

No. 688,652.

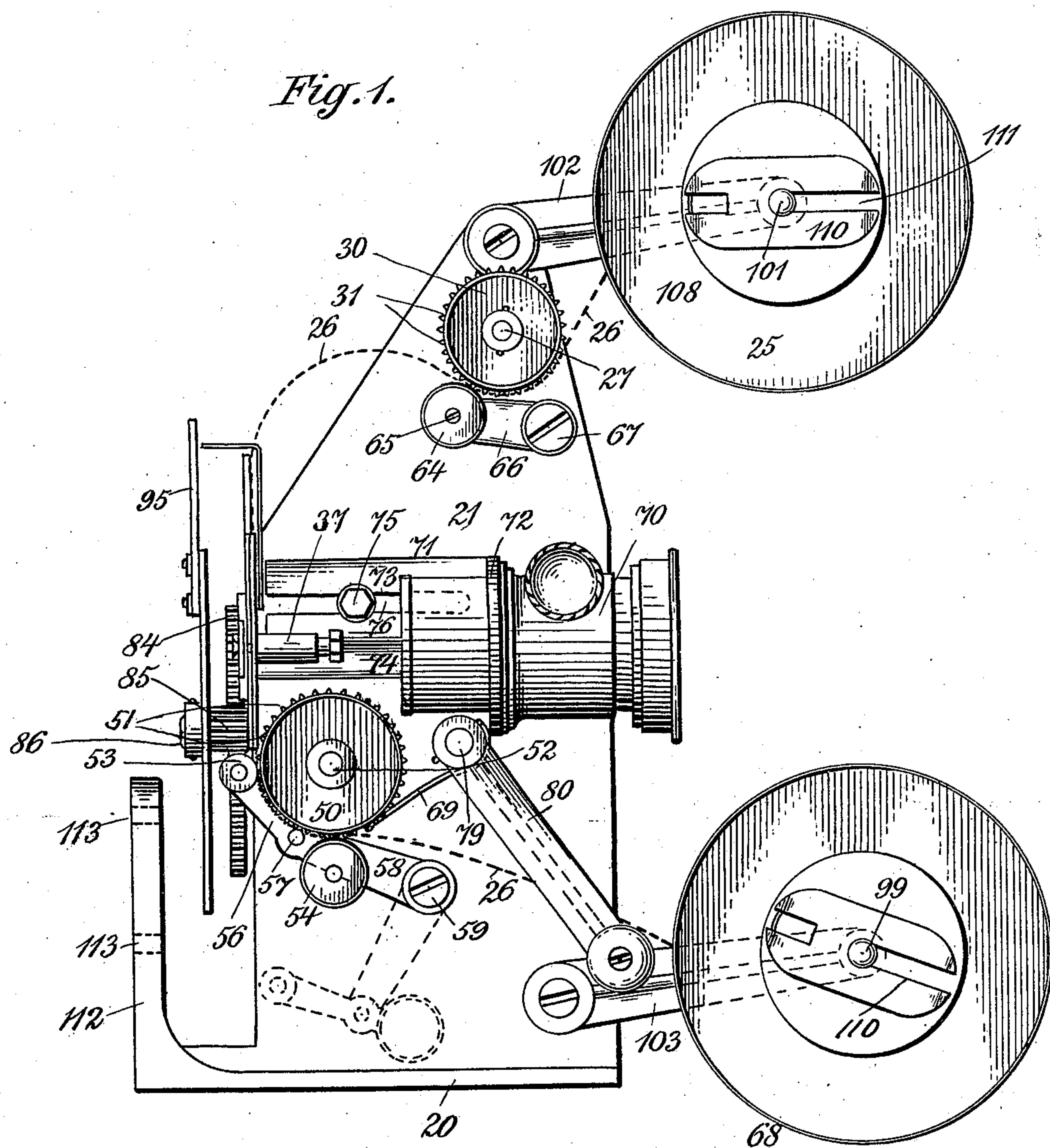
Patented Dec. 10, 1901.

P. F. KRUG.
KINETOSCOPE.

(Application filed Nov. 8, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

W. E. Bowser
J. L. Cutler

INVENTOR

Philip F. Kang
BY *E. L. Horack*
ATTORNEY

ATTORNEY

No. 688,652.

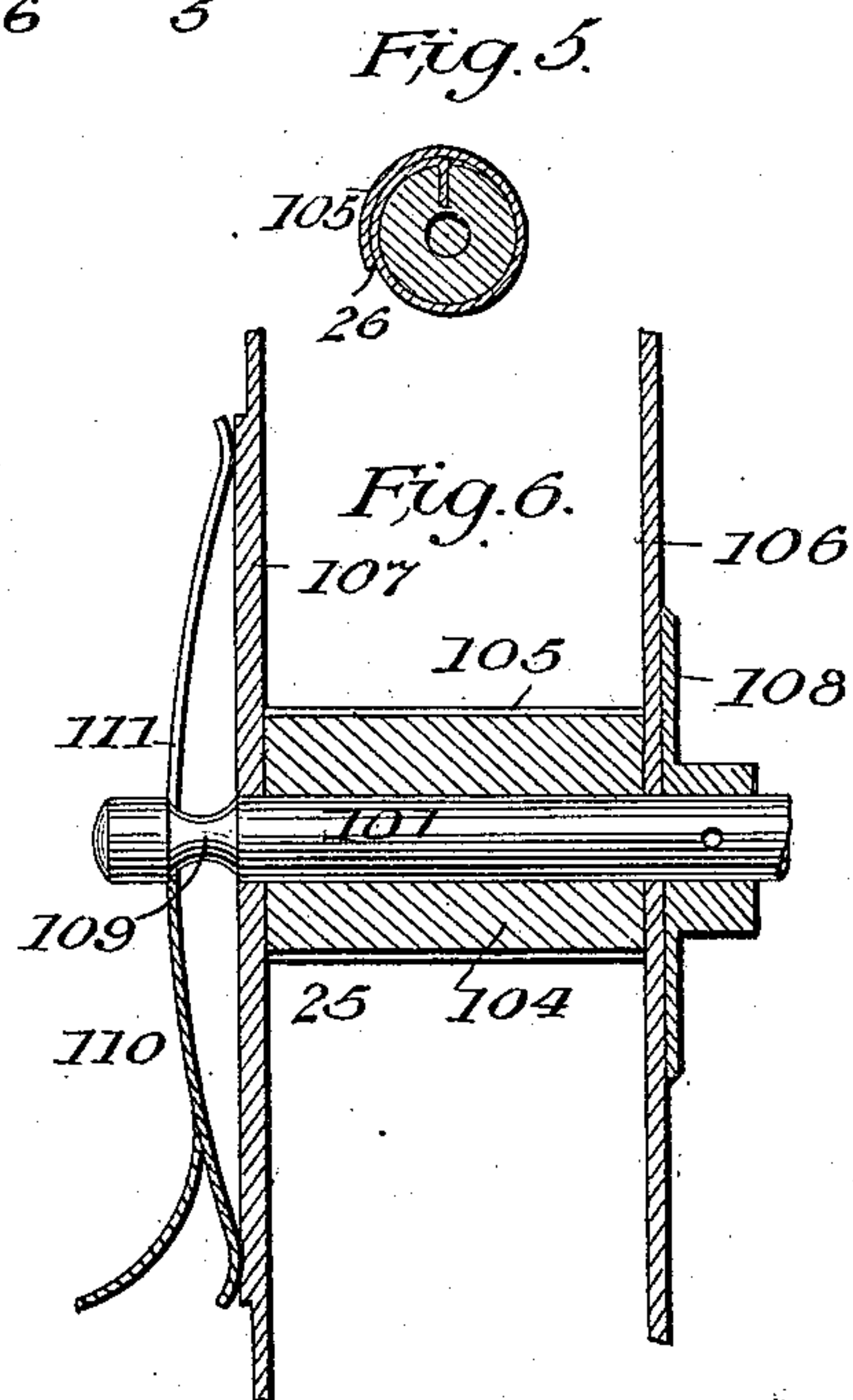
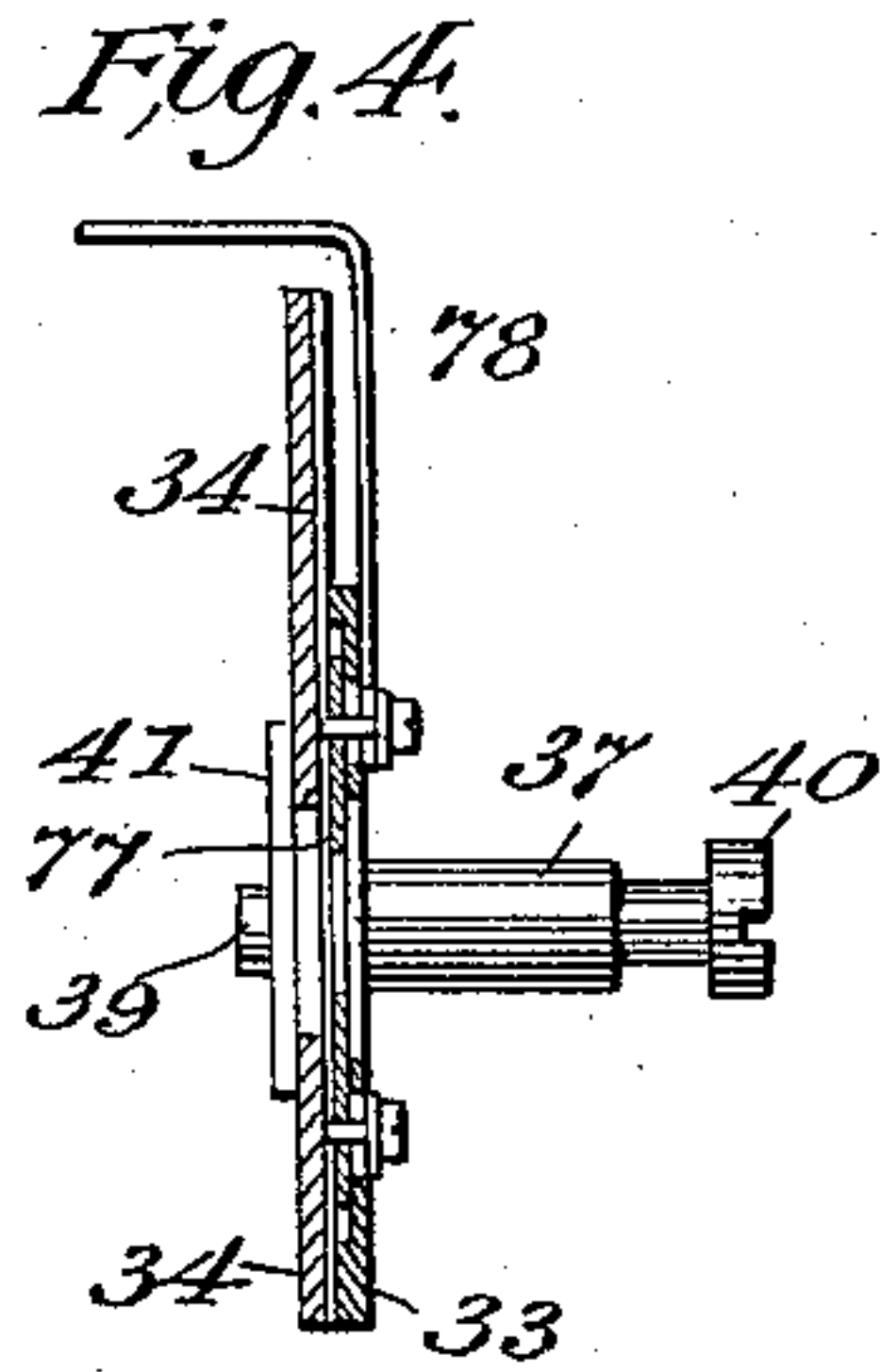
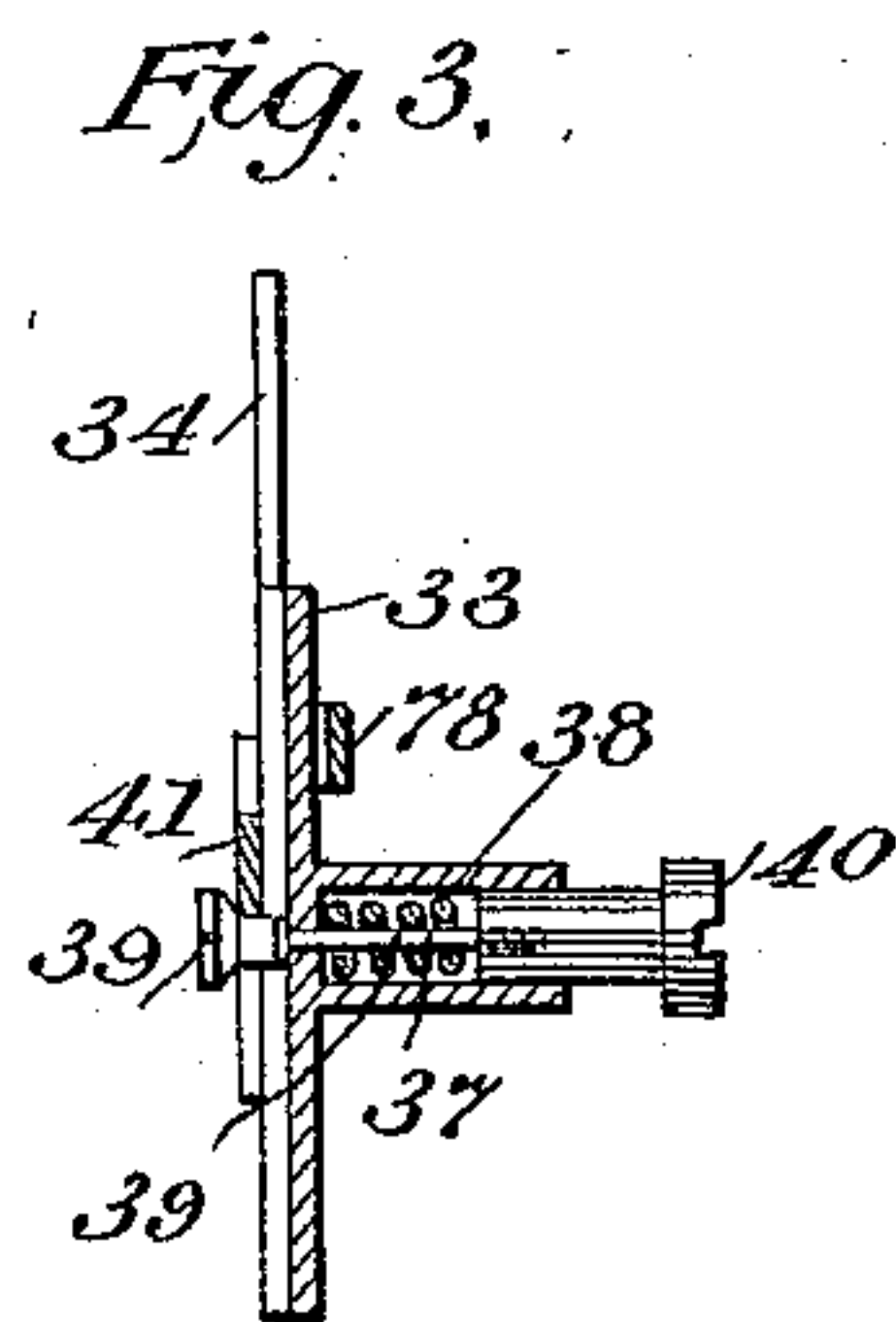
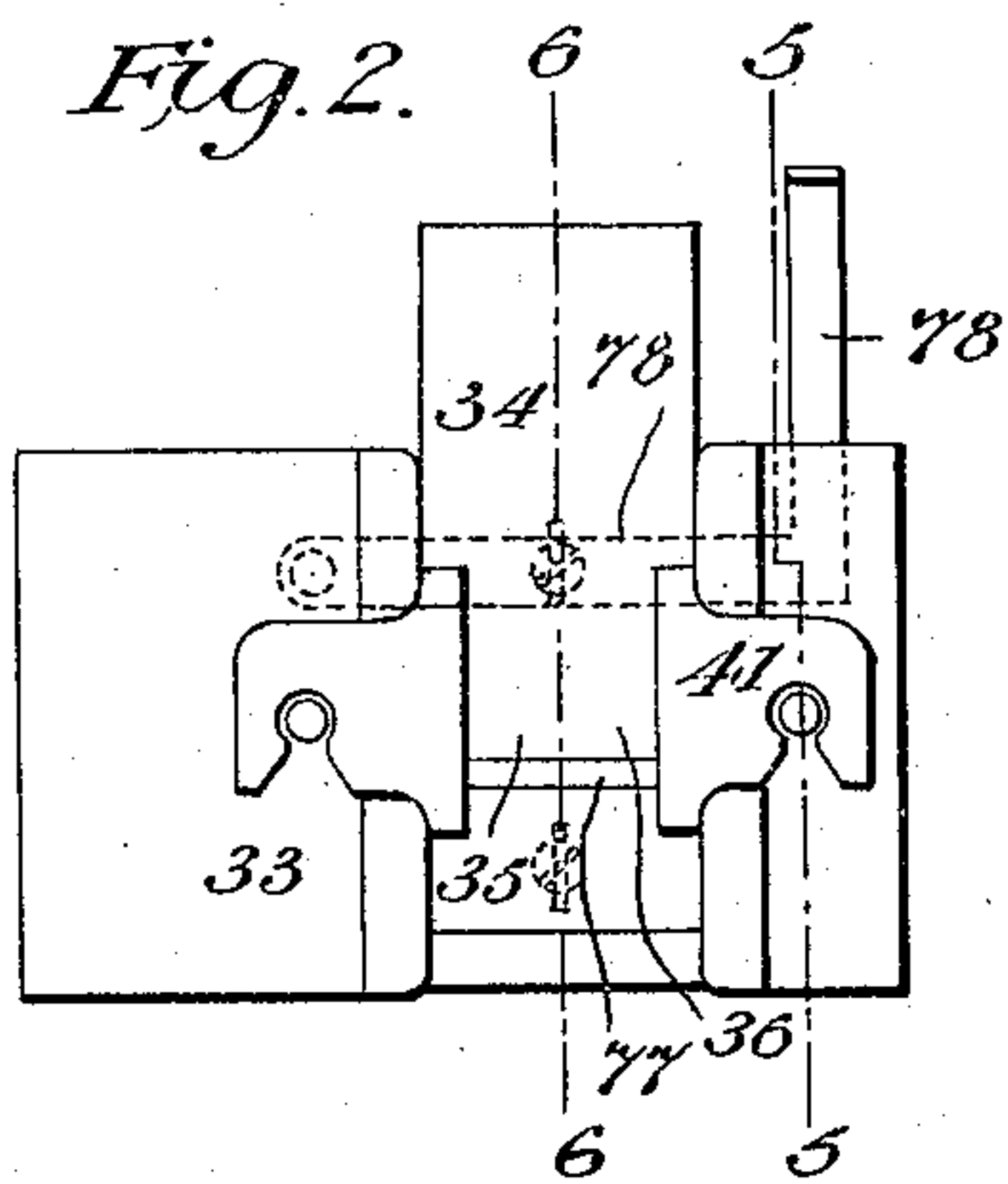
Patented Dec. 10, 1901.

P. F. KRUG.
KINETOSCOPE.

(Application filed Nov. 8, 1899.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:

Wm. J. Parsons
Wm. J. Parsons

Inventor:

Philip F. Krug
By E. L. Horack
Attorney.

UNITED STATES PATENT OFFICE.

PHILIP F. KRUG, OF NEW YORK, N. Y.

KINETOSCOPE.

SPECIFICATION forming part of Letters Patent No. 688,652, dated December 10, 1901.

Application filed November 8, 1899. Serial No. 736,228. (No model.)

To all whom it may concern:

Be it known that I, PHILIP F. KRUG, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Kinetoscopes, of which the following is a specification.

By means of the improved kinetoscope invented by me photographs and pictures representing bodies in positions occupied by them in quick succession may be reproduced upon an enlarged scale by projecting the same upon a screen through the instrumentality of a suitable camera in such manner as to thereby give to the observer the impression that he is looking upon such bodies while in continuous motion without his being disturbed by the noise and irregularities in the movement of the picture-film generally attending the use of kinetoscopes.

The objects of my invention are to provide suitable means for guiding the picture-film and for imparting to it proper tension, particularly, also, to that portion of it which at the time is in line with the axis of the camera; also, to provide the reels for delivering and for receiving the picture-film with suitable means for attaching thereto one end of the film and with appliances whereby, while the film moves through the apparatus at a uniform rate of speed, the speed of said reels, while actuated by the same propelling apparatus, may be varied automatically, so as to always give to the film while passing from the delivery-reel and while being wound upon the receiving-reel such speed as will keep it there under substantially uniform tension, notwithstanding that the outer diameter of the roll of film upon said reels is changing constantly. I accomplish these and other useful objects by the means hereinafter set forth, and specified more particularly in the claims.

In the accompanying drawings, forming part of this specification, and wherein corresponding figures of reference refer to corresponding portions, Figure 1 is a front view of a kinetoscope upon which my improved devices are used. Fig. 2 is an elevation of the guide-plate for the film and connecting parts; Fig. 3, a vertical section along line 5 5 in Fig. 2, and Fig. 4 such a section along line

6 6 in Fig. 2. Fig. 5 is a vertical section of a device for securing the film to the core of one of the reels, and Fig. 6 is a longitudinal central section of the delivery-reel and its tension devices.

20 is a base-plate, and 21 a vertical longitudinal wall, cast in one piece with said plate. Said wall and proper brackets extending laterally therefrom serve to support the various parts of the mechanism.

25 is a reel from which a film 26 is delivered, which film is made of properly-prepared celluloid or other suitable material containing the positives of the pictures which are to be reproduced or upon which suitable negatives may be photographed.

30 is a drum carrying at uniform distances guide-studs 31, so placed in two rows around said drum as to engage with corresponding perforations near the edges of film 26.

33 is a plate for guiding the film, secured to the end of wall 21 and at right angles to said wall.

34 is a tension-plate yieldingly mounted on and held against plate 33. Film 26 is drawn along and between said plates in manner hereinafter described.

35 is an aperture within plate 33, corresponding in length and slightly exceeding in height the size of one of the pictures on the film which are to be reproduced, and 36 an aperture within plate 34, corresponding in size and position with aperture 35 and located directly opposite to that portion of film 26 containing the picture which is to be reproduced.

37 37 are two sockets attached to the face of guide-plate 33, into which are inserted spiral springs 38, placed around pins 39, which pass through said guide-plate and tension-plate 34 and are screwed into studs 40, which rest against said springs and extend outward from said sockets. Tension-plate 34 is placed between vertical guiding projections on plate 33 and provided with brackets 41, which on their under sides are cut out, so as to rest upon and surround about three-quarters of the circumferences of the thickened portions of pins 39, and it will be seen that as pins 39 and studs 40 are each provided with proper heads springs 38 will normally force tension-plate 34 toward guide-plate 33, and will hold it

there with its aperture in line with that of plate 33, but will permit of pushing in studs 40 sufficiently so as to cause the thickened portions of said pin, which closely fit the recesses in the brackets, to recede therefrom, and thereby leave the tension-plate free to be raised or lowered or to be detached entirely, as may be desired. By thus making parts of pins 39 of different thicknesses and shaping the contact portions of brackets 41 as described I am enabled to normally hold the tension-plate in its position, even when the film is being run backward, which could not be accomplished if the said contact portions were made U-shaped, so as to embrace only one-half of the circumference of each pin 39. On the other hand, the circumference of drum 30 back of the film is made of the same diameter throughout, thus giving a continuous support to said film throughout its width, and owing to the frictional contact there between film and drum reducing the strain on the perforated portions of the film, which are its weakest parts.

After passing between plates 33 and 34 the film is conducted around about one-quarter of a drum 50, provided with guide-studs 51, arranged like studs 31 on drum 30.

53 and 54 are two tension-rollers placed along drum 50. They are of sufficient lengths to entirely cover the width of film 26, grooves being provided around said tension-rollers, into which fit the guide studs 51. Rollers 53 and 54 are revolvably mounted on a lever 56, hinged to a pivot 57 on a second swinging arm 58, which is hinged to a pivot 59, extending forward from wall 21, said rollers being arranged in such positions that when said swinging arms are swung upward both rollers will hold film 26 against guide-roller 50. When a new film is to be inserted in the machine, said guide-rollers are swung away from roller 50 and held in their non-operative positions, as indicated in dotted lines in Fig. 1, by means of a suitable tension device—such, for instance, as have heretofore been used for corresponding purposes.

The upper guide-drum 30 is provided with a tension-roller 64, mounted upon a pivot 65 on a swinging arm 66, which swings around an axle 67, fixedly secured to and extending forward from wall 21. Said swinging arm is operated in similar manner as swinging arm 58, so as to apply roller 64 to drum 30 or keep it from contact therewith, as may be desired.

68 is a receiving-reel upon which the film is finally wound after passing through the apparatus, and 69 a stripping-blade so held against that portion of the periphery of drum 50 which faces said reel that in case the film adheres too closely to the guide-studs on said drum and is thereby carried upward along that side of the drum said blade will strip off the film and cause it to travel more directly toward the receiving-reel. Said blade is provided with slots into which studs 51 enter, so

as to permit said blade to more closely approach drum 50.

70 is the objective. Its axis is placed at right angles to the guide-plate, so as to pass through the center of the aperture therein, and as it is desirable in order to always obtain the best optical effect to be able to vary the distance between the objective and the film passing between the guide-plate and the tension-plate I provide a bracket 71, having one arm 72 extending forward and provided with a circular opening, to the edges of which a flange on the objective is fastened, and an arm 73 placed along wall 21 and resting on a suitable guide on said wall. Said arm 73, and with it the objective, may be secured in varying positions to wall 21 by a set-screw 75 passing through said wall and engaging with a horizontal slot 76 in said arm.

77 is a thin plate having an aperture of the same size as the picture which is to be reproduced. It forms part of a swinging arm 78, hinged to guide-plate 33, and is guided along said plate between it and the film. The aperture in said plate is of the exact size of the picture on the film which is to be reproduced and the swinging arm is so adjusted as to be capable of placing the edges of the aperture in plate 77 approximately parallel with and close to those of the apertures in the guide and tension plates. It frequently happens that in bringing the picture opposite the last-named apertures it does not exactly coincide therewith, but allows the dividing-line between two adjoining pictures on the film to be exposed, and to therefore appear on the screen upon which the pictures are projected. By swinging arm 78 in such position that the edges of the aperture in plate 77 coincide as nearly as possible with the edges of the picture to be reproduced this difficulty is avoided.

By placing and holding the adjusting-arm close to the position to be occupied by the film it is possible to properly adjust and focus the machine before the film is inserted, as if the edges of the aperture in said adjusting-plate appear in sharp lines on the screen the picture itself after the film is inserted will also be in focus.

Intermittent motion, so as to successfully and rapidly bring adjoining pictures on the film opposite to the aperture in plate 77, is required to produce the apparent continuity of motion of the figures in the pictures as they pass the film, and as this motion may be produced by any suitable or well-known means not forming part of this invention no further reference is made herein to such means, it being sufficient to state that intermittent motion is imparted to drum 50 and through the same to the film as it passes between the guide-plate and the tension-plate. Continuous motion is imparted to a shutter 95, which consists of about one-quarter of an annular body so adjusted that it will be placed in front of apertures 35 and 36 when-

ever movement of the film takes place there. Shaft 101 of the delivery-reel is mounted on a swinging arm 102, and shaft 99 on a swinging arm 103, both arms being hinged tightly to wall 21, so that said arm may remain in any position into which it is swung without the employment of further securing means. This arrangement permits of folding the whole apparatus together very compactly when not in use and placing the reels in the most convenient positions while the apparatus is in use. To secure the ends of the picture-films to said reels, I construct the cores of the latter of wooden cylinders, as 104, and fixedly secure to each such cylinder one end of a leaf-spring 105, while curving the main body of said spring closely around said cylinder and partially winding it around itself, so that the free end of the spring presses against the inner coil forming part of the spring, thus enabling me to firmly hold the end of the film between different portions of said spring without using any further securing devices. By holding the film between the smooth surfaces of the leaf-spring the danger of injuring or tearing the film there is guarded against. To regulate the tension of the film between each of said reels and the nearest guide-drum, I construct said reels as follows: Referring to the delivery-reel 25, which corresponds with receiving-reel 68, I provide for the same flanges 106 and 107, both loose on said shaft, flange 106 resting against a disk 108, fixedly secured to said shaft. Directly outside of the position normally occupied by flange 107 I provide on shaft 101 a groove 109. 110 is a leaf-spring provided with a slot 111, enlarged at its inner end, where it fits against a sloping wall of said groove. By making the remaining portion of the slot smaller dropping off of the spring is prevented. Said spring is so curved that its ends will firmly rest against flange 107 and will force it, together with core 104 and flange 106, toward disk 108, while its central portion engages with said groove. Owing to the frictional contact so enforced between parts 107, 104, 106, and 108, all said parts will normally move together; but in case the tension on the film becomes excessive the frictional contact between spring 110 and disk 107 and between flange 106 and disk 108 will be overcome thereby, and the core will thus be permitted to revolve freely upon its shaft until the tension upon the film has again become normal, it being understood that the power-transmission for revolving the receiving-reel is so adjusted as to give said reel sufficient speed for winding the film directly upon its core 104, the automatic adjustment of its speed afterward taking place as the outer diameter of the roll of film on the reel increases. 112 112 are two upright standards secured to base 20. They are provided with screw-threaded holes 113, so as to permit of attaching there the lens-box and artificial source of light (not shown) usually employed

in kinetoscopes. When the apparatus is to be used for the taking of pictures, a stationary shutter with a round hole is substituted for the "cut-off shutter" above described and the objective is placed in a dark box in usual manner and is attached to standards 112 in place of the lens-box above referred to.

I do not wish to confine myself to the details herein described, as it will readily be seen that many variations might be introduced in that respect without departing from the spirit of my invention.

I claim—

1. The combination with a frame, of a guide-plate and a tension-plate, both provided with corresponding apertures, mechanism for conducting a film between said plates, studs on one of said plates, each made of different thicknesses in different parts, slots being provided on the other plate adapted to pass over the thinner portions of said studs and to embrace more than half of the circumferences of the thicker portions of said studs, which normally contact therewith, and means for forcing the tension-plate toward the guide-plate after the insertion of the studs in said openings.

2. The combination with a frame, of a guide-plate and a tension-plate both provided with corresponding apertures, mechanism for conducting a film between said plates, studs on one of said plates, each made of different thicknesses in different parts, slots being provided on the other plate adapted to pass over the thinner portions of said studs and to embrace more than half of the circumferences of the thicker portions of said studs, which normally contact therewith, and elastic means for forcing the tension-plate toward the guide-plate.

3. The combination with a frame, of a guide-plate and a tension-plate both provided with corresponding apertures, mechanism for conducting a film between said plates, suitable sockets on one of said plates, studs passing through said sockets in engagement with both plates, each of said studs being made of different thicknesses in different parts, one of said plates, detachably secured to said studs, having slots adapted to pass over the thinner portions of said studs and to embrace more than half of the circumferences of their thicker portions, and springs within said sockets for actuating said studs.

4. The combination with a grooved revolving axle, of a roller revolvably mounted thereon, and adapted to receive the film, a disk secured to the roller, two flanges adapted to slide upon the axle together with said roller toward said disk, and a leaf-spring having a slot in engagement with the grooved portion of the axle and resting upon the disk on both sides of its point of engagement with the axle.

5. A film-holder comprising a cylindrical body and a leaf-spring having one end fixedly secured to said body and having its other

free end sprung inward toward the circumference of said cylindrical body so as to extend around the same and to be partially wound around itself, whereby the film may be
5 clamped between different portions of said spring.

Signed at New York, in the county of New

York and State of New York, this 24th day of October, A. D. 1899.

PHILIP F. KRUG.

Witnesses:

C. L. HORACK,
WM. SHAW.