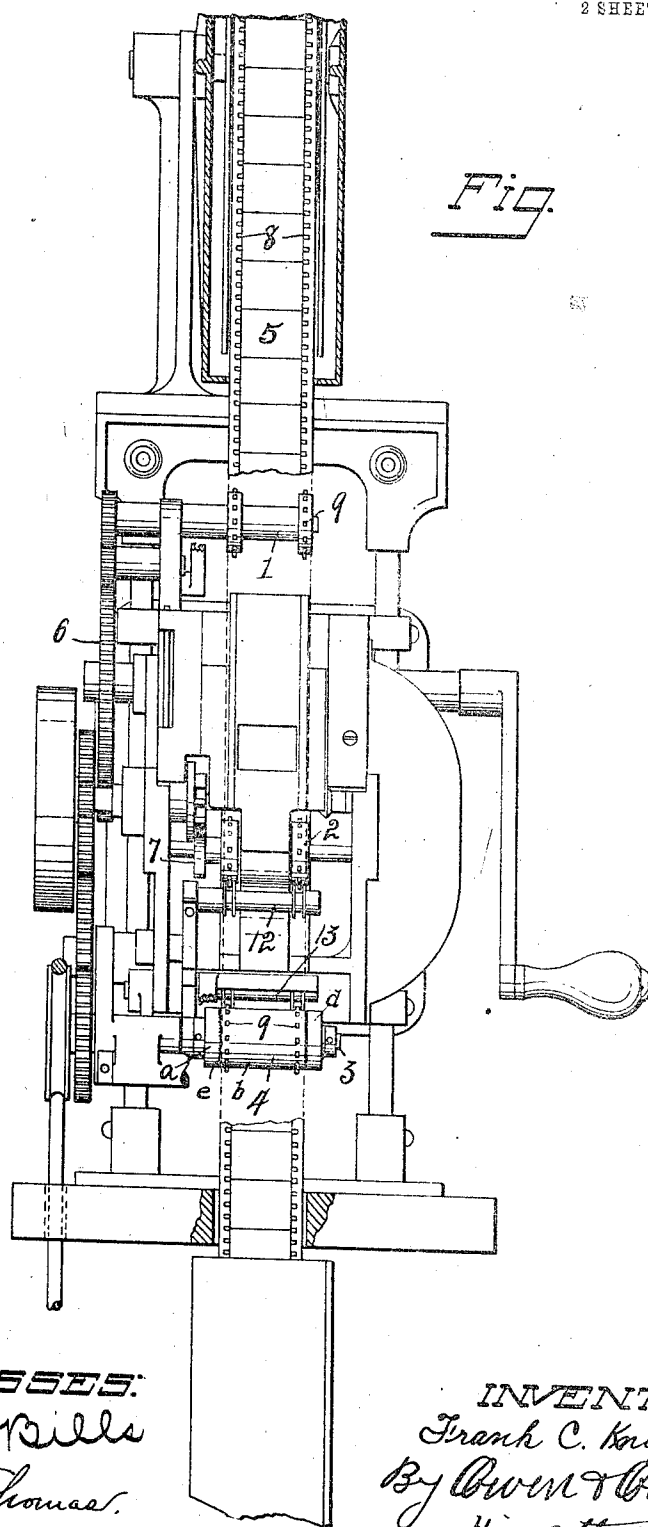


F. C. KNOPF.
ATTACHMENT FOR MOVING PICTURE MACHINES.
APPLICATION FILED DEC. 20, 1911.

1,041,813.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

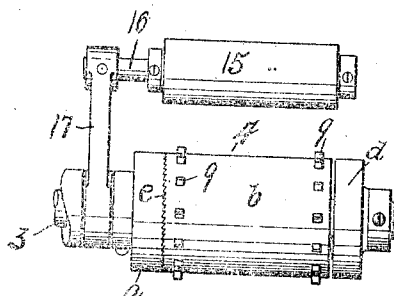


Fig. 3.

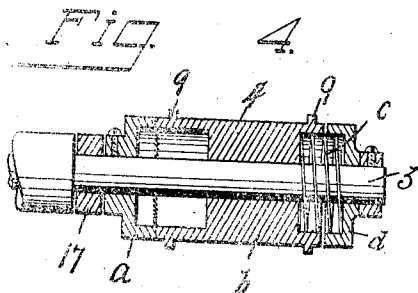
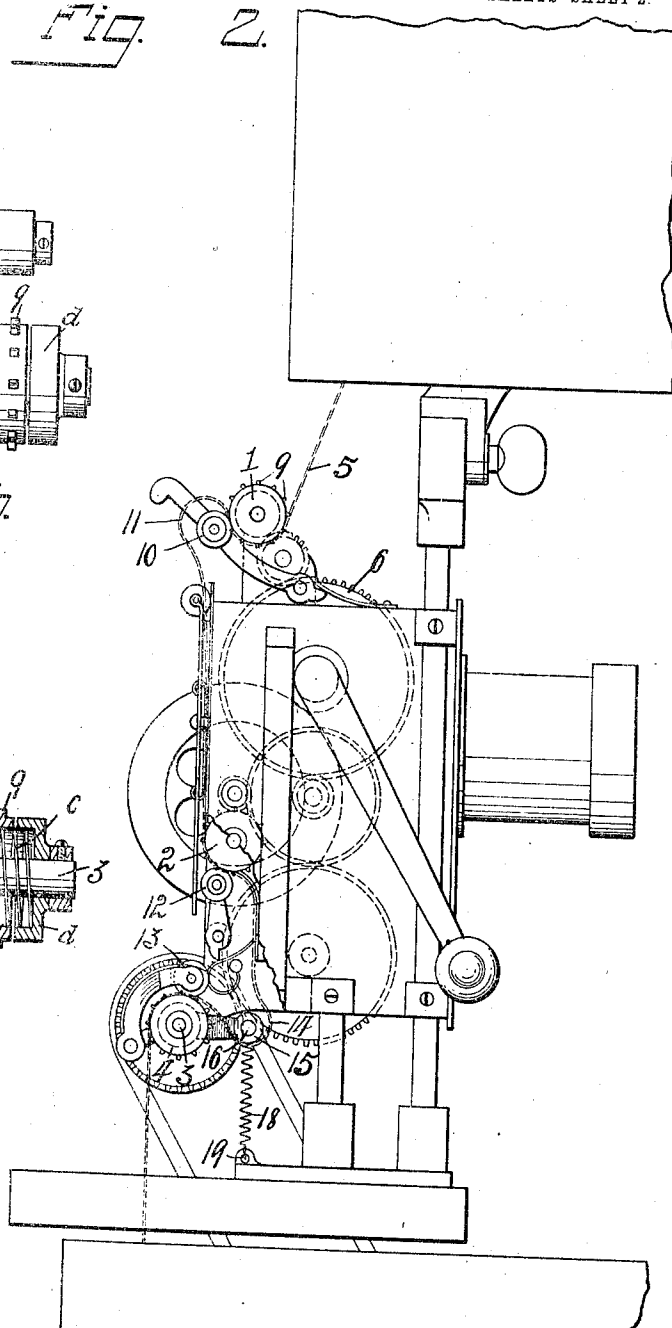


Fig. 4.



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ATTACHMENT FOR MOVING-PICTURE MACHINES.

1,041,813.

Specification of Letters Patent.

Patented Oct. 22, 1912.

Application filed December 20, 1911. Serial No. 667,053.

To all whom it may concern:

Be it known that I, FRANK C. KNOFF, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Attachment for Moving-Picture Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to moving picture machines, and particularly to the means employed for guiding the course of the film through the machine.

It is customary in machines of this class to employ a pair of continuously moving feed-rolls and an interposed intermittently rotating feed-roll for the film, the pair of rolls imparting a steady feeding movement to the film while the other roll imparts a jerking or intermittent feeding action to the portion of the film disposed between the pair of rolls, thus necessitating the provision of a loop or loose portion in the film at each side of the intermittently acting roll to prevent a jerking of the portions of the film coasting with the continuously rotating rolls, and a consequent tearing of the film. In the use of these machines it is found in practice that the film very frequently slips in engagement with the lower feed-roll, especially when a thickened portion of the film, such as would be occasioned by the pasting together of the ends of a broken portion of the film, moves into engagement therewith, thus taking up the lower loop in the film so that the jerking action thereof effects either a breaking in two of the film or a tearing out of the perforated edges thereof in mesh with the lower feed roll spurs or teeth. When such breaking or tearing of the film occurs it is necessary to stop the machine to repair the film, thereby adding to the damage to the film the annoyance incident to the stopping of the machine in the midst of a performance.

The object of my invention is the provision in association with a machine of this class of simple and efficient means which

will permit an easy and automatic back turning of the film to replenish the loop therein when the same has been taken up by a slipping action of the film in engagement with one of the feed-rolls and will reduce to a minimum, if not entirely eliminate the breaking and tearing of a film as above described, and which is capable of being easily and quickly attached to the machines of this class commonly employed, thus materially enhancing the efficiency, practicability and commercial value of such machines.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a front elevation of a moving picture machine embodying my invention and with portions broken away. Fig. 2 is a side elevation thereof with portions removed and broken away. Fig. 3 is an enlarged plan view of the features comprising my invention, and Fig. 4 is a central longitudinal section of the feed-roll of such feature.

Referring to the drawings, 1 designates the upper continuously rotating feed-roll of the machine, 2 the intermittently moving roll thereof, 3 the shaft on which the lower continuously rotating feed-roll of the machine is mounted and which, in the present instance, has the feed-roll 4, comprising one of the features of my invention, mounted thereon, and 5 the film. The customary gearing for driving the upper and lower feed-rolls in unison and at uniform speeds is indicated at 6, and this train of gears is adapted to impart intermittent rotation to the intermittently rotating feed wheel 2 through the medium of a star-wheel 7 and other suitable gearing, as is well understood in the art. As these features form no part of the present invention and may be varied as the construction or make of the machine may require they will not be described in detail.

The film 5 is provided throughout its length with series of perforations 8, adjacent each side edge thereof, which coast with registering circumferential series of spurs or teeth 9 on the respective feed-rolls in the manner of a chain and sprocket-wheel

to cause a rotation of the feed-rolls to impart positive feeding movements to the film. The film is shown as having its course under the feed-roll 1 and over an idler-roll 10, which yieldingly holds the film in engagement with the roll 1, thence forms a loop or loose portion 11, after which it passes downward through the picture projecting portion of the machine under the intermittently rotating feed roll 2 with which it is held in engagement by a yielding pressure-roll 12. The film after leaving the roll 2 passes over the continuously rotating feed-roll 3 being held in engagement therewith by a pressure roll 13, and is normally provided intermediate the rolls 2 and 4 with a loop portion 14, which loop is the one which it is so important to keep intact during the running of the film feeding means heretofore used to prevent a breaking in two or tearing of the film.

The roll 4 is shown as comprising the parts *a* and *b*, the former of which is fixed to the shaft 3 in any suitable manner to cause it to rotate therewith, while the latter is loosely mounted upon such shaft to permit it to rotate freely thereon. The part *b* is the one with which the film coacts and which has the film engaging teeth 9 thereon and the adjacent ends of the two parts *a* and *b* are provided with interengaging clutch surfaces to cause the two parts to normally rotate in unison. A coiled compression spring *c* has its opposite ends thrust against the outer end of the roll part *b* and a collar *d* mounted on the shaft therewith, and acts to yieldingly hold the parts *a* and *b* in engagement. The interengaging surfaces of the roll parts *a* and *b*, which are designated at *e*, are adapted to cause the parts *a* and *b* to rotate in unison when the coacting portion of the film is exerting very little back pressure thereon, as is the case under normal running conditions when the loop 14 is present in the film, and when such loop is taken out of the film the back pressure which is then communicated to the roll 4 through the film from the intermittent action of the roll 2 causes a back turning of the lower roll part *b* relative to the part *a*, thus preventing the tearing in two of the film or a tearing of its perforated edges, which would otherwise be the case. It is found in practice that the best results are obtained by making the spring *c* of sufficient tension to only maintain the parts *a* and *b* of the roll in driving engagement under normal working conditions so as to permit such parts to relatively turn as soon as any undue or abnormal back pressure is exerted on the part *b* by the film.

In order to automatically restore the loop 14 to the film when it has been taken therefrom by any cause, an idler roll 15 is disposed within such looped portion of the film

and is carried by a shaft 16 projecting from an arm 17, which is loosely carried by and projects radially from the shaft 3. A coiled contraction spring 18 connects the outer end of the arm 17 to a stationary subjacent part, as at 19, to yieldingly resist a raising of the roll 15 from its normal position. While the jerking movement imparted to the looped portion 14 of the film by the intermittent action of the roll 2 causes a vibratory action of the idler roll 15, the spring *c* in the feed roll 4 is adapted to permit a back turning of the part *b* thereof before a very considerable raising of the idler roll 15 would be permitted by the spring 18. It is preferable to use the idler-roll 15 in connection with my improved feed roll 4, but such feed-roll may be used alone if desired.

I wish it understood that my invention is not limited to any specific construction or arrangement of the parts except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is,—

1. In a machine of the class described, the combination with an intermittently moving film-feeding roll, of a continuously driven feed-roll having its film coacting part adapted to back turn when undue pressure is exerted thereon by the film.

2. In a machine of the class described, a film-feeding roll having a continuously rotating part and a part with which a film coacts adapted to back turn relative to said continuously rotating part when undue back pressure is exerted on the roll by the film.

3. In a machine of the class described, a continuously rotating shaft, a film-feeding roll mounted on said shaft and having a plurality of parts, one of which is fixed to the shaft while the other has yielding clutch engagement with the fixed part to permit a back turning thereof when an undue back pressure is exerted thereon by a film.

4. In a machine of the class described, a driven shaft, a film-feeding roll mounted on said shaft and having a part fixed thereto and a part mounted for free rotation thereon, said roll parts having interengaging surfaces which permit a back turning of the loose part to effect a yielding engagement of the engaging surfaces of such parts.

5. In a machine of the class described, the combination of a continuously driven feed-roll having a film coacting part which is adapted to back turn when undue back pressure is exerted thereon by a film, and an idler-roll adapted to yieldingly act on a film to form a loop therein prior to its coaction with the feed-roll.

6. In a machine of the class described, an intermittently rotating feed-roll, a con-

tinuously rotating feed-roll, said continuously rotating feed roll having a film coacting part adapted to back turn when undue pressure is exerted thereon by a film, and
5 an idler-roll adapted to yieldingly act on a film and to normally retain a loop therein intermediate said feed-rolls.

In testimony whereof, I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

FRANK C. KNOFF.

Witnesses:

C. W. OWEN,
E. E. THOMAS.