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(54) FILM PULL-DOWN MECHANISM FOR MOTION PICTURE APPARATUS

(71) We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America of 343 State Street, Rochester, New York 14650, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates generally to web handling apparatus such as a motion picture projector which has a film claw driven to engage and advance a film strip, and more particularly to a single frame advance mechanism for causing the film claw in a motion picture projector to engage and advance the film strip by a single image frame each time the mechanism is actuated.

An improved slow motion projection mechanism has been described in copending British Patent Application No. 21314/73 (Serial No. 1,431,197) wherein the film claw of the mechanism can be periodically restrained from engaging and advancing a received film strip. Such a defeat mechanism is suitable to provide very slow projection speeds (e.g. two frames per second), but in certain instances it is desirable to provide for stop frame projection and to permit the operator to selectively advance a film by a single frame to permit viewing of greater detail. While known mechanisms are suitable to provide stop frame viewing, the defeat mechanism disclosed in British Patent Application No. 21314/73 (Serial No. 1,431,197) is especially suitable for use with the improved single frame advance mechanism of the present invention.

In accordance with the present invention there is provided a film pull-down mechanism for a motion picture apparatus having a film claw adapted to intermittently engage and advance a film strip, first cam means adapted to drive said claw to engage

and release said film strip, ratchet means rotatable continuously about an axis synchronously with operation of the claw, pawl means coupled to second cam means and movable into and out of engagement with said ratchet means for driving said second cam means synchronously with said first cam means when the pawl means and ratchet means are engaged, restraining means operatively coupled to the second cam means and positionable by said second cam means relative to the claw into and out of a position for holding said claw ineffective to engage said film strip, disengaging means for disengaging the pawl means from the ratchet means when the second cam means has positioned the restraining means in its position for holding the claw ineffective to engage the film strip, thereby effecting prolonged projection of a single frame, the disengaging means comprising a catch mounted for movement between a first position in which the catch is engageable with the pawl means so as to disengage the pawl means from the ratchet and a second position in which the catch is not engageable with the pawl means, and said disengaging means further comprising shift means for moving the catch between its first and second position.

In accordance with the present invention there is also provided a motion picture projector comprising first means for advancing a motion picture film, said first means comprising a film claw adapted to be synchronously movable into and out of engagement with the film and to advance the film by a single frame when the film claw is engaged with the film, second means arranged to prevent the first means from advancing the film, the second means comprising a ratchet operable continuously and synchronously with the film claw, a pawl coupled to cam means for controlling operation of the cam means, the ratchet and pawl being adapted to be shifted between a first condition wherein the pawl is

disengaged from the ratchet so that the ratchet and pawl are thereby ineffective to operate the cam means and a second condition wherein the pawl is engaged with the ratchet so that the ratchet and pawl are effective to cause the cam means to be operated synchronously with the film claw, and restraining means operable by the cam means for restraining the film claw from movement into engagement with the film, a member adapted to engage the pawl to change the ratchet and pawl from said second condition to said first condition, and means for selectively moving said member between a first position wherein said member is engageable with the pawl and a second position wherein said member is removed a spaced distance from the pawl.

The present invention will now be described by way of example with reference to the accompanying drawings in which:—

Fig. 1 is a perspective view, partially exploded, of a preferred embodiment of a film pull-down mechanism according to the present invention;

Fig. 2 is a side view of the embodiment shown in Fig. 1 showing in phantom the movement of the control linkage of the invention which causes advancement of the film by a single image frame; and

Fig. 3 is a side view of the embodiment shown in Fig. 1 showing the projector mechanism in an operative position.

Because photographic apparatus are well known, the present description will be directed in particular to elements forming part of, or cooperating more directly with, the present invention, apparatus not specifically shown or described herein before understood to be selectable from those known in the art.

The embodiment of the present invention shown in the accompanying drawings and discussed herein is especially suitable for use with the projector embodiments disclosed in detail in the aforementioned copending British Patent Application No. 21314-73 (Serial No. 1,431,197) wherein a slow motion defeat mechanism is provided for a motion picture projector having a single film claw for one type of film or having two film claws which are selectively operable for either super 8 or regular 8 motion picture films.

Referring now to the drawings, Figs. 1 to 3 show a projector mechanism 20 which includes film claws 22 and 24, each having pairs of claw teeth 22a and 24a respectively, for engaging different film types. Film claws 22 and 24 are mounted to move up and down and also to pivot in and out relative to the film gate (not shown) of the projector by use of any suitable pivot arrangement, as for example, the ball and race structure 26 which is described in detail in our Letters

Patent No. 1,136,645. Film claws 22 and 24 are both normally urged in an anticlockwise direction (as viewed from above in Figs. 1 to 3) about pivot 26 by biasing members (not shown) such that the claw teeth 22a and 24a are urged toward the film strip whenever in-and-out cam followers 28 and 30 pass into indentations on the face of a face cam 42 as will be described in detail later.

The up-and-down movement of the film claw 22 and 24 is under the control of pull-down cams 32 and 34 respectively, which are secured to a drive shaft 40 and are embraced by follower surfaces 36 and 38 of claw arms 22 and 24 respectively. Each revolution of pull-down cams 32 and 34 is effective to produce one complete reciprocal stroke of film claws 22 and 24. Thus as described in the aforementioned Letters Patent No. 1,136,645 where shaft 40 is typically driven at 54 revolutions per second, film claws 22 and 24 are both caused to reciprocate in the up-and-down or film advancing direction at a rate of 54 strokes per second.

At the same time that the film claws 22 and 24 are reciprocally driven in the film advancing direction, one of the claws can be selectively driven in and out or in the film engaging and disengaging direction while a film selector lever or film slide 52 effectively restrains the other claw from engaging the film in a manner which will be described in greater detail later. A face cam 42 is secured to a shaft 44 which is rotatably mounted in the projector substantially parallel with the drive shaft 40 and is driven in synchronism therewith by known means, such as a gear drive. As best shown in Fig. 1, the face cam 42 is provided with a plurality of groups of depressions 46, 46' (and other not shown) which have various radial dimensions and are spaced circumferentially about the face of cam 42. As described in our Letters Patent Nos. 1,107,718 and 1,107,719, these indentations cooperate with cam followers 28 and 30 to cause the pairs of claw teeth 22a and 24a respectively, to be moved into and out of engagement with a film strip at various frequencies so as to achieve various predetermined projection speeds, such as 54, 18 or 6 frames per second.

As best seen in Fig. 1, film slide 52 is slidably mounted on the projector housing by rivets 51 which pass through an elongate slot 53 in the slide 52 and are secured to the projector. A shaft 54 is secured to the slide 52 for moving control arms 56 and 58 as slide 52 is moved. Control arms 56 and 58 are both pivotably mounted about the shaft 44 and are resiliently urged into contact with the shaft 54 by springs 60 and 62, respectively.

Extending from the control arm 56 is a

stud shaft 64 which is engageable with a tab 68 of the film claw 24. Stud shaft 64 is effective to drive claw 24 in a clockwise direction about the pivot 26 and hold the film claw 24 from moving in the film engaging direction whenever the slide 52 is positioned at the "R8" position for regular 8 operation. (Fig. 1 position). Similarly, a stud shaft 66 extends from the control arm 58 for contacting a tab 70 of the film claw 22 and for preventing the film claw 22 from engaging the film strip when the slide 52 is moved to the right to the indicated "S8" or super 8 position. Movement of the slide 52 from the regular 8 to the super 8 position would allow spring 60 to urge the control arm 56 in an anticlockwise direction about the shaft 44 thereby removing the stud shaft 64 from contact with the tab 68 and allowing film claw 24 to resume being driven for engaging and advancing film in response to the in-and-out cam follower 30.

The projector mechanism shown in Figs. 1 to 3 also includes a speed selector 50 which may be moved to any one of several predetermined locations before or during operation of the projector to determine the projection speed. Movement of slide 50 causes cam followers 28 and 30 to be shifted and positioned along the face of face cam 42 such that the cam followers 28 and 30 are in alignment with different ones of the groups of depressions 46, 46'. As the face cam 42 is rotated, the claw arm which is unrestrained is then urged to follow the inward movement of cam follower 28 or 30 as previously explained. The resulting in-and-out motion of the claw arm allows the film to be engaged and advanced as the claw is also being moved up-and-down in synchronous relation by the pull-down cam.

To provide projection speeds which correspond to less than one advancement of the film per revolution of face cam 42, the projector mechanism shown in Figs. 1 to 3 includes a defeat mechanism of the type which is fully disclosed in the aforementioned British Patent Application No. 21314/73 (Serial No. 1,431,197), but will now be briefly discussed to aid in understanding of the embodiment of the present invention.

As best shown in Fig. 1, a pinion 72 is secured to the shaft 44 adjacent to speed selector 50. Pinion 72 drives a gear 74 which is secured to a shaft 76. Pinion 72 has one-third as many teeth as gear 74 and therefore gear 74 and shaft 76 are necessarily driven at one-third the speed of the shaft 44. Thus, where the shaft 44 is typically driven at a speed of six revolutions per second, the shaft 76 is driven at two revolutions per second.

A ratchet 78 is secured to the shaft 76 closely adjacent to the gear 74 and could be

integral therewith. A cam 80 is rotatably mounted about the shaft 76 in a position closely adjacent to the ratchet 78. Eccentrically secured to the inner surface of the cam 80 is a pivot shaft 82 which extends over the outermost surface of the ratchet 78. A pawl 84 is pivotally mounted on the shaft 82 between the cam 80 and the gear 74. The pawl 84 includes a first end portion 86 which is positionable for engaging the ratchet 78 and a second end portion 88 which is positionable for contacting a tab 90 of the speed selector 50, as will be explained in greater detail.

A spring 92 urges the pawl 84 in an anticlockwise direction about the shaft 82 such that the end portion 86 is brought into engagement with the ratchet 78 whenever speed selector 50 is in the positions shown in Figs. 1 to 3 wherein the second end portion 88 does not contact the tab 90 of speed selector 50. That is, when the speed selector 50 is positioned for single frame operation, as shown in Figs. 2 and 3, or two frames per second operation, as shown in Fig. 1, the second end portion 88 can no longer contact the tab 90 and the spring 92 then urges the pawl 84 to pivot about the shaft 82 until the first end portion 86 of the pawl 84 is operatively engaged with the ratchet 78. When the pawl 84 is thus engaged with the ratchet 78, the cam 80 is effectively coupled through the pawl 84 to the shaft 76 and caused to rotate as if it were itself secured to the shaft 76. That is, the rotational force applied to the ratchet 78 is transmitted by the pawl 84 to the shaft 82 which in turn causes the cam 80 to be driven by the shaft 76 as if those members were a single unit being driven at two revolutions per second in the preferred embodiment. The spring 92 is effective to hold the pawl 84 in engagement with the ratchet 78 until the speed selector 50 is again moved to the left for operation at 54, 18 or 6 frames per second whereupon the tab 90 once again is brought into contact with the second end portion 88 causing the pawl 84 to be held disengaged from the ratchet 78.

A plate 96 which is bifurcated at one end to form extensions 96a and 96b, is slidably secured to the projector by a rivet 98 and is mounted about the shaft 76 which passes through an elongated opening 100 in the plate. Secured to the central portion of the plate 96 is a post 94 which is maintained in contact with a cam surface 81 of the cam 80 by a spring 102 which is secured to both the plate 96 and the projector in any known manner.

As disclosed in the aforementioned British Patent Application No. 211314/73 (Serial No. 1,431,197), post 94 is effective to follow the contour of the cam surface 81 as the cam 80 is rotated and to overcome the

force of the spring 102 to drive the plate 96 to the left as shown in Fig. 2. When the plate 96 is moved to this position, extensions 96a and 96b are in contact with stud shafts 66 and 64 causing the claw arms 22 and 24 to be restrained by the engagement of the shafts 64 and 66 with tabs 68 and 70. Cam surface 81 is effective to hold the plate 96 in this position for approximately 240° of rotation and thereby restrain the claw arms 22 and 24. As the cam 80 continues to rotate, post 94 continues to follow along the contour of cam surface 81 and passes into an indented portion thereof, as seen in Fig. 3, allowing the spring 102 to again move the plate 96 to the right and allowing extensions 96a and 96b to be removed from contact with stud shafts 64 and 66 for approximately 80° of rotation of the cam 80. The effect of movement of the stud shafts 64 and 66 into and out of contact with the tabs 68 and 70 once per revolution of the cam 80 is to allow the unrestrained film claw to follow the movement of the in-and-out cam follower only once for every third revolution of the face cam 42. That is, for every six revolutions of face cam 42, cam 80 rotates twice and allows a film claw to be urged by its cam follower into engagement with the film only twice. Thus, this defeat mechanism is effective to provide advancement of the film at a rate of two frames per second.

The projector mechanism shown in the drawings also includes a preferred embodiment of a single frame advance mechanism for cooperating with the previously discussed defeat mechanism to permit the film claws 22 and 24 to engage and advance the film only by a single image frame each time a control mechanism is selectively actuated. The embodiment of the present invention cooperates with the defeat mechanism of the projector to selectively disengage the pawl 84 from the ratchet 78 and cause extensions 96a and 96b to be held in position for restraining film claws 22 and 24 until the advance mechanism is operated in a manner which will be hereinafter described. While the advance mechanism shown and described herein is manually controlled, it is emphasized that such a mechanism could readily be controlled by other means, such as an electric solenoid or electric motor.

As best shown in Fig. 1, a catch 110 is pivotally secured to the speed selector 50 by a rivet 114. Catch 110 is normally urged in an anticlockwise direction about the rivet 114 and into contact with a pin 115 by a spring 116 which bears against an edge of the catch 110 and against a post 118 which is also secured to the speed selector 50. As is shown in Fig. 2, when the catch 110 is held

in contact with the pin 115 and speed selector 50 is set for single frame operation, an end portion 112 of the catch 110 is positioned to be engageable with the second end portion 88 of the pawl 84 as the cam 80 and the pawl 84 are rotated. As the catch 110 is contacted by second end portion 88, it is effective to cause the pawl 84 to become disengaged from the ratchet 78 and thereby prevent the cam 80 from being driven. When the pawl 84 is disengaged in this manner, the cam 80 is stopped in a position wherein the post 94 remains in contact with that portion of cam surface 81 which is not indented so as to maintain extensions 96a, 96b of the plate in contact with the stud shafts 66 and 64, thereby restraining claw arms 22 and 24 from engaging and advancing the film. Thus, the cam surface 81 holds the plate 96 in position to permit viewing of the single image frame of the film until the catch 110 is caused to release the pawl 84 and the cam 80 is again rotated in a manner to be hereinafter described.

A control member in the form of a bracket 120 is pivotally and slidably mounted on the projector by rivet 128 which is secured to a projector through an elongated opening 122 of the bracket 120. A peg 130 is secured to the projector and passes through a generally rectangular opening 124 in the bracket 120 which is positioned near the end of the bracket 120 opposed to the slot 122, and which is thereby effective to limit the travel of the bracket 120. As will be explained later in greater detail, the bracket 120 is movable in response to movement of both a toggle 138 and the cam surface 81 to cause a single frame of film to be advanced.

The toggle 138 is pivotally mounted on the projector by a pin 146 and extends through an elongated opening 142 such that the toggle is readily accessible by the operator and is manually movable. The toggle 138 is normally urged in a clockwise direction about the pin 146 by a spring 144 (Figs. 2 and 3) and is held in the Fig. 1 position until it is manually caused to pivot against the force of the spring 144.

One end of a rod 134 is secured to the toggle 138 and the other end of the rod is secured to a bent off portion 120a of the bracket 120. In the embodiment shown, threaded fasteners 136 and 140 are screwed upon the threaded ends of the rod 134 to provide adjustment of the travel of the bracket 120 and the toggle 138, though other known fastening means could also be used. Also, it would be possible to substitute a cable or other flexible member for the rod 134 if appropriate fasteners are used and if the bracket 120 is urged to the right by appropriate spring means.

Referring now in particular to Figs. 2 and 3, the operation of the single frame mechanism will be described. As shown in these Figs., speed selector 50 has been moved to the single frame position as indicated by the alignment of the indicator mark on speed selector 50 with the letter S on the projector. When speed selector 50 is in this position, the cam followers 28 and 30 are positioned upon the face of face cam 42 such that they may contact only a single indentation as the cam 42 is rotated. Thus, where face cam 42 is driven at six revolutions per second, the cam followers would cause either one of the film claws 22 or 24 to engage and advance the film at a rate of six frames per second. However, as shown in Fig. 2, when the pawl 84 is disengaged from the ratchet 78 by the catch 110, extensions 96a and 96b contact stud shafts 64 and 66 and drive them under tabs 68 and 70 of the film claws wherein the film claws 22 and 24 are restrained from engaging the film until the plate 96 is again moved to the right, thereby permitting viewing of a single image frame.

When the projector mechanism is in the Fig. 2 position, the bracket 120 is caused to pivot in the clockwise direction about the rivet 128 until a surface 120c of the bracket 120 is in contact with the portion of the cam surface 81 which is indented. Thus, when the toggle 138 is manually pivoted to the left, as shown in phantom, the bracket 120 is also moved to the left by the rod 134. As end 120b of bracket 120 is brought into contact with the catch 110, the catch 110 is moved in a clockwise direction about the rivet 114 until the second end portion 88 of the pawl 84 is released. Spring 92 causes the pawl 84 to pivot about shaft 82 until the first end portion 86 is again engaged with the ratchet 78.

Once the ratchet 78 is engaged by the pawl 84, the cam 80 is caused to rotate again and, as shown in Fig. 3, the post 94 contacts the indented portion of the cam surface 81, permitting spring 102 to urge the plate 96 to the right. As the plate 96 is moved to the right in this manner, extensions 96a and 96b are withdrawn from contact with the stud shafts 64 and 66 so as to permit the unrestrained claw arm to engage and advance the film strip by a single image frame. The continued rotation of the cam 80 from the Fig. 2 position causes the bracket 120 to be pivoted in an anti-clockwise direction about the rivet 128 as the surface 120c is contacted by the enlarged portion of cam surface 81 and the force of a spring 132 is overcome. As a result, end 120b of the bracket 120 is pivoted away from the catch 110 and the catch 110 is then pivoted by the spring 116 back into contact with the pin 115 wherein

it is in position (Fig. 3) to once again engage the pawl 84. Thus, even if the operator holds the toggle 138 to the left instead of pulsing the toggle 138 as normally would be done for single frame operation, the stop frame mechanism automatically limits the projector mechanism to advancing a single frame. Of course, as soon as the operator releases the toggle 138, the bracket 120 will again be moved to the Fig. 2 position and in this position is ready to be again operated to cause a single frame to be advanced.

If the operator desires to operate the projector at a speed other than the single frame operation, simply moving speed selector 50 to a position other than that shown in Fig. 2 and Fig. 3 causes the catch 110 to be moved from position for end portion 112 thereof to contact second end portion 88 of the pawl 84 and normal operation of the projector can be resumed.

WHAT WE CLAIM IS:—

1. A film pull-down mechanism for a motion picture apparatus having a film claw adapted to intermittently engage and advance a film strip, first cam means adapted to drive said claw to engage and release said film strip, ratchet means rotatable continuously about an axis synchronously with operation of the claw, pawl means coupled to second cam means and movable into and out of engagement with said ratchet means for driving said second cam means synchronously with said first cam means when the pawl means and ratchet means are engaged, restraining means operatively coupled to the second cam means and positionable by said second cam means relative to the claw into and out of a position for holding said claw ineffective to engage said film strip, disengaging means for disengaging the pawl means from the ratchet means when the second cam means has positioned the restraining means in its position for holding the claw ineffective to engage the film strip, thereby effecting prolonged projection of a single frame, the disengaging means comprising a catch mounted for movement between a first position in which the catch is engageable with the pawl means so as to disengage the pawl means from the ratchet means and a second position in which the catch is not engageable with the pawl means, and said disengaging means further comprising shift means for moving the catch between its first and second position.

2. A film pull-down mechanism according to Claim 1 comprising a control member controlled by the second cam means and cooperating with the catch in response to movement of the shift means to effect shifting of the catch from its first position to its second position, said control member



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Referring now in particular to Figs. 2 and 3, the operation of the single frame mechanism will be described. As shown in these Figs., speed selector 50 has been moved to the single frame position as indicated by the alignment of the indicator mark on speed selector 50 with the letter S on the projector. When speed selector 50 is in this position, the cam followers 28 and 30 are positioned upon the face of face cam 42 such that they may contact only a single indentation as the cam 42 is rotated. Thus, where face cam 42 is driven at six revolutions per second, the cam followers would cause either one of the film claws 22 or 24 to engage and advance the film at a rate of six frames per second. However, as shown in Fig. 2, when the pawl 84 is disengaged from the ratchet 78 by the catch 110, extensions 96a and 96b contact stud shafts 64 and 66 and drive them under tabs 68 and 70 of the film claws wherein the film claws 22 and 24 are restrained from engaging the film until the plate 96 is again moved to the right, thereby permitting viewing of a single image frame.

When the projector mechanism is in the Fig. 2 position, the bracket 120 is caused to pivot in the clockwise direction about the rivet 128 until a surface 120c of the bracket 120 is in contact with the portion of the cam surface 81 which is indented. Thus, when the toggle 138 is manually pivoted to the left, as shown in phantom, the bracket 120 is also moved to the left by the rod 134. As end 120b of bracket 120 is brought into contact with the catch 110, the catch 110 is moved in a clockwise direction about the rivet 114 until the second end portion 88 of the pawl 84 is released. Spring 92 causes the pawl 84 to pivot about shaft 82 until the first end portion 86 is again engaged with the ratchet 78.

Once the ratchet 78 is engaged by the pawl 84, the cam 80 is caused to rotate again and, as shown in Fig. 3, the post 94 contacts the indented portion of the cam surface 81, permitting spring 102 to urge the plate 96 to the right. As the plate 96 is moved to the right in this manner, extensions 96a and 96b are withdrawn from contact with the stud shafts 64 and 66 so as to permit the unrestrained claw arm to engage and advance the film strip by a single image frame. The continued rotation of the cam 80 from the Fig. 2 position causes the bracket 120 to be pivoted in an anti-clockwise direction about the rivet 128 as the surface 120c is contacted by the enlarged portion of cam surface 81 and the force of a spring 132 is overcome. As a result, end 120b of the bracket 120 is pivoted away from the catch 110 and the catch 110 is then pivoted by the spring 116 back into contact with the pin 115 wherein

it is in position (Fig. 3) to once again engage the pawl 84. Thus, even if the operator holds the toggle 138 to the left instead of pulsing the toggle 138 as normally would be done for single frame operation, the stop frame mechanism automatically limits the projector mechanism to advancing a single frame. Of course, as soon as the operator releases the toggle 138, the bracket 120 will again be moved to the Fig. 2 position and in this position is ready to be again operated to cause a single frame to be advanced.

If the operator desires to operate the projector at a speed other than the single frame operation, simply moving speed selector 50 to a position other than that shown in Fig. 2 and Fig. 3 causes the catch 110 to be moved from position for end portion 112 thereof to contact second end portion 88 of the pawl 84 and normal operation of the projector can be resumed.

WHAT WE CLAIM IS:—

1. A film pull-down mechanism for a motion picture apparatus having a film claw adapted to intermittently engage and advance a film strip, first cam means adapted to drive said claw to engage and release said film strip, ratchet means rotatable continuously about an axis synchronously with operation of the claw, pawl means coupled to second cam means and movable into and out of engagement with said ratchet means for driving said second cam means synchronously with said first cam means when the pawl means and ratchet means are engaged, restraining means operatively coupled to the second cam means and positionable by said second cam means relative to the claw into and out of a position for holding said claw ineffective to engage said film strip, disengaging means for disengaging the pawl means from the ratchet means when the second cam means has positioned the restraining means in its position for holding the claw ineffective to engage the film strip, thereby effecting prolonged projection of a single frame, the disengaging means comprising a catch mounted for movement between a first position in which the catch is engageable with the pawl means so as to disengage the pawl means from the ratchet means and a second position in which the catch is not engageable with the pawl means, and said disengaging means further comprising shift means for moving the catch between its first and second position.

2. A film pull-down mechanism according to Claim 1 comprising a control member controlled by the second cam means and cooperating with the catch in response to movement of the shift means to effect shifting of the catch from its first position to its second position, said control member

5 permitting the return of the catch to its first position from its second position after advancement of a single film frame and following movement of the control member to a position for moving the catch to its second position, whereby the film strip is engaged and advanced only one frame each time the catch is selectively shifted from its first to its second position.

10 3. A film pull-down mechanism according to Claim 1 constructed substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

15 4. A motion picture projector comprising first means for periodically advancing a motion picture film, said first means comprising a film claw adapted to be synchronously movable into and out of engagement with the film and to advance the film by a single frame when the film claw is engaged with the film, second means arranged to prevent the first means from advancing the film, the second means comprising a ratchet operable continuously and synchronously with the film claw, a pawl coupled to cam means for controlling operation of the cam means, the ratchet and pawl being adapted to be shifted between a first condition wherein the pawl is disengaged from the ratchet so that the ratchet and pawl are thereby ineffective to operate the cam means and a second condition wherein the pawl is engaged with the ratchet so that the ratchet and pawl are effective to cause the cam means to be operated synchronously with the film claw, and restraining means operable by the cam means for restraining the film claw from movement into engagement with the film, a member adapted to engage the pawl to change the ratchet and pawl from said second condition to said first condition, and

means for selectively moving said member between a first position wherein said member is engageable with the pawl and a second position wherein said member is removed a spaced distance from the pawl.

5. A motion picture projector according to Claim 4 wherein the means for selectively moving said member comprises toggle means movably secured to a first portion of the projector, bracket means movably secured to a second portion of the projector, connecting means for connecting the toggle means and the bracket means such that movement of the toggle means produces movement of the bracket means, and wherein the said member comprises catch means selectively cooperable with the pawl such that the restraining means is movable from a first position in which it is effective to restrain the film claw to a second position in which it is ineffective to restrain the film claw, the catch means being located with respect to the bracket means so that the catch means is controlled by the bracket means in response to movement of the toggle means.

6. A motion picture projector according to Claim 5 wherein the cam means cooperates with the bracket means to move the bracket means from a first position in which the bracket means is ineffective to cooperate with the catch means to a second position in which the bracket means is effective to cooperate with the catch means.

7. A motion picture projector according to claim 4 constructed substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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