C. ANSELMI AND M. VITURRO.

APPARATUS FOR PROJECTION OF MOTION PICTURES.

APPLICATION FILED JUNE 17, 1920.

1,393,735. Patented Oct. 18, 1921.

4 SHEETS—SHEET 1.

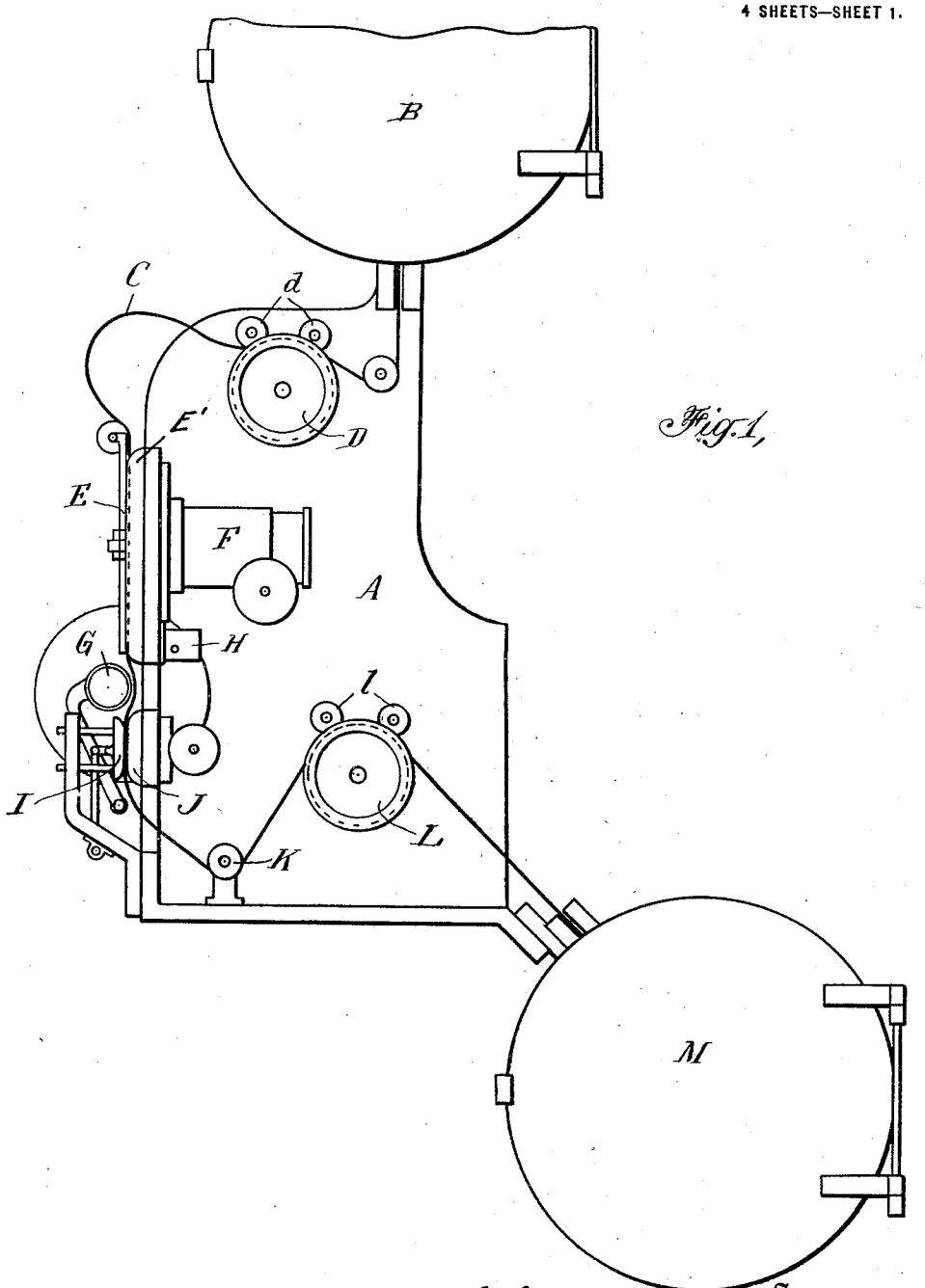


Fig. 1.

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Inventors

By their Attorneys
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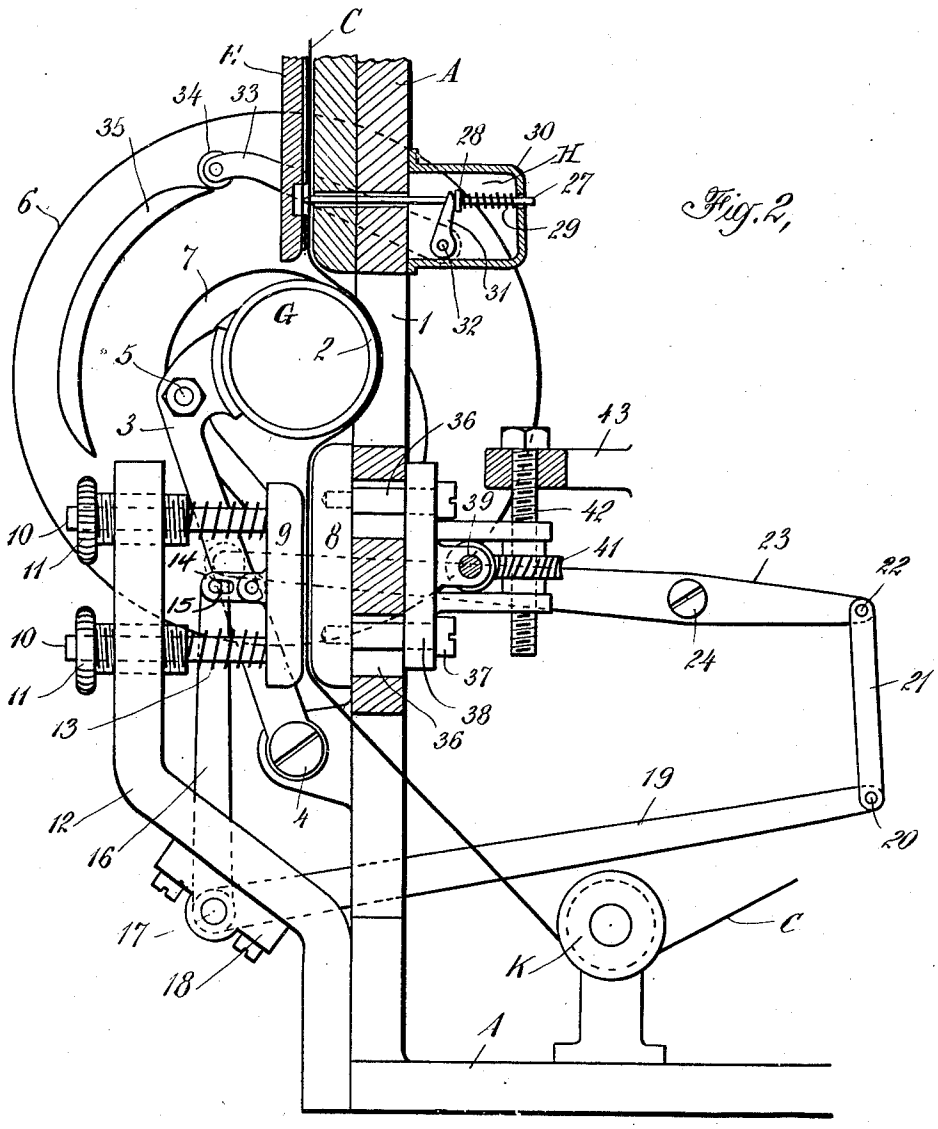


Fig. 2.

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4 SHEETS—SHEET 3.

Fig. 4.

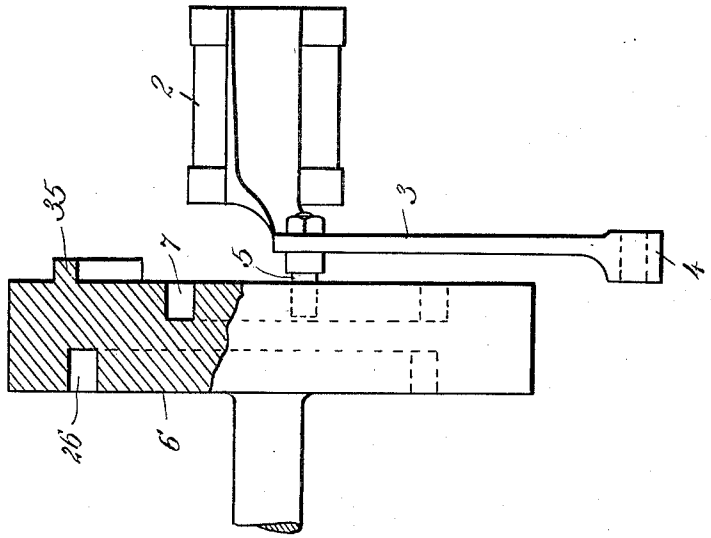
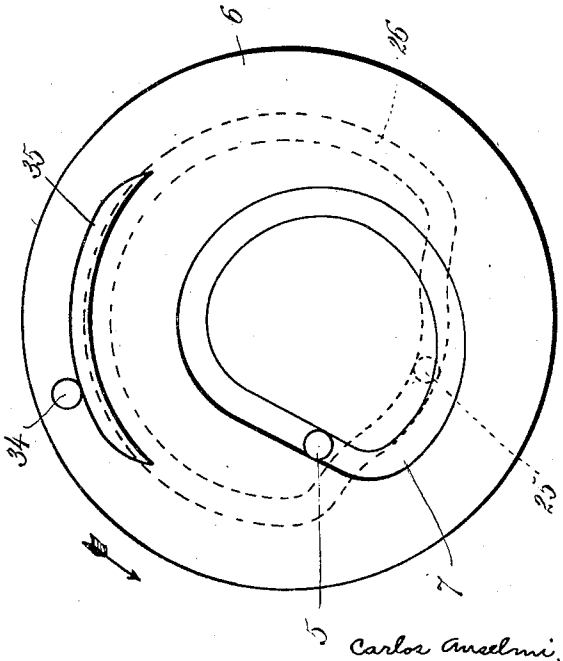


Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 6

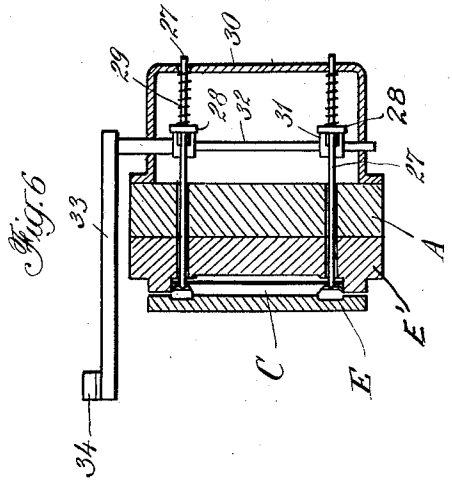
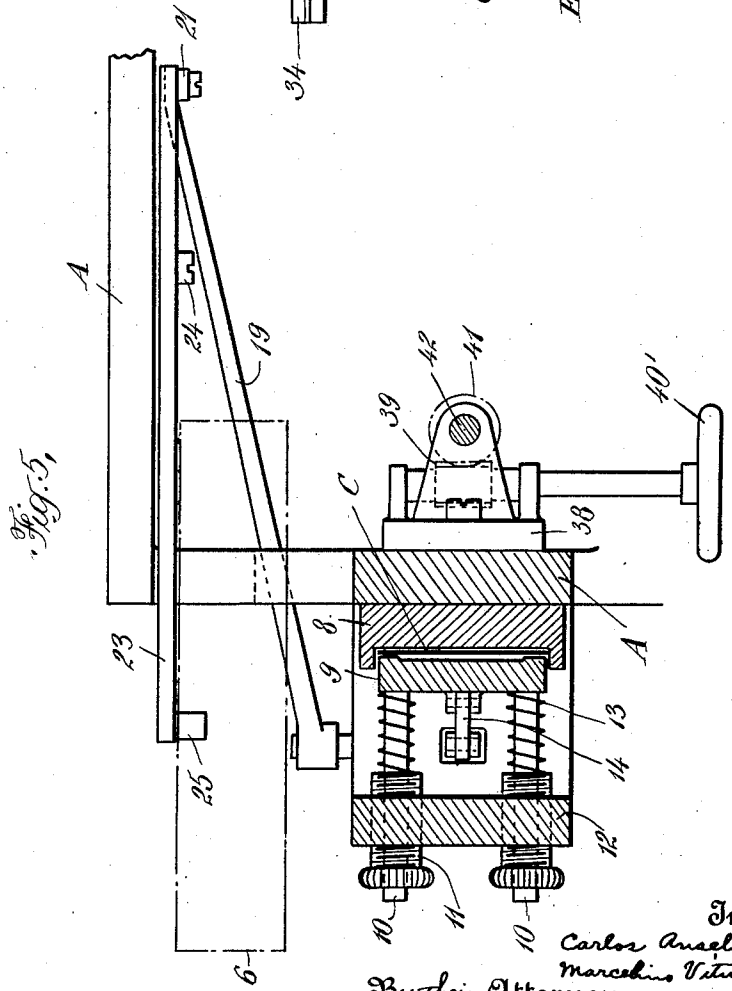


Fig. 5.



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UNITED STATES PATENT OFFICE.

CARLOS ANSELMI AND MARCELINO VITURRO, OF BUENOS AIRES, ARGENTINA.

APPARATUS FOR PROJECTION OF MOTION-PICTURES.

1,393,735. Specification of Letters Patent. Patented Oct. 18, 1921.

Application filed June 17, 1920. Serial No. 389,750.

To all whom it may concern:

Be it known that we, CARLOS ANSELMI and MARCELINO VITURRO, subjects of the King of Italy and of the King of Spain, respectively, residing at 2166 Espinosa street, Buenos Aires, Republic of Argentina, have invented certain new and useful Improvements in Apparatus for Projection of Motion-Pictures, of which the following is a specification.

This invention relates to certain improvements in apparatus for the projection of motion pictures and has for its principal object a projecting apparatus wherein the teeth have been eliminated from the film driving drum and in which the motion of the film is performed without the aid of perforations.

The projecting apparatus according to this invention offers considerable advantages over all constructions heretofore known, as it eliminates the necessity of using perforations in the films, whereby not only the life of said films is considerably lengthened, as it is a well known fact that films will soon suffer damage on account of their perforations being torn or worn out, but also the usual vibration of the pictures will be avoided, said vibration being generally caused by the fact that the wear of the perforations will permit of the teeth of the driving or traction drum to have a certain amount of clearance therein.

This invention further has for object a simple and practical means for performing the intermittent motion or feeding of the film. Heretofore, the traction or feeding motion of the film has been effected by means of a Geneva movement, which requires the film conveying rollers or drums to be provided with teeth. According to this invention, this function is performed by a simple means, adapted to be readily operated and adjusted.

A further object of the invention is a particular method for adjusting the pictures of the film, adapted to be used in connection with films of the perforated type or with films of any other design, provided with special perforations for their adjustment, as will hereinafter be explained.

Other objects and advantages will be apparent from the following description of a preferred embodiment of the invention.

In order to facilitate the understanding and carrying into practice of this invention, the same has been illustrated by way of example on the accompanying drawings, wherein:

Figure 1 is a general diagrammatic view of a machine for projecting motion pictures, constructed in accordance with this invention.

Fig. 2 is a detail view in side elevation, partially in vertical section, of the device for feeding the film and of the picture adjusting means.

Fig. 3 shows a cam with its corresponding grooves, intended to operate the aforementioned devices.

Fig. 4 is a front view, partially in section, of said cam.

Fig. 5 is a horizontal section, with some parts broken away, showing the arrangement of the film retention device and the means for regulating and operating the same.

Fig. 6 is a sectional view of the picture regulating device with its operating elements.

In all the said views, the same numbers and letters of reference have been used to indicate like or corresponding parts.

Fig. 1 is a diagrammatical representation of a machine according to this invention, in which for clearness of illustration, the lantern, the shutter or obturator, as well as the general feeding means have been omitted. In said figure, A indicates the side frame of the apparatus, intended to support the several elements thereof. B is the upper drum on which the film, indicated at C, is wound, said film being dragged or fed from said drum by the feeding rollers D, on which rest the pressure rollers *d*. These latter rollers simply drag the film along by friction and avoid the use of teeth and of the corresponding perforations in the film. E is the door or gate which coöperates with the piece E′ to form an upper guide for the film, F is the objective. G is the feeding hammer which causes the intermittent movement of the film in front of the objective, and H is the picture positioning device. J indicates the support of the film retaining device, the height of which may be adjusted at will in accordance with the dimensions of the pictures. The vertical position of the said retaining means will depend the length of film which will be fed at each stroke of the hammer G. K indicates a guide roller; L is the lower continuous feeding drum, on which press the auxiliary drums 1, 1, similar in all

respects to the drums or rollers D and *d*. M is the winding drum on which the film is wound after projection.

Referring to the remaining figures of the accompanying drawings, 1 is the gate or door formed in the frame A of the apparatus, below the corresponding part of the objective and gate E, in front of which passes the film C before being wound on the final drum M. 2 is a cylindrical hammer, adapted to act on the said film in a manner to be explained farther on. The edges of said hammer project beyond its middle part, so that it will only engage with the film by its edges. The hammer is mounted on the end of an arm 3, pivoted at 4 to the frame A of the apparatus, near the lower part of the same. Said arm 3 carries a protruding pivot 5, suitably secured thereto and adapted to engage with a suitably curved groove 7, formed on a cam 6. The form of said groove has been selected so that at a given moment the hammer 2 will operate on the film C and cause the same to bend on the face of the hammer in an inward direction with regard to the opening 1, formed in the framing, for a purpose hereinafter to be explained.

In the framing of the machine is mounted an abutment 8 against which the film is made to slide in its descending motion, when going to be wound on the drum M. This abutment is mounted adjustably, as regards its height, within the framing of the machine, in a manner and for a purpose to be explained.

Against the said abutment may come to rest a presser foot 9 which coöperates with the abutment 8 to form a lower guide for the film slidably supported by the arms 10, in threaded sleeves 11, screwed onto the arm 12, rigidly secured to the machine in the manner clearly shown in Fig. 2. On said arms are mounted the springs 13 whose pressure or tension may be adjusted at will by the sleeves which rest on their ends, while the other ends of said sleeves operate on the pressure foot 9. The object of said springs is to yieldingly support the said pressure foot or abutment 9, so that it may act with a suitable degree of resiliency on the film in the required moment, as will later be explained, when describing the operation of the device.

To the pressure foot 9 is jointed a small link 14, provided with an elongated groove 15, in which engages the end of an angular lever 16, pivoted at 17 to a piece 18 formed integral with the framing A of the apparatus, while the other arm 19 of the angular lever is jointed at 20 to a link 21, the opposite end 22 of which is jointed to the lever 23, pivoted at 24 to the framing of the apparatus and carrying at its end a stud 25 in engagement with a groove 26 of suitable shape, formed on the cam 6. The groove 26 is so arranged that during part of its rotation, the pressure foot 9 will press on the film C, against the abutment 8, and will leave the film free during the remainder of the revolution. The duration and timing on this retaining pressure corresponds with the duration and timing in which the hammer 2 acts on the said film, for a reason which will later be set forth.

The device for properly positioning of the picture consists of a casing 30, suitably affixed to the framing A of the machine and in which move two horizontally arranged rods 27, the amount of separation of which coincides with that of the perforations in case there are any at each side of the film; each of said rods is provided with a collar 28 on which bears the end of a tension spring 29, the other end of which bears against the inner wall of the casing 30. The springs tend to keep the rods pressing against the film and the free end of said rods is tapered so that it may readily enter into the perforations and the width of the rods will clearly determine the position of the same and hence, that of the picture before the objective. On the collar 28, aforesaid, also bears the end of a lever 31, secured to the axle 32 which passes through the casing and formed integral at its end with a lever arm 33, provided at its end with a roller 34, adapted to ride on a boss 35 formed on the cam 6. The arrangement is such that when the said roller rides on said cam face, the lever arm 31 acts on the collar 28, causing the rods 27 to recede against the action of the springs 28 and leaving the film free. The operation of this device is such that the rods will be free to act under the influence of their springs at the moment in which the hammer 2 and the retention device 9 are inoperative, the film being released from engagement with the rods by the action of the cam and the lever 31 at the moment at which said hammer and pressure foot initiate their operation.

The abutment 8 is mounted by means of screws 37 in a guide piece 38, adapted to move along the inner side of the frame, said screws being able to slide vertically within the grooves 36, formed in said frame. The piece or bracket 38 is provided with two ears in which is mounted a horizontal shaft formed integral with a worm and being provided on one of its ends with a handwheel 40′, as may be seen in Fig. 5. The bracket 38 also is provided with two further ears within which is rotatably supported a vertical shaft 42, to which is keyed a worm wheel 41 in engagement with the worm 39. The shaft 42 is screwed into a bracket 43 formed integral with the framing, so that, as will be readily understood, when the hand wheel is turned in one direction or the other, the abutment 8 is raised or lowered. As the device 8 is raised or lowered, it will be apparent that the

amount of film pulled down by the hammer 2 will be varied; the nearer the abutment 8 is to the hammer, the more the film that will pass around the hammer, and the more will be pulled down at each stroke thereof. If the hammer 2 is in its lowermost position, a minimum length of film will be advanced by the hammer. The threaded adjusting means for the abutment 8, just described, gives a very fine adjustment of the abutment 8, so that just the right amount of film will be advanced for proper positioning of the picture on the screen. The device may be secured or locked in the adjusted position, if desired, by means of a lock nut or any other convenient means.

Having now described the several parts which constitute the apparatus according to this invention, we shall now explain the manner of operating of the same, with special reference to Figs. 1 and 2.

After placing the film in the usual manner on the drum B, it is made to pass between the corresponding rollers and led to the drum M, as usual. The apparatus is now ready for operation. The rods 27 which are now free, under the action of their springs, enter into the perforations,—in case there are any—of the film C; in the case of films without perforations, the use of the said positioning device may be dispensed with. Feeding of the film from the drum B is performed by the toothless rollers D, *d*, the film being slack along the part preceding its entrance into the projection door or gate. At the moment at which the picture is to be changed, the cam causes the three motions to take place nearly simultaneously. In the first place, owing to the action of its boss 35, it raises the roller 34 of the lever 33 which by means of its other arm 31 causes the guide rods 27 to recede from engagement with the perforations, thereby leaving the film free for feeding. Thereupon, the groove 26 of the same cam, by the action of the lever 23 and parts associated therewith, immediately causes the forward movement of the pressure foot 9 against the abutment 8, thereby gripping the film between both parts, whereupon the hammer 2, under the influence of the groove 7 in the same cam 6, will move forwardly and push the film toward the interior of the door 1. The said feeding motion has been adjusted in such a manner that the amount or length of film fed in front of the door will be equal to the space occupied by a picture. After a fresh picture has been placed in projecting position, the further rotation of the cam will release the parts from their former positions, that is, the rods 27, free from the action of the lever 31 on the collar 28, will, under the pressure of their springs, again move forward and enter into the perforations of the film in order to properly position the picture, the hammer 2 will recede by following the stroke of its cam and finally the retention device or pressure foot 9 will also recede, so as to liberate the film. The film will then descend by its own weight so as to form an arch at the lower part, where it will be seized by the rollers L, *l* and led to the drum M to be wound thereon. The film accordingly is given an intermittent or step by step movement. The slack part or arch of the film at the lower part allows of its being pulled along by the traction of the rollers L, *l* during the time it is being gripped between the pressure foot 9 and the abutment 8, as otherwise, owing to the continuous traction of the said rollers, the film might be torn at any moment.

The apparatus constructed in accordance with this invention operates in the manner described, the cycle of operations above set forth being repeated with regard to every picture fed for projection. As has already been stated, the device for controlling the positioning of the picture may be dispensed with when the apparatus operates with film without perforations, or, if desired, such device may be rendered inoperative by withdrawing the springs 29.

However, in order to secure the exact positioning of the film for projection, it will be convenient to provide the films with one perforation at least for each picture, corresponding to the position of the above mentioned rods or pins.

In the machine in accordance with this invention, also other means for causing the intermittent feeding of the film might be used, different from those described and shown in the accompanying drawings, without departing from the scope of the claims annexed to this specification.

The devices according to this invention, may also be applied to existing apparatus, and the transmission of motion to the cams and levers may be performed by any suitable means, from any source of power that may be desired.

It will also be evident that modifications of construction and detail may be introduced into this invention, without departing from the limits of the same, clearly pointed out in the claims hereto annexed.

Having now described our said invention, we declare that what we claim as new and desire to secure by Letters Patent, is:—

1. In combination with the projection apparatus of a moving picture machine, a gripping device, free from film-engaging projections, for gripping the film, means engaging with the film, for advancing it intermittently and means for intermittently operating said gripping device and said advancing means so that the film is advanced while the gripping device is in film-gripping position.

2. In combination with the projection apparatus of a moving picture machine, a gripping device, free from film-engaging projections, for frictionally gripping the film, means engaging with the film for advancing it with a step-by-step movement, operating means for the said gripping device and the said film-advancing means for intermittently advancing the film while the film is gripped by the gripping device, and means for controlling the length of film advanced at each step by the said film-advancing means.

3. In combination with the projection apparatus of a moving picture machine, a gripping device comprising two relatively movable elements for gripping the film between them, means for operating said gripping device to grip the film intermittently, means for pushing the film to one side for advancing it intermittently, and means for operating said pushing means when the gripping elements are in gripping position.

4. In combination with the projection apparatus of a moving picture machine, upper and lower spaced guides for the film, a film-gripping device associated with the lower guide, means for operating said gripping device so as to grip the film intermittently, means operating in the space between the two guides for pushing the film to one side for advancing it, and means for operating said pushing means when the gripping device is gripping the film, one of said guides being adjustable up and down for controlling the amount of film advanced by the said pushing means.

5. The combination as claimed in claim 4, in combination with a traction roller engageable with the strip of film between the gripping device and the receiving reel, for taking up slack beyond said gripping device.

6. In combination with the projection apparatus of a moving picture machine, an upper guide, a lower guide, spaced from the upper guide, composed of a pair of relatively movable gripping elements, a reciprocating hammer movable in the space between the two guides for engaging with the film to advance it intermittently, means for operating the hammer so as to cause it to advance the film when gripped by the lower guide, and means for intermittently operating the said gripping elements.

7. The combination as claimed in claim 6, in combination with means for adjusting one of said guides up and down for controlling the length of film advanced by the hammer and so controlling the positioning of the picture on the screen.

8. In combination with the projection apparatus of a moving picture machine, a gripping device, free from film-engaging projections, for gripping the film, means engaging with the film for advancing it intermittently, and a cam disk for operating said gripping device and said advancing means so that the film is advanced while the gripping device is in film-gripping position.

9. In combination with the projection apparatus of a moving picture machine, a gripping device, free from film-engaging projections, for frictionally gripping the film, means engaging with the film for advancing it with a step-by-step movement, a cam disk for the said gripping device and the said film-advancing means for advancing the film while the film is gripped by the gripping device, and means for controlling the length of film advanced at each step by the said film advancing means.

10. The combination as claimed in claim 1, in combination with a traction roller, engageable with the strip of film between the gripping device and the receiving reel, for taking up slack beyond said gripping device.

11. The combination as claimed in claim 1, in combination with a device adapted to engage with perforations in the film for positioning successive pictures, and means for intermittently operating said film engaging device.

12. The combination as claimed in claim 4, in combination with a device, associated with the said upper guide, engageable with perforations in the film for positioning successive pictures, and means for intermittently operating said film-engaging device.

In testimony whereof we affix our signatures.

CARLOS ANSELMI.
MARCELINO VITURRO.