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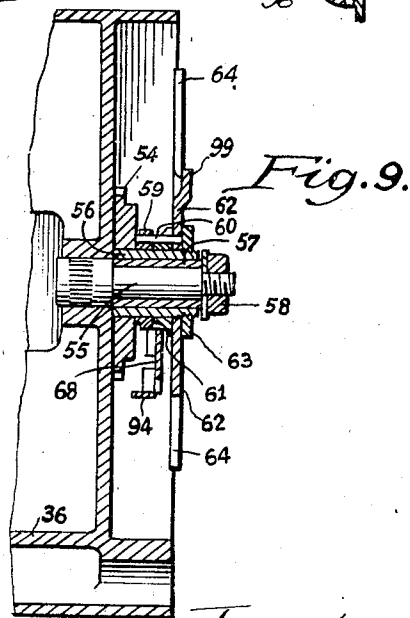
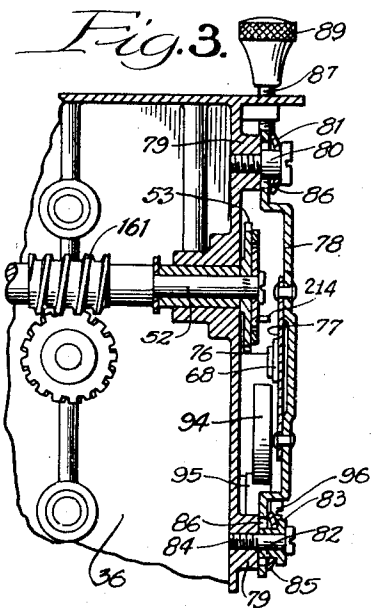
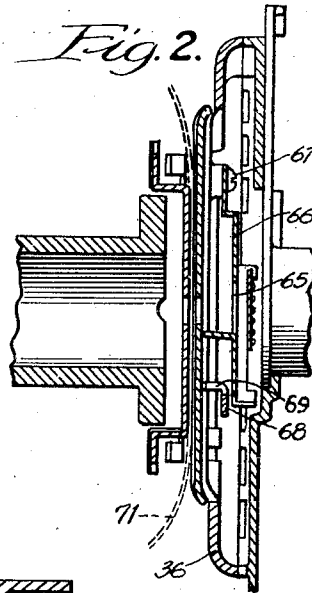
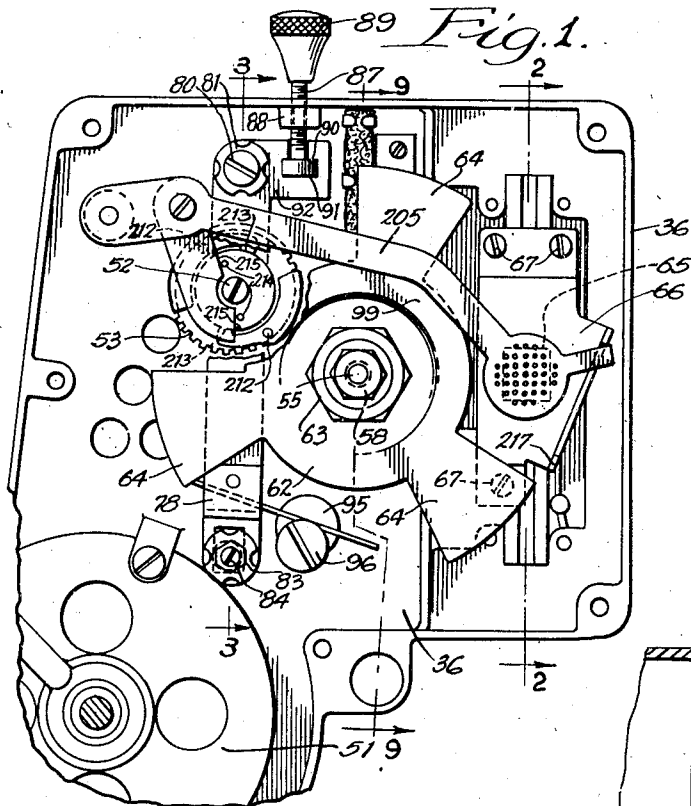
T. J. MORGAN ET AL

2,335,435

CINEMATOGRAPH FILM FEEDING MECHANISM

Filed April 15, 1940

2 Sheets-Sheet 1



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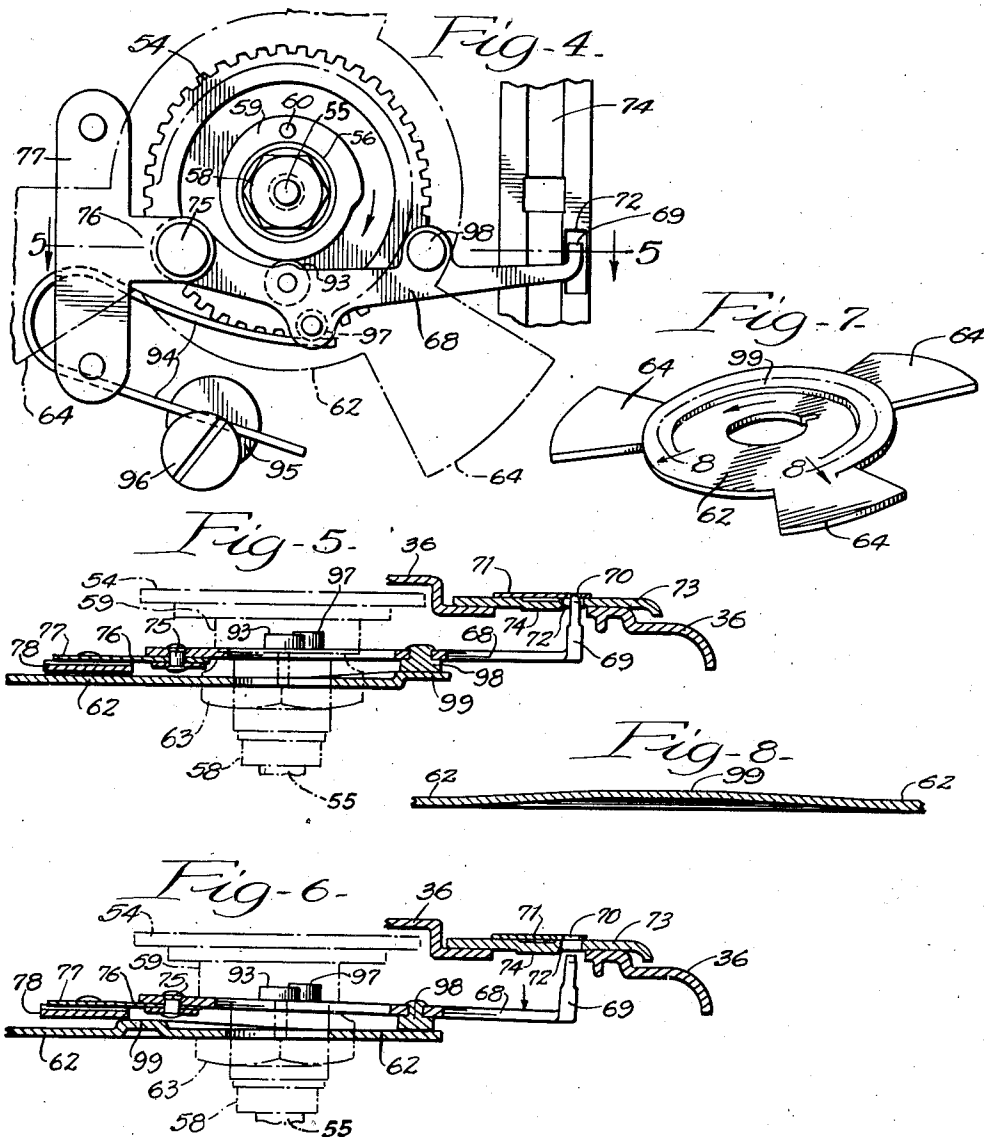
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CINEMATOGRAPH FILM FEEDING
MECHANISM

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5 Claims. (Cl. 88—18.4)

This invention relates to cinematographs and more particularly, although not exclusively, to such devices as are designed for home use. The main objects of the invention are to provide a simple but highly efficient film feeding mechanism; to provide such mechanism which will be readily adjustable into proper operating relationship to the film which is to be fed; to provide such mechanism which will be durable but low and economical in cost of manufacture; and to provide such mechanism which will be quiet in operation.

In general, it is the object of the invention to provide an improved cinematograph film feeding mechanism of the character indicated and other objects and advantages will be understood by reference to the following specification and accompanying drawings (two sheets) wherein there is disclosed a cinematograph embodying a selected form of the invention.

In the drawings:

Fig. 1 is an elevation of mechanism appearing upon removal of certain housing parts not herein illustrated;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary elevation corresponding in part to the disclosure of Fig. 1 but showing certain parts which are concealed by parts in Fig. 1;

Fig. 5 is a section on the line 5—5 of Fig. 4;

Fig. 6 is a section corresponding to Fig. 5 but showing a changed position;

Fig. 7 is a perspective of a combined shutter and cam member shown also in Figs. 1, 5 and 6;

Fig. 8 is a section on the line 8—8 of Fig. 7;

Fig. 9 is a section on the line 9—9 of Fig. 1.

Referring now to Figure 1, the mechanism there shown appears in the back of the main housing 36 when certain other housing sections (not shown) are removed. As shown in Figure 1, a reversible electric motor 51 is suitably mounted in said main housing 36 and said motor is adapted to drive through the agency of a belt and pulley or other suitable means (not shown) a shaft indicated at 52 which is suitably journaled in bearings provided in said housing member 36.

On the end of the shaft 52 in back of the housing member 36 there is provided a gear 53, said gear being secured to the shaft 52 for rotation therewith and meshing with a gear 54 rotatably mounted on a stud shaft 55 which is rigidly secured in a suitable boss provided in the housing member 36 (see Figure 9).

The gear member 54 is rotatably mounted on 55

the shaft 55 through the agency of a sleeve 56 (see Figure 9) to which the gear member is suitably anchored or keyed and said sleeve member is in turn rotatably mounted on a bushing 57, disposed on the shaft 55 and held in place thereon by means of a nut and washer as indicated at 58. Endwise displacement of the gear 54 and sleeve 56 is also prevented by said nut and washer 58 as will be apparent from an inspection of Figure 9.

On the sleeve 57 and adjacent the gear 54, there is mounted a cam member 59, said cam being suitably anchored to the sleeve 56 so as to rotate therewith. Said cam 59 is provided with a laterally extending pin 60 which enters suitable openings provided in a spacing collar 61 and shutter member 62, which are mounted on said sleeve 56 and caused to rotate therewith incident to the interlocking connection produced by said pin 60. A clamping nut 63 threadedly engages the outer end of the sleeve 56 and serves to clamp the shutter member 62 in assembled relation to the sleeve 56 and other parts carried thereby.

The shutter member 62 may be of the more or less conventional three-bladed type at least in so far as its shutter function is concerned. As will be apparent from an inspection of Figure 1, the edgewise extending blades 64 of the shutter are adapted to successively pass a projection opening 65 provided in a plate member 66, which is suitably secured as by screws 67 to the housing member 36.

A film feeding member which is caused to reciprocate vertically and also horizontally is indicated at 68, said member being provided with a laterally forwardly extending dog or tooth 69 which is adapted to successively engage the apertures indicated at 70 in a film 71. The tooth 69 projects through an opening 72 in a plate 73 which is suitably secured to the front of the housing member 36, the front face of said member 73 being suitably finished so as to avoid scratching of the film surface which is slidable thereover. Suitable guides (not shown) may also be provided in association with said plate 73 for maintaining the film 71 in a proper path of travel over said plate 73. A portion 74 of the plate is also preferably offset as best shown in Figure 5 so as to avoid actual contact with that portion of the film strip which bears the photographs.

The film feeding member 68 is pivotally connected as indicated at 75 to an ear 76 of a spring metal member 77 which is in turn rigidly secured at its ends to a rigid, vertically extending strap 78 (see Figures 1 and 3).

The strap 78 is vertically slidably mounted on suitable bosses 79 formed in the housing member 36. As shown in Figure 3, the upper end portion of the strap is so mounted through the agency of a shouldered screw 80 and a cupped spring member 81, the latter serving to resiliently maintain the underlying end portion of the member 78 in seated position on the boss 79. The lower end of the member 78 is vertically adjustably mounted and also horizontally adjustably mounted on the underlying boss 79 through the agency of an eccentrically drilled collar 82, provided with a nut-like flange part 83 for facilitating rotation of the sleeve 82 about its mounting screw 84. A cupped spring 85 interposed between the head 83 of the sleeve 82 and the adjacent end of the member 78 serves to resiliently maintain that end seated on its supporting boss 79. It will be observed that by rotation of the sleeve 82, the horizontal position of the lower end portion of the strap 78 may be adjusted, thereby imparting corresponding horizontal adjustment to the location of the film feeding tooth or dog 69. The upper and lower ends of the strap 78 are provided with vertically elongated slots 86, 86 which receive the shoulder portion 80 and sleeve 82, respectively, so as to permit vertical movement of the strap 78.

For effecting vertical adjustment of the strap 78, there is provided (as best shown in Figures 1 and 3) an adjusting screw 87 threadedly engaging an aperture in a boss 88 provided as a part of the housing member 36, said screw being provided with a knurled head 89 to facilitate manual rotation of the screw and an integrally formed end collar 90. The collar 90 fits rotatably within a suitable opening 91 provided in a lateral extension 92 of the strap 78 so that vertical movement of the screw 87 will be imparted to the strap 78. Such vertical movement of the strap 78 will effect vertical adjustment of the operating zone of the film feeding tooth or dog 69 as will presently appear.

The film feeding member 68 is provided intermediate its ends with a stud 93 which engages the cam 59 which is thereby operative to effect vertical rocking movement of the film feeding member 68. A suitable U-shaped spring member 94 is provided for urging the member 68 in an upward direction to cause its stud 93 to constantly follow the cam 59. Said spring 94 has one end mounted in a slot in a disc-like member 95 which is secured to the wall of the housing member 36 by a screw 96. The other end of the spring 94 bears against a suitable stud 97 carried by the film feeding member 68.

It will be observed that vertical movement of the strap 78 and the rigidly attached spring member 77 to which the film feeding member 68 is pivotally mounted will effect rocking of the latter about its cam-engaging stud 93 as a fulcrum. Hence the beforementioned vertical adjustment of the operating zone of the film feeding tooth 69 will be effected.

For producing the required lateral movement of the tooth 69 for causing the same to become engaged and disengaged from the film intermediate the vertical reciprocations of the tooth, said film feeding member 68 is rocked laterally by cam means, the flexibility of the spring metal mounting member 77 permitting such lateral rocking.

The film feeding member 68 is provided with an anti-friction bearing element 98, the same being formed of an impregnated fibre or like ma-

terial and rigidly secured in any suitable manner such as indicated in Figure 5 to the member 68.

The member 98 is adapted to bear against a cam surface 99 formed in the periphery of the hub portion of the shutter 62. The cam 99 may be conveniently formed by laterally offsetting the peripheral portion of the hub of the shutter 62 as is clearly shown in Figures 5 to 8, inclusive. The cam 99 is suitably formed and proportioned to effect the horizontal, in and out reciprocating movement of the film feeding tooth 69 at the upper and lower limits, respectively, of the vertical movement of said tooth. The rotation of the shutter member 62 with its cam 99 and the rotation of the cam 56 are suitably timed and synchronized to produce the proper step by step feeding movement of the film. Horizontal movement of the member 68 relative to the spring part 94 is permitted, there occurring corresponding shifting movement between the spring 94 and stud 97.

The described details of construction lend themselves to low-cost production of the various parts and to ease of assembly with consequent economy in manufacturing costs. In respect of the operation of the device, its relative simplicity of itself assures durability and efficiency in operation.

Changes in the described construction may be made without departing from the spirit of the invention, the scope of which should be determined by reference to the following claims.

We claim:

1. In a cinematograph, the combination of a film feeding arm, means for pivotally supporting said arm comprising a flexible spring member having said arm pivoted thereto for film feeding movement, a rotatably driven cam, means on said arm for engaging said cam whereby the latter is operable to effect said film feeding movement, spring means for normally maintaining said cam engaging means in operative engagement with said cam, a second rotatably driven cam, and means carried by said arm for engaging said second cam whereby the latter is operative to effect in and out movement of said arm, the resiliency of said spring member serving to permit such movement and to maintain said arm in operative engagement with said second cam.

2. In a cinematograph, the combination of a film feeding arm, a vertically adjustably mounted flexible spring member having said arm pivoted thereto for film feeding movement, a rotatably driven cam, means on said arm for engaging said cam whereby the latter is operative to effect said film feeding movement, spring means for normally maintaining said cam engaging means in operative engagement with said cam, a second rotatably driven cam, means carried by said arm for engaging said second cam whereby the latter is operative to effect in and out movement of said arm, the resiliency of said spring member serving to permit such movement and to maintain said arm in operative engagement with said second cam, and manually operable means for effecting vertical adjustment of said spring member.

3. In a cinematograph, the combination of a film feeding arm, means for mounting said arm comprising a spring member having said arm pivotally secured thereto for film feeding movement, cam means for rocking said arm on its pivot mounting to thereby effect said film feeding movement, and a second cam means having

operative engagement with a portion of said arm for effecting film engaging and disengaging lateral movement thereof, said lateral movement being permitted by the flexibility of said spring mounting member.

4. In a cinematograph, the combination of a film feeding arm, means for pivotally supporting said arm comprising a vertically elongated flexible spring member having said arm pivoted thereto for film feeding movement, a rotatably driven cam, means on said arm for engaging said cam whereby the latter is operable to effect film feeding movement of said arm, a second rotatably driven cam, and means carried by said arm for engaging said second cam whereby the latter is operative to effect film engaging and disengaging movement of said arm, the resiliency of said spring member serving to permit such movement of the arm, said vertically elongated spring member being pivotally mounted adjacent one end for rocking movement in a plane extending transversely of the directions of film engaging and disengaging movement of said arm, and means for adjustably supporting the other end of said

arm in selected position, whereby said film feeding arm is also adjustable in the direction of said transversely extending plane.

5. In a cinematograph, the combination of a film-feeding arm, a vertically adjustably mounted vertically elongated member supporting said arm for film-feeding movement and for film-engaging and disengaging movements, means for effecting such movements of said arm, said vertically elongated member being pivotally mounted adjacent one end for rocking movement in a plane extending transversely of the directions of said film-engaging and disengaging movements of said arm, adjustable means normally maintaining the other end of said member in selected position, said film-feeding arm being thereby supported for adjustment in the direction of said transversely extending plane, and means for effecting vertical adjustment of said member to thereby effect vertical adjustment of the path of said film-feeding movement of said arm.

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