E. RECTOR.

PROJECTOR.

APPLICATION FILED JUNE 4, 1910.

1,177,137.

Patented Mar. 28, 1916.

3 SHEETS—SHEET 1.

Fig. 8.

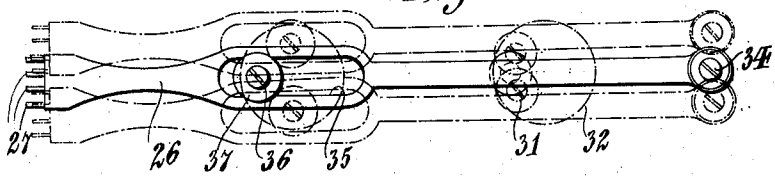
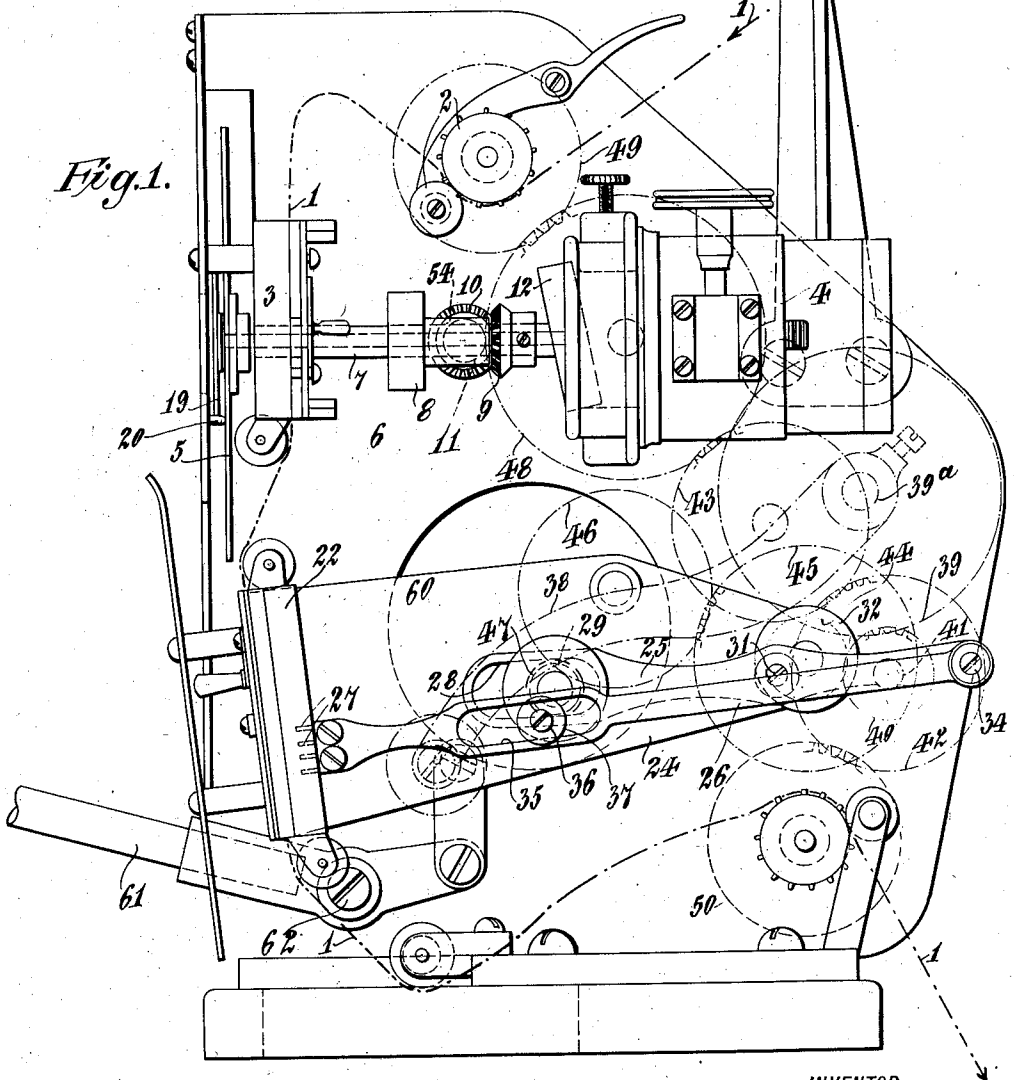


Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

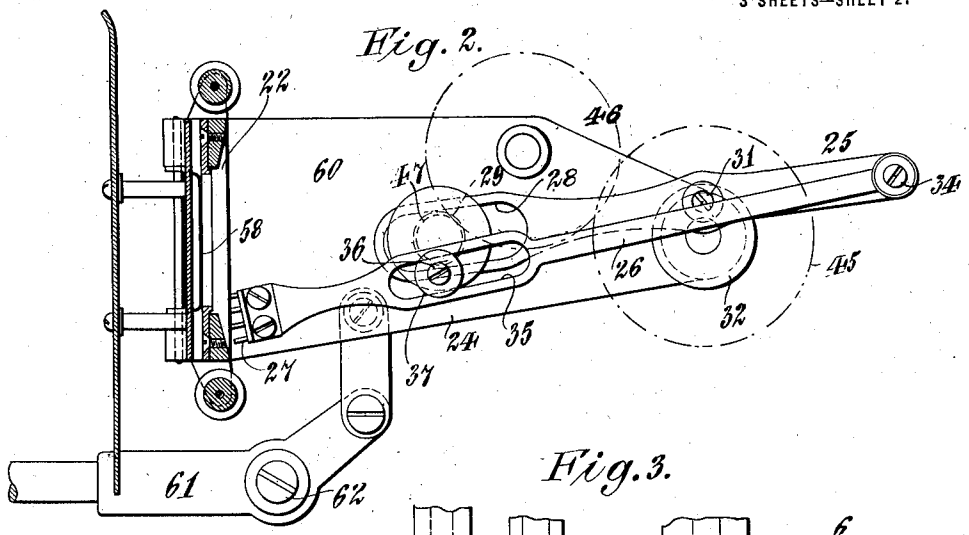


Fig. 3.

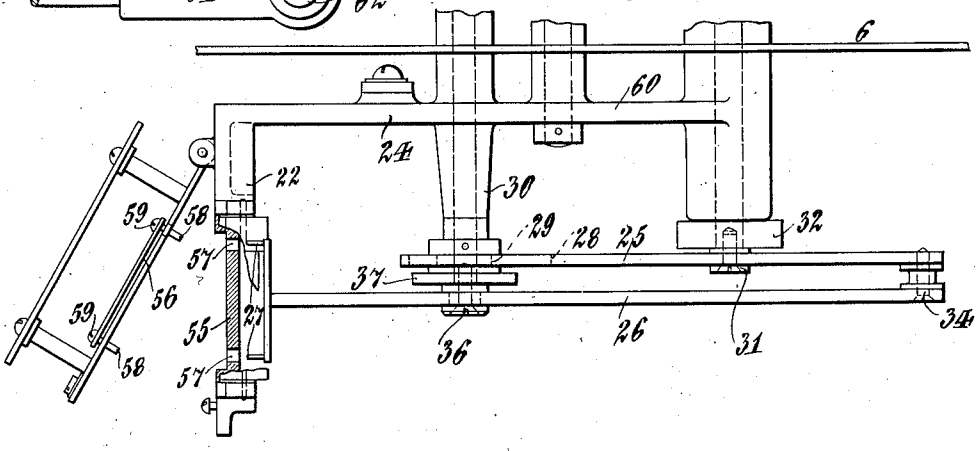
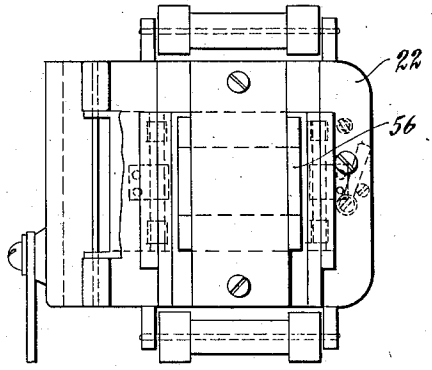


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

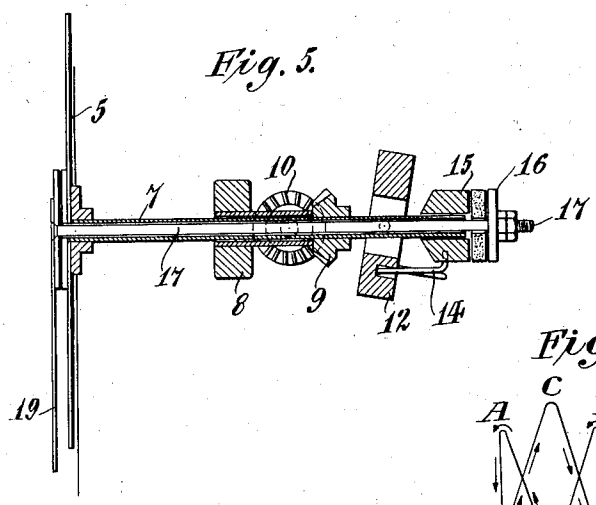


Fig. 9.

Fig. 6.

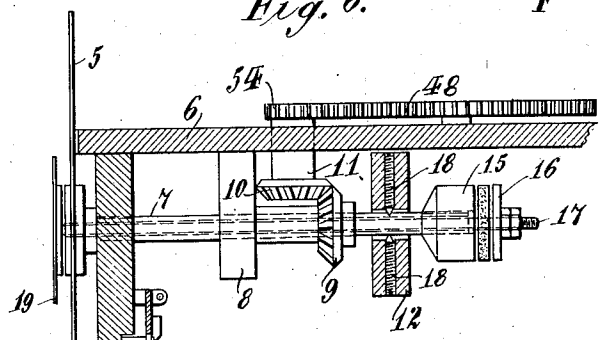
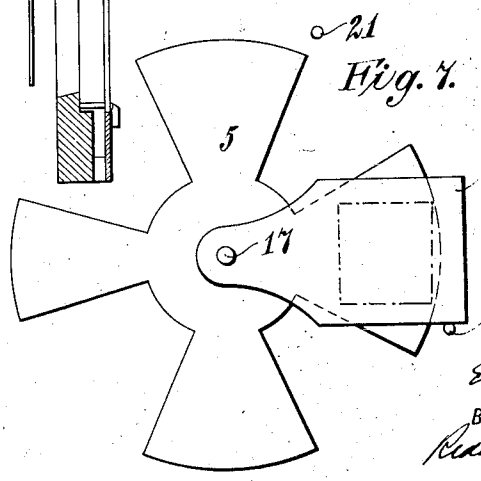


Fig. 7.



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UNITED STATES PATENT OFFICE.

ENOCH RECTOR, OF NEW YORK, N. Y.

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1,177,137. Specification of Letters Patent. Patented Mar. 28, 1916.

Application filed June 4, 1910. Serial No. 565,091.

To all whom it may concern:

Be it known that I, ENOCH RECTOR, a citizen of the United States, residing in the borough of Manhattan of the city of New York and State of New York, have invented certain new and useful Improvements in Projectors, of which the following is a specification.

The invention relates particularly to machines for exhibiting moving pictures, and the primary object of the invention is to provide mechanism whereby the separate pictures can be fed forward with extreme accuracy and speed with proper proportionate pause while each picture is being displayed, and with proper proportionate interval between the successive pictures.

A further object of the invention is to provide means for quickly and accurately framing the picture.

The various other objects of the invention will be more fully set forth in the following description of one form of mechanism embodying the invention, which consists in the new and novel features of construction and combinations of parts hereinafter set forth and claimed.

In the accompanying drawings Figure 1 is a side elevation of my improved projector. Fig. 2 is a detail view partly in section of a portion of the feeding mechanism. Fig. 3 is a plan view of a portion of the feeding mechanism showing the holder partly in section. Fig. 4 is a front elevation of the holder. Figs. 5 and 6 are detail views partly in section of the mechanism for actuating the shutter. Fig. 7 is a front elevation of the shutter showing the safety guard. Fig. 8 is a detail view of one of the lever members. Fig. 9 is a diagram showing the path of the feeding teeth.

The film 1 passes over the rollers 2 which are rotated at a uniform speed, and then passes through a guide 3 arranged between the projecting lens 4 and the shutter 5. Both the guide and the lens are suitably supported upon the frame 6 and the guide comprises springs or other means arranged to hold the film against accidental movement in any well-known manner.

The shutter 5 is secured to a sleeve 7 which is rotatably mounted in a bearing 8 provided in the frame, and which has a miter gear 9 keyed thereon. Said gear meshes with the miter gear 10 upon a countershaft 11 that is driven through a chain of gears from the main driving shaft. Pivoted upon the sleeve is a weighted member 12 that is connected by any suitable means as the rod 14 to a sliding clutch member 15 also mounted upon the sleeve and adapted to engage with a disk 16 keyed to a shaft 17, which passes through and has a bearing in the sleeve. The weighted member is pivoted by any suitable means as the screws 18 so as to lie normally at an angle with the axis of the sleeve and so that it will tend to assume a vertical position when the sleeve is rotated and thus force the clutch into engagement. A shield 19 is secured upon the shaft between the film and the lamp (not shown) and normally rests against a stop 20 and protects the film against the lamp, but said shield is pressed against the stop 21 when the shaft is rotated by reason of engagement between the members of the clutch.

The film is fed from the guide 3 to a holder 22 mounted upon the pivoted carrier 24 and coöperating with the levers which feed the film. The feeding mechanism comprises a plurality of levers and in the particular mechanism shown in the drawings consists of a compound lever having the two members 25 and 26, one of which, as 26 is pivoted to the other member 25, and is provided with teeth 27 to engage suitable perforations in the film.

The number 25 is provided with a slot 28 so as to slide upon a pivot 29 provided by a suitable bracket 30, secured to the carrier, and is fulcrumed upon a wrist pin 31 secured to an arm or disk 32. The member 26 is pivoted as at 34 to the free end of the lever 25, and is also provided with a slot 35 engaging and sliding upon the wrist pin 36 upon a disk or arm 37 which forms the fulcrum of said lever. The arms 32 and 37 are driven through any suitable chains of gears which may be so proportioned in connection with the length of the levers and the radii of the wrist pins as to provide any desired ratio between the interval of engagement of the teeth 27 with the film and the period of disengagement therefrom, and also to provide any desired length of stroke. In the particular mechanism shown in the drawings the wrist pin 36 travels approximately three revolutions to one revolution of the wrist pin 31, and the interval of non-engagement is approximately seven to one of engagement. The teeth travel in the path

indicated in Fig. 9, in which the starting point A is assumed to be at the instant of engagement of the teeth with the perforations in the film, and the path of travel is from A to B, C, D, E, F, back to the starting point A. In said mechanism the crank arm 38 actuates a gear 39 on the shaft 39ª which meshes with a pinion 40 upon a stub shaft 41, which also carries the gear 42. Said gear 42 meshes with a gear 43 which meshes with a pinion 44 upon the shaft of the arm or disk 32, the said shaft also having the gear 45 thereon, which meshes with and drives through an idler 46 the pinion 47 which actuated the arm 37. The gear 43 actuates, through the idler 48, the gear 49 that actuated the roller 2. Said gear 42 also meshes with a gear 50, which actuates a roller 51 that is rotated at a fixed rate of speed to wind up the film as same is fed downward by the feeding mechanism. The gear 48 also meshes with a pinion 54 mounted upon the shaft 4 which actuates the shutter.

The holder 22 which is mounted upon the carrier, and which coöperates with the feeding levers, comprises a body portion 55 and a gate 56. The body portion is provided with openings 57 for permitting the up and down movement of the teeth while in engagement with the film. The gate is provided with two springs 58, which are secured thereto by any suitable means as the screws 59 so that their tension shall be adjustable, and engage with the side of the film opposite to the feeding teeth to provide a yielding resistance against outward movement of the film, thus permitting the teeth to engage with the perforations in the edge of the film without tearing the film even though said perforations do not exactly register with the teeth.

The feeding mechanism comprising the holder, the lever members and a chain of gears is mounted upon the carrier, which is pivoted to the frame so as to be movable with relation thereto. The carrier comprises a suitable plate 60 which affords a support for the studs or spindles of the gear comprising the gear chain. The center of said gears are so placed and the gears are so proportioned that they remain in mesh with the stationary gears in any position of the carrier. A lever 61 pivoted as at 62 to the frame provides means for adjusting the carrier, and thereby secures an accurate and definite movement of the film and properly "frames" the picture. By means of this construction the teeth have only a horizontal or to and fro movement at the instant of engagement of the film and have a movement absolutely parallel with the film during the feeding movement and leave the film while the line of travel thereof is upward instead of downward, so that they lift from engagement with the film instead of dragging off therefrom. The feeding mechanism is mounted on a carrier which permits the film, and consequently the picture projected therefrom to be accurately adjusted or framed without disturbing any stationary parts, and consequently films having perforations of different register can be substituted readily and without serious inconvenience.

I claim as my invention:

1. In a projector, a feeding mechanism to produce an intermittent movement of a film, comprising a plurality of lever members, one of said members being provided with means to engage the film and pivoted to one of the other lever members, and means to actuate said members whereby said first mentioned member shall move in a substantially horizontal plane at the instant of engagement with the film and shall have a lifting movement at the instant of disengagement therefrom.

2. In a projector, a feeding mechanism to produce an intermittent movement of a film, comprising a plurality of lever members, one of said members being provided with means to engage the film and pivoted to one of the other lever members each of said members having a rotating fulcrum and one of said members having a sliding movement on its pivot.

3. In a projector, a feeding mechanism to produce an intermittent movement of the film, comprising a plurality of lever members, one of said members being provided with means to engage the film, and pivoted to one of the other lever members, each of said lever members having a rotating fulcrum, and one of said members having a sliding movement on its pivot and said other member having a sliding movement on its fulcrum.

4. In a projector, a feeding mechanism to produce an intermittent movement of the film, comprising a plurality of lever members, one of said members being provided with means to engage the film, and pivoted to one of the other lever members, said levers being mounted on a pivoted carrier, whereby the point of engagement with the film may be controlled.

5. In a projector, a feeding mechanism to produce an intermittent movement of a film, comprising a pivoted carrier, a plurality of lever members mounted on said carrier, one of said members being provided with means to engage the film, and a holder for the film secured to said carrier and provided with yielding means opposing the thrust of said lever member at the instant of engagement with said film.

6. In a projector, a feeding mechanism to produce an intermittent movement of a film, comprising a pivoted carrier, a plu-

rality of lever members mounted on said carrier, one of said members being adapted to engage the film, a holder for the film, and a chain of gears for actuating said lever members.

7. In a projector, a feeding mechanism to produce an intermittent movement of a film, comprising a pivoted carrier, a plurality of lever members mounted on said carrier, arms provided with wrist pins engaging said lever members, and a chain of gears operatively connected with said arms.

8. In a projector, a pivoted carrier, means for rotating said carrier on its pivot, and a feeding mechanism comprising a reciprocating member to engage with the film to produce intermittent motion thereof, mounted upon said carrier and movable therewith.

9. In a projector, the combination of a carrier pivoted to move in the arc of a circle and a lever for moving said carrier, of a holder for the film to be displayed secured to said carrier and arranged in a plane tangent to the arc described by said carrier, and a feeding mechanism comprising a reciprocating member mounted on said carrier and adapted to engage the film to effect an intermittent feeding movement thereof.

10. In a moving picture machine, the combination with a fixed support having a film feeding means carried thereby and having a fixed picture aperture, of a carrier pivoted to said support and having an intermittent film feeding mechanism mounted thereon and movable therewith, and means for shifting said carrier about its pivotal point to move said mechanism substantially parallel to the direction of film feed thereby to frame the film relative to the aperture without affecting the film feeding mechanism means carried by the support.

11. In a moving picture machine, the combination with a fixed support having a film feeding means carried thereby and having a fixed picture aperture, of a carrier pivoted to said support and having an intermittent film feeding mechanism mounted thereon and movable therewith, and means for shifting said carrier about its pivotal point to move said mechanism substantially parallel to the direction of film feed thereby to frame the film relative to the aperture without affecting the film feeding mechanism means carried by the support, and a unitary driving means continuously in operative engagement with said feeding means and with said film feeding mechanism.

12. In a moving picture machine, the combination with a fixed support having film feeding means carried thereby, of an intermittent film feeding mechanism having a reciprocating film aperture engaging member and means for shifting the mean position of said reciprocating member thereby to frame the film in the picture aperture.

This specification signed and witnessed this 24th day of May, A. D. 1910.

ENOCH RECTOR.

Signed in the presence of—
EDWARD FRANCIS ROEHM,
N. A. SMITH.