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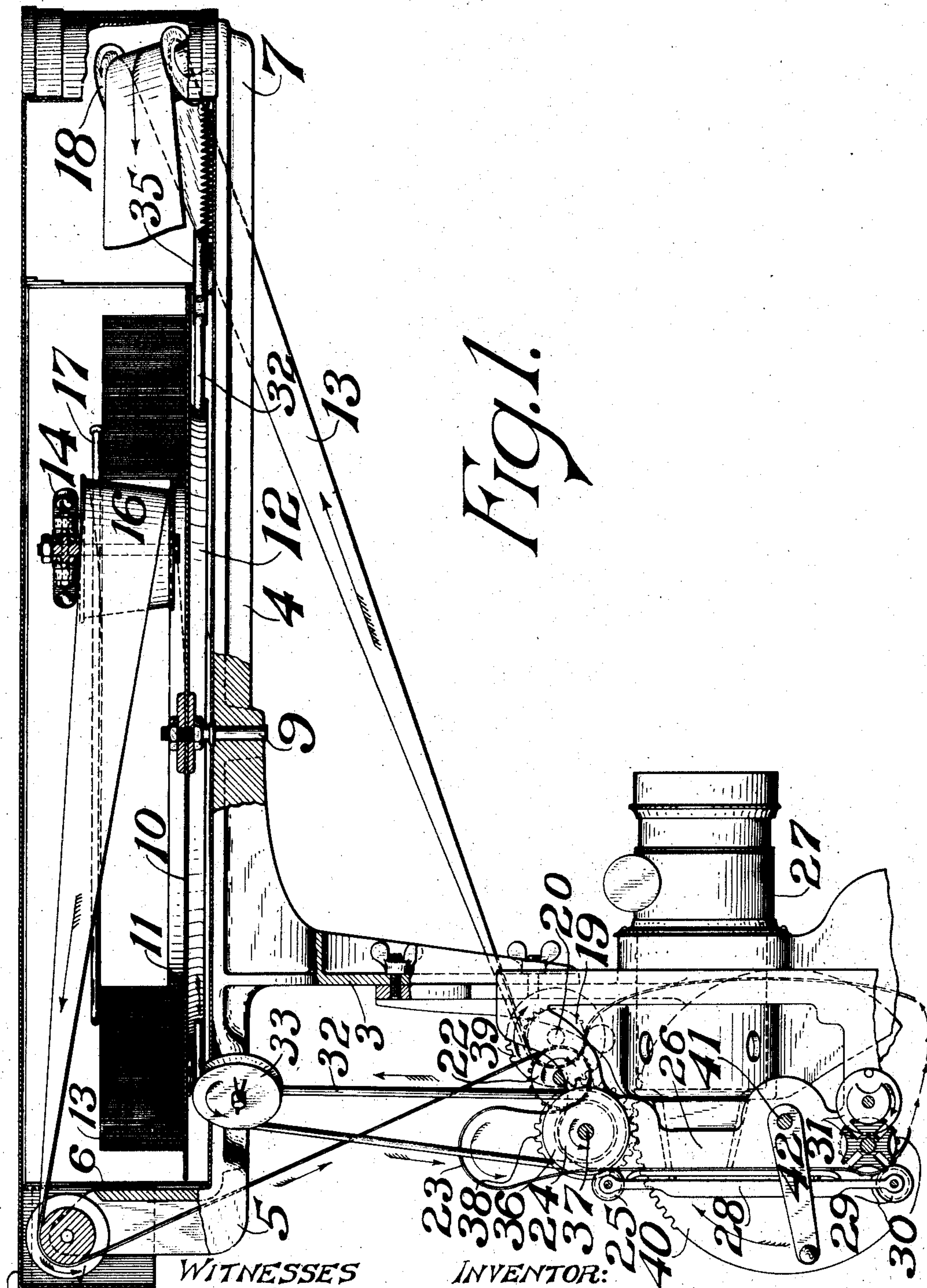
PATENTED MAY 12, 1908.

H. K. SANDELL.

FILM WINDER FOR MOVING PICTURE MACHINES.

APPLICATION FILED AUG. 26, 1907.

2 SHEETS—SHEET 1.



WITNESSES

John F. Sandell.

Ralph Schaefer

INVENTOR:

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BY Dyrenforth, Lee, Christon & Wiles,

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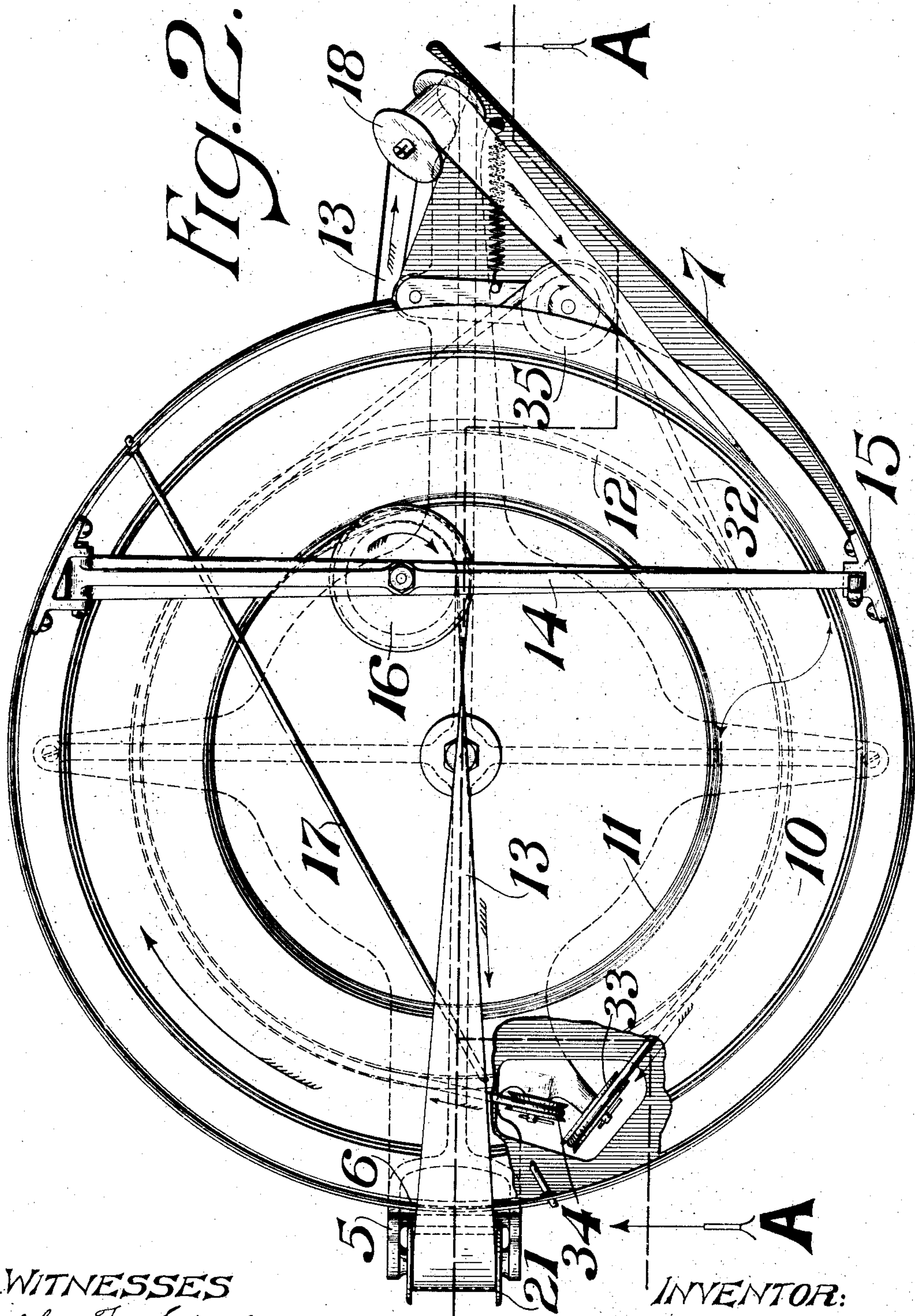
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# UNITED STATES PATENT OFFICE.

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## FILM-WINDER FOR MOVING-PICTURE MACHINES.

No. 887,431.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed August 26, 1907. Serial No. 390,097.

*To all whom it may concern:*

Be it known that I, HENRY K. SANDELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Film - Winders for Moving-Picture Machines, of which the following is a specification.

The film of a moving - picture machine is commonly supported, in reel form, in a vertical or hanging position to be fed across the display-opening at which the illuminated lens is directed against it; and, moreover, the film is fed by "dragging" or pulling upon it. Thus supporting the film is conducive to its rapid impairment, causing the inner windings to bear the weight of the outer ones, which in the case of a long film may be several pounds, with the effect of marring the contacting film-surfaces; and pulling the film to feed it tends to scratch its surface, and thus ruin it for use, this tendency being enhanced by the weight referred to.

The primary objects of this invention are to avoid the causes of impairment to the film thus explained; and the invention consists in means for these purposes hereinafter described and as pointed out in the appended claims.

In the accompanying drawings, Figure 1 shows the improved film-winder by a view in side elevation, partly broken and sectional, the section being taken at the line A—A on Fig. 2; and Fig. 2 is a plan view of the same with the casing-cover removed.

The mechanism is carried on a suitable support, that shown being in the nature of a bracket having a vertical depending arm 3 and a horizontal arm 4 provided on one end with an upright vertical extension 5 of U-shape. On the arm 4 is stationarily supported a cylindrical casing 6 provided with a tangential extension 7 and a removable cover 8. In the casing is centrally pivoted at 9, to occupy a horizontal position, a rotating film-carrier 10, shown in the form of a disk having a shallow annular flange 11 rising from its upper surface between its edge and pivotal point, with which it is concentric; and on the bottom of the carrier is formed, as a part thereof, a grooved pulley 12 concentric with the pivot 9.

The film 13 is preparatorily wound on a spool or drum (not shown) of the external diameter of the flange 11 and is transferred in that condition to seat on the carrier 10

about the flange. On the casing is hinged at one end an arm 14 to extend across the casing to one side of its center, being adapted to be releasably fastened at its opposite end, as indicated at 15 (Fig. 2); and on the hinged arm is journaled to depend from it at the inner periphery of the coil of film a downwardly-tapering guide-roller 16, extending coincidentally with the top of the flange 11 adjacent to the inner edge thereof. The arm is raised on its hinge preparatory to adjusting the film in place, after which it is lowered and fastened to bring the roller 16 into operative position. The film is confined against rising from its seat by a rod 17 extending across and bearing against the top of the coil, the rod passing through opposite openings in the casing-wall and being withdrawable longitudinally to permit removal of the film from the casing.

The free outer end of the coil of film is passed through the casing-wall about an inclined guide-roller 18 having flanged ends and journaled in the extension 7. Thence it is passed about a roller 19 journaled at 20 and having circumferential series of teeth on its ends for the usual purpose of engaging the rows of perforations commonly provided in the edge-portions of the film. The inner end of the film-coil crosses and is directed by the tapering surface of the guide-roller 16 about a guide-pulley 21 journaled in the bracket-extension 5; from this last-named pulley the film-end is passed about a guide-pulley 22 like and adjacent to the pulley 19 and beyond which the film is formed into the usual feed-loop 23, whence it passes between a roller 24 and a smaller roller 25. The roller 25 guides the film across the usual opening, indicated at 26 through which the light (not shown) is projected into the lens-device represented at 27, being held against the face of the opening by similar parallel spring-arms, one of which is represented at 28, depending from the roller 25, and carrying on their lower ends a roller 29 to bear against the film which passes between it and the roller 30 of the "movement" 31, which may, as represented, be the ordinarily provided star-movement for feeding the film with the usual vibratory action.

The film guiding and feeding means and the lens-device provided on the bracket need not be more minutely described, as they are familiar to those skilled in the art, who will understand that the two ends of the film, to



render it endless, are fastened together beyond the feed-movement 31, below which the film depends in the usual lengthy loop, which cannot be shown in Fig. 1 because of the limitations of the sheet, but is intended to be indicated by the arrows connecting the two film-terminals.

To drive the carrier 10 and thereby simultaneously pay out and wind up the film without exerting pull upon it in the feeding, which is an important advantage of the invention, an endless belt 32 is provided about the pulley 12 and passes thence over guide-pulleys 33, 34 and 35 journaled on the bracket-arm 4 and about a pulley 36 journaled at 37 and carrying a gear 38 to mesh with a gear 39 on the shaft carrying the roller 19 and with the driving gear-wheel 37 journaled at 41 and having a crank-handle 42 provided on its shaft for driving the mechanism. While provision is thus made for operating the device by hand, it will be actuated in some situations by a suitable power-motor to be substituted for the crank-handle. By turning the crank the belt 32 rotates the carrier 10 causing the horizontally supported film-coil to pay out from its inner circumference and wind upon its outer circumference, while the feeding mechanism vibrates and advances the film past the opening 26 in the usual way. The pulley 16, owing to its form, gently guides the film over the flange 11, thus without straining it. This flange, or some other suitable reinforcing means for the coil at its center, is required to prevent the strain of winding the endless film back about the exterior of the coil from displacing the latter on its carrier and, particularly, against distorting it by such strain. As will be observed, by supporting the film-coil in horizontal position, thus edgewise, all weight is taken off the layers that is imposed upon them with the coil hanging in vertical position, as heretofore, so that mar-  
 45 ring of the frictionally-contacting surfaces of the layers is completely avoided. Moreover, in practice, the layers in the horizontal coil remain, for the most part, out of frictional contact, or where such contacts exists it is  
 50 extremely light. This is due to the difference between the inner and outer diameters of the coil, since in each rotation of the carrier 10 the section of film paid out from the internal diameter is wound upon the greater  
 55 external diameter and the slight tension on the latter keeps the constantly changing inner layer loosely about the rim 11 while permitting the layers to spread apart, so that in practice it is found that there is never  
 60 more than a very slight frictional contact between them. As in the form of construction shown the film is rewound upon the outer diameter of the coil and unwound from the inner diameter thereof, each convolution of  
 65 the coil must move from the outer to the

inner position over the surface of the rotatory plate, but in so doing it only rests with its edge against the surface of the plate, and consequently this movement does not impair the face of the film. It will also be observed that all drag or pull on the film is avoided by rotating the coil through the medium of the carrier-pulley 12 independently of the film-feeding action, with the advantage of enhancing the friction-avoiding action due to supporting the film-coil edgewise on the horizontally rotating carrier.

From the foregoing description of the invention it will be understood that it consists, in its broadest sense, in supporting the coil of endless film-band on the edge of the film, about suitable reinforcing means upon a rotary carrier in contradistinction to supporting it in a manner to incur the imposition of the weight of the coil-layers upon each other; and feeding the film from the center of the coil and back about the exterior thereof so that while this may be done by causing the coil to occupy a horizontal position, as shown and described, the term "horizontal" is not to be strictly interpreted, since any variation therefrom is within the purview of the invention, provided the film of the coil is supported on edge in a manner to avoid the weighting referred to of the surfaces of the layers.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a moving-picture machine, the combination of a rotatory carrier adapted to support a coil of film in edgewise position thereon, and means whereby successive convolutions of said coil are unwound therefrom and rewound thereon as said coil is rotated by said carrier.

2. In a moving-picture machine, the combination of a rotatory carrier adapted to support a coil of film in edgewise position thereon, and means whereby said film is continuously unwound from and wound on said coil as it is rotated by said carrier.

3. In a moving-picture machine, the combination of a rotatory carrier adapted to support a coil of film in edgewise position thereon, and means whereby said film is unwound from the interior of said coil and rewound upon the exterior thereof, as said coil is rotated by said carrier.

4. In a moving-picture machine, the combination of a rotatory carrier adapted to support a coil of film in edgewise position thereon, and means whereby said film is continuously unwound from the interior of said coil and rewound upon the exterior of said coil, as the coil is rotated by the carrier.

5. In a moving-picture machine, the combination of a rotatory carrier adapted to support a coil of film in edgewise position thereon, with the ends of the coil connected and its inner and outer convolutions extended



into a loop, and means for feeding the loop-portion of said film, whereby successive convolutions of said coil are unwound therefrom and rewound thereon as said coil is rotated by said carrier.

6. In a moving-picture machine, the combination of a rotatory carrier adapted to support a coil of film in edgewise position thereon, the coil having its ends connected and its inner and outer layers extended into a loop, and feeding means for the loop portion of said film, whereby said film is unwound from the interior of said coil and rewound upon the exterior thereof as said coil is rotated by said carrier.

7. In a moving-picture machine, the combination with film feeding and driving mechanisms, of a rotatory carrier for a coil of film geared to said driving mechanism, said rotatory carrier being adapted to support a coil of film in edgewise position thereon, means for guiding the film from said coil to said feeding mechanism, and means for returning said film to said coil after it has passed through said feeding mechanism.

8. In a moving picture machine, the combination with film feeding and driving mechanisms, of a rotatory carrier for a coil of film geared to said driving mechanism, said rotatory carrier being adapted to support a coil of film in edgewise position thereon, means for guiding the film from said coil to said feeding mechanism, means for returning said film to said coil after it has passed through said feeding mechanism, means for guiding said film from the interior of said coil to said feeding mechanism and means for returning said film to the exterior of said coil after it has passed through said feeding mechanism.

9. In a moving-picture machine, the combination with a casing, of a rotary disk in said casing adapted to support a coil of film in edgewise position thereon, and means whereby successive convolutions of said coil are unwound therefrom and rewound thereon as said coil is rotated by said carrier.

10. In a moving-picture machine, the combination with a rotatory carrier adapted to support a coil of film in edgewise position thereon, of means located above the carrier and within the coil for holding the coil distended, and means whereby successive convolutions of said coil are unwound therefrom and rewound thereon as said coil is rotated by said carrier.

11. In a moving-picture machine, the combination of a rotatory carrier adapted to support a coil of film in edgewise position thereon, said carrier being provided with an annular flange about which the interior of the coil seats, and means whereby successive convolutions of said coil are unwound therefrom and rewound thereon as said coil is rotated by said carrier.

12. In a moving-picture machine, the com-

bination with a rotatory carrier adapted to support a coil of film in edgewise position thereon, of a guide located within the coil, a second guide located without the coil, said guides being adapted to guide the film in its movement to and from the coil, and means for feeding said film from the coil and returning same thereto.

13. In a moving-picture machine, the combination with a rotatory carrier adapted to support a coil of film in edgewise position thereon and having a loop extending from the boundary windings of said coil, of means for directing one of said boundary windings from the plane of said coil, and means for returning the loop-portion of the film to the plane of the coil at the other boundary thereof.

14. In a moving-picture machine, the combination with a rotatory carrier adapted to support a coil of film in edgewise position thereon, of a guide roller supported within said coil, a second guide roller supported without said coil, said rollers being adapted to guide the film in its movement to and from the coil, and means whereby said film is continuously unwound from and rewound on said coil as it is rotated by said carrier.

15. In a film-winder for moving-picture machines, the combination of a casing, a horizontal rotatory carrier in said casing provided with an annular flange about which to seat on the carrier a film-coil in horizontal position, and a downwardly-tapering guide-roller supported to extend with its lower end adjacent to the inner upper edge of said flange, for the purpose set forth.

16. In a film-winder for moving-picture machines, the combination of a casing, a horizontal rotatory carrier in said casing provided with an annular flange about which to seat on the carrier a film-coil in horizontal position, an arm hinged to the casing to extend across the same, and a downwardly-tapering guide-roller journaled on said arm to depend therefrom with its lower end adjacent to the inner upper edge of said flange, for the purpose set forth.

17. In a film-winder for moving-picture machines, the combination of a casing, a horizontal rotatory carrier in said casing provided with an annular flange about which to seat on the carrier a film-coil in horizontal position, a downwardly-tapering guide-roller supported to extend with its lower end adjacent to the inner upper edge of said flange, and a rod extending across the casing to bear against the upper side of said coil, for the purpose set forth.

18. In a film-winder for moving-picture machines, the combination with film feeding and driving mechanisms, of a casing, a horizontal rotatory disk in said casing provided with an annular flange about which to seat on the carrier a film-coil in horizontal posi-

tion, a downwardly - tapering guide - roller supported to extend with its lower end adjacent to the inner upper edge of said flange, a film-guiding pulley journaled in inclined position at one side of the casing and a film-guiding pulley journaled in horizontal position at the opposite side thereof, a pulley on

said disk, and an endless belt connecting said last-named pulley with said driving mechanism, for the purpose set forth.

HENRY K. SANDELL.

In presence of—

RALPH SCHAEFER,

W. T. JONES.