

Oct. 11, 1932.

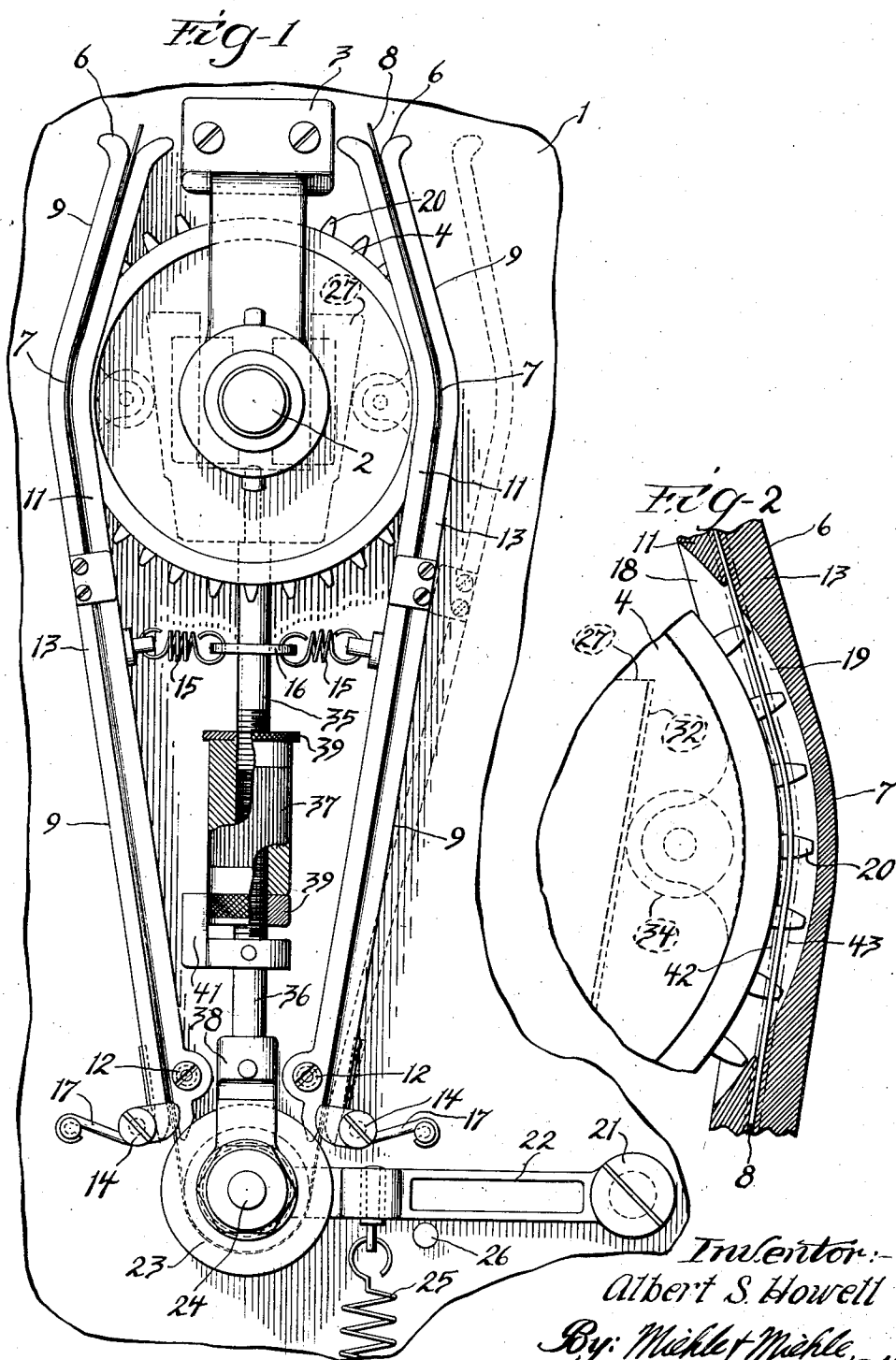
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PERFORATED STRIP SPROCKET FEED MECHANISM

Filed July 8, 1930

2 Sheets-Sheet 1



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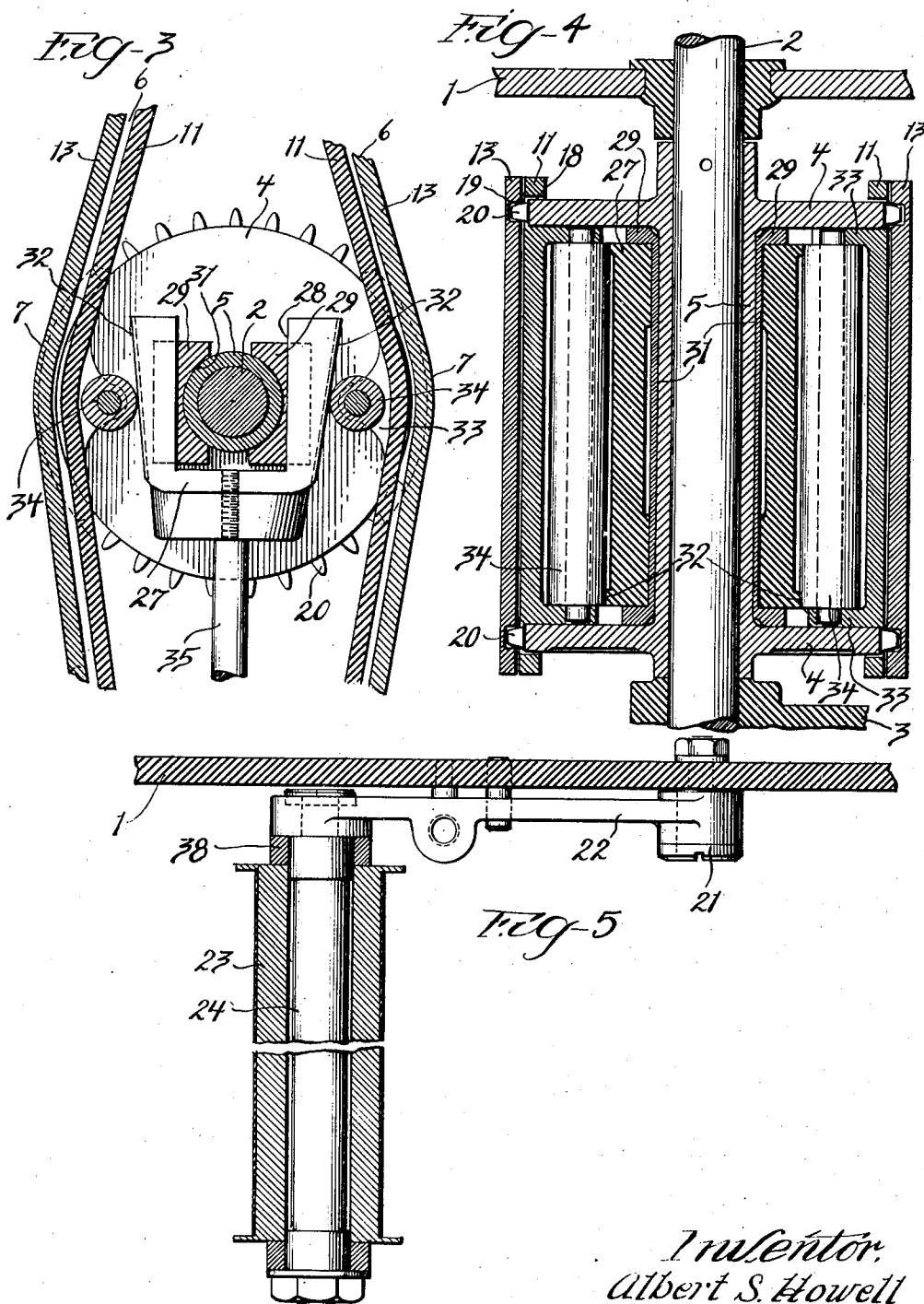
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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PERFORATED STRIP SPROCKET FEED MECHANISM

Application filed July 8, 1930. Serial No. 466,469.

My invention relates particularly to motion picture film sprocket feed mechanism although not limited to this use along.

The main object of the invention resides in the provision of a perforated strip sprocket feed mechanism which provides compensation, preferably automatically, for lineal variation of the strip, as for instance, that of motion picture film due to shrinkage or expansion, with a view particularly to the provision of a suitable sprocket feed for constant film feed motion picture machines which will compensate for lineal variation of the film.

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 object and certain other objects, hereinafter appearing are effected, all as fully described with reference to the accompanying drawings and more particularly pointed out in the appended claims.

In the said drawings:—

Figure 1 is a side elevation of a motion picture film sprocket feed mechanism embodying my invention with parts broken away and shown in section;

Figure 2 is an enlarged sectional view of a portion thereof;

Figure 3 is a partial sectional view thereof in elevation similar to that of Figure 1;

Figure 4 is a horizontal section on the axis of the feed sprocket of the mechanism;

Figure 5 is a horizontal sectional view of another portion of the mechanism.

Like characters of reference indicate like parts in the several views.

Referring to the drawings, 1 designates a frame and revolubly mounted on this frame is a drive shaft 2, the projecting end of which is journaled in a bracket 3 on the frame. See Figures 1 and 4.

Secured on the shaft 2 between the frame 1 and the bearing of the bracket 3 is a bored feed sprocket comprising two spaced toothed wheels 4 and an axial spindle 5 extending therebetween. See Figure 4.

A pair of vertically arranged film guides, generally indicated at 6, are arranged in diametrically opposite relation with the

sprocket and are pivoted at their lower ends, as hereinafter described, for movement radially of the sprocket. See Figure 1. The portions of the guides opposite the sprocket are curved correspondingly therewith, as designated at 7, to guide a film 8 in the guides engaged for short distances on the sprocket at diametrically opposite places thereon, and the portions of the guides above and below the curved portions 7 are straight and tangent to the curved portions 7 and converge toward each other in directions away from the sprocket, as designated at 9.

Each guide consists of an inner face guide member 11 pivoted at its lower end, as designated at 12, and an outer face guide member 13 pivoted at its lower end adjacent the pivot 12, as designated at 14.

The inner face guide members 11 are yieldably urged in opposite directions and inwardly of the sprocket by springs 15 connected with these guide members and extending toward each other and having their adjacent ends connected with an annular member 16.

The outer face guide members 13 are yieldably urged in opposite directions and inwardly of the sprocket by torsion springs 17 associated with the pivots 14 thereof.

Movement of the guide members 11 inwardly of the sprocket by means of the springs 15 is limited by means hereinafter described for properly positioning the guides for engaging the film on the sprockets, and the springs 17 normally maintain the outer face guide members 13 in film guiding relation with the guide members 11, but permit the outer face guide members to be moved outwardly from the inner face guide members for the lacing and unlacing of film in the guides.

The curved portions of the inner face guide members 11 are slotted, as designated at 18, for the projection of the sprocket wheels 4 therethrough to engage the film in the guides, while the curved portions of the outer face guide members 13 are grooved, as designated at 19, for the clearance of the teeth 20 of the sprocket wheels 4. See Figure 4.

The lower straight portions 9 of the guides 6 are relatively long and provide a loop of the film 8 of suitable length between the places of engagement of the film on the sprocket. See Figure 1.

Pivotally mounted on the frame 1, as designated at 21, is a horizontally disposed arm 22, the free end of which is disposed adjacent the lower ends of the guides 6. A roller 23 is revolvably carried on the free end of the arm 22 by means of a stud 24 secured on the arm. See Figures 1 and 5.

The aforesaid loop of the film 8 is trained about the roller 23, and the arm 22 and roller 23 are yieldably urged downwardly to tension the loop of the film by a spring 25 connected with the arm and the frame 1, a pin 26 on the frame limiting downward movement of the arm and roller.

The guides 6 are adjustably positioned radially of the feed sprocket in the following manner.

Disposed between the guides 6 and the wheels 4 of the sprocket is a wedge member 27 provided with a central box opening 28 through which the spindle 5 of the sprocket passes. See Figures 3 and 4. A pair of bearing blocks 29 are disposed on opposite sides of the spindle 5 and engage the same with concave bearing surfaces 31 and slidably engage the opposing vertical sides of the opening 28 of the wedge member 27, whereby the wedge member is maintained centrally of the sprocket for sliding movement diametrically thereof.

The opposite outer surfaces of the wedge member 27, extending correspondingly with the aforesaid movement thereof and designated at 32, converge downwardly to form a wedge, and journaled on and extending between inwardly projecting ears 33 at the sides of the inner face guide members 11 are rollers 34 which have a rolling contact with the surfaces 32 of the wedge member.

The aforesaid springs 15 yieldably urging the guides 6 inwardly of the sprocket are opposed by the wedge member 27 engaging the rollers 34, so that movement of the wedge member effects opposite adjusting movement of the guides radially of the sprocket, the arrangement being such that corresponding adjustment of the guides is effected.

A connecting link, comprising an upper rod 35 secured to the wedge member 27 and extending through the annular member 16, a lower rod 36 connected with the upper rod by a turn nut 37 screw-threaded on the adjacent ends of the rods with right and left screw-threads for adjusting the length of the connecting link, and a head 38 secured on the lower end of the lower rod 36 and pivotally engaged on the stud 24 of the arm 22, connects the wedge member 27 with the arm 22 and roller 23 for movement therewith. See Figures 1, 3 and 5.

The turn nut 37 is locked in adjusted position with the rods 35 and 36 by means of lock nuts 39, and an index scale 41 is provided on the lower rod 36 for predeterminedly adjusting the length of the connecting link.

The arrangement is such that the guides are adjusted to equal radii with reference to the feed sprocket, and these guides are adapted in their said movement for variably positioning the film radially with reference to the sprocket, the two portions of the film engaged on the sprocket being disposed at equal radii with reference to the sprocket in the adjustment of the guides.

The loop of the film 8 between the engagements of the film with the sprocket varies in extent with lineal variation of the film, that of a shrunken film being smaller than that of a film of normal lineal extent and that of an expanded film being greater than that of a normal film or of a shrunken film.

Consequently the roller 23 engaged with the aforesaid loop of the film and yieldably urged to tension the same moves up and down with lineal variation of the film forming the loop, and operating through the connecting link moves the wedge member 27 up and down with corresponding adjustment of the guides and film therein radially of the sprocket.

Thus, as the roller 23 moves downward in consequence of extension of the loop of the film resulting from an expanded film, the guides 6 and the film therein move radially of the sprocket outwardly, and, as the roller 23 moves upward in consequence of the contraction of the loop of the film resulting from a shrunken film, the guides move radially of the sprocket inwardly.

As a result, a shrunken film is engaged on the sprocket at a short radius while an expanded film is engaged on the sprocket at a long radius, a normal film being engaged on the sprocket at an intermediate radius, as illustrated in a somewhat exaggerated manner in Figure 2 wherein the position of the film 8 of normal extent is illustrated, the position of a shrunken film is indicated at 42, and the position of an expanded film is indicated at 43.

In practice the difference in radius of film on the sprocket in the several conditions thereof amounts to approximately .010 or .012 of an inch, and the teeth of the sprocket are preferably of modified involute form.

As a result lineal variation of the film is compensated for, automatically as shown, so that a uniform picture space to picture space or perforation space to perforation space feed of the film or perforated strip is provided.

While I have described and shown the preferred embodiment of my invention I do not wish to be limited to the precise details of

construction as changes may readily be 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. The combination with a revoluble feed sprocket, of a guide movable radially of said sprocket and adapted in its said movement for variably positioning a perforated strip engaged on said sprocket, and automatic means responsive to lineal variation of the strip for adjustably positioning said guide whereby to correspond the position of the strip radially on said sprocket with lineal variation of the strip.

2. The combination with a revoluble feed sprocket means, of guide means movable radially of said sprocket means and adapted in its said movement for variably positioning a perforated strip engaged at spaced places on said sprocket means with a loop of the strip therebetween, and means responsive to variations of length of said loop for adjustably positioning said guide means whereby to correspond the position of the strip radially on said sprocket means with lineal variation of the strip.

3. The combination with a revoluble feed sprocket, of a pair of guides movable radially of said sprocket and adapted in their said movement for variably positioning a perforated strip engaged at spaced places on said sprocket with a loop of the strip therebetween, and means responsive to variations of length of said loop for adjustably positioning said guides in correspondence whereby to correspond the position of the strip radially on said sprocket with lineal variation of the strip.

4. The combination with a revoluble feed sprocket means, of guide means movable radially of said sprocket means and adapted in said movement for variably positioning a perforated strip engaged at spaced places on said sprocket means with a loop of the strip therebetween, a movable member over which said loop of the strip is trained and yieldably urged to tension said loop, and means for adjustably positioning said guides in correspondence whereby to correspond the position of the strip radially on said sprocket means with lineal variation of the strip.

5. The combination with a revoluble feed sprocket means, of guide means movable radially of said sprocket means and adapted in said movement for variably positioning a perforated strip engaged at spaced places on said sprocket means with a loop of the strip therebetween, a movable member over which said loop of the film is trained and yieldably urged to tension said loop, and means under the control of said movable member for adjustably positioning said guide means in correspondence whereby to correspond the po-

sition of the strip radially on said sprocket means with lineal variation of the strip.

6. The combination with a revoluble feed sprocket, of a pair of guides arranged in diametrically opposite relation with said sprocket and movable radially thereof and adapted in their said movement for variably positioning a perforated strip engaged at diametrically opposite places on said sprocket with a loop of the strip therebetween, a movable roller over which said loop of the strip is trained and yieldably urged to tension said loop, and means actuated by said roller in its said movement for adjustably positioning said guides in correspondence whereby to correspond the position of the strip radially on said sprocket with lineal variation of the strip.

7. The combination with a revoluble feed sprocket, of a pair of guides arranged in diametrically opposite relation with said sprocket and pivoted for movement radially thereof and adapted in their said movement for variably positioning a perforated strip engaged at diametrically opposite places on said sprocket with a loop of the strip therebetween, a roller over which said loop of the strip is trained, a pivoted arm carrying said roller and yieldably urged to move said roller to tension said loop, and means actuated by said arm and roller for adjustably positioning said guides in correspondence whereby to correspond the position of the strip radially on said sprocket with lineal variation of the strip.

8. The combination with a revoluble feed sprocket comprising two spaced toothed wheels and an axial spindle extending therebetween, of a pair of guides arranged in diametrically opposite relation with said sprocket and pivoted for movement radially thereof and adapted in their said movement for variably positioning a perforated strip engaged at diametrically opposite places on said sprocket with a loop of the strip therebetween and yieldably urged in opposite directions, a roller over which the loop of the strip is trained, a pivoted arm carrying said roller and yieldably urged to move said roller to tension said loop, a wedge member between said toothed wheels and embracing said spindle for simultaneously actuating said guides in directions opposite those in which said guides are yieldably urged and provided with an opening through which said spindle extends, a connecting rod secured with said wedge member and pivotally connected with said arm, and a slide bearing embracing said spindle and slidably engaged by said wedge member.

9. The combination with a revoluble feed sprocket, of a pair of guides movable radially of said sprocket and adapted in their said movement for variably positioning a perforated strip engaged at spaced places on said

sprocket with a loop of the strip therebetween, means for adjusting said guides in correspondence whereby to correspond the position of the strip radially on said sprocket
5 with lineal variation of the strip, and means for tensioning said loop of the strip.

In witness whereof I hereunto affix my signature this 27th day of June, 1930.

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ALBERT S. HOWELL.

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