upon which is mounted the casing 2 of the lantern. The latter is provided with the usual lens 3 and has the focusing tube 4, as shown in Fig. 3. Between the lens 3 and the focusing tube 4 is disposed a shutter construction which is best illustrated in Figs. 3 and 4. In these figures it will be seen that a lateral extension 5 is provided in the tapering tube 6. This extension is provided with upper and lower guide members 7 for guiding slides 8 and 9 respectively. These slides have cut-away portions 8^{x} and 9^{x} respectively facing each other. The slide 8 is operated by means of a bell-crank lever 10 which is pivoted at 11 and whose long arm has a pivot connection with the slide at 12. At opposite sides of the extension 7 are anti-friction wheels or rollers 13 around which cords 14 pass. As will be seen from Figs. 3 and 4 one of these cords 14 is attached to that edge of the slide 9 facing the slide 8, passes around the pulley 13 at the rear of the slide 8 and is fastened to the rear of the slide 8, while a similar cord is connected at the front of the slide 8, passes around the pulley 13 at the rear of the slide 9 and is connected to the slide 9 at its rear. This arrangement serves to move the slides toward each other when the lever 10 moves in one direction, or to move them farther from each other when it moves in the other direction and the movement is simultaneous and to the same extent. It will also be seen from Fig. 4 that the slides when moved toward each other overlap so as to completely shut off the light.

On the same base 1 which supports the lantern is mounted an electric motor M which is preferably provided with an auto-

matic switch including a switch arm g, contacts g', and a governor G and whose shaft m is provided with a worm 15 arranged to drive a worm wheel 16 on a shaft 17. The shaft 17 bears a gear 18 and also a mutilated gear 19 having but one tooth $19^{\times}$ (see Fig. 8). The gear 19 is arranged to engage a gear 20 loosely mounted on a shaft 21 so as to turn a distance of one tooth for every complete revolution of the gear 19. The shaft 21 also bears a gear 22 which is designed to mesh with the gear 18 under certain conditions, but which is mutilated so as to provide a portion 23 which will permit the gear 18 to revolve while the gear 22 remains idle. The gear 22 is provided with a stop pin 24 arranged to be engaged by a spring-holding member 25, as shown in Fig. 9 for positioning the gear 22 so as to free it from engagement with the gear 18 at certain stated times.

As will be seen from Fig. 3 the casing 2 of the lantern is provided with a holder 27 for a series of slides 28 which are stacked one above another. An inclined partition 29 is provided which extends underneath the bottom of the holder, the space between the partition and the holder being such that one slide may pass between the bottom of the partition and the holder but not two. A longitudinal slide $29^{\times}$ is provided in the partition 29 and the front of the casing 2 has an opening $2^{\times}$ for a purpose which will be explained later.

Disposed underneath the inclined partition 29 in guides 30 (see Fig. 7) is a slide 31 which bears a pivoted catch 32. The slide 31 has a lug 33 which is pivotally connected by a link 34 with a crank arm 35 (see Fig. 3) on the shaft 21.

This shaft 21, as will be seen from Fig. 7 extends from side to side of the casing and is provided on the exterior thereof with a crank arm 36 which is connected by means of a link 37 with a rock arm 38 which is mounted on a shaft 39 bearing a spring 40, which counterbalances the weight of a slide at the end of the rock arm. The rock arm 38 is bent laterally, as shown in Fig. 10, the laterally bent portion $38^{\times}$ bearing a leaf spring 41 which is provided at its ends with L-shaped supporting members 42. The laterally extending portion $38^{\times}$ is also provided with upwardly extending curved springs 43 having hook shaped portions $43^{\times}$ at their tops.

As will be seen from Figs. 2, 3, 5 and 6 the casing 2 is provided with an arc-shaped slot 2^{a} through which the portion $38^{\times}$ extends. The lantern is provided with the usual lamp 44 and reflector 45. At 46 I have shown a spring member whose purpose will be explained later, while at 47 is another spring.

From the foregoing description of the various parts of the device the operation thereof may be readily understood.

The holder 27 is first filled with slides and the motor is set going. This revolves the worm 15, the worm wheel 16 and the shaft 17. As stated above, the gear wheel 18 on the shaft 17 is normally out of engagement with the gear wheel 22. The revolution of the mutilated gear 19 will cause the gear 20 to revolve. In Fig. 8 the gear 20 is shown as having thirteen notches or teeth, but in practice I prefer to provide twenty teeth for the wheel 20 so that one revolution of the mutilated gear will cause the gear 20 to be moved one-twentieth of a revolution.

Let us assume that one of the slides is in position for projection. This position is shown in Fig. 3. The gear wheel 20 is provided with a pin 20^{a}, which, during the revolution of the gear, eventually comes into contact with a pin 22^{a} on the gear wheel 22, thus forcing the gear wheel 22 forward, the spring 25 (see Fig. 9) being pushed aside by the stop pin 24, and the teeth of the gear 22 coming into mesh with those of the gear 18. The revolution of the shaft 21 will now be effected by means of the gear 22, the gear 20 being retarded meanwhile by friction springs 48 (see Fig. 7).

The revolution of the shaft 21 causes an upward movement of the rock arm 38 from the position shown in Fig. 3. An intermediate position is shown in Fig. 5. The slide 28 is therefore lifted from its position of projection and is deposited on the top of the pile of slides in the holder 27.

In the meantime the arm 35 which is on the crank shaft 21, as stated, is revolved thereby pushing the slide 31 forwardly in the direction shown in Fig. 5. The catch 32 engages one of the slides 28, *i. e.*, the bottom one and forces it forwardly. Prior to the beginning of the operation of the machine a slide 28 was placed underneath the springs 47 being held in this position by the tension of the spring, but this slide is now pushed forwardly by the slide just behind it and which is being moved by the catch 32, as clearly shown in Fig. 5.

On reference to Fig. 6, it will be seen that when the catch 32 reaches its forward limit the first slide has been pushed free from the spring 47 and will pass through the opening $2^{\times}$ in the casing 2 so as to rest on the springs 46.

The rock arm 38 will be moved downwardly on further revolution of the crank shaft 21, while the slide 31 will be moved outwardly. When the spring 41, holding the members 42, reaches the slide, which is now resting on the springs 46, as shown in Fig. 6, the end $38^{\times}$ of the rock arm will push the springs 46 aside in its movement downwardly. The holding members 42 mean-

while will move the bottom of the slide inwardly to a vertical position and will then enter beneath the slide and support the same, while the springs 43 will draw the slide down with the downward movement of the arm 38 to the position shown in Fig. 3. The springs 46 will now assume a position such as that shown in Fig. 3 in which the slide is held upright.

Just at this point the teeth on the gear 22 leave the teeth on the gear 18 and the gear 22 is held stationary by the engagement of the pin 24 with the spring 25 (see Fig. 9). The gear 22 cannot again be actuated until the pin 20^a on the gear 20 again engages the pin 22^a on the gear 22. This will not occur until the mutilated gear 19 has turned the gear 20 through one complete revolution. The period of this revolution is preferably thirty seconds which is the time allowed for the exposure of the lantern slide on the screen.

The means by which the shutter in Fig. 4 is operated may be as follows:

A bell-crank lever 49 is pivoted at 50 on the casing 2 (see Figs. 1 and 2) and is normally held by a spring 51 in an upper position. One end of this bell-crank lever extends rearwardly and may engage a pin 52 on the timing wheel or gear 20. During the revolution of the latter the pin will come into engagement with the bell-crank lever thereby forcing the forward end downwardly and thus causing the slides to close. On the further revolution of the gear the slides will be opened by the spring 51. The timing of the opening of the slides is a mere matter of adjustment and the operation of the slide is such as to cause the dissolving of one view and the reappearance of the successive view after the manner of the dissolving view stereopticon.

It will be seen that I have provided a device which automatically displays the picture or advertisement on the slides successively by bringing these slides successively from the holder and depositing them again in the holder. This provides for the continuous operation of the device, but it will be apparent that since the slides are laid one upon the other a maximum number of slides may be placed in the holder. This device therefore provides for a greater number of slides with a lantern of given size than could possibly be provided by a device in which the slides are brought into position through the medium of a rotating wheel or similar contrivance. It will also be observed that the rock arm in its upward movement deposits the slide and in its downward movement brings another slide into position. This double function is also important since it does away with the necessity of providing one part for elevating the slide and another part for bringing another slide into position and thus simplifies the apparatus.

I am aware that other devices based on the same general principle might be made, but I consider as my own all such modifications as fairly fall within the spirit and the scope of the invention.

I claim:—

1. In a projection apparatus, a holder for lantern slides, said slides being piled in the holder with their faces in contact with one another, a movable member disposed underneath said holder, means for reciprocating said movable member intermittently, means carried by said movable member for withdrawing the bottom slide of the pile at each reciprocatory movement, means for temporarily retaining the slides so withdrawn in a position of rest between said holder and the position of projection, the subsequent withdrawal of another lantern slide from the bottom of the pile serving to release the previously withdrawn slide, and means for bringing said last named slide into position for projection.

2. In a projection apparatus, a holder for lantern slides, said slides being piled in the holder with their faces in contact with one another, a movable member disposed underneath said holder, means for reciprocating said movable member intermittently, means carried by said movable member for withdrawing the bottom slide of the pile at each reciprocatory movement, means for temporarily retaining the slides so withdrawn in a position of rest between said holder and the position of projection, the subsequent withdrawal of another lantern slide from the bottom of the pile serving to release the previously withdrawn slide, and means for bringing said last named slide into position for projection, said last named means comprising a rock arm having a slide carrier at the end thereof.

3. A projection lantern having a bottomless holder for lantern slides, a movable member disposed beneath said holder and spaced therefrom, said slides being piled upon said movable member with their faces in contact with one another and parallel to the plane of the movable member, a catch carried by said movable member and adapted to engage the bottom slide of the pile, and means for reciprocating the movable member.

4. A projection lantern having a bottomless holder for lantern slides, a movable member disposed beneath said holder and spaced therefrom, said slides being piled upon said movable member with their faces in contact with one another and parallel to the plane of the movable member, a catch carried by said movable member and adapted to engage the bottom slide of the pile,

means for reciprocating the movable member, said last named means comprising a power shaft, a crank arm connected with said power shaft, and a link pivotally connecting said crank arm and said movable member.

5. In a projection lantern, an oscillating carrier, a holder for lantern slides, means for delivering said slides successively to said oscillating carrier, means for oscillating said carrier, the movement of said oscillating carrier in one direction serving to bring the slide into the field of projection, and means for bringing the oscillating carrier to rest for a predetermined period at the end of its movement in one direction, the movement of the oscillating carrier in the opposite direction serving to remove the slide from the field of projection and to deposit it in the holder.

6. A projection lantern comprising a bottomless holder for lantern slides, an inclined movable plate disposed beneath said holder and spaced therefrom a distance less than the thickness of two lantern slides, said lantern slides being piled one upon the other in a position parallel to the plane of the movable inclined plate, a catch carried by said movable inclined plate and arranged to engage the bottom lantern slide of the pile, and means for reciprocating said movable inclined plate, a portion of said movable plate being underneath the holder in any position of the plate.

7. A projection lantern comprising a holder for lantern slides, a rock arm, a lantern slide carrier at the end of said rock arm, means for oscillating said rock arm into the field of projection at one end of the oscillatory movement and above the lantern slide holder at the other end, and automatic means for withdrawing the slides successively from the bottom of the holder and delivering them to the oscillatory slide carrier, whereby the slides are brought successively into the field of projection and are then deposited in the holder at the top thereof.

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Witnesses:
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J. H. FLIPPO.