

Oct. 21, 1941.

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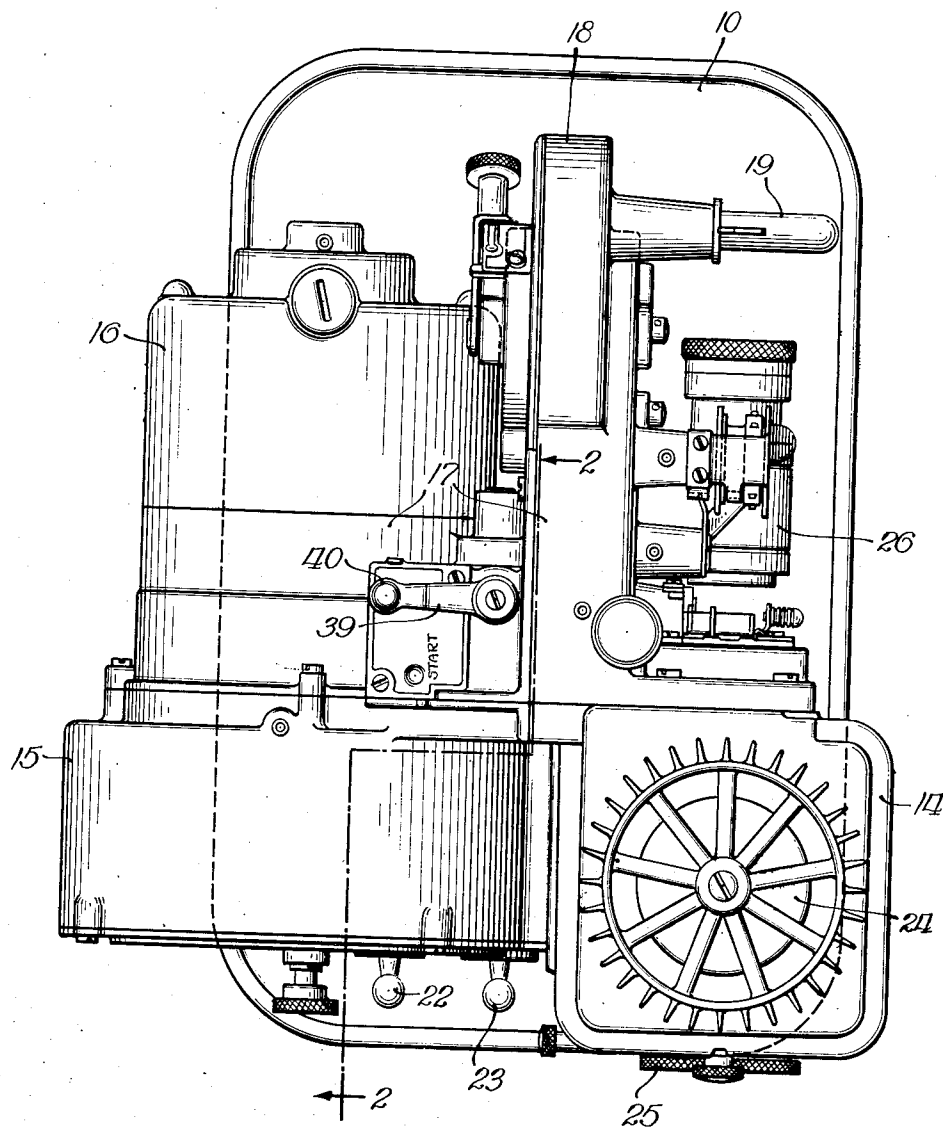
2,259,591

DRIVING MECHANISM FOR PROJECTORS

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3 Sheets-Sheet 1

Fig. 1.



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3 Sheets-Sheet 2

Fig. 2.

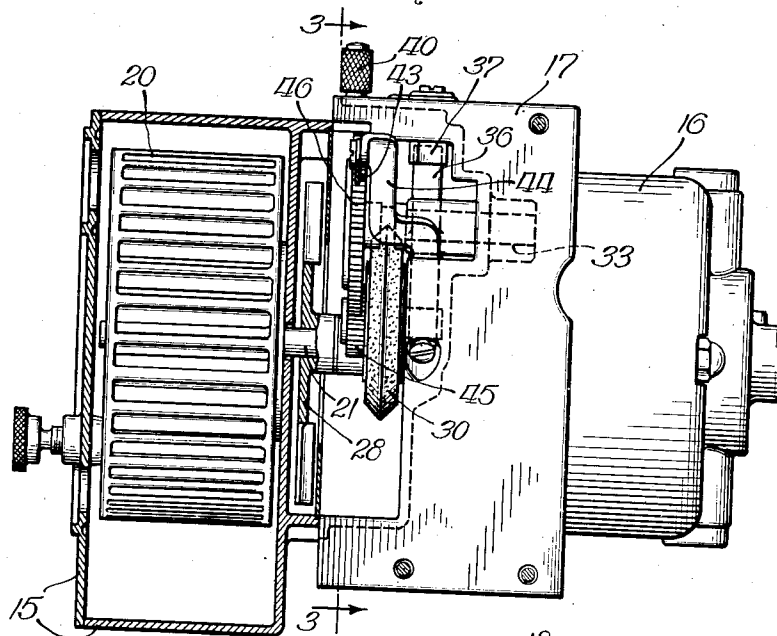


Fig. 3.

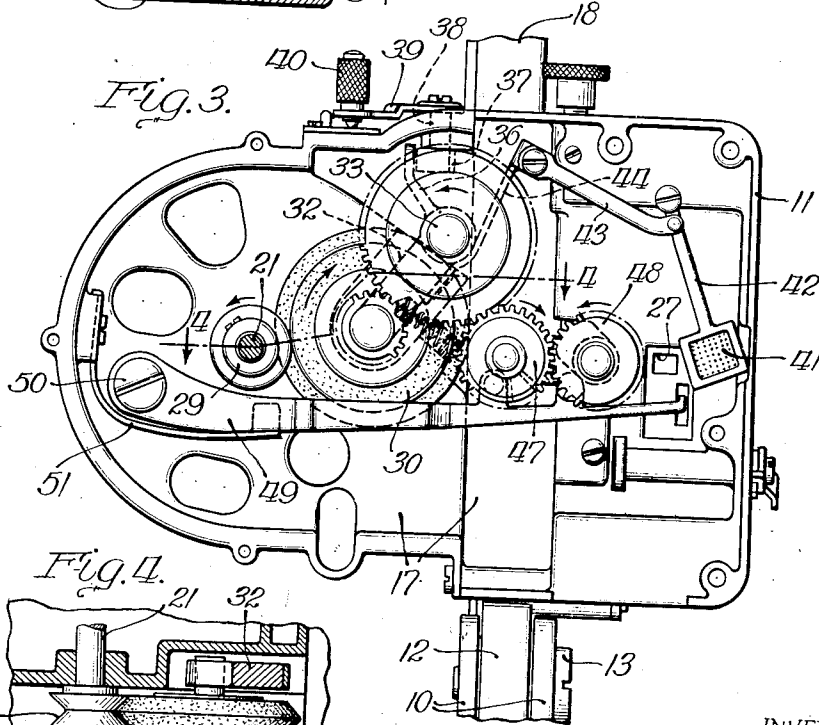
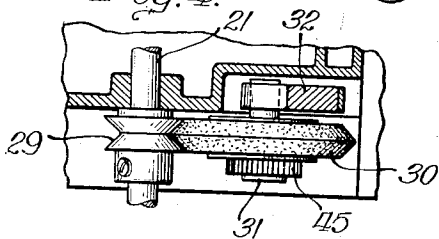


Fig. 4.



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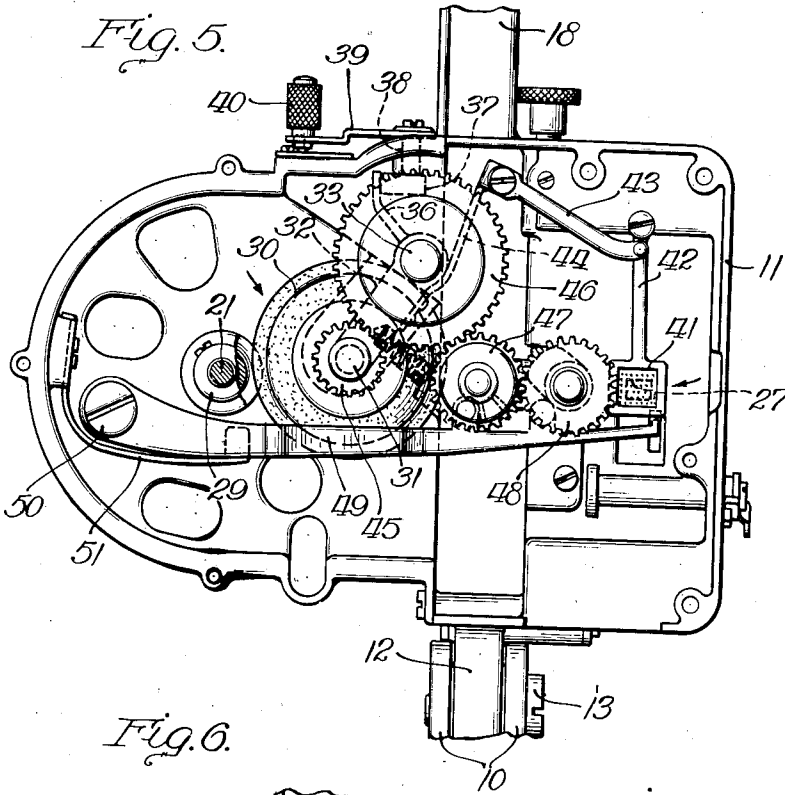
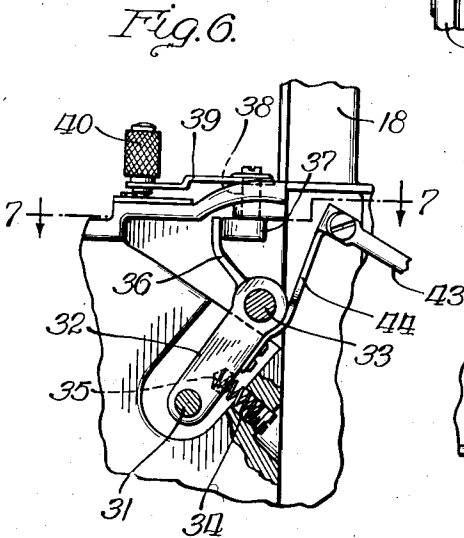
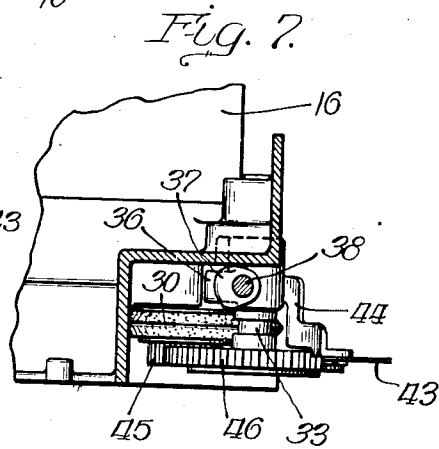
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DRIVING MECHANISM FOR PROJECTORS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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DRIVING MECHANISM FOR PROJECTORS

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4 Claims. (Cl. 88—17)

This invention relates to projectors and particularly to the driving means for the projector by which the application of power may be controlled, and to an automatically actuated shutter device by which the beam of light is cut off at a point between the film and the source of the light. It is the object of this invention to provide an improved form and arrangement of parts adapted to take up a minimum of space in the projector housing and arranged with special reference to the position and form of the associated parts in the housing whereby the structure shall be made very compact without detracting from its effectiveness.

In the arrangement shown by which the several objects have been accomplished, a clutch is provided comprising a driving wheel connected with the motor of the projector and a friction wheel movable into and out of operative engagement with the driving wheel, the engaging face of the friction wheel in the arrangement shown being formed of cork and the wheel being rotatably mounted on an arm adapted to swing toward and from said driving wheel. A lever is provided for moving said arm and said friction wheel out of operative position, said lever acting through a cam arranged so that when it is given an operative stroke for moving the friction wheel out of operative position it serves automatically to hold the friction wheel out of operative position until the cam is again moved through the medium of the lever.

In the construction illustrated, a movably mounted shutter is provided having an operative connection with the operating means for the movable driving wheel and arranged so that when the clutch is being opened upon a movement of the driving wheel out of operative position the shutter is automatically moved into position to cut off the beam of light from access to the film.

It is another object of this invention to improve projectors in sundry details hereinafter pointed out. The preferred means by which the several objects have been accomplished are illustrated in the accompanying drawings, in which—

Fig. 1 is a top plan view of a projector embodying the invention;

Fig. 2 is a vertical sectional view taken substantially at the line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view taken substantially at the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary horizontal sectional view taken substantially at the line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 3 but showing a changed position of certain of the parts;

Fig. 6 is a fragmentary view similar to a portion of Fig. 5 but with the section taken at a slightly different point so as to omit some of the operating parts; and

Fig. 7 is a horizontal sectional view taken substantially at the line 7—7 of Fig. 6.

Referring now to the several figures of the drawings, in which corresponding parts are indicated by the same reference characters, 10 indicates a standard, a fragmentary portion of which is shown in Figs. 3 and 5, having a framework in the form of a housing 11 movably mounted thereon by means of a lug 12 and a horizontally disposed pivot pin 13. In the arrangement shown, the framework 11 comprises a lamp housing 14, a fan housing 15, a motor housing 16 and a centrally disposed housing portion 17 (see Fig. 1) having arms 18 communicating therewith, one of such arms 18 extending upwardly from the housing portion 17 and the other extending downwardly. In the drawings, the upwardly extending arm 18 only is illustrated, having a spindle 19 rotatably mounted therein at its upper end for supporting a reel of film rotatably in position thereon.

As is best shown in Fig. 2, a centrifugal fan 20 is rotatably mounted upon the shaft 21 of the motor located within the housing 16, such fan being adapted to drive a stream of air into the lamp housing 14 for keeping the temperature within the desired limits therein. In Fig. 1, two switch devices 22 and 23 are shown for controlling the delivery of electric current to the motor and for the lamp 24 in the housing 14. A beam of light from the lamp 24 is projected forwardly from a reflector 25 through a lens housing 26 as shown in Fig. 1, the ray of light being adapted to pass through an opening 27 as shown in Figs. 3 and 5 for access to the film which is driven intermittently through the machine at a point between the lens housing 26 and the lamp housing 14. As is clearly shown in Fig. 2, a second fan 28 is rotatably mounted upon the motor shaft 21 within the housing 17 for drawing a stream of air backwardly through the motor and delivering such stream of air toward the right in Fig. 3 to the film and the driving mechanism by which it is given an intermittent motion so as to have a cooling effect thereon.

The means for driving the operating mechanism of the projector other than the centrifugal fan 20 and the fan 28 comprises a driving wheel 29 mounted upon the motor shaft 21 at a

point between the fans and the motor. In the arrangement shown, the driving wheel 29 is provided with a deep groove in its outer face, being adapted to cooperate with a second driving wheel 30 rotatably mounted in position so as to be movable into and out of operative engagement with the driving wheel 29. In the construction illustrated, the driving wheel 30 is mounted in position by means of a pin or bolt 31 carried by an arm 32 swingingly mounted upon a pin or bolt 33 carried by the framework. In the arrangement shown, the driving wheel 30 is tapered outwardly so as to have a snug driving fit in the groove of the driving wheel 29, the bearing portion at least of the wheel 30 being formed of cork in the construction shown. The arrangement is such that upon a swinging movement of the arm 32 the driving wheel 30 is moved into and out of operative engagement with the driving wheel 29 so as to be driven by friction thereby.

As is best shown in Fig. 6, the arm 32 is normally pressed in clockwise direction in said figure by a spring 34 which is removably mounted in the framework adjacent to the arm so as to bear in a socket 35 in said arm for pressing the arm toward the left in said Fig. 6.

Means is provided for moving the arm 32 in counterclockwise direction in Figs. 3 and 6 against the action of the spring 34. This means comprises a lug or finger 36 extending upwardly from the arm 32, the upper end of such lug being in position to engage a cam 37 carried by a pin 38 provided at its upper end with a lever 39 having a handle 40 thereon for giving the cam 37 a rotary movement. The arrangement is such that when the lever 39 stands in the position as shown in Fig. 1 the cam 37 is held in the position as illustrated in Fig. 7, serving to hold the parts in the position as shown in Fig. 5 with the driving wheel 30 out of operative engagement with the driving wheel 29. When however the lever 39 is swung in counterclockwise direction in Fig. 1 to the limit of its motion the cam 37 is moved into differential position as shown in Fig. 3 so as to permit the wheel 30 to stand in driving engagement with the driving wheel 29, as shown in Fig. 3. The arrangement of the cam 37 and the finger or lug 36 is such that when the cam is moved into the position as shown in Fig. 7 it serves automatically to hold the arm 32 against movement by the spring 34, serving thus to hold the driving wheel 30 out of operative engagement with the driving wheel 29.

Adjacent to the opening 27 through which the beam of light passes from the lamp 24 for passage through the film, there is mounted a shutter 41 carried by a pivotally mounted arm 42. The arm 42 is connected by means of a rigid link 43 with a second lug or finger 44 carried by the arm 32, the arrangement being such that when the arm 32 is moved in counterclockwise direction in Fig. 3 for carrying the driving wheel 30 out of engagement with the driving wheel 29 the shutter 41 is at the same time moved in clockwise direction in said Fig. 3 into the position as shown in Fig. 5, in which position the shutter stands directly opposite to the opening 27 through which the beam of light passes. The shutter 41 is thus interposed between the film and the source of the ray of light so as to prevent the application of undue heat to the film when the film is permitted to remain at rest by reason of the opening of the clutch comprising the driving wheels 29 and 30.

The means for giving a film an intermittent

motion past the opening 27 comprises in the arrangement shown a pinion 45 carried by the pin or shaft 31 so as to rotate with the driving wheel 30. Upon the pin or bolt 33 upon which the arm 32 is pivotally mounted, there is provided a gear 46 which meshes with the pinion 45, the arrangement being such that the pinion 45 and gear 46 remain constantly in mesh as the arm 32 is swung about its pivotal axis. The gear 46 in turn meshes with a pinion 47 which drives a pinion 48. Cooperating with the pinions 47 and 48, there is a shuttle member 49 pivotally mounted upon a pin 50 at the left in Fig. 5 normally pressed upwardly by a spring 51. Means is provided actuated by the pinions 47 and 48 for moving the shuttle 49 downwardly against the action of the spring 51 and for giving it a movement forwardly and backwardly in the machine into and out of engagement with a film so as to actuate the film in the desired intermittent manner. Inasmuch as this driving mechanism for the film forms no part of the present invention, it is believed to be unnecessary to describe the same further herein.

By the use of the improved arrangement as disclosed by this application, the intermittent movement of the film through the projector is very readily controlled. With the handle or lever 39 standing in the position as shown in Figs. 1, 5, 6 and 7, the motor is cut off from the driving wheels 46, 47 and 48 and the shutter 41 is held in position to intercept the beam of light. When the operator desires to operate the projector, the handle 39 is moved to the position as shown in Figs. 2 and 3, and the motor is then effective for driving the film feeding mechanism and the shutter 41 is held out of the path of the beam of light.

While the form and arrangement of parts as shown in the drawings and as above described are preferred, the invention is not to be limited thereto except so far as the claims may be so limited, it being understood that changes might well be made in the form and arrangement of the parts without departing from the spirit of the invention.

I claim:

1. In a projector, the combination of a frame, a drive wheel rotatably mounted on said frame, an arm pivotally mounted on the frame so as to swing toward and from said drive wheel, a second drive wheel rotatably mounted on said arm alongside of said first-named drive wheel and movable into and out of operative engagement with said first-named drive wheel so as to be driven in the opposite direction thereby when in engagement therewith, a pinion connected with said second drive wheel so as to rotate therewith, a gear rotatably mounted on the axis of said arm and meshing with said pinion so as to permit said second drive wheel to be moved into and out of engagement with said first-named drive wheel without disturbing the operative engagement between said pinion and said gear, a spring normally pressing said arm in the direction for carrying said second drive wheel into operative engagement with said first-named drive wheel, a lug extending from said arm beyond said pivotal axis, and means comprising a cam rotatably mounted on said frame adapted by engagement with said lug to move said arm against the action of said spring for moving said second drive wheel out of operative engagement with said first-named drive wheel.

2. In a projector, the combination of a frame

in the form of a housing, a drive wheel rotatably mounted on a horizontal axis on said frame and having a deep V-groove in its outer face, an arm pivotally mounted on a horizontal axis on said frame so as to swing toward and from said drive wheel, a second drive wheel rotatably mounted on said arm and movable into and out of operative engagement with said first-named drive wheel and having its outer face oppositely beveled so as to be driven by said first-named drive wheel when in engagement therewith, a pinion connected with said second drive wheel so as to rotate therewith, a gear rotatably mounted on the axis of said arm and meshing with said pinion so as to permit said second drive wheel to be moved into and out of engagement with said first-named drive wheel without disturbing the operative engagement between the pinion and the gear, a spring normally pressing said arm toward said first-named drive wheel for bringing said two drive wheels into engagement with each other, a lug extending upwardly from said arm, a cam rotatably mounted on a vertical axis on said frame above said arm adapted by engagement with said lug to move said arm against the action of said spring for moving said second drive wheel out of operative engagement with said first-named drive wheel, and a handle on the outer face of said housing and connected with said cam for rotating the cam.

3. In a projector, the combination of a frame, a drive wheel rotatably mounted on said frame, an arm pivotally mounted on the frame so as to swing toward and from said drive wheel, a second drive wheel rotatably mounted on said arm and movable into and out of operative engagement with said first-named drive wheel so as to be driven thereby when in engagement therewith, a pinion connected with said second drive wheel so as to rotate therewith, a gear rotatably mounted on the pivotal axis of said arm on said frame and meshing with said pinion so as to permit said

second drive wheel to be moved into and out of engagement with said first-named drive wheel without disturbing the operative engagement between said pinion and said gear, means for swinging said arm toward and from said first-named drive wheel, a shutter movable into and out of the path of a beam of light through a film being fed through the projector, and a link pivotally connected with said arm and with said shutter actuated by a movement of the arm in opposite directions to move the shutter into and out of position to intercept said beam of light.

4. In a projector, the combination of a frame, a drive wheel rotatably mounted on said frame, an arm pivotally mounted on the frame so as to swing toward and from said drive wheel, a second drive wheel rotatably mounted on said arm and movable into and out of operative engagement with said first-named drive wheel so as to be driven thereby when in engagement therewith, a pinion connected with said second drive wheel so as to rotate therewith, a gear rotatably mounted on the pivotal axis of said arm on said frame and meshing with said pinion so as to permit said second drive wheel to be moved into and out of engagement with said first-named drive wheel without disturbing the operative engagement between said pinion and said gear, means for swinging said arm toward and from said first-named drive wheel, a shutter movable into and out of the path of a beam of light through a film being fed through the projector, a lug extending from said arm beyond said pivotal axis, and a link pivotally connected with said lug and with said shutter actuated by the movement of the arm to move the shutter into position to intercept said beam of light when said drive wheels are separated and to move the shutter out of intercepting position when said drive wheels are brought into operative engagement with each other.

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