

E. M. WOODEN.
MOVING PICTURE MACHINE.
APPLICATION FILED OCT. 27, 1910.

1,004,330.

Patented Sept. 26, 1911.

4 SHEETS—SHEET 1.

Fig. 2.

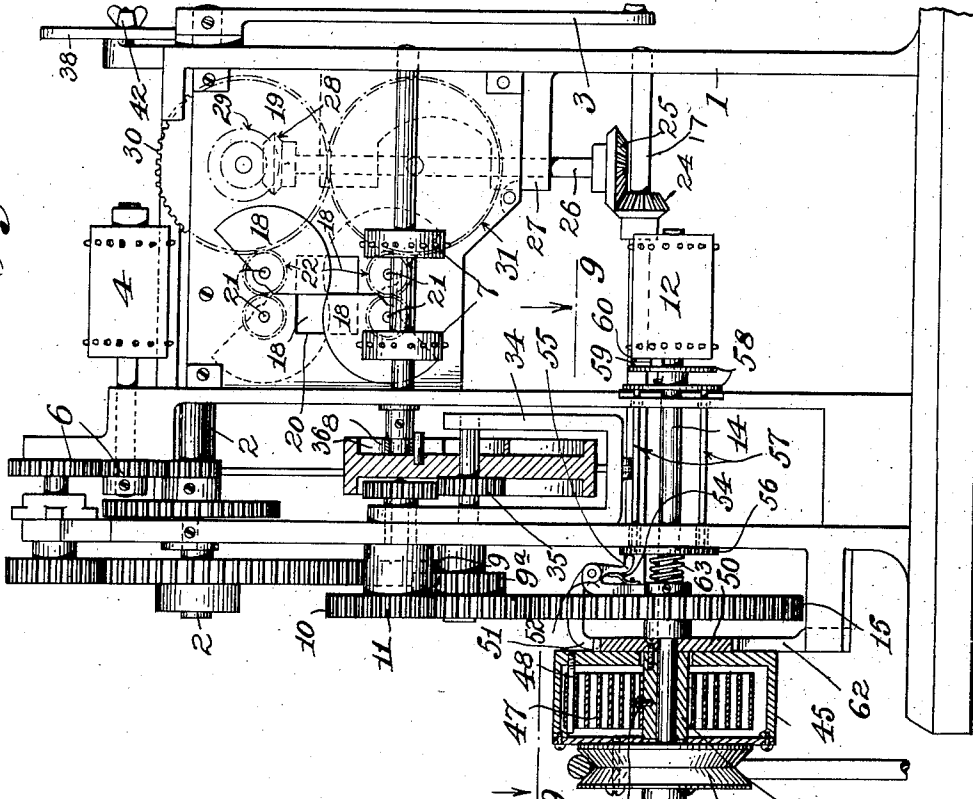
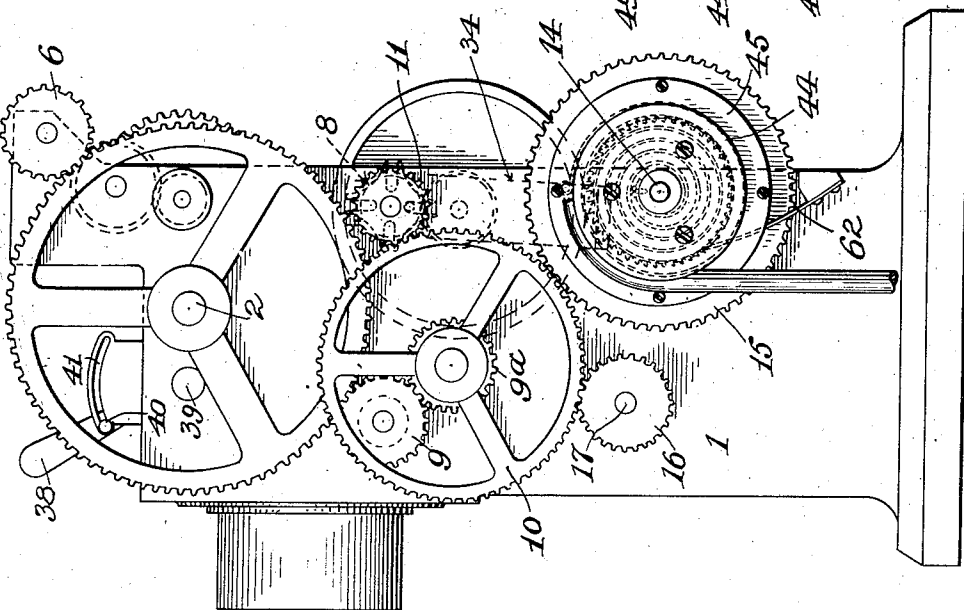


Fig. 1.



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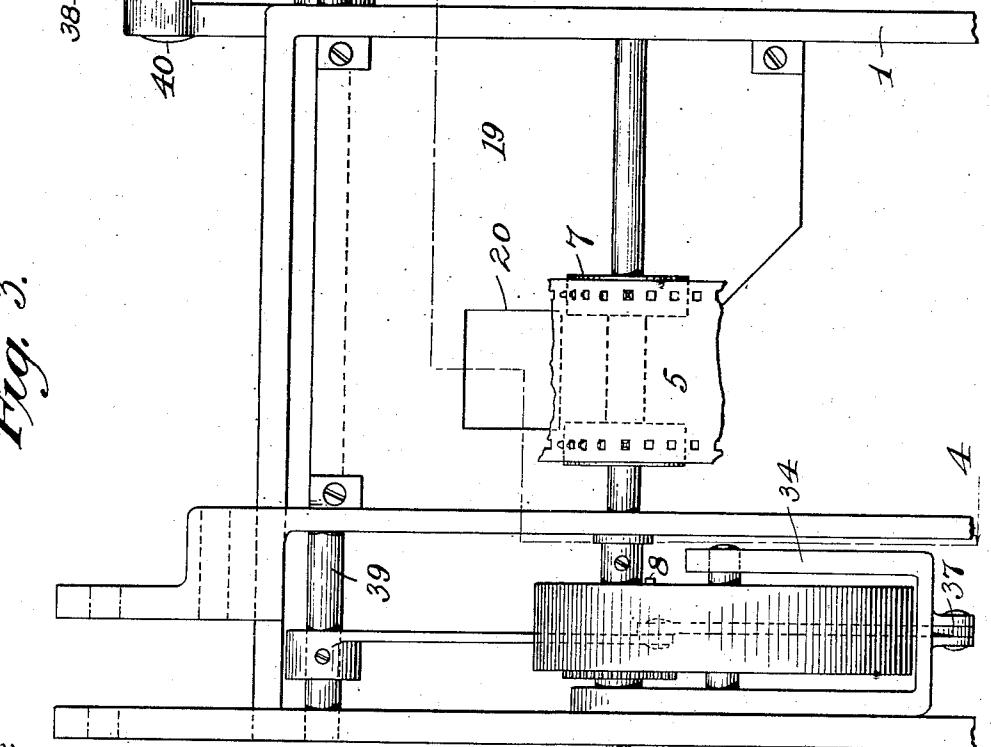
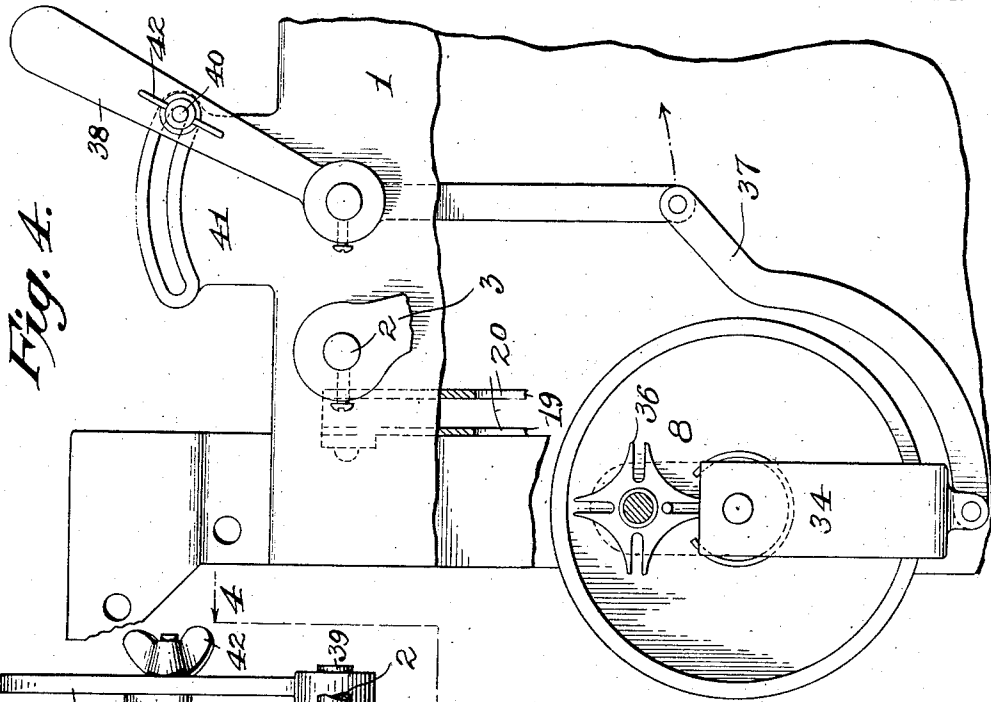
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4 SHEETS—SHEET 2.

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4 SHEETS—SHEET 3.

Fig. 6.

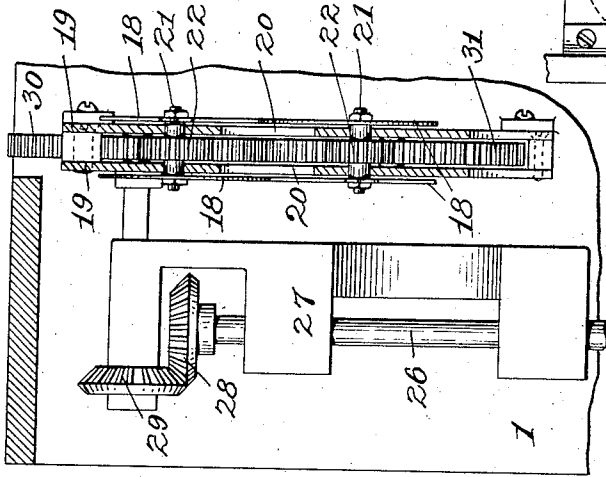


Fig. 8.

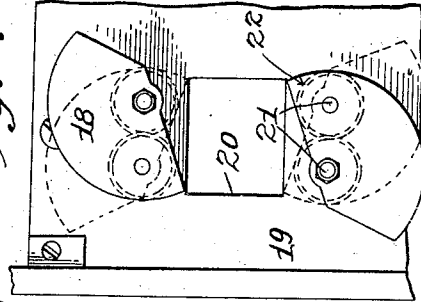


Fig. 5.

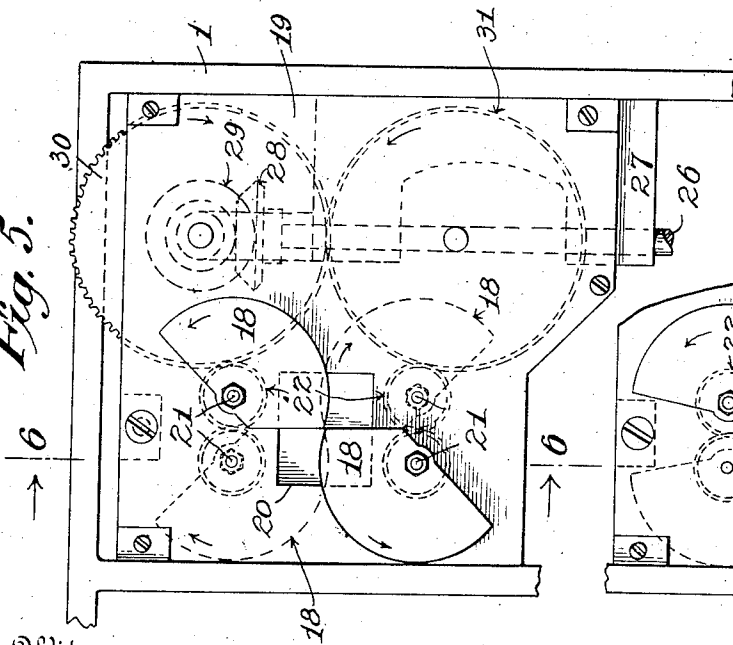
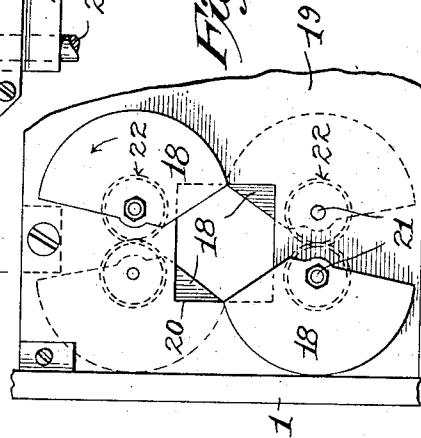


Fig. 7.



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1,004,330.

Patented Sept. 26, 1911.

4 SHEETS—SHEET 4.

Fig. 9.

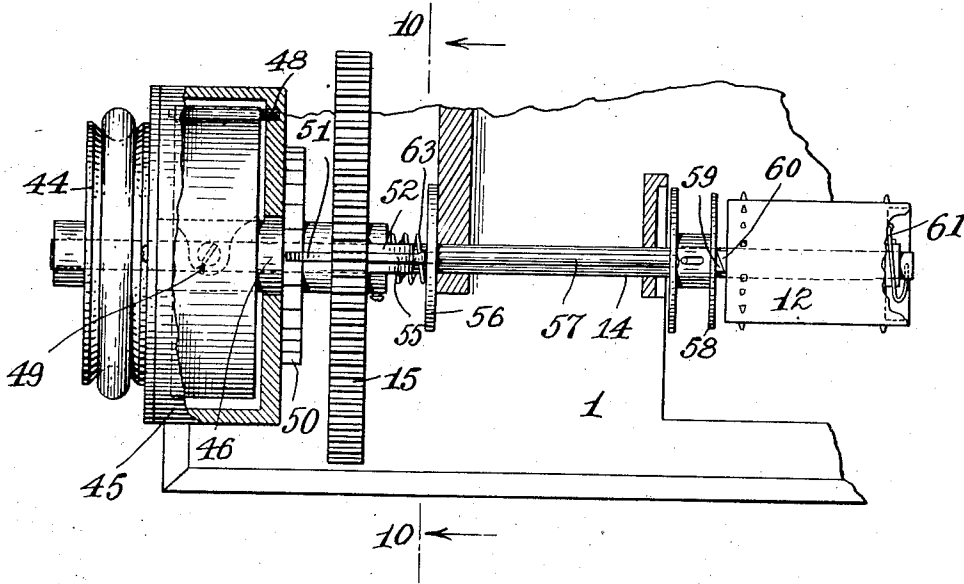


Fig. 10.

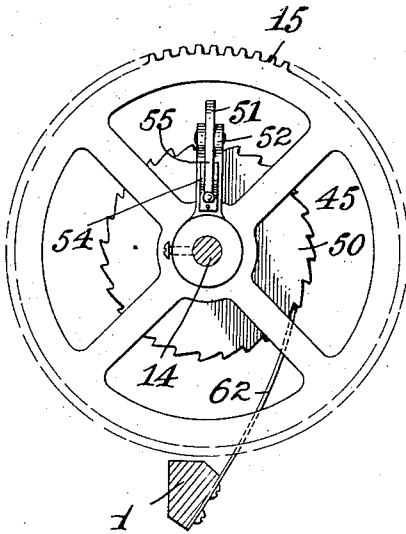
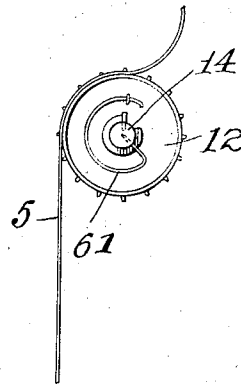


Fig. 11.



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UNITED STATES PATENT OFFICE.

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MOVING-PICTURE MACHINE.

1,004,330.

Specification of Letters Patent. Patented Sept. 26, 1911.

Application filed October 27, 1910. Serial No. 589,477.

To all whom it may concern:

Be it known that I, EARLE M. WOODEN, a citizen of the United States, residing at Nepperhan, in the city of Yonkers and State of New York, have invented certain new and useful Improvements in Moving-Picture Machines, of which the following is a specification.

The invention relates to moving picture machines comprising the several parts and combinations of parts necessary to display pictures from a movable film.

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

In the accompanying drawings: Figure 1 represents a side elevation of my improved moving picture machine. Fig. 2 represents a front elevation of the same partly in section. Fig. 3 is an enlarged front elevation of the framing mechanism. Fig. 4 is a side view of the same on the line 4-4 of Fig. 3. Fig. 5 is a front view of the shutter mechanism. Fig. 6 is a side elevation of the same. Figs. 7 and 8 are detail views showing different positions of the shutters. Fig. 9 is a front view partly in section of the take up mechanism. Figs. 10 and 11 are detail views respectively of the take up mechanism.

The machine is provided with a solid head or frame 1, since no sliding parts are required, having bearings for the main shaft 2 which is operated by a crank 3. All of the parts of the machine are driven through suitable gears or trains of gearing from the main shaft, and all of the parts are so arranged with relation to the head or frame that they may be detached independently of the various other working parts, so that replacements and repairs can be made with a minimum expense and delay.

The upper feed sprocket 4 receives the film 5 from a suitable holder (not shown) and is driven from the main shaft by a suitable train of gears 6. An intermittent feed sprocket 7 is driven by a Geneva movement 8 of any well known construction, which is actuated from the main shaft by the train of gears 9-9^a and the gear 10, which meshes with the gear 11 of the said Geneva movement. The film then passes downwardly over the lower feed sprocket 12, which is mounted on a shaft 14 having

suitable bearings in the frame, and is actuated through a gear 15 meshing with the gear 10. Said gear 10 also meshes with a gear 16 keyed to a countershaft 17, which operates the shutter mechanism.

The shutter comprises four segments 18, which are arranged in upper and lower pairs, the members of each pair being arranged on opposite sides of a frame of plates 19, which is detachably secured to the head of the machine, and has the aperture 20 provided therein, which is intermittently opened and closed by the shutter as hereinafter described. Each shutter member 18 is secured to a shaft or pin 21 mounted on the frame 19 and provided with a gear 22, the gears of each pair meshing with each other. The shutter members or segments on the same side of the plate are arranged diagonally opposite each other with respect to the aperture. The shutters are operated from the countershaft 17 which is provided with a miter gear 24 meshing with a corresponding gear 25 upon a vertical shaft 26 mounted in brackets 27 provided in the frame and having a miter gear 28 at its upper end meshing with a corresponding gear 29 which drives a gear 30 that is in mesh with one of the gears 22 of the upper pair of shutter members. Said gear 30 also meshes with a corresponding gear 31 which operates the lower pair of shutter members.

The Geneva movement 8 is mounted in a swinging carrier or oscillating frame 34 which is pivoted concentrically with the driving gear 35 of said movement. The intermittent feed sprocket 7 is connected with the star wheel 36 of the movement and is driven intermittently thereby. Since the frame is pivoted concentrically with the driving gear it is evident that the frame can be swung in the arc of a circle without disengaging or interrupting the operation of the Geneva movement and furthermore that any such swinging or oscillating movement will tend to raise or lower the film which may be secured to the teeth of the feed sprocket 7. Consequently the picture may be "framed" with relation to the aperture 20.

The frame is controlled and adjusted by means of an arm 37 which is pivoted to the frame and to one arm of a hand lever 38 pivoted as at 39 to the head of the machine. This lever is provided with a stud or projection 40 movable in a slot 41 in the head

and having a thumb screw 42 thereon which permits the lever to be securely held in its adjusted position.

The film, after leaving the lower feed sprocket 12, passes into a receiving box (not shown) which is operated through a pulley 44, which, in my improved mechanism, is mounted loosely on the shaft 14. Said pulley is secured by any suitable means to a box or casing 45 having a bearing upon a sleeve or bushing 46 upon said shaft 14. A spring 47 is mounted within the box 45 and has one end secured thereto by any suitable means as the pin 48 secured in the sides of the box. The opposite end of the spring is secured by any suitable means as the screw 49 to the said sleeve or bushing 46, which is secured to or formed integral with a ratchet 50. Said ratchet is normally engaged by a pawl 51, which is supported upon an arm 52 secured to or formed integral with the hub of the gear 15. Said pawl is normally held in engagement with the ratchet by means of a spring 54 and has its free end 55 normally held in engagement with a flange 56 forming part of a frame 57 mounted and longitudinally sliding upon the shaft 14. The opposite end of said frame comprises a corresponding flange 58, which is provided with a cam or beveled projection 59 which is adapted to engage with a cam or oppositely inclined projection 60 provided upon the sprocket wheel 12. The pulley 44 is normally driven through the spring 47 which permits a certain amount of adjustment with respect to different degrees of tension upon the film between the sprocket wheel 12 and any mechanism which may be contained in the receiving box. When, however, the mechanism in the receiving box which is driven from the pulley 44 exerts an undue tension upon the film, it causes a slight independent rotation of the sprocket wheel 12, which is loosely mounted on the shaft 14 and is normally driven by a spring 61 secured by one end to the shaft and by the other end to the sprocket, which independent movement of the sprocket forces the frame longitudinally on the shaft 14 and releases the pawl 51 from the ratchet 50, which is held, however, against reverse movement under the tension of the spring by means of the catch 62 so that the pulley will continue to be driven and the wind up mechanism operated thereby solely under the tension of the spring. Any suitable means, as the spring 63 arranged between the hub of the gear 15 and the flange, releases the pawl and permits same to engage the ratchet as soon as the tension on the film is relieved.

The operation of my improved machine will be readily understood from the foregoing description. After the film has been adjusted upon the feed sprockets the ma-

chine is operated by the crank 3 upon the main or driving shaft from which all of the other parts of the machine are driven. The several movements and operations are automatic, except the framing of the picture, which is readily accomplished during the operation of the machine through the hand lever 38 which, when the proper adjustment has been made, is firmly secured in place by the thumb screw 42. The Geneva movement may be of any well known or preferred construction, and any extended statement of its operation is unnecessary.

By this construction the head or frame of the machine may be made of a single casting, since no sliding parts are required for the purpose of framing the picture. Furthermore the framing mechanism permits an accurate register between the aperture and the picture printed on the film to be made much more quickly and expeditiously and with very much less movement of the film than is possible by any structure wherein such adjustment is made by the means of sliding parts movable in the frame. The arrangement of the shutter reduces the time during which the shutter is passing across the face of the film to an exceedingly brief interval since each shutter member covers approximately one-quarter of the aperture and the shutter opens from the center of the aperture toward the sides instead of passing diagonally entirely across the aperture as in the case of the shutters heretofore used. By means of this construction also the tearing of the film due to non-synchronous operation of the lower feed sprocket and the take up mechanism is entirely avoided, since the moment any serious tension is exerted on the film the feed sprocket is caused to rotate slightly, thus instantly relieving the tension and at the same time the driving pulley or other driving device for the take up mechanism is disconnected from the driving gear so that tension upon the film is effectually released. At the same time, however, the driving pulley or similar device does not come to a complete stop, but continues to operate at least for a short period by reason of the remaining tension in the spring, which connects the pulley with the driving gear.

It is obvious that various changes within the skill of the mechanic may be made in the mechanism herein set forth, and such changes and modifications are within the scope of the invention provided the means set forth in the following claims be employed.

I claim as my invention:

1. In a moving picture machine the combination of a fixed head, having an aperture therethrough, a shutter controlling said aperture, an intermittent feed sprocket, a shaft mounted in said head, a lower feed sprocket

on said shaft, a driving pulley on said shaft, a clutch mechanism between said shaft and driving pulley and means actuated by the sprocket wheel to control said clutch.

- 5 2. In a moving picture machine the combination of a solid head having an aperture therein, a shutter pivoted to said head for controlling said aperture, a feed sprocket having an intermittent movement mounted
- 10 in the head, a driving gear operatively connected with said intermittent feed sprocket, a lower feed sprocket normally actuated by said driving gear and having movement independent thereof, a pulley yieldingly connected to said driving gear, a clutch mechanism between said driving gear and pulley, and means for actuating said clutch when the feed sprocket is rotated independently of said driving gear.
- 15 3. In a moving picture machine the combination of a solid head having an aperture therethrough, a shutter controlling said aperture, an intermittent feed sprocket, a gear train operatively connected with said shutter, an intermittent feed sprocket, a lower feed sprocket normally rotated by said gear train and having movement independent thereof, a driving pulley, a spring secured by one end to said driving pulley, a ratchet wheel secured to the opposite end of said spring, a pawl mounted on said gear train and normally engaging said ratchet to rotate the same and the pulley, and means operatively connected with said pawl and said
- 25 lower feed sprocket to release the pawl from said ratchet wheel when the feed sprocket moves independently of the gear train.
- 30 4. In a moving picture machine, in combination, a sprocket adapted to engage and
- 35 guide the film, a clutch, a spring adapted to be placed in tension by a driving force acting through said clutch, said spring transmitting said driving force to the receiving reel and means controlled by said sprocket
- 45 for opening said clutch.

5. In a moving picture machine, in combination, a sprocket adapted to engage and guide the film, a clutch, a spring adapted to be placed in tension by a driving force acting through said clutch, said spring 50 transmitting said driving force to the receiving reel and means controlled by said sprocket for opening said clutch, said clutch including a ratchet wheel and a detent pawl cooperating with said ratchet wheel where- 55 by said spring continues to drive the receiving reel after said clutch is open.

6. In a moving picture machine, in combination, a shaft, a sprocket mounted to have a limited rotation thereon adapted to engage and guide the film, means for rotating said sprocket through said shaft, means for driving a receiving reel, and means for relieving tension in the film controlled by the relative position of said 60 sprocket and said shaft.

7. In a moving picture machine, in combination, a shaft, a sprocket on said shaft, a flexible connection between said shaft and said sprocket for driving said sprocket, a 70 clutch through which the receiving reel is driven, means controlled by said sprocket for opening said clutch and means for continuing the driving movement to the receiving reel when said clutch is open. 75

8. In a moving picture machine, in combination, a shaft, a sprocket thereupon, a flexible connection therebetween for driving said sprocket from said shaft, a clutch through which the receiving reel is driven, 80 a cam on said sprocket, a member actuated by said cam to open said clutch, and means for continuing the driving of the receiving reel when said clutch is open.

This specification witnessed this 21st day 85 of October, A. D. 1910.

EARLE M. WOODEN.

Signed in the presence of—
AMEROSE L. O'SHEA,
N. A. SMITH.