

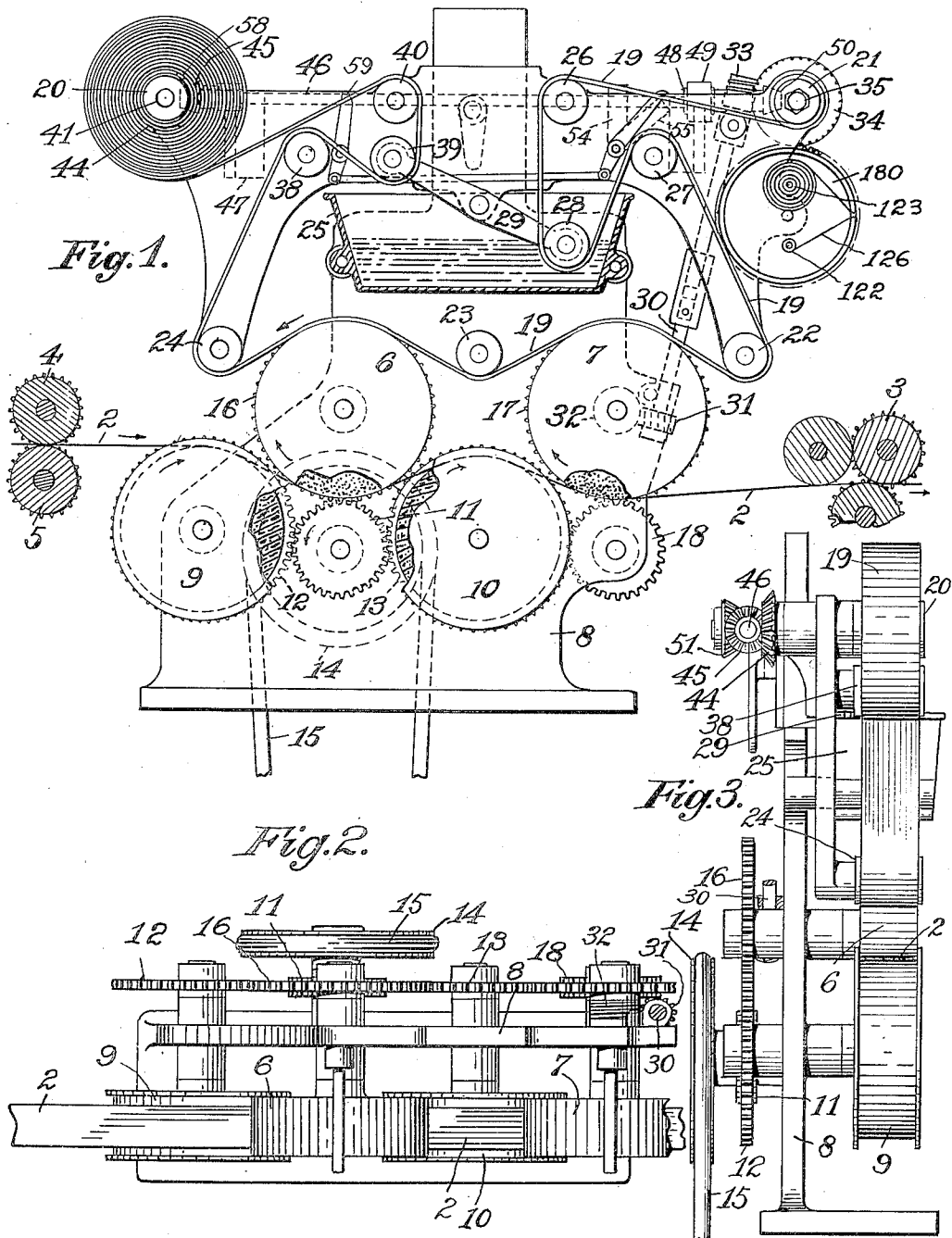
A. TEITEL.
FILM CLEANER.

APPLICATION FILED JAN. 16, 1920.

1,401,012.

Patented Dec. 20, 1921.

4 SHEETS—SHEET 1.

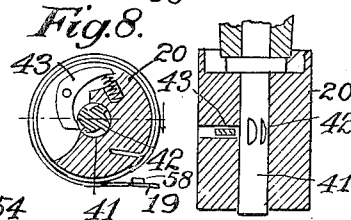
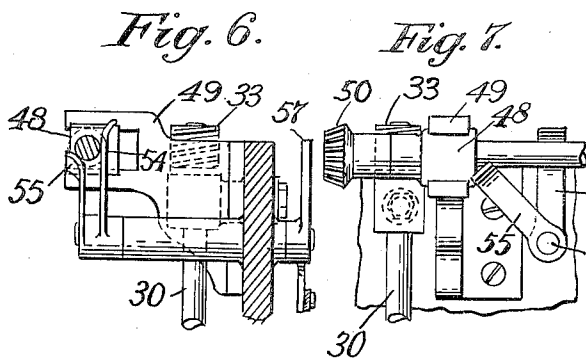
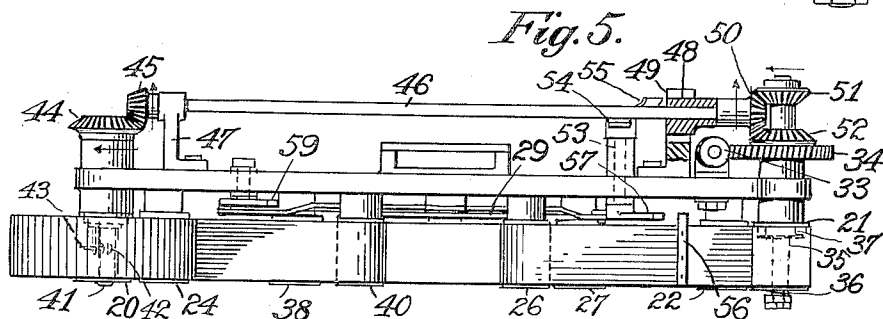
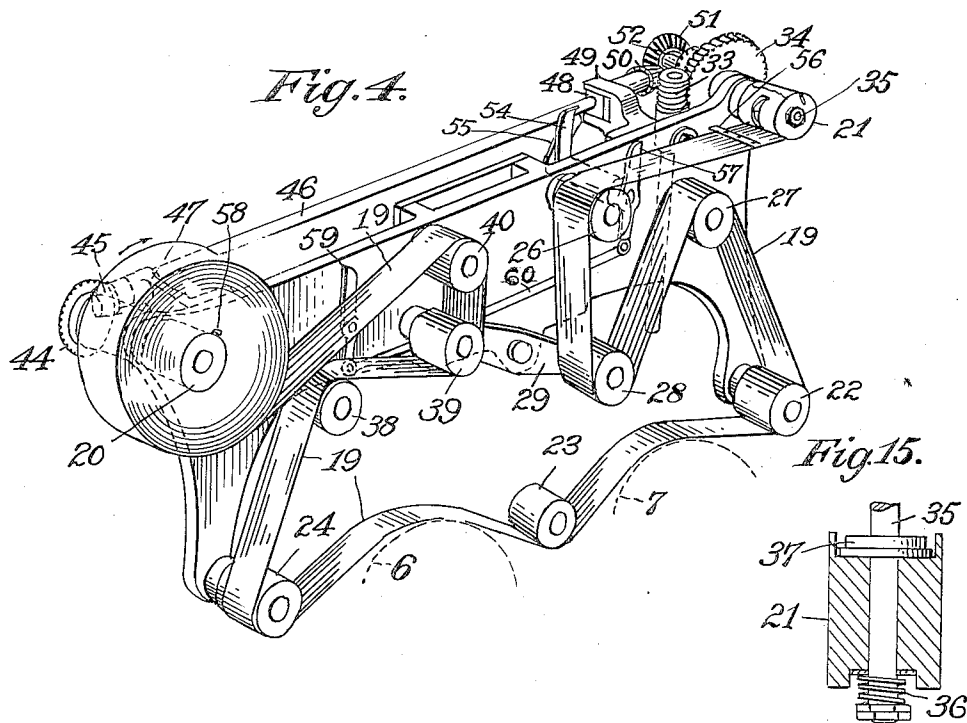


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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 10.

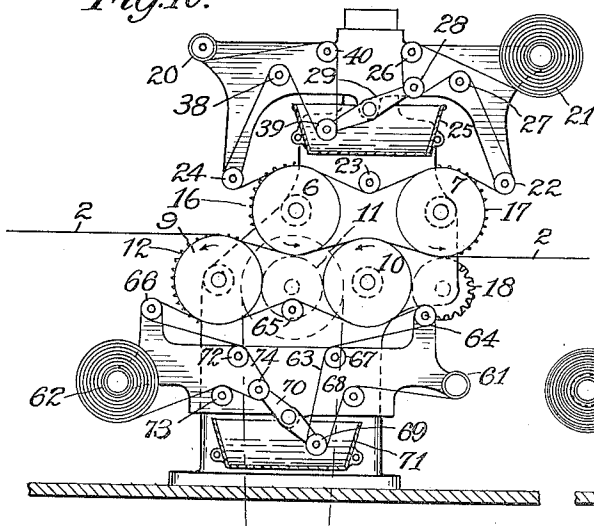


Fig. 11.

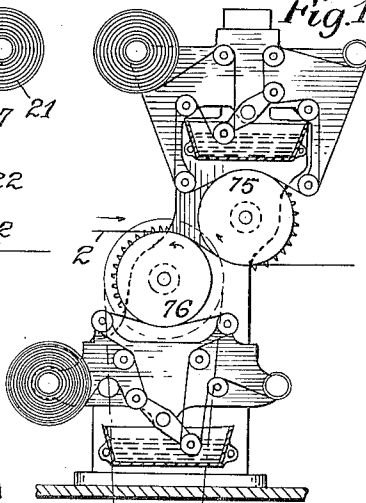


Fig. 12.

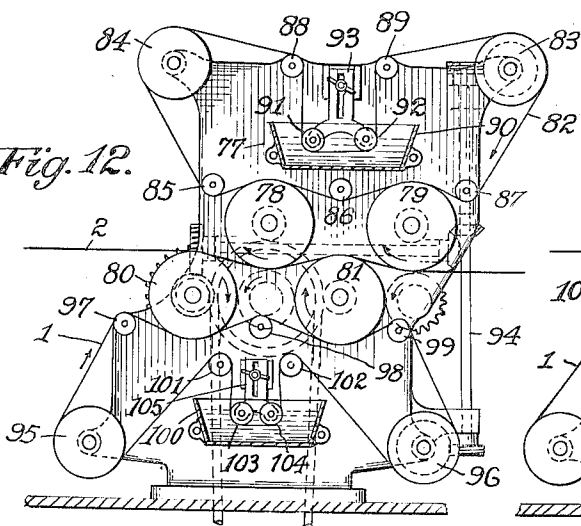


Fig. 13.

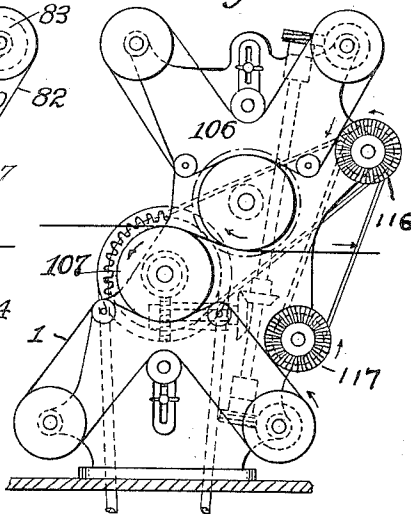
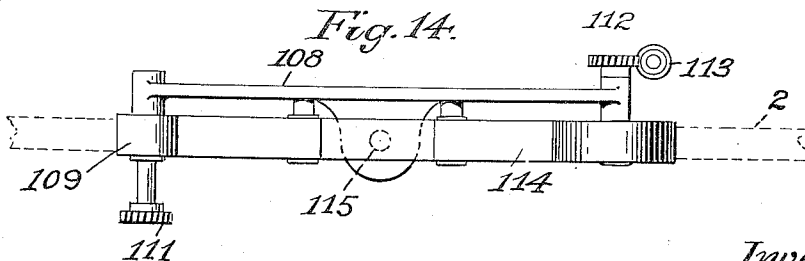


Fig. 14.



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4 SHEETS—SHEET 4.

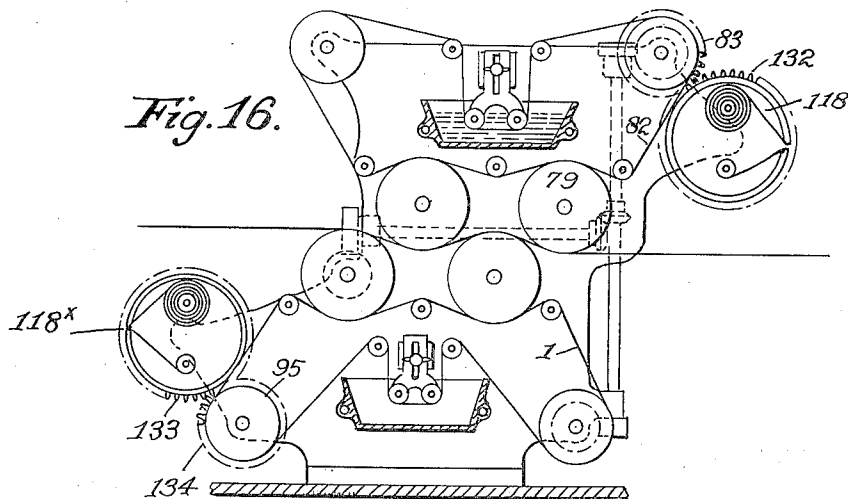


Fig. 17.

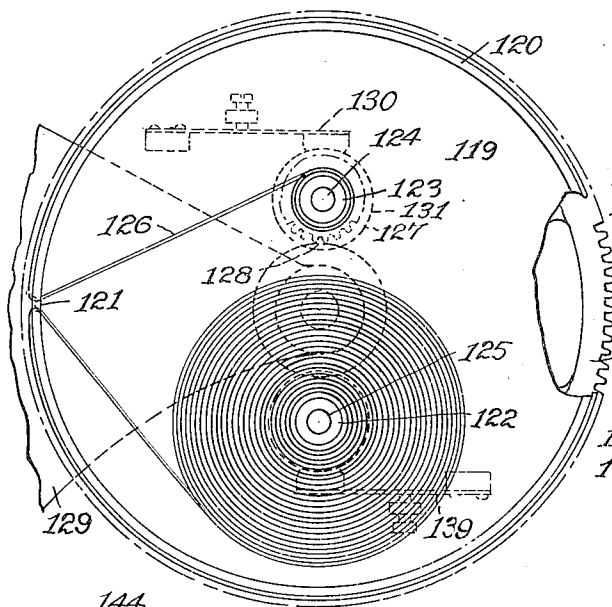
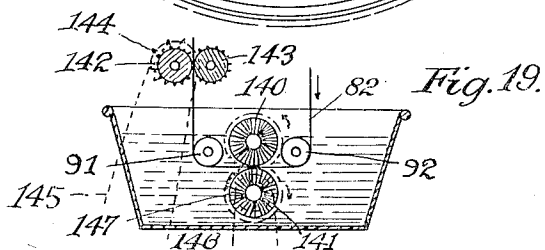
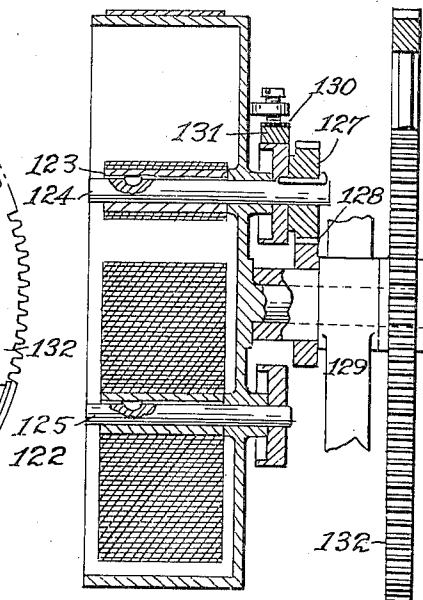


Fig. 18.



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UNITED STATES PATENT OFFICE.

ALBERT TEITEL, OF NEW YORK, N. Y., ASSIGNOR TO CINEMA PATENTS COMPANY, OF CHICAGO, ILLINOIS, A PARTNERSHIP.

FILM-CLEANER.

1,401,012.

Specification of Letters Patent. Patented Dec. 20, 1921.

Application filed January 16, 1920. Serial No. 351,867.

To all whom it may concern:

Be it known that I, ALBERT TEITEL, a citizen of the United States, and resident of New York, in the county of Bronx and State of New York, have invented certain new and useful Improvements in Film-Cleaners, of which the following is a specification.

This invention relates to apparatus or devices for cleaning the films usually employed for projecting motion pictures, that are made of a suitable flexible material such as celluloid or similar substances.

The object of the present invention is to provide an apparatus of this character in which the film is caused to travel and a cleaning member will bear against the film as advanced, and means are provided for removing the accumulation of dirt and material removed from the film, from this cleaning member, during a continuous operation, so that the film is cleaned from end to end.

A further object of the invention is to provide a device of this character in which the film will be engaged by one or more rolls, on one or both faces of the film, whereby to remove foreign material from its faces, and the roll or rolls are engaged by a suitable cleaning device, such as a web or band, whereby the roll is kept clean and accumulation of the material removed from the film, does not interfere with the cleaning operation of the roll.

A further object of the invention is to cause such cleaning web or band to pass through a suitable bath, to facilitate the cleaning of the roll.

In the accompanying drawings illustrating embodiments of my invention, Figure 1 shows the apparatus in front elevation, partly in section.

Fig. 2 is a plan view of the roll driving means.

Fig. 3 shows an end elevation.

Fig. 4 is a partial view in perspective.

Fig. 5 is a plan view of the parts shown in Fig. 4.

Figs. 6 and 7 show enlarged details of the reversing means.

Fig. 8 shows the pawl and ratchet wheel for one reel.

Fig. 9 is an axial section through the latter.

Fig. 10 shows means for cleaning rolls on both sides of the film.

Fig. 11 is a similar modification.

Figs. 12 and 13 show cleaning means with endless bands or webs.

Fig. 14 is a plan view showing means for reversing the position of the cleaning web.

Fig. 15 shows a reversible frame.

Fig. 16 is a view similar to Fig. 12 showing a roll for drying the cleaning web.

Figs. 17 and 18 show the cleaning roll.

Fig. 19 shows brushes in a bath for cleaning the web.

As shown in Fig. 1, the film 2 is shown as advanced by a toothed wheel 3, and passing from a pair of wheels 4 and 5, it being understood that the film is drawn from a suitable supporting reel, and wound up on another reel. In this view two pairs of cleaning rolls are shown, rolls 6 and 7 suitably supported on a frame 8; engage the upper face of the film, which rolls may be covered with felt or other fabric. The lower face of the film is engaged by rolls 9 and 10, rotatably mounted on the frame 8, a short distance below the said rolls 6 and 7, and projecting slightly above the lower edges of the latter, as shown. These rolls, or some of them, are driven in the reverse direction to the travel of the film. A gear 11 engages gears 12 and 13 on rolls 9 and 10 respectively to drive these rolls in the same direction as the film travels where the rolls engage the film at their upper parts, the gear 11 being driven by a pulley 14 and belt 15. The upper roll 6 carries a gear 16 driven from the gear 11 to travel in the reverse direction to the film on its lower portion. The upper roll 7 carries a gear 17 meshing with a gear 18 that engages the gear 13, whereby the roll 7 moves in the reverse direction to the film travel on its lower portion. The lower rolls 9 and 10 are preferably covered with cork or similar composition. But the lower rolls 9 and 10 are preferably rotated so that their surface speed is less than that of the film travel.

To clean these rolls, or the upper pair 6 and 7, I provide a cleaning member in the form of a web or band that is caused to advance. As shown in Figs. 1-9, a web 19 is shown as being wound on a reel 20, and unwound from a reel 21. This web passes around guide rolls 22, 23 and 24, by which

it is caused to pass around the upper portions of the rolls 6 and 7, and it will be seen that it travels in the reverse direction to the movement of these rolls where engaged by the rolls. This band is also preferably caused to pass through a bath in a tank 25 as unwound and before engaging the rolls. This is caused by means of guide rolls 26 and 27 on the frame, and a guide roll 28 carried by a swinging arm 29 that projects down into the tank.

In these views, Figs. 1-9, the cleaning band or web 19 is provided with driving means that will automatically reverse the winding operation as the film becomes unwound from each of the reels. An upright shaft 30 is driven from the roll 7 by the gears 31, 32, which shaft carries a worm 33 meshing with a worm wheel 34, on a cross shaft 35, suitably supported on the frame 8 at the upper portion. This shaft 35 carries the reel 21, and preferably drives the same through a friction clutch shown in Fig. 15. The reel 21 is loose on the shaft 35, and one end is pressed by a coil spring 36 against a disk 37 fast on the shaft 35. This shaft 35 is so driven that it constantly rotates in a direction that would turn the reel 21 to wind up the web 19; but when the other reel 20 is positively driven to wind the web thereon, the friction clutch will permit the reel 21 to unwind.

The web 19, after passing around the guide roll 24, engages a guide roll 38, and then passes around a guide roll 39 on the other end of the swinging arm 29. The web then passes around a guide roll 40 and thence to the reel 20. The purpose of the swinging arm is that when the web is reversed and wound on the reel 21, the draft on this end of the reel will swing the roll 28 out of the bath by rocking the arm 29, and the roll 39 will now be advanced into the bath, so that the web will pass through the bath immediately before engaging the rolls 6 and 7. This reversal will be automatic as the direction of the winding is reversed.

The reel 20 turns loose on a shaft 41 that carries a ratchet wheel 42. This reel carries a spring pawl 43 pressed against the ratchet wheel, so that rotation of this shaft in one direction will carry the reel with it. It also follows if the shaft is driven at a certain speed by positive means, the reel in unwinding cannot rotate faster than such speed. The shaft 41 carries a bevel gearing 44 engaging a bevel gearing 45 on a cross shaft 46 supported by a bracket 47 at this end. The other end of the shaft 46 carries a block 48 sliding in a grooved bracket 49. This movement will permit a bevel gear 50 on this end of the shaft 46, to alternately engage bevel gears 51 and 52 fast on the said driven shaft 35. It will be understood that this shifting of the shaft 46 will cause it to be

driven in reverse directions by the said bevel gears, which will reverse the rotation of the shaft 41 and ratchet wheel 42.

This shifting of the shaft 46 is automatically produced by the web 19 as it becomes entirely unwound from each reel. A rock shaft 53 on the frame carries cam arms 54 and 55 that engage the shaft 46 to shift it to its two said positions for reversal. A strip 56 on the web 19 will engage arm 57 on this rock shaft when the web is unwound from the reel 21 and shift the shaft 46. This will cause the shaft 46 to be reversed in a direction whereby the ratchet wheel that has previously been turning in a direction to engage its pawls, will now turn in the reverse direction and not rotate the reel 20. This will permit the friction clutch on the shaft 35 to rotate the reel 21 and wind up the web thereon. This will reverse the direction of movement of the web, so that it will now travel in the same direction as the rolls 6 and 7. Should the friction of these rolls moving at high speed tend to cause the web to travel at a greater speed than it is being wound up by the reel 21, such movement will be prevented because it would unwind the reel 20 at a more rapid speed than the ratchet 42 is turning, and the pawl would engage the ratchet wheel and reduce the speed of unwinding of the reel 20.

When the web becomes entirely wound on the reel 21, a strip 58 on the end of the web adjacent the reel 20, will strike a rock arm 59, that connects with the rock arm 57 through a bar 60. This will again shift the shaft 46 to reverse the movement of the ratchet wheel 42. The latter will now rotate to engage the pawl 43 and turn the reel 20 to wind the web thereon. The reel 21 by its friction clutch will permit the web to unwind until the web again reverses the shaft 46, when the reel 21 will again wind the reel.

In Fig. 10 is shown a mechanism similar to that just described for cleaning the two upper rolls, and in addition thereto a substantially identical mechanism is provided for cleaning the two lower rolls 9 and 10. It will be seen that this mechanism comprises reels 61, 62, serving to operate a web 63, over suitable guide rolls 64, 65 and 66, that direct the web against these rolls 9 and 10. Other guide rolls 67 and 68 direct the web to a roll 69 on an arm 70 that carries the web into a bath in a tank 71. Other guide rolls 72 and 73 direct the web to a second guide roll 74 on the arm 70. When the web is reversed this arm will swing, as set forth in connection with the described mechanism.

In Fig. 11 substantially similar apparatus is shown to clean an upper roll 75 and a lower roll 76, whose construction and operation is substantially identical with that just

described, except for the location of some of the guide rolls, and further description is not necessary.

In Figs. 12 and 13, I show an arrangement that uses a web or band that is endless instead of being wound up alternately on two reels. In Fig. 12 is shown a frame 77 provided with cleaning rolls 78 and 79 for the top of the film, and rolls 80 and 81 that engage the bottom of the film, which rolls are driven similar to the described rolls 6, 7, 9 and 10, as indicated by the arrows. An endless web or band 82 passes around guide rolls 83 and 84 at the top and guide rolls 85, 86 and 87 that direct this web against the cleaning rolls 78 and 79. The band also passes around guide rolls 88 and 89 and thence down into a tank 90 containing a suitable bath, and around rolls 91 and 92 supported on an adjustable bracket 93. An upright shaft 94 serves to drive the roll 83, by which the band 82 is driven in the direction of the arrow, that will move across the upper cleaning rolls in the reverse direction to their movement.

Another endless band 1 passes around rolls 95 and 96, by which it is driven and guided by rolls 97, 98 and 99, to press against the lower rolls 80 and 81. This band is caused to pass into a tank 100 by guide rolls 101, 102, and rolls 103, 104, on a bracket 105.

In Fig. 13 a substantially similar arrangement is shown, except that a single pair of rolls 106, 107, are used to engage the upper and lower faces of the film, but in this arrangement the bath is omitted.

In Fig. 14 an arrangement is shown for reversing the web that cleans the rolls, without reversing the actual direction of movement of the web against the cleaning rolls. In this arrangement a frame 108 carries reels 109 and 110 connected with gears 111 and 112 respectively. The latter is shown meshing with a driving worm 113 to wind up the web 114. When it is desired to reverse the winding of the web, the frame is swung on a pivot 115 through one half circle, that will bring the gear 111 to engage the driving worm 113. But this will reverse the position of the web and its actual direction of movement will be the same.

In Fig. 13, I show rotary brushes 116, 117, that press against the endless bands, which brushes are rotated by suitable means such as the belts shown, and serve to clean the webs.

Fig. 16 shows a construction similar to Fig. 12 with the addition of a roll 118 arranged to engage the endless band 82 after passing through the bath and before engaging the cleaning roll 79. The lower endless band 1 is engaged by a similar roll 118* for the same purpose. This roll 118 is shown in detail in Figs. 17 and 18, and comprises a

disk 119 having a drum portion 120 containing a slot 121. On the disk are carried rolls 122 and 123 on shafts 124 and 125 that are rotatable on the disk. A cleaning band 126 is passed around the drum 120 and both ends 70 passed in through the slot 121, and wound on the two rolls 122 and 123, as shown. Suitable driving means are provided whereby the web 126 is caused to wind on these rolls and hence drawn around the drum to unwind from the other roll. The roll 123 carries a gear 127 that engages a single tooth 128 suitably carried by the frame 129, when the drum is rotated. At each rotation of the drum this single tooth will engage the gear to wind up the roll 123. A brake arm 130 engages a disk 131 on the shaft 124. A similar brake arm 139 controls the unwinding of the shaft 125. The drum is driven by a gear 132 from the driving roll 83. By this means the band 126 will present fresh surfaces to the endless band 82, and serve to dry it after passing through the bath in the tank 77.

The cleaning wheel 118* is identical with 90 that just described, for cleaning the other endless band 1, and is driven by a gear 133 thereon engaging a gear 134 on the roll 95.

In Fig. 1, I show a cleaning wheel 180 similar to the wheel 118 that serves to clean 95 the band 19 before it engages the roll 7 to remove the cleaning fluid received in the tank 25. The roll 180 is driven from the gear 34. When the band 126 is wound up on the roll 123 and unwound from the roll 100 122, these rolls are interchanged on their shafts and the band will be caused to feed as before.

In Fig. 19, I show the tank for the bath provided with rotary brushes 140 and 141 engaging opposite sides of the band 82 while passing between the rolls 91 and 92 in the bath. These rolls are driven by suitable means such as a belt. As the band 82 leaves the tank the surplus fluid is removed from the band by rolls 143, 144, between which it passes. These rolls are preferably of soft material such as gelatin, and may be rotated by suitable means. The brushes in the bath will serve to thoroughly clean the band 115 82, and the gelatin rolls will remove the excess liquid therefrom.

What I claim is:—

1. In a film cleaning machine, means for supporting and advancing a film, a cleaning member supported to bear against the film as advanced, means for moving the cleaning member to present different portions to the film as advanced, a cleaning web arranged to engage the cleaning member at a point removed from the portion engaged by the film, and means for advancing the cleaning web.

2. In a film cleaning machine, means for supporting and advancing a film, a cleaning 130

member supported to bear against the film as advanced, means for moving the cleaning member to present different portions to the film as advanced, a cleaning web arranged
5 to engage the cleaning member at a point removed from the portion engaged by the film, and means for advancing the cleaning web in a direction contrary to the movement of the cleaning member where engaged by
10 said web.

3. In a film cleaning machine means for supporting and advancing a film, a cleaning member supported to bear against the film as advanced, means for moving the cleaning
15 member to present different portions to the film as advanced, a cleaning web arranged to engage the cleaning member at a point removed from the portion engaged by the film, and means for advancing the web.

4. In a film cleaning machine means for supporting and advancing a film, a cleaning member supported to bear against the film as advanced, means for moving the cleaning member to present different portions to the
20 film as advanced, a cleaning web arranged to engage the cleaning member at a point removed from the portion engaged by the film, means for advancing the web, a bath and means for passing the web through the
25 bath previous to engaging the cleaning member.

5. In a film cleaning machine, means for supporting and advancing a film, a pair of cleaning members each supported to bear
35 against one side of the film as advanced, means for moving each cleaning member to present different portions to the film as advanced, a pair of cleaning webs arranged to engage respective cleaning members at
40 points removed from the portions engaged by the film, and means for advancing said webs.

6. In a film cleaning machine, a supporting film reel, a winding film reel, a cleaning
45 wheel rotatably supported to press against the film as advanced between said reels, a cleaning web engaging the cleaning wheel at a portion thereof remote from the portion engaging the film, means for advancing the web in a direction contrary to
50 the movement of the web contacting portion of the wheel, and means for reversing the movement of said web whereby to cause travel of the web in the same direction as the portion of the cleaning wheel engaged
55 thereby.

7. In a film cleaning machine, a supporting film reel, a winding film reel, a cleaning wheel rotatably supported to press against
60 the film as advanced between said reels, a cleaning web engaging the cleaning wheel

at a portion thereof remote from the portion engaging the film, means for advancing the web in a direction contrary to the movement of the web contacting portion of the wheel, and means for reversing the movement of said web whereby to cause travel of the web in the same direction as the portion of the cleaning wheel engaged thereby,
70 said web advancing and reversing means comprising a pair of reels for the web, a driving shaft arranged to be continuously rotated in one direction, a friction drive connecting said shaft with one web reel, a pawl and ratchet wheel connection from the other
75 reels to said driving shaft, and reversible mechanisms connecting the latter device with said driving shaft whereby the driving of said reel by said device will cause the web to unwind from the friction driven reel and
80 on shifting said reversing mechanisms the said friction driven wheel will wind the web thereon and the said pawl and ratchet device will permit unwinding at a maximum predetermined speed.

8. In a film cleaning machine, a winding reel, a cleaning wheel rotatably supported to press against the film as advanced between said reels, a cleaning web engaging the wheel in spaced relation to its engagement with the film, and means to advance the web comprising a pair of reels for the
85 web, a driving shaft arranged to be continuously rotated in one direction, a friction drive connecting said shaft with one web reel, a pawl and ratchet wheel connection from the other reels to said driving shaft, and reversible mechanisms connecting the latter device with the driving shaft
90 whereby the driving of said reel by said device will cause the web to unwind from the friction driven reel and on shifting said reversing mechanisms the said friction driven wheel will wind the web thereon and the said pawl and ratchet device will permit unwinding at a maximum predetermined speed and means mounted on the web to actuate the reversing mechanism.

9. In a film cleaning machine, a supporting film reel, a winding film reel, a cleaning
110 wheel rotatably supported to press against the film as advanced between said reels, a cleaning web engaging the cleaning wheel at a point remote from its engagement with the film, means for advancing the web, a bath, means for passing the web through the bath, and a cleaning roll engaging the web between the bath and said cleaning wheel.

Signed at New York city, N. Y., on January 8th, 1920.

ALBERT TEITEL.