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O. L. BOWERS ET AL

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REEL DRIVE MECHANISM

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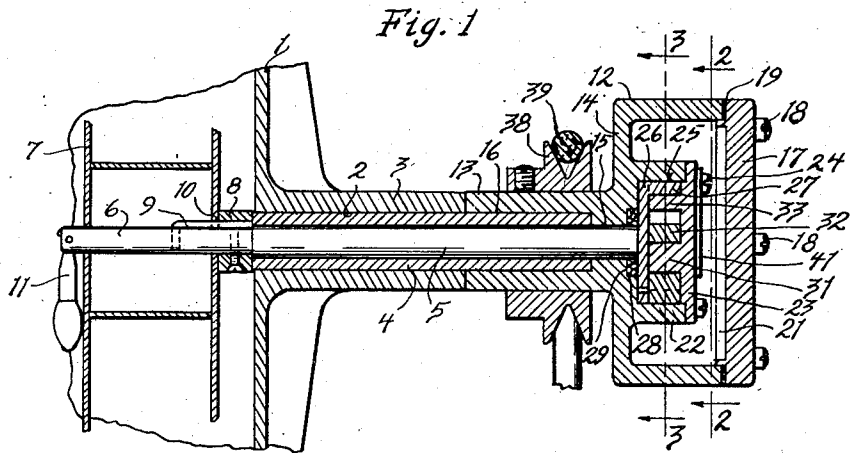
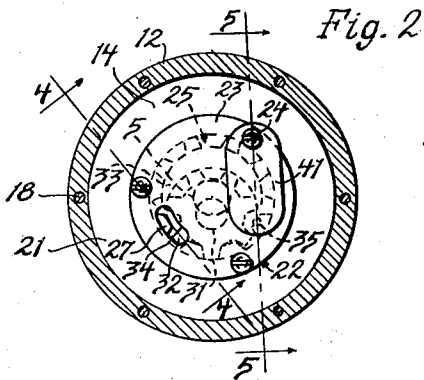
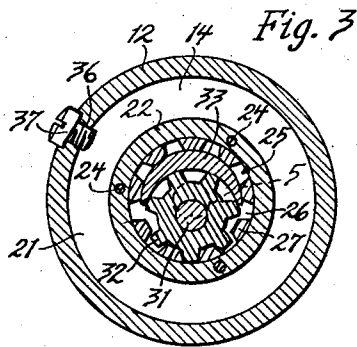


Fig. 4

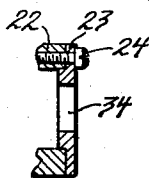
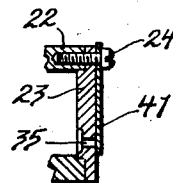


Fig. 5



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REEL DRIVE MECHANISM

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1 Claim. (Cl. 192—61)

Our invention relates particularly to the driving mechanism of the film reels of motion picture projecting machines, although not limited to this use alone.

In the conventional motion picture machine, the film is positively driven by the mechanism of the machine and is drawn from a roll thereof on a feed reel and wound on a take up reel which is driven with the mechanism of the machine by means of yielding drive mechanism, the yielding take up reel driving mechanism accommodating for the slowing up of the take up reel as the film roll thereon increases in diameter. Such yielding reel drive mechanism usually comprises a yieldable friction drive which, while fairly satisfactory in practice, has certain well known disadvantages characteristics.

The general object of our invention resides in the provision of a novel and effective yieldable reel drive mechanism which does not possess the disadvantageous characteristics of a yieldable friction drive, and which provides a uniform yielding drive through long periods of operation without requiring attention or replacement due to wear.

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

In the said drawing—

Figure 1 is a view in axial section of a reel drive mechanism embodying our invention;

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

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

Figure 4 is a partial section substantially on the line 4—4 of Figure 2; and

Figure 5 is a partial section substantially on the line 5—5 of Figure 2.

Referring to the drawing, 1 designates a support which, as shown, is in the form of a film magazine of a motion picture projecting machine and is provided with a central horizontal bore 2 therethrough which is extended by an integral hub 3. See Figure 1. A relatively long bushing 4 is secured in the bore 2 and extends outwardly beyond the outer end of the hub 3, and a film reel shaft 5 extends through and is journaled in the bore of the bushing 4.

One end portion 6 of the shaft 5 extends within the film magazine and forms a reel mount

portion upon which a usual film reel 7 may be detachably mounted, and a collar 8 is secured on the shaft 5 immediately inward of the portion 6 and engages against the opposing end of the bushing 4 to form one thrust bearing for the shaft and to form a stop limiting inward movement of the reel on the shaft. The film reel is rotatably fixed with the shaft by means of a key 9 on the shaft and engaging a keyway 10 of the reel, and the reel is retained on the shaft by means of a releasable retainer 11 as is usual.

A circular cup-shaped casing 12 is provided with an axial hub 13 extending exteriorly of the transverse wall 14 thereof and with an axial bore consisting of a relatively small inner bore portion 15 rotatably engaged on the shaft 5 and of a relatively large outer bore portion 16 rotatably engaged on the extending end of the bushing 4, the casing being thus adequately mounted for rotation. A cap 17 extends across and is secured on the lip of the casing in fluid tight relation therewith by means of screw 18 and a sealing gasket 19 interposed between the casing and cap to form a fluid reservoir 21.

A circular gear pump casing is provided within the reservoir 21 and consists of the central portion of the transverse wall 14, a cylindrical wall 22 disposed concentrically of the casing 12 and the shaft 5 and formed integrally with and projecting from the wall 14, and a cap 23 extending across and secured on the outer end of the wall 22 by means of screws 24. See Figures 1, 2 and 3.

An internal gear 25 of relatively large diameter, comprising a web 26 and internal gear teeth 27 projecting axially from the web, is formed integrally with the shaft 5 in coaxial relation therewith and is disposed within the pump casing for rotation relative thereto, this gear closely fitting the pump casing both as to diameter and axial extent. A suitable sealing ring 28 is disposed within a counterbored portion 29 of the bore of the casing 12 and bears against opposing axial surfaces of the casing 12 and the web 26 of the internal gear to form a fluid seal therebetween, as shown in Figure 1.

A bearing stud 31, formed integrally with the pump casing cap 23, is disposed within the pump casing in eccentric relation with the internal gear 25 and an axially bored external gear 32 of relatively small diameter is mounted for rotation on the stud 31 and meshes in eccentric relation with the internal gear. A crescent-shaped fluid obstructing partition 33, formed integrally with the pump casing cap 23, is disposed within the pump

casing between the internal and external gears 25 and 32 and has its opposite surfaces closely fitting though rotationally related respectively with the opposing peripheries of the teeth of the internal and external gears.

The pump casing is provided with intake and outlet ports 34 and 35 extending through the pump casing cap 23 and communicating with the reservoir 21. See Figures 2, 4 and 5. These intake and outlet ports are spaced angularly of the gears 25 and 32 and are disposed respectively at the opposite tooth engaging and disengaging regions of the gears, so that as the gears are rotated relative to the pump casing fluid is drawn from the reservoir 21 into the pump casing and then returned to the reservoir, the reservoir being filled with a fluid, preferably oil of a proper consistency by means of a filler opening 36 in the casing 12 which is normally closed by a closure plug 37 screwthreaded into the opening as shown in Figure 3.

Observing that the gears 25 and 32 and the pump casing related as above described comprise a fluid pump which, by reason of the gear 25 being fixed with the shaft 5 and the pump casing being fixed with the casing 12 and carrying the gear 32, provides a yieldable fluid drive connection between the casing 12 and the shaft 5 when the passage of fluid through the pump is impeded, the casing 12, forming part of the reservoir 21, constituting the driving member for driving the shaft 5 to wind a film in a roll on the reel 7. The casing 12 is rotated in a counterclockwise direction in Figures 2 and 3 and is driven from the mechanism of a motion picture projecting machine by a suitable driving means such as a belt and pulley drive including a pulley 38 secured on the hub 13 of the casing 12 and a belt 39 engaged thereon.

The passage of fluid through the pump is impeded to develop a driving torque by means of the outlet port 35 of the pump being restricted and/or by means of a valve such as a spring valve blade 41 secured at one end under the head of one of the screws 24 and having its other end overlying the outlet port 35 and spring pressed against the outer surface of the cap 23, thus forming a control valve operative on the outlet port to impede the passage of fluid through the pump and yieldably urged into closed position in opposition to said passage.

While we have thus described our invention, we do not wish to be limited to the precise details described, as changes may be readily made

without departing from the spirit of our invention, but having thus described our invention, we claim as new and desire to secure by Letters Patent the following:

5 In driving mechanism of the character described, the combination of a bearing member provided with an elongated bore and an external cylindrical bearing surface disposed concentrically of said bore and extending inwardly from an end of said bearing member, a shaft rotatably mounted in said bore and extending outwardly from said end of said bearing member, a thrust bearing operative between said bearing member and shaft to limit movement of said shaft outwardly from said end of said bearing member, a rotatable drive member comprising a generally circular reservoir provided with a central hub extending outwardly from a transverse wall thereof and with a central bore extending through said hub and wall and consisting of a relatively small inner bore portion rotatably engaged on the portion of said shaft extending outwardly from said end of said bearing member and a relatively large outer bore portion rotatably engaged on said external bearing surface, and a gear pump within said reservoir and comprising a circular pump casing fixed within said reservoir and disposed concentrically of said bore of said reservoir and which includes the central portion of said transverse wall of said reservoir, an internal gear of relatively large diameter within said pump casing and fixed on said shaft in concentric relation therewith and rotatable with respect to and closely fitting the pump casing as to diameter and axial extent and comprising a web engaging against the internal surface of said wall and internal teeth extending axially from the web, an external gear of relatively small diameter within said pump casing and mounted for rotation thereon in eccentric relation and meshing with said internal gear, a fluid obstructing partition fixed with said pump casing and disposed between said gears and with respect to which said gears are rotatable, and said pump casing being provided with intake and outlet ports communicating with said reservoir and spaced angularly of said gears and disposed respectively at the opposite tooth engaging and disengaging regions of the gears and one of which ports is restricted to impede the passage of fluid through said pump to develop yieldable driving torque.

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