R. J. EMORY.

KINETOSCOPE.

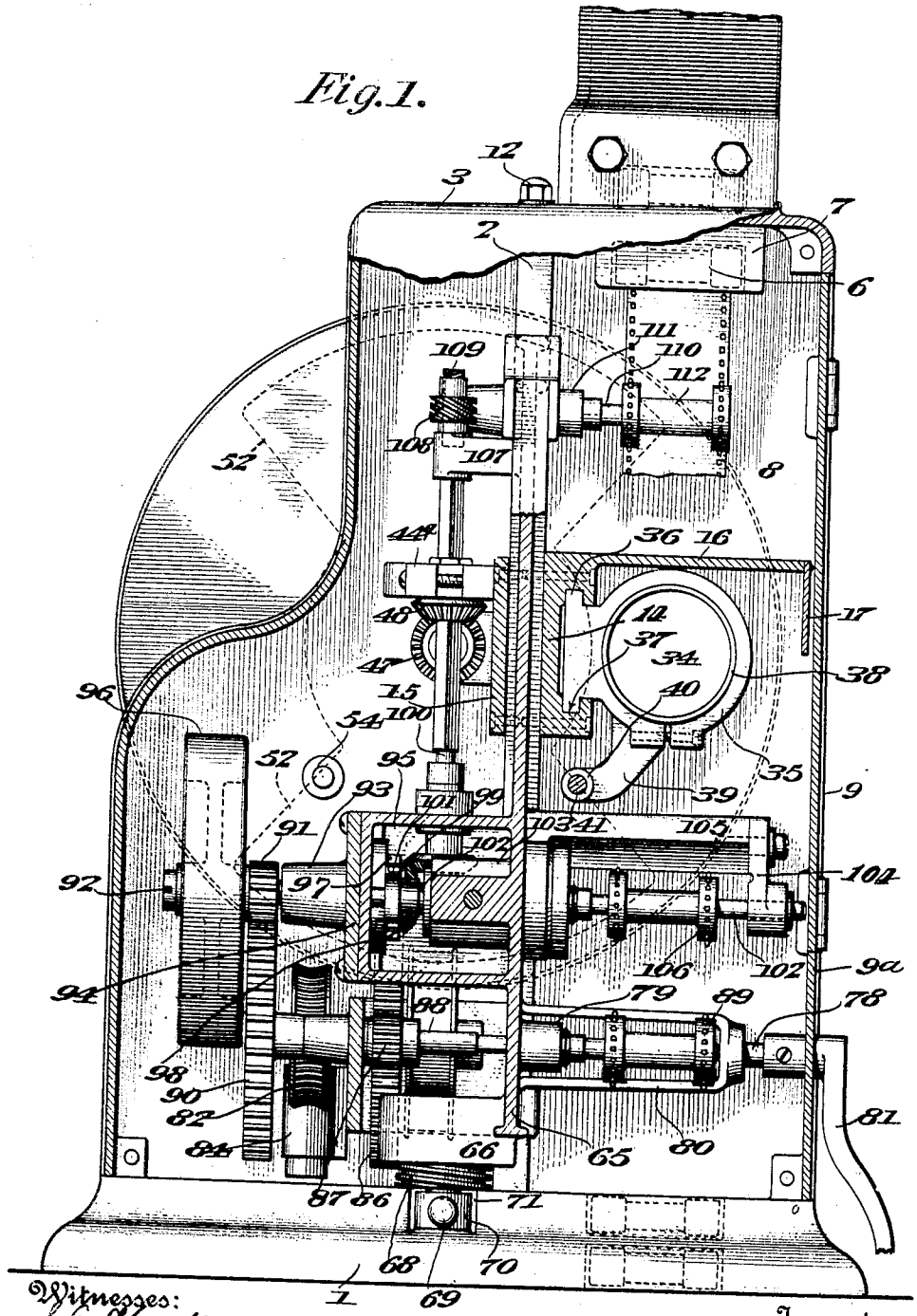
APPLICATION FILED FEB. 25, 1914.

1,292,448.

Patented Jan. 28, 1919.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

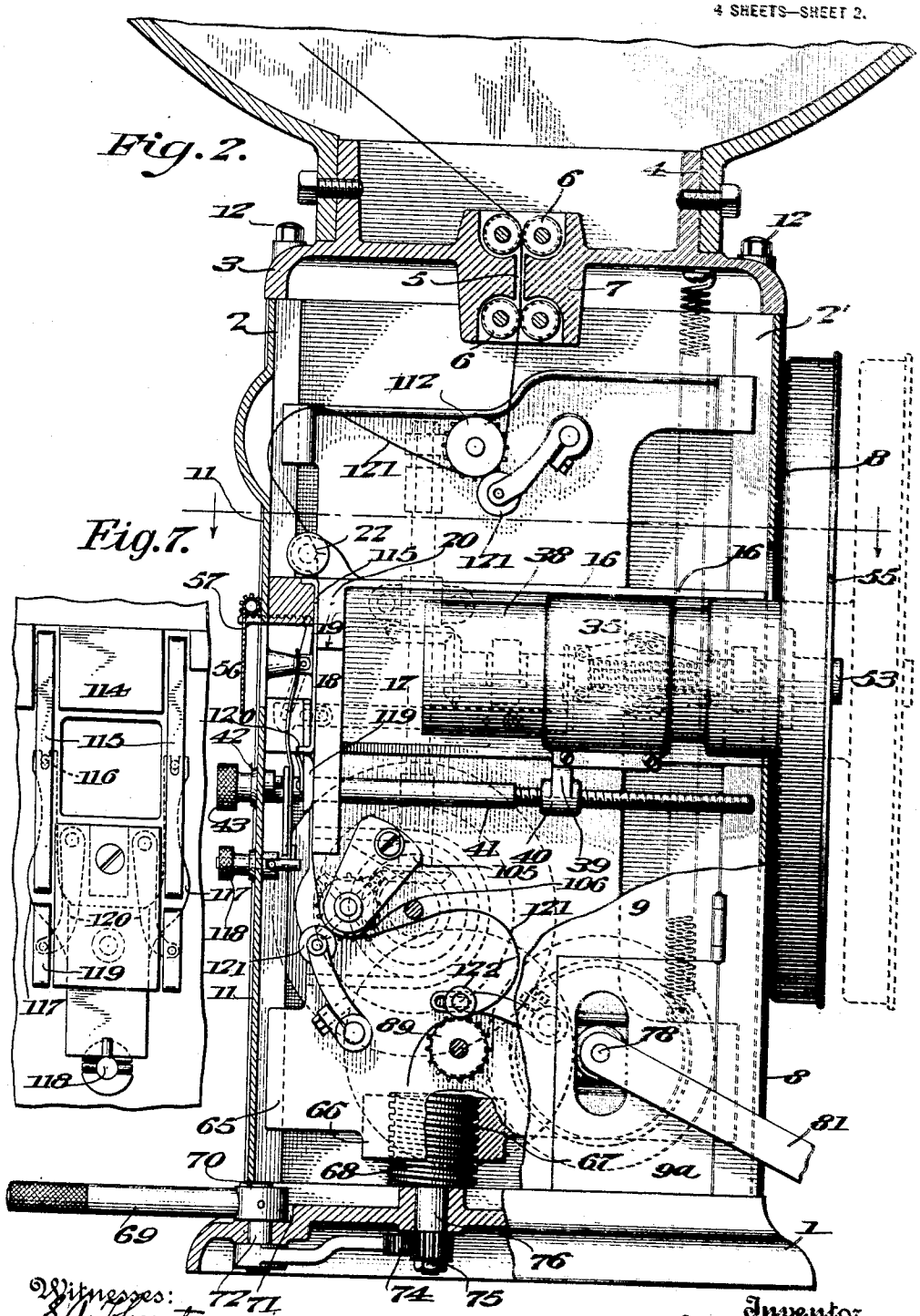


Fig. 7.

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4 SHEETS—SHEET 3.

Fig. 3.

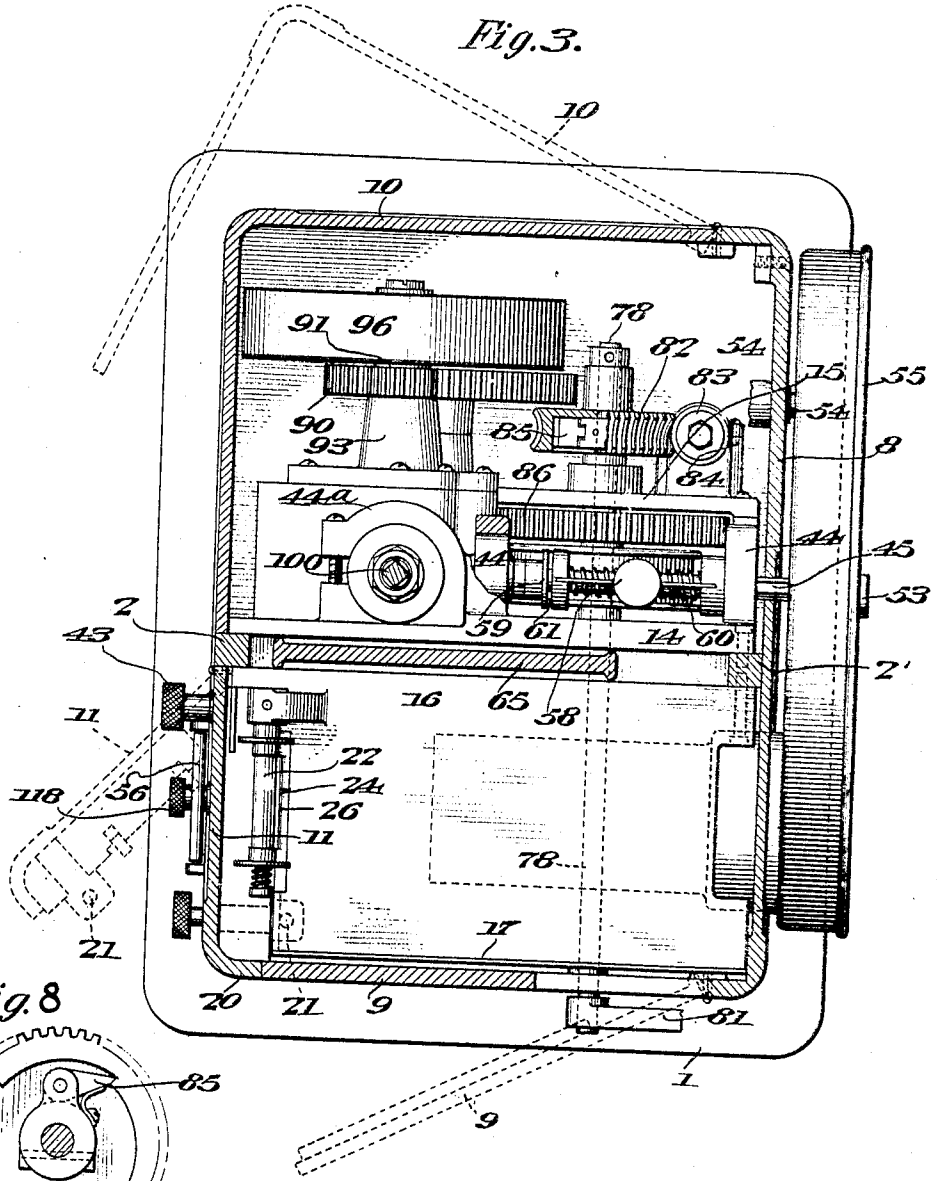


Fig. 8

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4 SHEETS—SHEET 4.

Fig. 4.

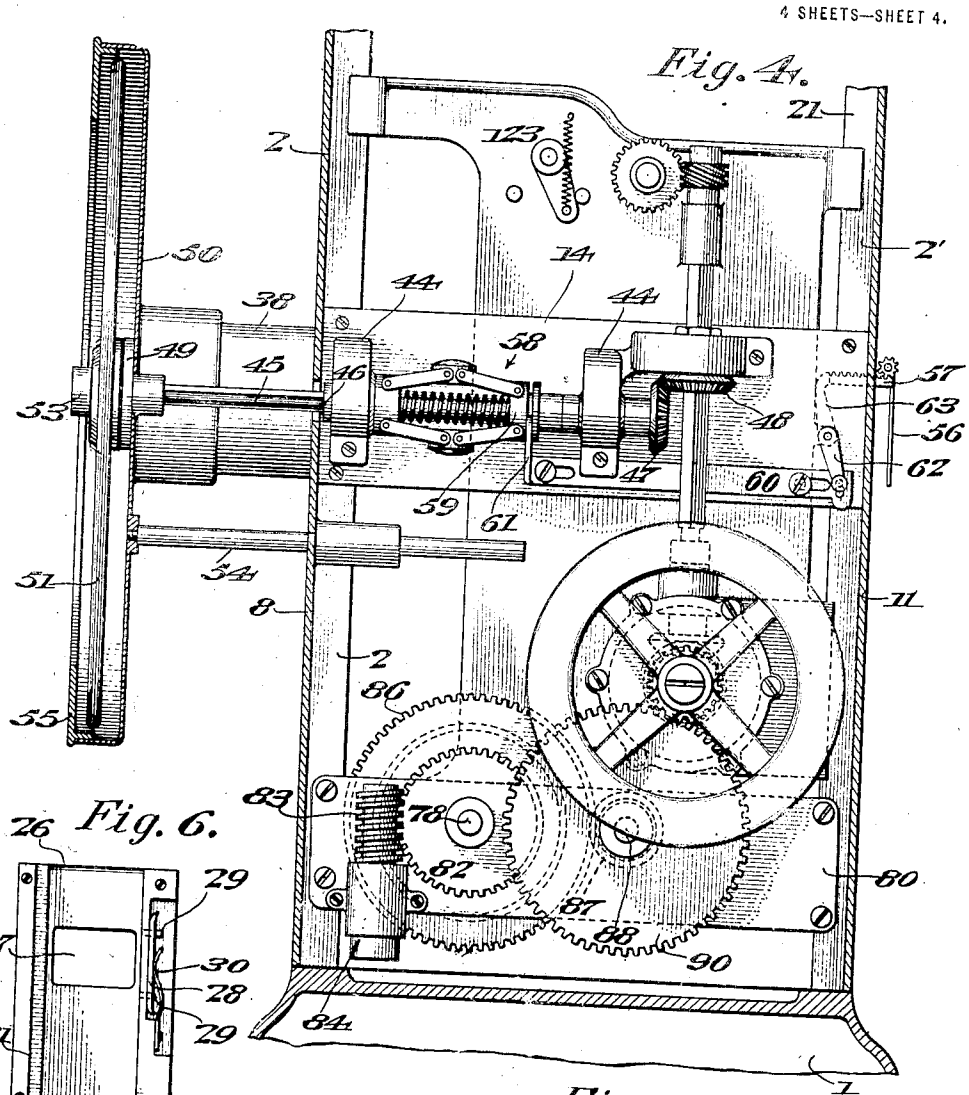
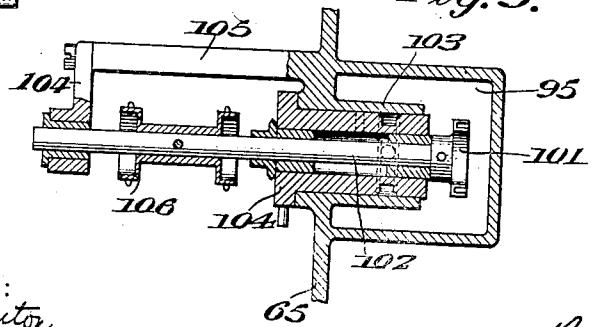


Fig. 6.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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KINETOSCOPE.

1,292,448. Specification of Letters Patent. Patented Jan. 28, 1919.

Application filed February 25, 1914. Serial No. 821,022.

To all whom it may concern:

Be it known that I, ROBERT J. EMORY, a citizen of the United States, residing in Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Kinetoscopes, of which the following is a specification.

My invention relates to improvements in projecting mechanism for moving picture machines, and the primary object of the invention is to provide a machine in which the mechanism comprises a plurality of units, the separate parts of which are so related together and the several units are so related to each other that the machine may be readily assembled, adjustment quickly made and accurate and efficient operation maintained.

The other and more specific objects of the invention will either be obvious from the accompanying drawings or will be more fully set forth in the following description of the mechanism shown therein, in which—

Figure 1 is a rear elevation of a machine showing a preferred embodiment of my invention, a portion of the rear casing being removed and certain parts being shown in vertical section.

Fig. 2 is a side elevation of the machine with a portion of the casing shown in vertical section and with certain parts broken away to show the interior construction.

Fig. 3 is a horizontal sectional view taken on the lines 3—3 of Fig. 1.

Fig. 4 is a side elevation of the projection shutter actuating mechanism with parts of the casing in section.

Figs. 5 and 6 are detail views of the Geneva stop and the aperture plates respectively.

Fig. 7 is a view in elevation of the rear gate showing the portion opposite the aperture plate, and

Fig. 8 is a detail side elevation of the clutch mechanism showing the main shaft in section.

Referring to the particular construction shown in the drawings, the frame of the machine comprises a base 1 and two oppositely arranged upright posts or guides 2 and 2′ held in spaced relation to each other by a removable top or cover 3 preferably provided with suitable flanges 4 to support the film magazine. The top has a film slot 5 therethrough and is also preferably provided with a plurality of guide rollers 6 arranged to guide the film and prevent tearing or abrasion thereof. Said rollers may be mounted in any desired manner on the cover, preferably in flanges 7 formed integral therewith. The machine is inclosed by a casing having a front wall 8 that is normally secured in fixed relation to the base and having side walls or doors 9 and 10 hinged thereto. Preferably one of said doors, as 9, comprises a section 9^a substantially at right angles to the other section so as to form a portion of the rear wall. The other portion of the rear wall comprises a separate door 11 that is hinged to one of the guides as 2. The front wall and both side walls can be removed as a unit by releasing the front wall from the top and base to which it is secured by any suitable means.

Secured to the guides are two stationary plates or brackets 14 and 15 which are arranged approximately opposite each other. The bracket 14 supports a horizontal plate 16 that is approximately parallel with the base and top and extends outwardly to engage with the adjacent securing walls or doors in their closed position so as to form a fire wall dividing the casing into upper and lower compartments. If desired, the fire wall may be integral with the bracket 14 and be provided with a depending flange 17 parallel to the side wall and with a depending end flange 18 parallel to the door 11 that may also be integral with the bracket. Said end flange is cut away as at 19 to form a lip adapted to engage with a catch or bolt 21 provided on the wall 11 and hold same in its closed position. A three part guide roller 22 is also preferably mounted on the bracket or fire wall adjacent the rear edge thereof, the parts of the roller being movable with relation to each other to permit automatic adjustment to films of varying width.

An aperture plate 24 is also supported by the bracket 14 and fits into a recess provided in the fire wall. The upper edge of the aperture plate is rounded as at 26 to permit the film to pass over the same without abrasion. The plate is formed with an aperture 27 for the light beam and is provided at one side with a yielding projection or guide 28 movable on pins 29 nor-

mally held against displacement by any suitable means as the spring 30. Opposite said yielding flange is a stationary guide or abutment 31, said yielding flange and stationary abutment forming a recessed passage for the film and normally holding the same in its path against lateral displacement. The aperture plate, together with the yielding guide mounted thereon is secured to the bracket or fire wall in any suitable manner permitting ready adjustment or removal thereof, and has its outer face flush with the edge of the fire wall. The aperture plate is also preferably provided intermediate each edge of the aperture and the adjacent guide with a runway 32 which is raised very slightly from the face of the plate for the edge of the film.

The lens 34 is mounted in a suitable support that is carried by the bracket 14 below the fire wall. Said support comprises a clamp 35 having a flange 26 integral therewith that is mounted to move lengthwise on suitable grooves or tracks 37 provided on the bracket. A tube or sleeve 38 is mounted in the clamp and holds the lens. The clamp is also provided with a depending inwardly curved arm 39 having a threaded eye 40 to receive a threaded end of an actuating rod 41 which extends rearward through the end flange 18. The outer end of the rod also extends through a suitable aperture 42 in the door 11, in its closed position and is provided with a suitable knob 43 whereby the lens support can be actuated without opening the casing.

The plate or bracket 15 is arranged on the guides opposite the plate or bracket 14 heretofore described, and is provided with projecting spaced and parallel bearings 44 for the shutter shaft which comprises a non-circular movable section 45 that telescopes into a relatively stationary section 46. The stationary portion of the shaft is driven by a gear 47 which meshes with driving gear 48 having its hub mounted in a suitable anti-friction bearing arranged on the bracket in a plane perpendicular to the bearings 44 and holding the said gear against upward or downward displacement. The forward end of the shutter shaft is mounted in a bearing 49 on a shutter cage or casing 50 that is secured to or formed integral with the sleeve 38 which carries the lens. The projection shutter 51 is carried on the forward end of the shaft and revolves within the cage. Said shutter preferably comprises two wings or blades 52 formed integral with each other and fixed on a suitable hub 53 that will permit easy adjustment of the blades. Preferably a guide rod 54 is secured to the casing opposite the sleeve 38 and moves in a bearing provided in the front wall 8 which serves to steady and support the cage. A removable cover 55 for the casing having an aperture registering with the lens may be provided if desired. The bracket 14 also carries suitable mechanism for operating the fire shutter 56 that is mounted upon the rear door 11 and is raised and lowered by a reciprocating rack 57 that also has a bearing in the door. Said operating mechanism comprises a centrifugal governor 58 mounted on the shutter shaft and connected to a movable collar 59 that actuates a sliding bar 60 through a yoke 61. The bar is connected with one arm of a lever 62 that has its other arm 63 provided with a bearing surface adapted to bear against the end of the rack 57. When the shutter shaft is at rest the arm 63 is in its retracted position, thus permitting the fire shutter to close, but when the machine is operated the governor throws the arm 63 backward, thus forcing the rack outward and automatically raising the shutter.

The film feeding and actuating mechanism is supported upon a sliding plate or carriage 65 mounted upon the guides between the stationary brackets and forming the inner wall of the upper and lower fireproof compartment established by the fire wall 16. Said plate is provided at its bottom with a head or enlargement 66 having a threaded recess or socket 67 therein to receive the threaded screw 68 which is rotatably mounted in suitable bearings in the base. The screw is actuated to raise and lower the carriage by means of an approximately horizontal handle 69 that extends from the rear of the machine and is connected to the screw through any suitable connecting means. Preferably said handle is provided with a head or enlargement 70 seating in a socket or recess 71 formed in the upper surface of the base and having a spindle 72 secured to or formed integral therewith that extends a suitable distance below the base. A segmental rack 74 is keyed to this spindle and meshes with a gear 75 mounted upon a portion 76 of the screw or worm that also projects below the base. Preferably the head or enlargement is offset with respect both to the carriage and the post and is arranged approximately in a line passing through the center of gravity of the carriage and the mechanism carried thereby.

The machine may be driven either by hand or may be driven mechanically as by a motor. The main driving shaft 78 is journaled in a support or sleeve 79 secured to or formed integral with the plate or carriage 65 and in a brace or bracket 80 secured to the plate. One end of said shaft is adapted to be driven by a crank 81 and the other end is provided with a gear 82 meshing with the worm 83 rotatably supported on the carriage and adapted to be connected by any

suitable means as the coupling 84 with a motor or other source of power. The worm gear 82 is coupled with the shaft by a one way clutch 85 so that the shaft will have independent rotation and the worm and gear will remain at rest when the shaft is driven manually. Said clutch also operates as a stop to limit the reverse movement of the handle. A driving gear 86 is keyed to the main shaft that meshes with a pinion 87 on a counter-shaft 88 likewise mounted in the carriage and in the bracket. Said shaft carries a lower feed sprocket 89 at one end and the gear 90 on the opposite end which meshes with a pinion 91 on a shaft 92 that is mounted in a hub 93 preferably formed integral with the cover 94 of an oil-tight chamber 95. The outer end of said shaft is provided with a flywheel 96 and the inner end carries the pinwheel 97 of the Geneva stop and a gear 98 meshing with a gear 99 keyed to a vertical driving shaft 100. The pinwheel meshes with a starwheel 101 of the usual construction that is secured to the inner end of a spindle 102 having a bearing in an adjustable sleeve 103 that is eccentrically mounted in the carriage 65. The free end of said shaft is supported in an outboard bearing 104 adjustably supported from an arm 105 secured to or formed integral with the carriage. The intermittent sprocket 106 is mounted on said shaft intermediate said bearing and the carriage.

The vertical shaft 100 passes through the top of the oil chamber 95 and the hub of the gear 48 which drives the shutter shaft. The central portion of said shaft engaging the hub is non-circular in section, permitting vertical movement of the shaft independent of the hub which is held against such movement by its bearings 44^a. The upper end of the shaft is mounted in a bearing 107 secured to the carriage and is provided adjacent said bearing with a gear 108 that meshes with a gear 109 upon one end of a shaft 110 mounted in bearings 111 on the plate. The upper feed sprocket 112 is secured to said shaft and is rotated thereby.

The rear door 11 is provided with a fixed plate 114 opposite the aperture plate and spaced slightly therefrom when the door is in its closed position to form a restricted passage for the film. Said plate is provided with a pair of shoes 115 that have a tilting or rocking movement as well as a to and fro or bodily movement opposite the runways 32. Said shoes are pivoted on sliding rods 116 that are secured to and adjusted by spring arms 117 controlled by any suitable means as the adjusting screw 118 on the door. If desired, an additional pair of shoes 119 may be provided in line with the shoes 115 that are normally pressed outward by a spring 120 which permits a to and fro bodily movement without any tilting.

The film 121 passes from the magazine (not shown) between the guide rollers 6 into the upper compartment and under the food sprocket 112 which is driven at a constant speed. The film is then drawn over the aperture plate by the intermittent sprocket 106. From this point it passes to the lower feed or take off sprocket 89 and then through any suitable opening provided in the base into a receiving magazine (not shown) of any well known or preferred construction. The film is held in contact with the intermittent sprocket and with the lower feed sprocket by means of suitable guide rollers 121 and 122 respectively, which are yieldingly held into engagement with the sprockets by any suitable means. The roller 121 is mounted so as to engage normally with the lower part of the intermittent sprocket and the roller 122 is arranged to engage the upper part of the lower feed sprocket, and consequently, the film passes above the roller 122 as well as below the same, thus forming an excess of film sufficient to prevent tearing thereof or unnecessary tension thereon.

By means of this construction the several parts of the machine are arranged in a plurality of units which are so assembled that they can readily be removed without disturbing the other parts of the machine. This arrangement also permits easy adjustment of the several parts and units with respect to each other. The machine can be operated at very high speed and is extremely steady in its operation so that practically no flicker is observable in the projected picture. The film is yieldingly but firmly held with respect to the aperture during intervals of rest and the movement of the film feeding mechanism is positively timed with the shutter so that "phantoms" and overlapping shadows are prevented.

Although I have described various features of the machine such as the fire shutter and the actuating mechanism therefor, the projection shutter and its mechanism, and the adjustment of the intermittent sprocket, these several features are set forth more in detail in my co-pending applications and no claims therefore are embodied in this application. It will be understood also that while I have shown and described, and have pointed out in the claims certain novel features of construction, arrangement and operation of one form of mechanism embodying my invention, it will be obvious to those skilled in the art that various omissions substitutions and changes in the forms and details of the machine and its operation may be made without departing from the spirit of my invention.

I claim as my invention:—

1. In a kinetoscope, a pair of spaced guides, a movable plate disposed therebe-

tween, means for adjusting said plate, driving mechanism carried by the plate, a pair of members supported in fixed position from said guides on opposite sides of said plate, a shutter actuating mechanism carried by one of said members, and projecting mechanism carried by the other member and operatively correlated to the shutter actuating mechanism.

2. In a kinetoscope, a pair of guiding posts, a movable plate disposed therebetween, means for adjusting said plate, a pair of members supported in fixed position from said posts on opposite sides of said plate, a shutter actuating mechanism carried by one of said members, an objective carried by the other member, a film actuating mechanism carried by said movable plate and designed to move the film in operative relation to said objective, and a driving connection between said mechanism and said shutter actuating mechanism.

3. In a kinetoscope, a pair of guiding posts, a movable carrying plate disposed therebetween, a pair of members supported in fixed position from said posts on opposite sides of said plate, a shutter actuating mechanism carried by one of said members, an objective carried by the other member, a film actuating mechanism carried by said movable plate and a driving connection between said mechanism and said shutter actuating mechanism and anti-friction bearings carried by said member for mounting said shutter actuating mechanism.

4. In a kinetoscope, the combination with a frame including guides, a carriage having film actuating mechanisms and driving means thereon movable on the guides, a pair of relatively fixed spacing plates on the guides intermediate their ends, said plates having the carriage between the same, a lens mounted in one of said plates and a shutter driving mechanism on the other plate, the carriage with its actuating and driving means being removable as a unit from the guides when said plates are detached therefrom.

5. In a kinetoscope, the combination with a supporting frame, of a projection shutter actuating mechanism, fire shutter actuating mechanism and an aperture plate fixedly mounted on the frame in operative relation to each other and a film actuating mechanism including a feed sprocket, a take-up sprocket and an intermittent sprocket, slidably mounted on a carriage adjustable relative to said aperture plate and a unitary actuating means for said shutter and film-actuating mechanisms.

This specification signed and witnessed this 14th day of February, A. D., 1914.

ROBERT J. EMORY.

Signed in the presence of—

JOHN W. MEMMOTT,

G. DEC. RUTH.