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STRIP FEED GUIDE

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Fig. 2

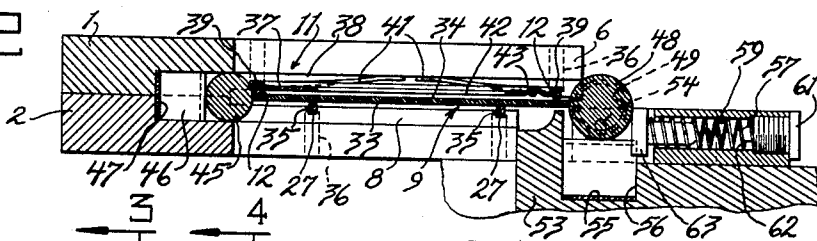


Fig. 1

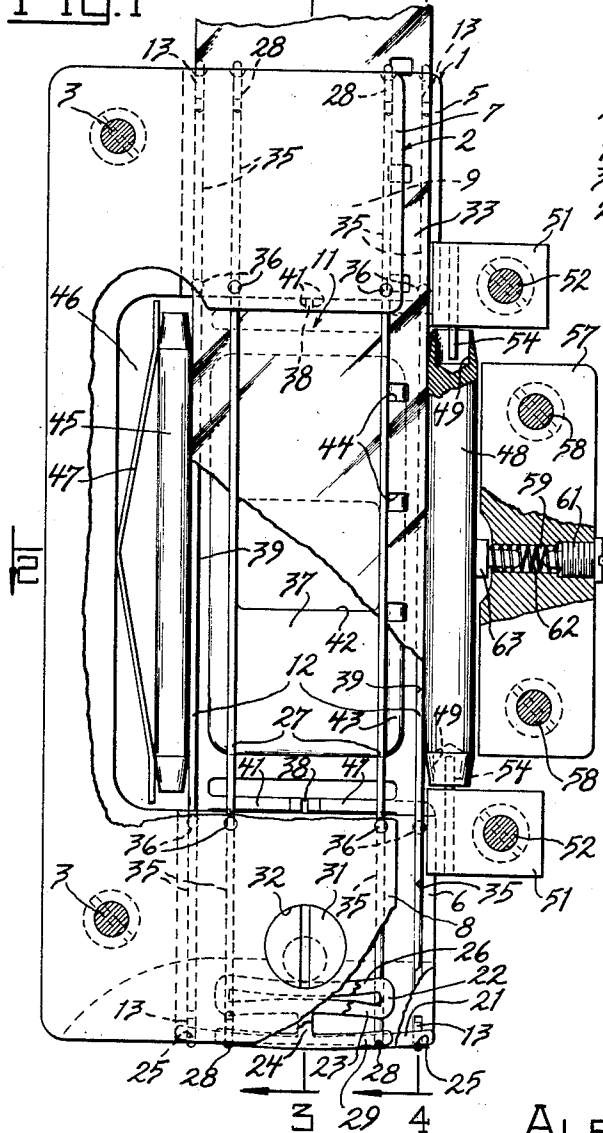


Fig. 3

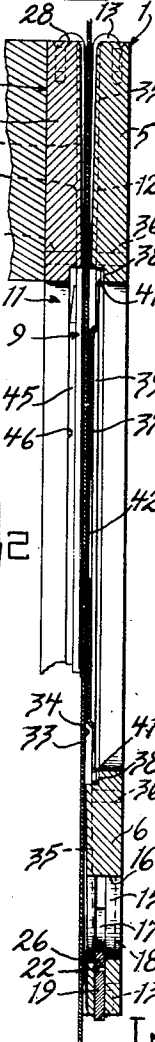
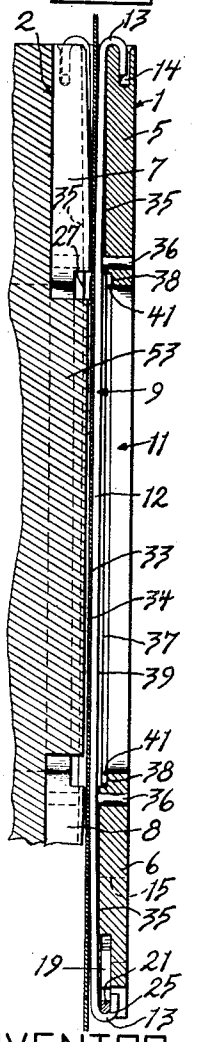


Fig. 4



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## UNITED STATES PATENT OFFICE

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## STRIP FEED GUIDE

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15 Claims. (Cl. 88-17)

My invention relates particularly to a light-exposure or projection-apertured strip feed guide for motion picture film such as forms a part of the intermittent feed mechanism of a motion picture projector or camera, although not limited to this use alone.

Objects of the invention reside in the provision of a novel and effective strip feed guide which accurately guides a strip therethrough, which minimizes scratching of the strip faces, which provides for correcting transverse curvature of the strip, and which is economical as to manufacture, all with a view toward the provision of a precision motion picture strip feed guide.

Further objects of the invention reside in the provision of a novel and effective strip edge guide structure of a strip guide which accurately guides a strip edgewise, which includes an edge guide element which may be successively positioned to bring different surface portions thereof into strip edge engaging position to substitute unused surface portions for worn or roughened surface portions, and which provides for edgewise insertion and removal of a strip with respect to the guide.

Referring to the drawing—

Figure 1 is a rear face elevation of a motion picture strip feed guide embodying my invention with parts removed, broken away or shown in section;

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; and

Figure 4 is a partial sectional view substantially on the line 4-4 of Figure 1.

In the said drawing, 1 and 2 designate respectively parallel vertically extending support plates secured together at one vertical side thereof, as designated at 3. The plate 1 is provided with vertically spaced lateral extensions 5 and 6 and the plate 2 is provided with similar vertically spaced lateral extensions 7 and 8, and the extensions are spaced to define a vertical guide channel 9 open at the top, bottom, and one side thereof, and having a vertically intermediate opening 11 therethrough.

A pair of laterally flexible parallel wires 12, spaced transversely of the channel 9, extend vertically of the channel at the inner faces of the extensions 5 and 6 of the plate 1 and vertically across the opening 11. The upper and lower ends of the wires 12 are doubled back to form opposing hooks 13 of which the upper hooks are engaged downwardly over the upper end of the upper plate extension 5 and in holes 14 therein

to secure the upper ends of the wires with this extension. See particularly Figures 3 and 4.

An eccentric member 15 is rotatably mounted by means of its periphery in a bore 16 through the lower plate extension 6 and disposed intermediate the wires 12, and the eccentric member is peripherally grooved eccentrically to provide an eccentric portion 17. The eccentric member is further provided at its outer end with a screw-driver slot 18 for the manual rotation thereof.

A spring member 19 of flat form comprises a cross bar portion 21 and an elongated resilient loop portion 22 extending correspondingly with the bar portion and having the intermediate portion of one elongated portion 23 thereof connected with the intermediate portion of the bar portion by a neck portion 24. See Figures 1 and 3. This spring member is disposed to extend transversely between the wires 12 and the cross bar portion 21 is spacedly engaged downwardly on the lower hooks 13 of the wires, spaced notches 25 being provided on the cross bar portion for engagement with these hooks, and the other elongated portion 26 of the loop portion 22 is upwardly engaged against the eccentric portion 17 of the eccentric member 15 intermediately between the wires to react thereagainst to simultaneously longitudinally tension the wires 12, the upper hooks 13 of which are engaged downwardly on the upper plate extension 5 in opposition to engagement of the spring member with the lower hooks 13.

In the angular position of the manually actuable eccentric member 15 shown in Figures 1 and 3, the wires 12 are longitudinally tensioned and secured by reason of the resilient portion 22 of the spring member being under compression, the spring member reacting upwardly on the eccentric member 15 and through the eccentric member reacting on the extension 6, and the cross bar portion 21 of the spring member engaging downwardly on the lower hooks 13 of the wires 12. Angular positioning of the eccentric member 15 diametrically opposite the position shown effects release of the tensioning of the wires 12, thus providing a convenient assembly.

Another pair of laterally flexible parallel wires 27, spaced transversely of the channel 9 and parallel to the wires 12, extend vertically of the channel at the inner faces of the extensions 7 and 8 of the plate 2 and vertically across the opening 11. The wires 27 are identical with the wires 12 and have the upper and lower ends thereof doubled back to form opposing hooks 28, and are secured in longitudinally tensioned con-

dition on the plate extensions 7 and 8 in identically the same manner in which the wires 12 are secured in longitudinally tensioned condition on the plate extensions 5 and 6.

Accordingly, the upper hooks 28 of the wires 27 are engaged downwardly on the upper plate extension 7 in opposition to a spring member 29, substantially identical with the spring member 19, engaged downwardly on the lower hooks 28 and reacting upwardly against a manually actuable eccentric member 31, identical with the eccentric member 15, rotatably mounted in a bore 32 through the lower plate extension 8 for longitudinally tensioning the wires 27.

As so secured and positioned in longitudinally tensioned condition, the wires 12 and 27 constitute lineal strip face guide elements and extend longitudinally of the guide, the pair of wires 12 being disposed in one plane for engagement with one face of a motion picture film strip 33 longitudinally engaged in the guide and the pair of wires 27 being disposed in another plane parallel with the plane of the wires 12 for engagement with the opposite face of the film strip for face-wise confining the strip, the wires 12 and 27 providing desirable line-like guide surfaces and preferably being formed of smooth surfaced hard stock wire such as piano wire with resulting manufacturing economy.

The pair of wires 27 are spaced closer than the pair of wires 12, as will be observed in Figures 1 and 2, and are spaced transversely of the guide inwardly of and relatively adjacent, with respect to the spacing of the wires of said pairs, for transverse curvature correction of the strip, the relatively wide spacing of the wires of each pair accommodating the picture record bearing section of the film strip therebetween.

Referring to the transverse curvature correction of the strip, a motion picture film strip has a natural transverse curvature rendering the emulsion bearing face thereof concave, due to the tension of the emulsion. For this reason the film strip 33 is engaged in the guide with the emulsion bearing side thereof, indicated at 34 in Figure 2, engaged against the more widely spaced pair of wires 12 with the result that the less widely spaced pair of wires 27 engages the opposite side of the film strip and, being spaced transversely of the guide inwardly from the wires 12, cooperates with the wires 12 to transversely straighten the film strip in the guide.

The inner faces of the plate extensions 5, 6, 7 and 8 are provided with vertical grooves 35 in which the wires 12 and 27 are respectively disposed, and pins 36 are mounted on the plate extensions at these grooves and adjacent the opening 11 and respectively laterally engage the wires to bow the pairs of wires toward each other, as shown in Figure 4 with reference to the wires 12, so that the planes of the intermediate portions of the wires 12 and 27 are closely spaced for accurately guiding the film while the end portions of the wires 12 and 27 diverge upwardly and downwardly from these intermediate portions for gradual confinement and release of the film strip as it passes through the guide.

A plate 37 extends across between the most widely spaced pair of wires 12 and is confined longitudinally of the guide by reason of its upper and lower ends engaging in transverse shoulder recesses 38 formed at the inner transverse edges of the plate extensions 5 and 6, this plate being movable face-wise and normal to the plane of the wires 12 and engageable therewith in oppo-

site relation with engagement of the film strip with these wires. The vertical edge portions of the plate 37 are provided with transversely spaced shoulders 39 offset inwardly from a face of the plate and engaging against the wires 12 to position the plate in clearance relation with the film strip in the guide. Transverse spring arms 41 are struck from the upper and lower end portions of the plate 37 and reacting on the shoulder recesses 38 yieldably urge the plate against the wires 12, thus automatically positioning the same with reference thereto. The plate 37 is provided with a light aperture 42 aligned with the picture record bearing portion of the film strip in the guide and is also provided with a vertically extending formed groove formation 43 facing the film strip and aligned with feed perforations 44 of the film strip for intermittent feed shuttle tooth clearance, the feed perforations of the film strip lying between the outermost wires 12 and 27.

A round edge guide spindle 45 extends longitudinally of the guide inwardly of the inner edge of the film strip in the guide and is confined in a vertically extending recess 46 formed in the plates 1 and 2, and a bow spring 47 in the recess reacts on the closed side thereof and yieldably urges the spindle 45 against the inner wire 2 to position the spindle for edge guiding engagement with the inner edge of the film strip.

A second round edge guide spindle 48 extends longitudinally of the guide outwardly of the outer edge of the film strip in the guide, and has large concentric bores 49 in the ends thereof. Vertically spaced brackets 51 secured, as designated at 52 in Figure 1, on a frame part 53, shown in Figure 2, are provided with small aligned pins 54 loosely engaged in the bores 49 to provide a mounting for the spindle 48, permitting rotation thereof as well as bodily movements thereof to and away from the opposing edge of the strip and normal to the plane of the strip.

A bow spring 55, engaged in a vertical recess 56 in the frame part 53 and reacting on the bottom thereof, see Figure 2, yieldably urges the spindle 48 normal to the plane of the film strip in the guide to position the spindle with the surfaces of the bores 49 engaging the pins 54, in which position the spindle axis is disposed in the plane of the film strip for edge guiding engagement with the outer edge of the film strip in opposition with guiding engagement of the spindle 45 with the inner edge of the film strip.

A plate 57 is secured, as designated at 58 in Figure 1, on the frame part 53 outwardly of the spindle 48 and is provided with a bore 59 disposed transversely of the guide and intermediate the ends of this spindle. A plug 61 is secured in the outer end of this bore, and a compression spring 62 in the bore reacts against the plug and yieldably urges a plunger 63 inwardly against the spindle 48 to urge this spindle inwardly against the outer edge of the film strip and thereby to edgewise confine the film strip between the spindles 48 and 45 for guiding the film strip edgewise, the spring 47 being stronger than the spring 62 so that the spindle 45 remains stationary.

Movement of the spindle 48 against the influence of the spring 55 and out of the plane of the film strip in the guide permits edgewise insertion and removal of the strip with respect to the guide, and both of the spindles 45 and 48 are rotatable so that when a portion of the surface of either becomes worn or roughened from guiding contact with the strip edge, another portion of

the surface thereof may be brought into guiding relation with the strip.

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 a strip feed guide, the combination with a support structure, of a laterally flexible wire-like strip face guide element extending longitudinally of the guide, and tensioning means operative on said guide element longitudinally thereof at spaced points therealong and reacting on said support structure to longitudinally tension said guide element, said tensioning means including a resilient member operative to tension said guide element.

2. In a strip feed guide, the combination with a support structure, of a laterally flexible wire-like strip face guide element extending longitudinally of the guide, and tensioning means operative on said guide element longitudinally thereof at spaced points therealong and reacting on said support structure to longitudinally tension said guide element, said tensioning means including a resilient member operative to tension said guide element and a manually actuatable member operative to establish and release tensioning of said guide element by said resilient member.

3. In a strip feed guide, the combination with a support structure, of a laterally flexible wire-like strip face guide element extending longitudinally of the guide and having the end portions thereof extended laterally to form opposing securing formations, one of which is engaged with said support structure, and resilient tensioning means engaging the other of said securing formations and reacting on said support structure for longitudinally tensioning said guide element.

4. In a strip feed guide, the combination with a support structure, of a laterally flexible wire-like strip face guide element extending longitudinally of the guide and having the end portions thereof doubled back to form opposing securing hooks, one of which is engaged with said support structure, and resilient tensioning means engaging the other of said hooks and reacting on said support structure for longitudinally tensioning said guide element comprising a resilient member engaging said last mentioned hook and a manually actuatable member operative between said support structure and said resilient member to establish and release longitudinal tensioning of said guide element by said resilient member.

5. In a strip feed guide, the combination with a support structure, of a laterally flexible wire-like strip face guide element extending longitudinally of the guide, tensioning means operative on said guide element longitudinally thereof at spaced points therealong and reacting on said support structure to longitudinally tension said guide element, and positioning means on said support structure laterally engaging said guide element between said spaced points and operative to bow said guide element in the direction of a strip in the guide.

6. In a strip feed guide, the combination with a support structure, of two transversely spaced laterally flexible wire-like strip face guide elements extending longitudinally of the guide, and tensioning means operative on said guide elements longitudinally thereof at spaced points therealong and reacting on said support structure

to longitudinally tension said guide elements, said tensioning means including a single resilient member operative to tension both of said guide elements.

7. In a strip feed guide, the combination with a support structure, of two transversely spaced laterally flexible wire-like strip face guide elements extending longitudinally of the guide, and tensioning means operative on said guide elements longitudinally thereof at spaced points therealong and reacting on said support structure to longitudinally tension said guide elements including a single resilient member extending transversely of and spacedly engaging said guide elements and having reaction relation with said support structure intermediately between said guide elements.

8. In a strip feed guide, the combination with a support structure, of two transversely spaced laterally flexible wire-like strip face guide elements extending longitudinally of the guide and having the end portions thereof doubled back to form opposing securing hooks, two corresponding hooks of which are engaged with said support structure, and resilient tensioning means engaging the other two corresponding hooks and reacting on said support structure for longitudinally tensioning said guide elements comprising a single resilient member extending transversely between said guide elements and spacedly engaging said last mentioned two hooks and a manually actuatable eccentric member pivotally mounted on said support structure and engageable with said resilient member intermediately between said guide elements to establish and release longitudinal tensioning of said guide elements by said resilient member.

9. In a strip feed guide, the combination with a support structure, of two transversely spaced laterally flexible wire-like strip face guide elements extending longitudinally of the guide, tensioning means operative on said guide elements longitudinally thereof at spaced points therealong and reacting on said support structure to longitudinally tension said guide elements, a light apertured plate extending across between said guide elements and movable normal to the plane of said guide elements, and resilient means reacting on said support structure and yieldably urging said apertured plate against said guide elements.

10. In a strip feed guide, the combination of a plurality of transversely spaced laterally flexible wire-like strip face guide elements extending longitudinally of the guide and at least two of which are disposed in one plane for engagement with one face of a strip in the guide and the remainder of which are disposed in another plane parallel to the first mentioned plane for engagement with the opposite face of the strip and all of said face guide elements being spaced transversely of the guide, a tensioning means operative on said guide elements longitudinally thereof to longitudinally tension the same.

11. In a strip feed guide, the combination of four transversely spaced laterally flexible wire-like strip face guide elements extending longitudinally of the guide and a pair of which is disposed in one plane for engagement with one face of a strip in the guide and the other pair of which is disposed in another plane parallel to the first mentioned plane for engagement with the opposite face of the strip and the guide elements of one of said pairs being spaced closer

than and respectively spaced transversely of the guide inwardly of and relatively adjacent, with respect to the spacing of the guide elements of said pairs, the guide elements of the other of said pairs, tensioning means operative on said guide elements longitudinally thereof to longitudinally tension the same, a light apertured plate extending across between one of said pairs of guide elements and engageable therewith in opposite relation with engagement of the strip with this pair of guide elements, and means positioning said apertured plate against this pair of guide elements.

12. In a strip face guide, the combination with opposing strip face guide elements for facewise guiding a strip therebetween, of edge guide means for edge guiding the strip including a spindle extending longitudinally of the guide and mounted for angular movement on its axis.

13. In a strip face guide, the combination with opposing strip face guide elements for facewise guiding a strip therebetween, of edge guide means for edge guiding the strip including a spindle extending longitudinally of the guide and mounted for angular movement on its axis and for bodily movement to and away from an opposing edge of the strip, and resilient means yieldably urging said spindle toward said edge of the strip.

14. In a strip face guide, the combination with opposing strip face guide elements for facewise guiding a strip therebetween, of edge guide means for edge guiding the strip including a spindle extending longitudinally of the guide and mounted for angular movement on its axis and for bodily movement to and away from an opposing edge of the strip and for bodily movement normal to the plane of the strip, resilient means yieldably urging said spindle toward said edge of the strip, and a second resilient means yieldably urging said spindle in one direction normal to the plane of the strip.

15. In a strip feed guide, the combination with a support structure, of two transversely spaced laterally flexible wire-like strip face guide elements extending longitudinally of the guide, tensioning means operative on said guide elements longitudinally thereof at spaced points therealong and reacting on said support structure to longitudinally tension said guide elements, a light apertured plate carried with said support structure and extending across between said guide elements and provided with shoulders offset inwardly from a face of said plate and spaced transversely and extending longitudinally of the guide and which are engaged against said guide elements.

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