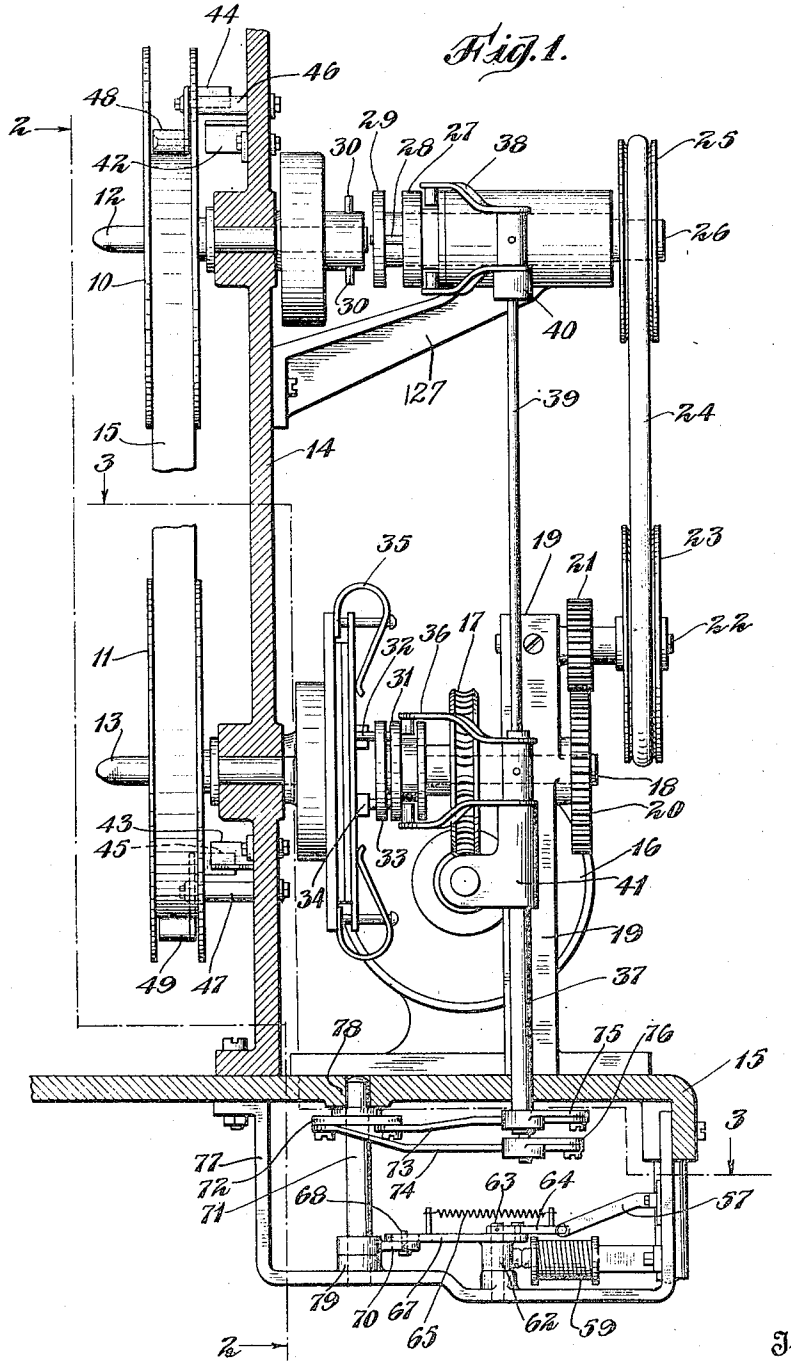
May 28, 1929. B. A. PROCTOR 1,714,816

PROJECTING MACHINE

Filed Oct. 22, 1925 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

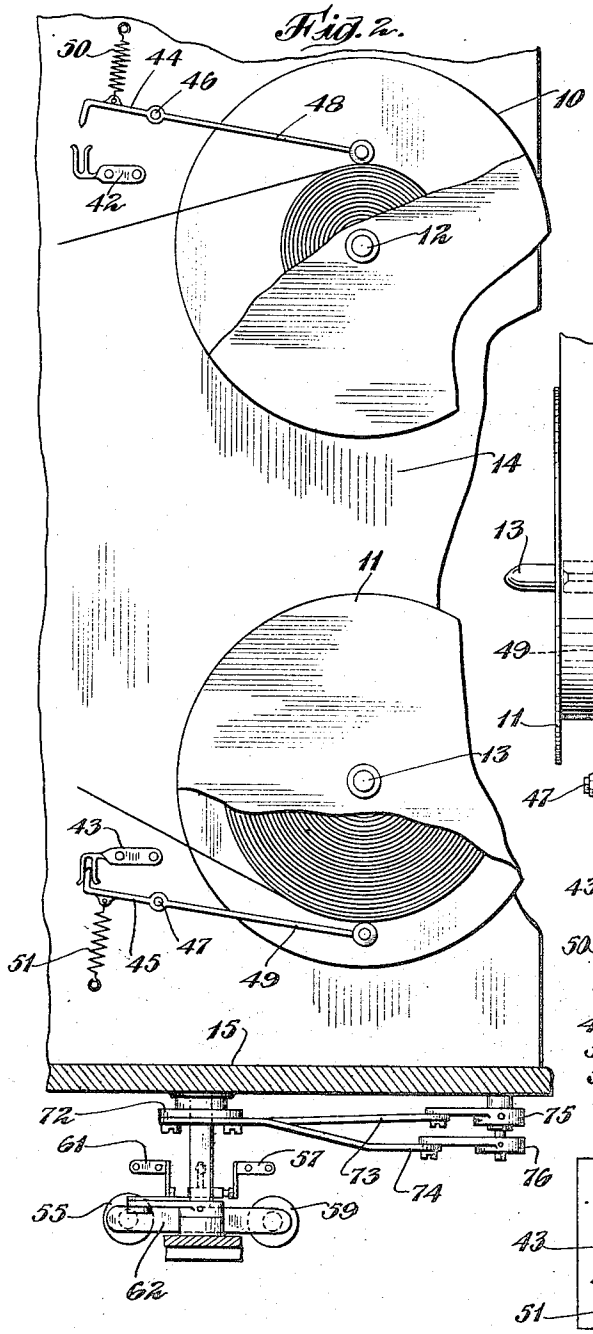


Fig. 3.

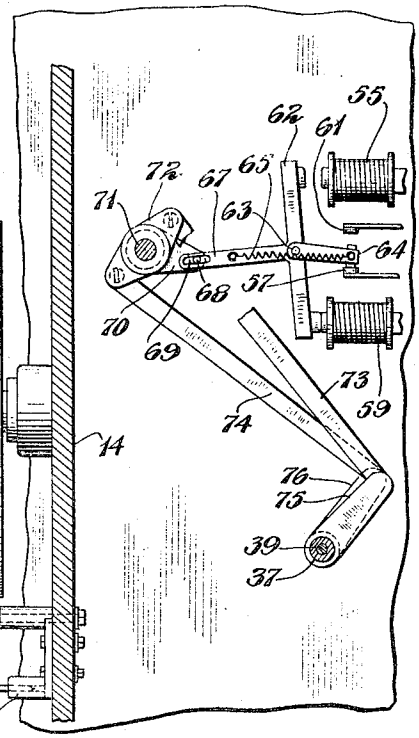
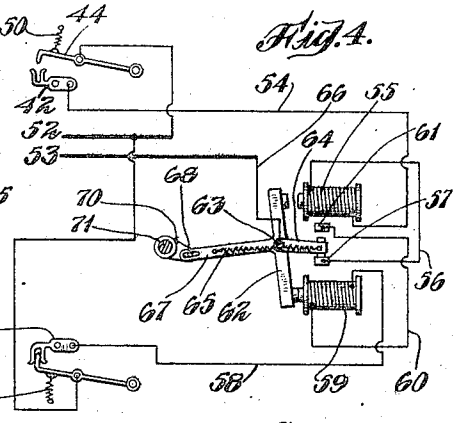


Fig. 4.



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Patented May 28, 1929. 1,714,816

UNITED STATES PATENT OFFICE.

BARTON A. PROCTOR, OF NEW YORK, N. Y., ASSIGNOR TO THE AUTOMATIC ADVERTISER, INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

PROJECTING MACHINE.

Application filed October 22, 1925. Serial No. 64,096.

The present invention relates to projecting machines, and is more particularly directed toward a projecting machine which is designed to automatically repeat the exhibition of a picture. The picture is passed through the projector to be exhibited, and is then automatically re-rolled so that it may again be exhibited.

The projector is preferably operated by an electric motor which runs all the time. This motor drives, through suitable gear trains or pulleys, a pair of shafts which are placed adjacent to the shafts carrying the reels of film, and clutches are provided so that one motor driven shaft may be connected to the corresponding reel shaft at the same time that the other is disconnected. The shifting of these clutches to alternately drivingly connect the reel shafts to the motor is a convenient method of accomplishing the re-rolling of the film. To insure satisfactory operation, it is desirable that this clutching and declutching be accomplished positively and at the right time.

While there are various manners in which this re-rolling operation may be controlled, the present invention relates, more particularly, to controlling it in response to the building up or increase in diameter of the roll of film on the reel onto which it is being wound.

As this increase in diameter is very gradual, it is not well suited as a primary power source for stopping the operation of one reel shaft and initiating the operation of the other. It is, therefore, preferable to provide a construction in which the primary power for shifting the clutches, or other devices used, is derived from another source, and to utilize the device responsive to the building up of the film on the reel as a controlling element which makes this power available at the proper time. In this manner, one is able to provide actuating mechanism for effectuating the reversal and to control it from the film.

In my copending application, Serial No. 45,963 filed July 25, 1925, I have shown and described a form of mechanism controlled in the above manner, and wherein the actuating of the clutches is accomplished mechanically by power derived from the motor. In the present application, the specific embodiment to be disclosed contemplates the use of electromagnetically controlled devices energized by circuit making devices responsive to the building up of the film on the reel. It will, of course, be understood that, when broadly considered, the two methods are equivalent, though the means employed may vary considerably.

The present invention also contemplates the provision of electrically operated clutch shifting mechanism and an arrangement of wiring of general application in this art. This wiring system and mechanism are useful even though the circuits are controlled from some other source than the increase in the diameter of the film on the reel.

Other and further objects of the invention will be apparent as the description proceeds.

The accompanying drawings show, for purposes of illustrating the invention, one of the many possible embodiments in which the invention may take form, it being understood that the invention may be embodied in various forms, and that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Figure 1 is a side elevation of the projecting machine with parts in section;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1, the upper part of the machine being shown in elevation;

Figure 3 is a horizontal sectional view taken on the line 3—3 of Figure 1; and

Figure 4 is a circuit diagram.

A pair of film reels 10 and 11 are carried on reel shafts 12 and 13 which are suitably mounted on a vertical plate 14 so that the film 15 may be transferred from one reel to the other. This plate 14 is mounted on top of a table or platform 15. An electric motor 16 is suitably mounted on the platform 15 behind the plate 14, and this motor is drivingly connected with a worm wheel 17 carried on a shaft 18 in line with the reel shaft 13. This shaft is mounted in bearings in an upright standard 19, and carries a spur gear 20, which meshes with a pinion 21 carried on a shaft 22, also supported from the standard 19. This shaft 22 carries a pulley 23, and a belt 24 drivingly connects this pulley with a pulley 25 carried on a shaft 26. This upper shaft 26 is supported in a bracket 127 so as to be in line with the reel shaft 12.

As here shown, the upper shaft 26 carries a sliding collar 27 provided with pins 28, which pass through a flange 29 integral with

the shaft 26. When this collar is moved toward the left, the pins 28 are enabled to engage with pins 30 carried on the inner end of the reel shaft 12, so as to drivingly connect the shafts 26 and 12. The shaft 18 is also provided with a similar sliding collar 31, which has pins 32 passing through the flange 33 and engageable with abutments 34 carried on the lower reel shaft 13. As the step-by-step mechanism for advancing the film forms no part of the present invention, it is omitted from the drawings. The mechanism which compensates for the varying diameter of the roll of film on the take-up reel, is indicated generally by the reference character 35, and consists essentially in a slip clutch.

It will thus be apparent that the motor 16 may be drivingly connected with either of the shafts 12 or 13 so as to wind the film onto the reel carried by the driven shaft. The gear trains are so proportioned that the film rewinds onto the upper reel more rapidly than it is wound onto the lower reel when being exhibited.

A convenient mechanism for simultaneously shifting the clutches 27 and 31 so as to alternately connect the motor to the shafts, is shown in the drawings. Here the lower collar 31 is connected by a yoke 36 with a hollow vertical shaft 37 which extends down below the platform 15, while the upper collar 27 is connected by a similar yoke 38 with a shaft 39, which passes down through the inside of the shaft 37. These shafts are suitably mounted in bearings 40 and 41 carried by the framework of the machine. The shifting of the clutches may be accomplished by quickly moving one of these shafts in one angular direction and the other in the opposite direction.

The mechanism for carrying out this clutch shifting operation is, in the present drawings, shown in the form of electromagnetic devices which are actuated in response to the building up or increase in diameter of the film on the reel onto which it is being wound. A mechanical device for this purpose is shown in the application above referred to.

Fixed contacts 42 and 43 are mounted on the vertical plate 14 adjacent each of the film reels. Movable contacts 44 and 45 are pivoted at 46 and 47 on the plate 14. These contacts have arms 48 and 49 which extend between the walls of the film reels. The exposed ends of the contacts are connected to springs 50 and 51 which hold the inner ends of the arms against the roll of film on the reel. The arrangement is such that the increase in diameter of the film when it is wound onto one of the reels will cause the corresponding contacts to be closed. The closing of one contact is indicated in the lower part of Figure 2. It will thus be seen that one is able to close a circuit when the film is completely wound onto either the lower or the upper reel.

While this circuit control may include magnets corresponding with each contact and which remain in circuit as long as the contacts are closed, it is preferable to provide supplemental contacts which are opened when the magnets function, thereby preventing overheating of the magnets and unnecessary current consumption. As an illustrative embodiment of such a control, I have herein shown, and will now describe, an arrangement utilizing an oscillating armature and switch contact. Many other arrangements may, of course, be used.

As shown in Figure 4, the incoming current supply lead 52 is connected to the pivots 44 and 45 of the switches. The fixed contact 42 is connected by a wire 54 with a magnet coil 55, the other side of which is connected by a wire 56 with a supplemental contact 57. The other fixed contact 43 is connected by a wire 58 with magnet coil 59, which is connected by a wire 60 with another supplemental contact 61. The armature 62, for the magnet coils 55 and 59, is pivoted at 63, and is provided with pole pieces opposite the magnet coils.

An oscillating switch member 64 is mounted so that it can be moved back and forth between the supplemental contacts 57 and 61. For convenience it is here shown as being mounted about the same pivot as the armature. This oscillating contact is under the control of a spring 65 and its pivot is connected by wire 66 with the supply lead 53. The armature 62 may be moved back and forth in an obvious manner by the electromagnets, and in the present embodiment of the invention this swinging armature is interconnected by a suitable mechanism with the clutch controlling shafts 37 and 39.

As here shown, an arm 67 extends out from the armature. This arm carries an end of the spring 65 and is provided with a pin 68 which engages in a slot 69 in an arm 70 carried on a vertical shaft 71. These connections are such that the shaft may be rocked when either electromagnet coil is energized. The shaft 71 is provided with a crosshead 72 which is connected by arms 73 and 74 with cranks 75 and 76 carried in the lower ends of shafts 37 and 39, respectively.

The electromagnetically controlled devices and supplemental contacts may be conveniently mounted underneath the platform 15. They may be carried on a U-shaped frame 77 suitably attached to this platform. The shaft 71 is mounted in bearings 78 and 79, while the armature 62 of the electromagnet may be mounted on a shaft 63 carried by this underframe. The magnets and supplemental contacts may be mounted on the other side of the frame 77, as indicated.

As shown in Figures 2 and 4, the contacts

43 and 45 have been closed to energize the magnet coil 59 which attracts the armature 62 and swings the system of oscillating levers and shafts to the position which will cause the motor drive to be disconnected from the lower shaft and connected to the upper shaft. When the armature is moved into the position, shown in full lines in Figures 3 and 4, the spring 65 will be carried across the center 63, above which the supplemental contacts 64 is pivoted, and the contraction of this spring will pull the contact 64 away from the supplemental contact 61 and against the supplemental contact 57 thereby breaking the circuit of the magnet coil 59 and closing one of the openings in the circuit of the magnet coil 55. When the parts are in the position indicated in Figure 4, both circuits are open; that for the magnet coil 59 being opened between the contacts 61 and 64, and that for the magnet coil 55 being opened between the contacts 42 and 44. When the film winds onto the upper roll to the predetermined amount it will close contacts 42 and 43 and energize magnet coil 55 thereby shifting the armature and all the oscillating parts to the other position. The spring 65 will snap the contact 64 so as to open the circuit, and assists in providing power to operate the oscillating parts so as to shift the clutches. It also holds the clutches in position after the magnets have been deenergized.

What is claimed is:

1. In a film reversing mechanism, the combination with two horizontal reel shafts, of a pair of clutches each connectible to a reel shaft, two vertical shafts each connected to one of said clutches, an oscillating plate pivotally mounted intermediate its free ends, each of said free ends being operatively connected to one of said vertical shafts, an actuating member operatively connected to said oscillating plate whereby to engage one clutch and simultaneously disengage the other, a movably mounted armature operatively connected with the actuating member, and coils for operating the armature.

2. In a mechanism for winding and rewinding film reels, means for reversing the direction of winding, said means comprising a pair of interconnected clutches for alternately drivingly connecting the film reels to a power source, a pivotal pin, an armature pivotally mounted intermediate its free ends on said pin, a connecting arm fixed to said armature at its pivotal point, a pair of opposed magnet coils operatively associated with the free ends of said armature, operating connections between the free end of said connecting arm and said clutches, a pair of leads connected to a source of electric energy, said armature being connected to one of said leads, a pair of circuit making and breaking devices each of which is connected with one of said magnet coils and the other of said leads and operable in response to film movement for closing the circuit when it is desired to reverse the movement of the film, a link pivotally connected to said pin, a common contact at the free end of said link, a spring connecting said link with said connecting arm to swing the free end of said link to either side of said pin, and a coil contact for each coil, the coils moving the armature and the armature in turn swinging said spring across said pin to swing said common contact from one coil contact to the other coil contact.

3. In a mechanism for winding and rewinding film reels, means for reversing the direction of winding, said means comprising a pair of interconnected clutches for alternately drivingly connecting the film reels to a power source, a T-shaped bracket composed of a shank and cross piece and pivotally connected at their intersection, the cross piece of said bracket constituting an armature, a pair of opposed magnet coils operably associated with the free ends of said armature, operating connections between the free end of said shank and said clutches, a pair of leads connected to a source of electric energy, said cross piece being connected to one of said leads, a pair of circuit making and breaking devices each of which is connected with one of said magnet coils and the other of said leads and operable in response to film movement for closing the circuit when it is desired to reverse the movement of the film, a link pivotally connected to the intersection of said T-shaped bracket, a common contact at the free end of said link, a spring connecting said link with said shank to swing the free end of said link to either side of said intersection, and a coil contact for each coil, the coils moving the armature from contact with one coil to contact with the other coil, said armature in turn swinging the said spring across said intersection to swing said common contact from one coil contact to the other coil contact.

4. The combination with a film winding reel and a film rewinding reel, of a motor, a driven shaft for the rewinding reel, a second driven shaft for the winding reel, a train of gears connecting the second driven shaft with the motor, a belt and pulley connection connecting the other driven shaft with the motor, two main clutches, a slip clutch associated with said winding reel, and means for alternately, simultaneously disengaging said main clutches from said slip clutch and engaging said main clutches with said rewinding reel and simultaneously engaging said main clutches with said slip clutch and disengaging said main clutches from said rewinding reel.

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