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A. S. HOWELL

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INTERMITTENT FEED DEVICE

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Fig. 1

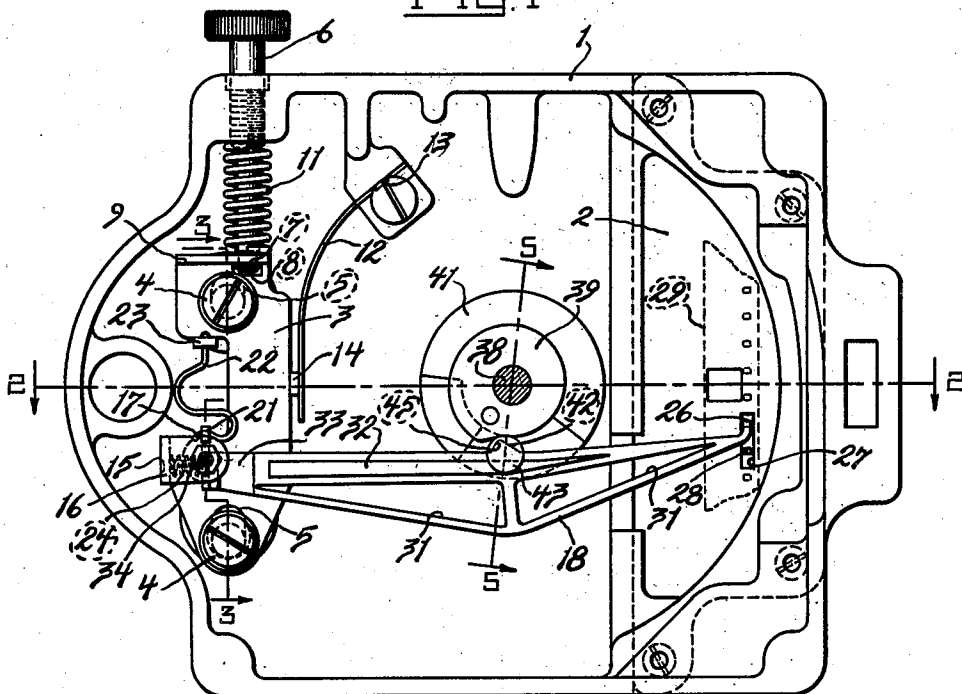


Fig. 2

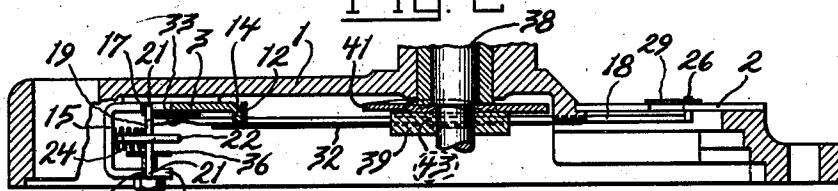


Fig. 3

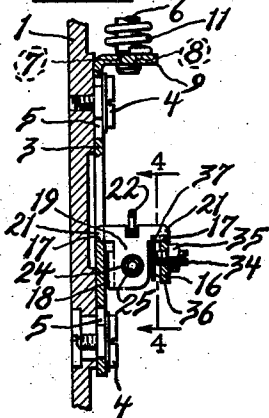


Fig. 5

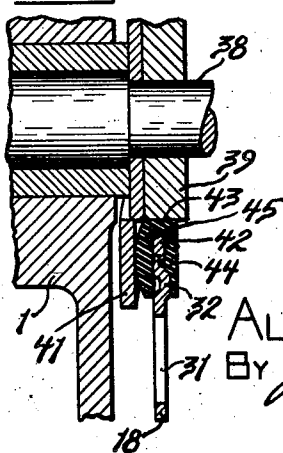
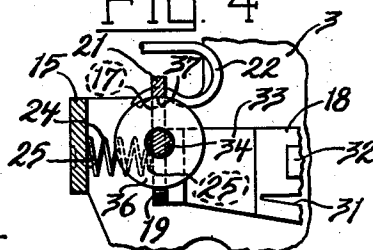


Fig. 4



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UNITED STATES PATENT OFFICE

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INTERMITTENT FEED DEVICE

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9 Claims. (Cl. 88—18.4)

My invention relates particularly to intermittent feed devices such as are used on motion picture machines although not limited to this use alone.

The general object of the invention resides in the provision of a simple, effective and accurate intermittent feed device which is particularly adapted for use in motion picture machines, the invention contemplating economy in manufacture and provision for assembly and service adjustment of the mechanism.

With this object in view my invention consists in certain features of novelty in the construction, combination and arrangement of parts by which the said objects and certain other objects, hereinafter appearing, are effected, all as fully described with reference to the accompanying drawing and more particularly pointed out in the appended claims.

In the said drawing—

Figure 1 is a partial view in front elevation of a motion picture projecting machine with parts removed;

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

Figure 3 is a partial sectional view substantially on the line 3—3 of Figure 1;

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

Figure 5 is a partial sectional view substantially on the line 5—5 of Figure 1.

Referring to the drawing, 1 designates a vertically disposed frame part, and a vertically extending apertured front face guide member 2 of a film feed guide is secured against a rear face of the frame part 1. See Figures 1 and 2.

A carrier member 3 is mounted for vertical movement, adjacent the side of the frame part 1 opposite that on which the guide member 2 is disposed, by means of vertically spaced headed and shouldered screws 4 passing through vertical slots 5 in the carrier member and screw-threaded into the frame part 2. See Figures 1 and 3.

A vertically disposed headed screw 6 is screw-threaded downwardly through the upper wall of the frame part 2, and the lower end of this screw is provided with a circumferential groove 7 which is engaged in a slot 8 in a horizontally disposed upper end portion 9 of the carrier 3.

Accordingly manual rotation of the screw 6 by means of the head thereof, which is disposed exterior of the frame part 2, effects vertical adjustment of the carrier 3. A helical compression spring 11 encircles the screw 6 and reacting on

the frame part 2 is operative downwardly on the carrier 3 and thus takes up any lost motion involved with the screw 6 and preventing displacement of the carrier incident to such lost motion during operation of the intermittent feed device.

A spring 12 has one end secured on the frame part 2, as designated at 13, and has its other end in pressure engagement with a forwardly extending portion 14 of the carrier 3, disposed immediately of the screws 4, and is thus operative on the carrier laterally of its vertical movement to take up any lost motion between the screws 4 and the slots 5 and prevent lateral displacement of the carrier incident to such lost motion during operation of the intermittent feed device.

The lower portion of the carrier 3 is provided with a portion 15 which extends forwardly therefrom and which has its end portion 16 extending in parallelism with the main portion of the carrier. The main portion of the carrier and the portion 16 thereof are provided with aligned upwardly facing slots 17 forming an upwardly facing open pivot mounting or bearing disposed on a forwardly and rearwardly extending axis.

A lever like feed shuttle of generally flat form, generally designated at 18, is provided and consists as follows. The shuttle extends transversely and is disposed in a vertical plane.

One integral end of the shuttle is disposed in a vertical forwardly and rearwardly extending plane, as designated at 19, and is provided with opposite aligned forwardly and rearwardly extending lugs 21 providing a pivot bearing formation extending laterally in both directions from the shuttle.

The slots 17 form a pivot mounting comprising spaced portions adapted to receive the shuttle therebetween, and the lugs 21 engage downwardly in the slots 17 to form a radially open pivot bearing for the shuttle for pivotal movement thereof in its vertical plane.

A spring 22, of generally S shape, has its upper end secured on a forward extension 23 of the carrier 3 and has its lower end in downward pressure engagement on the bearing end 19 of the shuttle intermediate the aforesaid bearing engagements thereof and thus maintains said bearing engagements.

A horizontally disposed helical compression spring 24 reacts on the portion 15 of the carrier 3 and engages the bearing end 19 of the shuttle below the aforesaid bearing engagements thereof and is thus operative on the shuttle in the region of said bearing engagements and longitudinally of the shuttle and eccentrically of said bear-

ing engagements and is adapted to urge the shuttle longitudinally thereof against said bearing engagements and to actuate the shuttle in one direction on said bearing engagements. The spring 24 is held in place by extrusions 25 on the portions 15 and 19 which are engaged inside of this spring.

The end of the shuttle 18 opposite the portion 19 is provided with a rearwardly projecting tooth 26 which projects through a vertical slot 27 through the guide member 2 for engagement with perforations 28 in a film 29 at the rear surface of the guide member 2 for the feeding of the film.

The shuttle diminishes in width in the plane thereof from its intermediate portion toward the ends thereof, as shown in Figure 1, and is provided with two spaced openings 31 there-through arranged longitudinally of the shuttle and diminishing in width in said plane toward the ends of the shuttle, thus reducing the weight of the shuttle while providing adequate rigidity of the shuttle in its plane.

The portion of the shuttle on the upper side of the openings 31 is provided with a longitudinally extending laterally offset portion 32 which serves to provide adequate rigidity of the shuttle laterally of its plane.

The shuttle is provided with a resilient portion of reduced section in a plane normal to the plane of the shuttle, as designated at 33, which portion is disposed adjacent the pivot mounting of the shuttle and is disposed between said pivot mounting and the offset portion 32 and the adjacent of the openings 31.

The portion 33 provides for pivotal movement of the shuttle laterally of its plane for film perforation engaging and disengaging movement of the shuttle tooth 26.

A screw 34 is screwthreaded through the portion 16 of the carrier 3 in parallelism with the axis of pivotal movement of the shuttle in its plane, and a lock nut 35 serves to secure the screw 34 in adjusted position. A flange 36 is secured on the inner end of the screw 34 and engages a notch 37 in the adjacent lug 21 of the shuttle to form an adjustable bearing for the shuttle operative normal to the pivotal movement of the shuttle in its plane.

A forwardly and rearwardly extending shaft 38 is rotatably mounted on the frame part 2 and is disposed above and intermediate the ends of the shuttle 18. Cams 39 and 41 are secured on the shaft 38, the cam 39 being a radial cam and the cam 41 being an axial cam disposed immediately to the rear of the cam 39 and facing forwardly.

The upper edge of the shuttle 18 is provided, intermediately thereof, with an upwardly projecting edge interlock formation 42, and a cam engaged bearing member 43, of molded material such as Bakelite, is provided with a slot 44 in which the shuttle is engaged, the bottom of the slot 44 being formed correspondingly with the interlock formation 42, as designated at 45, to prevent displacement of the member 43 with reference to the shuttle in the plane of the shuttle.

The cam engaged member 43 bears upwardly against the radial cam 39 and bears rearwardly against the axial cam 41, these cams being thus operative on the cam engaged member and the shuttle in planes normal to each other and each cam being operative on the shuttle in one direction.

The spring 24 serves to actuate the shuttle in

its plane in opposition to the radial cam 39 for effecting film feed and return movement of the shuttle in its plane, and the resiliency of the reduced portion 33 of the shuttle serves to actuate the shuttle normal to its plane in opposition to the axial cam 41 for effecting perforation engaging and disengaging movement of the shuttle, the cams 39 and 41 being timed to effect intermittent feed of the film 29.

Vertical adjustment of the carrier 3 serves for "framing", it being noted that the carrier is spring pressed to prevent accidental movement thereof, and adjustment of the screw 34 serves to provide adjustment of the film engaging and disengaging movement of the shuttle.

Having 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 feed device the combination of a lever like feed shuttle, an open pivot mounting for said shuttle at one end thereof comprising a pivot bearing formation on said shuttle and a cooperating pivot bearing formation one of which is of radially open bearing formation, revoluble means operative on said shuttle intermediate its ends for actuating said shuttle in one direction, a spring operative on said shuttle in the region of said mounting and transversely of said mounting adapted to maintain the shuttle engaged on said mounting, and a second spring operative on said shuttle in the region of said mounting and longitudinally of the shuttle and eccentrically of said mounting and adapted to urge the shuttle longitudinally thereof against said mounting and to actuate the shuttle in opposition to said revoluble means.

2. In an intermittent feed device the combination of a feed shuttle provided with a pivot formation extending laterally in both directions therefrom, a cooperating pivot mounting comprising spaced portions adapted to receive said shuttle therebetween and having open pivot bearing engagements with said pivot formation on both sides of said shuttle, and spring means operative on said shuttle intermediate said spaced portions and adapted to maintain said bearing engagements.

3. In an intermittent feed device the combination of a feed shuttle provided with a pivot formation extending laterally in both directions therefrom, a cooperating pivot mounting comprising spaced portions adapted to receive said shuttle therebetween and having open pivot bearing engagements with said pivot formation on both sides of said shuttle, revoluble means operative on said shuttle for actuating said shuttle in one direction, and spring means operative on said shuttle intermediate said spaced portions and adapted to maintain said bearing engagements and to actuate the shuttle in opposition to said revoluble means.

4. In an intermittent feed device the combination of a lever like feed shuttle provided with a pivot formation at one end and extending laterally in both directions therefrom, a cooperating pivot mounting comprising spaced portions adapted to receive said shuttle therebetween and having open pivot bearing engagements with said pivot formation on both sides of said shuttle, revoluble means operative on said shuttle intermediate its ends for actuating said shuttle in one direction, a spring operative on said shuttle in the region of

said bearing engagements and intermediate thereof adapted to maintain said bearing engagements, and a second spring operative on said shuttle in the region of said bearing engagements and longitudinally of the shuttle and eccentrically of said bearing engagements and adapted to urge the shuttle longitudinally thereof against said bearing engagements and to actuate the shuttle in opposition to said revoluble means.

5. In an intermittent feed device the combination of a lever like feed shuttle provided with a strip perforation engaging tooth at one end thereof, an open pivot mounting for said shuttle at the other end thereof affording feed and return movement of the same and comprising a pivot bearing formation on said shuttle and a cooperating pivot bearing formation one of which is of radially open bearing formation, revoluble means operative on said shuttle intermediate its ends for actuating the same comprising two cams operative on said shuttle in planes normal to each other and each cam operative on said shuttle in one direction, spring means operative on said shuttle in the region of said pivot mounting and adapted to maintain said shuttle engaged on said pivot mounting and to actuate the shuttle in opposition to the cam which is operative to actuate said shuttle on said pivot mounting, said shuttle being resilient and of reduced section in a plane corresponding with the axis of said pivot mounting between said cams and said pivot mounting and adjacent said pivot mounting for actuating the shuttle in opposition to the other cam, and adjustable bearing means associated with said pivot mounting and adjustable and operative on said shuttle in its plane of movement corresponding with the axis of said pivot mounting.

6. In an intermittent feed device the combination of a feed shuttle provided with a pivot formation extending laterally in both directions therefrom, a cooperating pivot mounting comprising spaced portions adapted to receive said shuttle therebetween and having open pivot bearing engagements with said pivot formation on both sides of said shuttle, revoluble means operative on said shuttle intermediate its ends for actuating the same comprising two cams operative on said shuttle in planes normal to each other and each cam operative on said shuttle in one direction, spring means operative on said shuttle in the region of said pivot mounting and adapted to maintain said shuttle engaged on said pivot mounting and to actuate the shuttle in opposition to the

cam which is operative to actuate said shuttle on said pivot mounting, said shuttle being resilient and of reduced section in a plane corresponding with the axis of said pivot mounting between said cams and said pivot mounting and adjacent said pivot mounting for actuating the shuttle in opposition to the other cam, and adjustable bearing means comprising a flanged member screw-threaded into one of said spaced apart bearing portions on an axis corresponding with the axis of said pivot mounting and having its flange engaged in a notch of the pivot formation of the shuttle.

7. A lever like feed shuttle of generally flat form provided with a pivot formation at one end disposed on an axis normal to the plane of the shuttle and with a longitudinally extending laterally offset portion terminating in spaced relation with said pivot formation and with a resilient portion of reduced section in a plane normal to the plane of the shuttle and disposed between said pivot formation and the adjacent end of said offset portion.

8. A lever like feed shuttle of generally flat form provided with a pivot formation at one end disposed on an axis normal to the plane of the shuttle, said shuttle diminishing in width in the plane thereof from its intermediate portion toward the ends thereof and provided with two spaced openings therethrough arranged longitudinally of the shuttle and diminishing in width in said plane toward the ends of the shuttle, a portion of said shuttle on one side of said openings being provided with a longitudinally extending laterally offset portion.

9. In a lever like feed shuttle of generally flat form provided with a pivot formation at one end disposed on an axis normal to the plane of the shuttle, said shuttle diminishing in width in the plane thereof from its intermediate portion toward the ends thereof and provided with two spaced openings therethrough arranged longitudinally of the shuttle and diminishing in width in said plane toward the ends of the shuttle, a portion of said shuttle on one side of said openings being provided with a longitudinally extending laterally offset portion, and said shuttle being provided with a resilient portion of reduced section in a plane normal to the plane of the shuttle and disposed between said pivot formation and said offset portion and the adjacent of said openings.

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