Sept. 9, 1947. L. A. McNABB 2,427,294

INTERMITTENT STRIP FEED MECHANISM

Filed July 27, 1945

Fig. 1

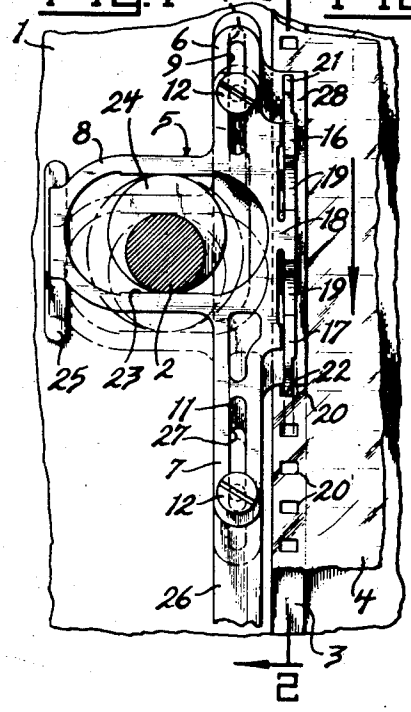


Fig. 2

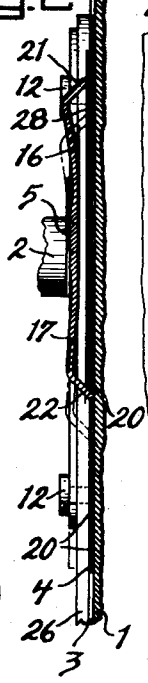


Fig. 3

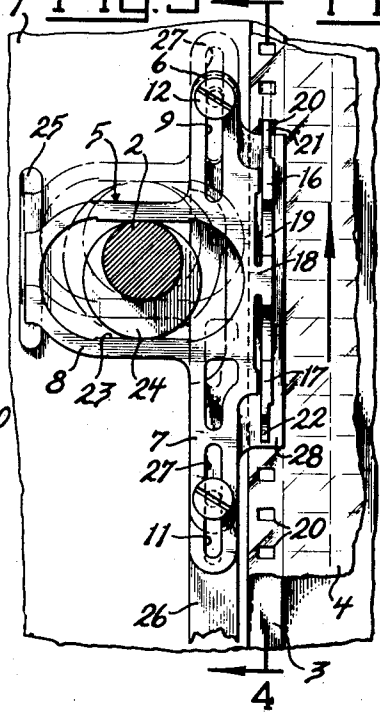


Fig. 4



Fig. 5

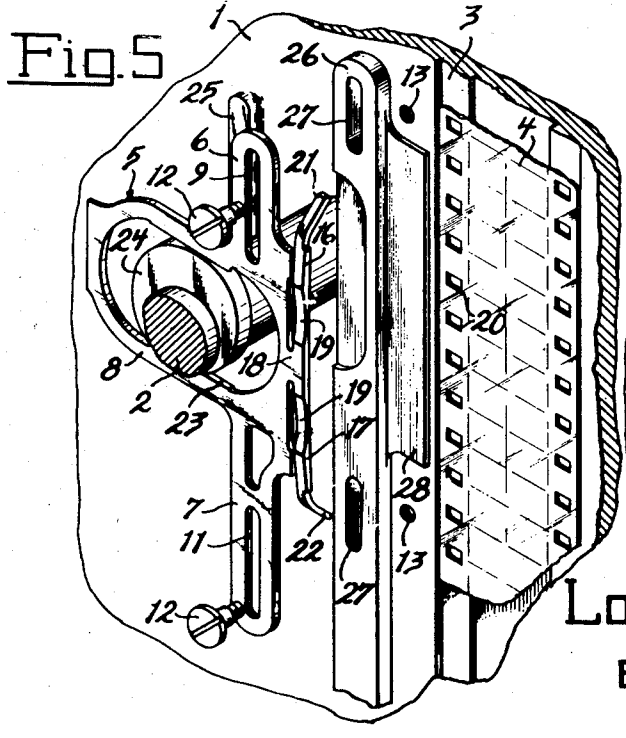
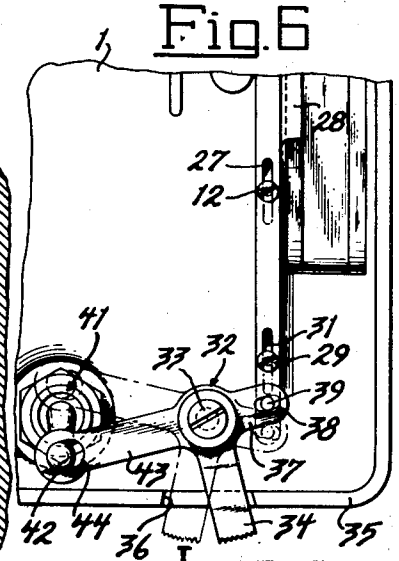


Fig. 6



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Patented Sept. 9, 1947

2,427,294

UNITED STATES PATENT OFFICE

2,427,294

INTERMITTENT STRIP FEED MECHANISM

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Application July 27, 1945, Serial No. 607,441

4 Claims. (Cl. 88—18.4)

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My invention relates particularly to intermittent strip feed mechanism for feeding motion picture film strips provided with the usual feed perforations spaced longitudinally thereof.

While an intermittent strip feed mechanism of the ratchet shuttle type has desirable characteristics, it is normally adapted to feed a strip only in one direction, whereas, particularly in the feeding of a motion picture film strip, it is occasionally desired to reverse the direction of feed of the strip.

The general object of my invention resides in the provision of a novel and effective intermittent strip feed mechanism of the ratchet shuttle type which provides for feeding a strip in either direction, having in mind simplicity of structure and convenience in the reversal of the direction of feed of the strip.

The invention will be better understood by reference to the accompanying drawing forming a part hereof and in which—

Figure 1 is a partial interior view in front elevation of a motion picture camera showing the intermittent strip feed mechanism of my invention;

Figure 2 is a partial sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 1 and showing the mechanism in a different position than that in which it is shown in Figure 1;

Figure 4 is a partial sectional view taken on the line 4—4 of Figure 3;

Figure 5 is an exploded perspective view of the intermittent strip feed mechanism shown in Figures 1 to 4 inclusive; and

Figure 6 is a partial interior view in front elevation of the camera, this view being a continuation of Figures 1 and 2 and the shuttle plate hereinafter described being omitted therefrom.

Referring to the drawing, 1 designates a vertically and transversely disposed frame plate of a motion picture camera, and a rotatable mechanism shaft 2, mounted in suitable bearings, extends forwardly through this plate. See Figures 1 to 5 inclusive. Spaced to one side of this shaft is a vertically extending film guide which is inclusive of a guide channel 3 in the forward face of the frame plate 1, the guide being adapted to guide a motion picture film strip 4 for longitudinal movement therein.

A shuttle plate, generally designated at 5, is provided with alined bearing extensions 6 and 7 extending oppositely from the intermediate portion 8 thereof, and these extensions are provided with alined bearing slots 9 and 11. Shouldered

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and headed bearing screws 12 respectively slidably engage through the bearing slots 9 and 11 and are respectively screw-threaded into vertically spaced threaded bores, shown at 13 in Figure 5, in the frame plate 1 and disposed adjacent one side of the guide channel 3, so that the shuttle plate is mounted for reciprocation longitudinally of the guide channel.

The shuttle plate 1 is provided, at the guide channel side of the bearing extensions 6 and 7, with a pair of resilient ratchet toothed arms 16 and 17 alined and extending oppositely therefrom in correspondence with the path of reciprocation of the shuttle plate and having their adjacent ends connected with the intermediate portion 8 of the shuttle plate as designated at 18, these arms being of reduced thickness in the regions of their adjacent ends, as designated at 19, to localize the flexing and to provide the proper degree of resiliency thereof facewise of the shuttle plate.

The arms 16 and 17 overlie the edge portion of the film strip 4 in the guide at said side of the guide channel 3 and are alined with usual spaced feed perforations 20 of the film strip, and the remote ends of the arms 16 and 17 are inclined toward the film strip and constitute ratchet teeth 21 and 22, respectively, of these arms which teeth are yieldably urged facewise of the shuttle plate by the resiliency of these arms into engaging relation with the feed perforations 20 of the film strip and which are operative to feed the film strip in respective of opposite directions with reciprocation of the shuttle plate.

The intermediate portion 8 of the shuttle plate is extended transversely of the path of reciprocation of the shuttle plate on the side of the bearing extensions 6 and 7 opposite that on which the arms 16 and 17 are disposed, and is provided with a correspondingly extending slot 23. An eccentric 24 on the mechanism shaft 2 engages the slot 23 to reciprocate the shuttle plate with rotation of the shaft. An additional slide bearing 25 on the frame plate 1 is operative on the extended side of the intermediate portion 8 of the shuttle plate in parallelism with the slide bearings comprising the bearing slots 9 and 11 and the bearing screws 12 to resist angular urge on the shuttle plate on an axis disposed correspondingly with the reciprocatory path of the shuttle plate by reason of the reaction of the resilient arms 16 and 17.

A selector bar 26 is provided with bearing slots 27 spaced and extending longitudinally thereof, and the bearing screws 12 also respectively slid-

ably engage through these slots, so that the bar extends longitudinally of and adjacent the said side of the guide channel 3 and is longitudinally reciprocable in correspondence with reciprocation of the shuttle plate 5, the bar being disposed between the shuttle plate 5 and the frame plate 1.

The selector bar 26 is provided with a longitudinally extending lateral extension 28 which is disposed between the arms 16 and 17 and the film strip and which is operative on these arms respectively in opposite positions of reciprocation of the bar to alternately maintain these arms out of engaging relation with the feed perforations 20 of the feed strip. In Figures 1 and 2 the selector bar is positioned at the upper extremity of its movement, and as so positioned the extension 28 underlies the ratchet tooth 21 of the upper arm 16 and maintains it out of engaging relation with the feed perforations 20 of the film strip and does not underlie the ratchet tooth 22 of the lower arm 17, with the result that only the ratchet tooth 22 is in engaging relation with the feed perforations of the film strip and reciprocation of the shuttle plate 5 causes intermittent feed of the film strip 4 downwardly as indicated by the arrow in Figure 1. In Figures 3 and 4 the selector bar is positioned at the lower extremity of its movement, and as so positioned the extension 28 underlies the ratchet tooth 22 of the lower arm 17 and maintains it out of engaging relation with the feed perforations 20 of the film strip and does not underlie the ratchet tooth 22 of the upper arm 16, with the result that only the ratchet tooth 21 is in engaging relation with the feed perforations of the film strip and reciprocation of the shuttle plate 5 causes intermittent feed of the film strip 4 upwardly as indicated by the arrow in Figure 3.

Accordingly, while the intermittent strip feeding mechanism is of the ratchet shuttle type, the direction of feed of the film strip may be reversed at will.

In order that the direction of feed of the film strip by other film strip feed means driven with the intermittent feed mechanism by the mechanism of the camera, such as usual constant strip feed means for feeding the film strip to and from the intermittent feed mechanism, may be automatically reversed in correspondence with reversal of the direction of feed of the film strip by the intermittent feed mechanism, means is provided for reversing the direction of drive of the mechanism of the camera and thus reversing the direction of feed of the film strip by the said other strip feed means in correspondence with the reversal of the direction of feed of the film strip by the intermittent feed mechanism, it being observed that reversal of the direction of drive of the shaft 2 which forms part of the camera mechanism, has no effect on the direction of feed of the film strip by the intermittent feed mechanism.

Referring to Figure 6, the selector bar 26 is extended downwardly and its lower end portion is slidably mounted for longitudinal movement by a headed and shouldered bearing screw 29 screw-threaded into the frame plate 1 and slidably engaged through a longitudinally extending bearing slot 31 through the lower end portion of the selector bar. A control lever 32 is pivotally mounted, as designated at 33, on the frame plate 1, and an arm 34 of this control lever extends outwardly of the camera casing 35 through a slot 36 for manual actuation of the lever. Another arm 37 of this lever is provided with a radial

slot 38 in which a stud 39 secured on the lower end of the selector bar 26 is slidably and pivotally engaged, so that the selector bar may be actuated to its opposite positions by actuation of the lever 32.

An electric motor, not shown, drives the mechanism of the camera, and a usual motor reversing switch 41 is secured on the frame plate 1 and is connected in circuit with the driving motor in a usual manner for reversing the same, the reversing switch thus constituting a mechanism drive direction selecting means serving to select the direction of feed of the film strip by the said other film strip feed means driven by the mechanism of the camera.

The reversing switch is inclusive of a pivoted control arm 42 which effects reversal of the drive motor with actuation thereof into its opposite control positions, and another arm 43 of the lever 32 is provided with a radial slot 44 in which the switch arm is slidably and pivotally engaged so that the switch arm may be actuated to its opposite drive direction positions by actuation of the lever 32. The selector bar 26 and the switch arm 42 are so connected by the control lever 32 that they are simultaneously positioned in opposite control positions thereof by actuation of the control lever and that the direction of feed of the film strip by said other feeding means corresponds with the instant direction of feed of the film strip by the intermittent feed mechanism. Thus, if it is desired to reverse the direction of feed of the film strip, it is only necessary to actuate the control lever 32 from one position to the other. In Figure 6 the positions of the selector bar 26, the control lever 32 and the switch arm 42 in which the film strip is fed downwardly, as indicated by the arrow in Figure 1, are shown in full lines, and the positions of the selector bar, control lever and switch arm in which the film strip is fed upwardly, as indicated by the arrow in Figure 2, are shown in dot and dash lines.

While I have thus described my invention, I do not wish to be limited to the precise details described, as changes may be readily made without departing from the spirit of my invention, but having thus described my invention, I claim as new and desire to secure by Letters Patent the following:

1. In an intermittent strip feed mechanism, the combination of a reciprocable shuttle provided with a pair of ratchet toothed arms extending oppositely therefrom in correspondence with the path of reciprocation thereof and having their adjacent ends connected with said shuttle and having ratchet teeth at their remote ends and yieldably urged into engaging relation with feed perforations of a guided strip and operative to feed the strip in respective of opposite directions, and a selecting member reciprocable in correspondence with said path of reciprocation and disposed between said arms and strip and operative on said arms respectively in opposite positions of its reciprocation to alternately maintain said arms out of engaging relation with the feed perforations of the strip.

2. In an intermittent strip feed mechanism, the combination of a reciprocable shuttle provided with a pair of ratchet toothed arms extending oppositely therefrom in correspondence with the path of reciprocation thereof and having their adjacent ends connected with said shuttle and having ratchet teeth at their remote ends and yieldably urged into engaging relation with feed

perforations of a guided strip and operative to feed the strip in respective of opposite directions, a selecting member reciprocable in correspondence with said path of reciprocation and disposed between said arms and strip and operative on said arms respectively in opposite positions of its reciprocation to alternately maintain said arms out of engaging relation with the feed perforations of the strip, and slide bearing means common to said shuttle and selecting member whereby they are mounted for reciprocation as aforesaid.

3. In an intermittent strip feed mechanism, the combination of a shuttle plate provided with bearing extensions extending oppositely from the intermediate portion thereof, spaced slide bearings on which said bearing extensions are slidably mounted whereby said shuttle plate is mounted for reciprocation, said shuttle plate being provided at one side of said bearing extensions with a pair of resilient ratchet toothed arms extending oppositely therefrom in correspondence with the path of reciprocation thereof and having their adjacent ends connected with said intermediate portion of the shuttle plate and having ratchet teeth at their remote ends and yieldably urged facewise of said shuttle plate into engaging relation with feed perforations of a guided strip and operative to feed the strip in respective of opposite directions, said intermediate portion of said shuttle plate being extended transversely of said path of reciprocation on the other side of said bearing extensions and provided with a correspondingly extending slot, a revoluble member engaging said slot and operative to reciprocate said shuttle plate, and a selecting member reciprocable in correspondence with said path of reciprocation and disposed between said arms and strip and operative on said arms respectively in opposite positions of its reciprocation to alternately maintain said arms out of engaging relation with the feed perforations of the strip.

4. In an intermittent strip feed mechanism, the combination of a shuttle plate provided with alined bearing extensions extending oppositely from the intermediate portion thereof, spaced

slide bearings on which said bearing extensions are slidably mounted whereby said shuttle plate is mounted for reciprocation, said shuttle plate being provided at one side of said bearing extensions with a pair of resilient ratchet toothed arms alined and extending oppositely therefrom in correspondence with the path of reciprocation thereof and having their adjacent ends connected with said intermediate portion of the shuttle plate and having ratchet teeth at their remote ends and yieldably urged facewise of said shuttle plate into engaging relation with feed perforations of a guided strip and operative to feed the strip in respective of opposite directions, said intermediate portion of said shuttle plate being extended transversely of said path of reciprocation on the other side of said bearing extensions and provided with a correspondingly extending slot, a revoluble member engaging said slot and operative to reciprocate said shuttle plate, a selecting member mounted on said slide bearings for reciprocation in correspondence with said path of reciprocation and disposed between said arms and strip and operative on said arms respectively in opposite positions of its reciprocation to alternately maintain said arms out of engaging relation with the feed perforations of the strip, and an additional slide bearing operative on the extended side of said intermediate portion of said shuttle plate in parallelism with said first mentioned slide bearings.

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