

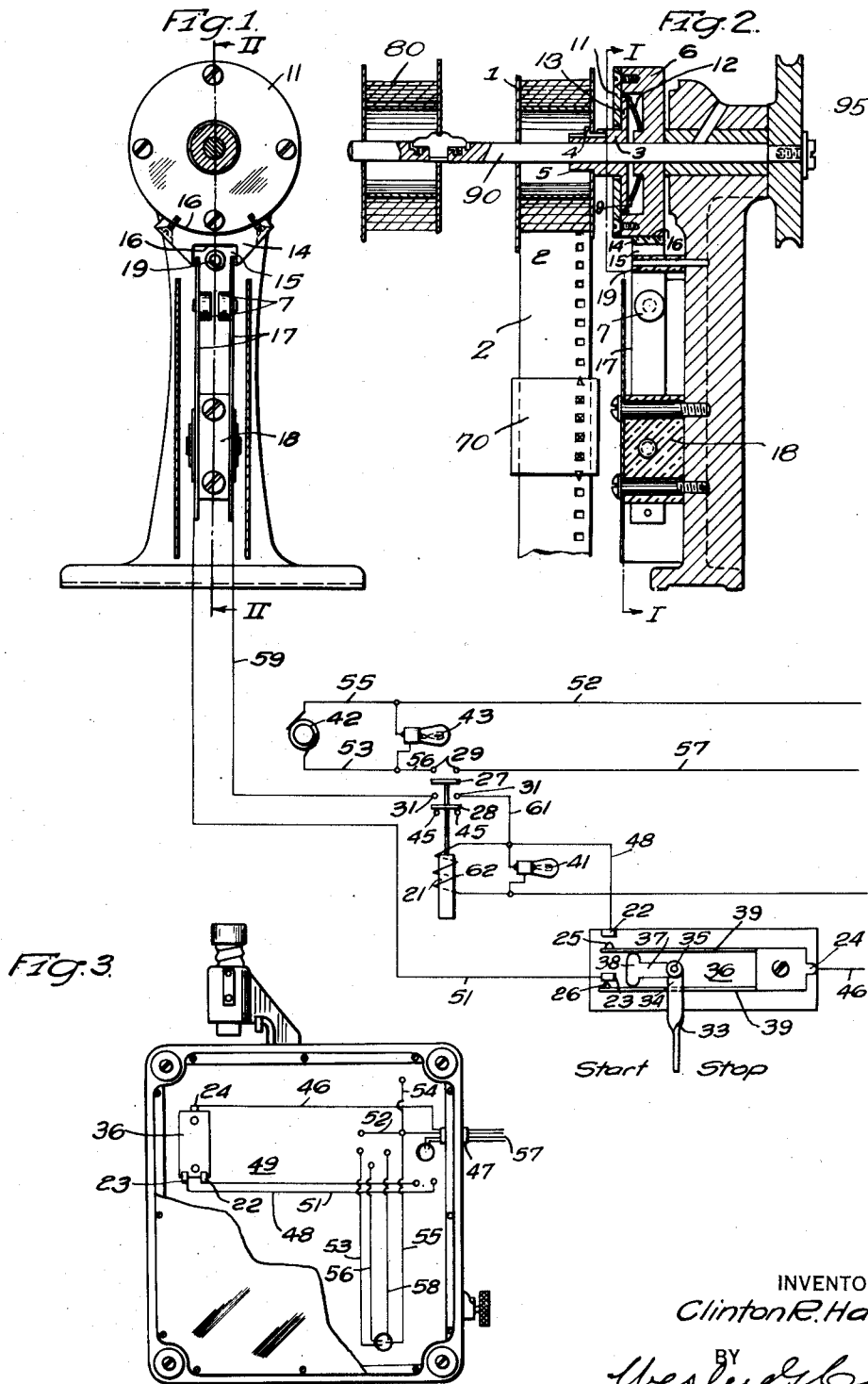
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MOTION PICTURE APPARATUS

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MOTION PICTURE APPARATUS

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2 Claims. (Cl. 242—57)

My invention relates to motion-picture apparatus and has particular relation to automatic stopping devices therefor.

The general principle of controlling a stopping device by the condition of a film-strip is not new in the art. However, contrivances of this nature, made according to the teachings of the prior art, with which I am familiar, have been designed to accomplish an entirely different purpose than the device hereinafter described.

In devising the older contrivances, fire prevention was the principal consideration of the inventor, while my device is designed chiefly for the purpose of facilitating the operation of an automatic threading device set forth in detail in a copending application of E. W. Reynolds, Serial No. 436,552, filed March 17, 1930, and assigned to Westinghouse Electric & Manufacturing Company, although it acts as a safety device, as well as a result of its distinct *raison d'être* my invention must conform to certain requirements which are not imposed upon devices constructed according to the teachings of the prior art.

Since the threading mechanism depends on the coaction of the end of a film that has been projected and the leader of a succeeding film, the stopping device must interrupt the action of the machine at the instant when the last layer of film leaves the feeding reel. The machine must, furthermore, be completely at rest before the film-end passes through the feeding sprocket, and, since the film moves at a speed of from 24 ft. per minute to 90 ft. per minute, depending on the particular machine in which it is used, the device, to be universally applicable, must respond instantaneously to a change in a property of the film, such as tension or velocity, between the reel and the feeding sprocket, involved in the stopping device.

On the other hand, by reason of the high sensitivity of the device, thus necessitated by the existing state of affairs in the motion-picture apparatus with which it is associated, it responds instantly to a requisite change in the effective property of the film-strip between the reel and the sprocket. Hence, the device must be designed in such manner that the film between the feeding reel and the feeding sprocket remains unchanged, with respect to the particular property involving the stopping device, during the entire projection of a reel.

It is, accordingly, an object of my invention to provide an automatic stopping device for a motion-picture machine that shall respond instantaneously to an alteration in a certain prop-

erty of a section of a film-strip disposed in the machine.

Another object of my invention is to provide means for causing the property of the film which is responsive to remain constant in the region affecting my device during the entire projection of a film-strip.

Still another object of my invention is to provide a system whereby a motion-picture machine may be stopped by the action of any one of a plurality of mechanisms at a plurality of points, and started by the action of one, and only one mechanism.

More specifically stated, it is an object of my invention to provide a power-supply network for a motion-picture machine, wherein a plurality of contacts are disposed, certain of said contacts being held in closed position by the instantaneous coaction of the film, disposed in the apparatus, with certain others of said contacts and being opened independently either by the instantaneous action of the remainder of said contacts or by the instantaneous action of the film.

According to my invention, I provide a sleeve concentric with the feeding spindle of a motion-picture machine and positively actuated by the tension of the film, through a friction clutch, to close a contact, thus providing a permanent path for the energizing current of a relay that has been initially excited by the temporary completion of an auxiliary circuit. I furthermore provide an additional contact in the permanent circuit of the relay for manually opening this circuit.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment, when read in connection with the accompanying drawing in which:

Fig. 1 is a view, partially in section taken along line I—I of Fig. 2 and partially in front elevation of a section of a motion-picture machine wherein the mechanical elements of my invention are embodied and shows, in addition, a schematic representation of the electrical network included in the device.

Fig. 2 is a view, in section, taken along line II—II of Fig. 1, showing, in addition, the hubs of the reels embodied in the machine.

Fig. 3 is a view, in elevation, of the bottom of the machine, showing the wiring system.

The mechanical elements of my device are in

part discussed in the above-mentioned copending application of Reynolds. Essentially, they comprise a feeding reel 1 driven by the tension exerted by a film 2 that unwinds therefrom, a bushing 3, of T form in longitudinal section, driven by the reel 1 and fastened to it by a key 4 with which the stem 5 is provided, and a bushing 6, of reversed E form in longitudinal-section, frictionally driven by the bushing 3 and coacting with a plurality of resiliently mounted contacts 7, as will be explained hereinafter. The film 2 is advanced by a sprocket wheel 70 suitably disposed in the film-handling machine of which the feeding reel 1 is an element.

The flange of the T section is urged to yieldingly engage a washer 11 fastened to the rim of the section 6 by a spring 12 compressed between its stem 13 and the washer. A dielectric prism 14, having a rectangular channel 15 milled in its apex and a cylindrical channel 16 milled on its base, is rigidly fastened to the section bushing 6 and rotates therewith as the former is rotated through the friction coupling between the T-flange 9 and the washer 11. The rectangular edges of the slot 15 in the prism 16 engage a plurality of flexible metallic strips 17, mounted on an insulator 18, and resiliently urge the studs fastened thereto to make contact with each other. A stop 19 is provided to prevent the springs 17 from being excessively deflected.

The electrical equipment of my invention is shown schematically in Fig. 1 and comprises a switch provided with a plurality of poles 22 and 23 and 24 and a plurality of movable contacts 25 and 26 and a relay 21 equipped with a plurality of movable contacts 27 and 28 and a plurality of stationary contacts 29 and 31.

The switch is actuated through an arm 33 of a bell-crank lever 34 pivotally mounted on a pin 35 fastened to the switch-supporting panel 36 and provided, near the end of its remaining arm 37, with a flange 38 that coacts with a plurality of flat springs 39 supporting the movable contacts 25 and 26.

Normally, one set of poles and contacts 23 and 26 are in closed position while the remaining sets 22 and 25 are in open position. When the machine is at rest, the contacts 7, operated by the feeding reel, are not closed, and the relay 21 is not energized. To start the machine, the operating lever is moved in the direction of the legend Start on the panel. The open contact 25 is thus closed, permitting a current to flow there-through to energize the relay 21 and to heat to incandescence the filament of a sound-exciting lamp 41.

When the relay 21 is excited, a movable contact 27 thereof closes the circuit wherein the motor 42 that drives the apparatus and the picture projection lamp 43 are disposed in parallel. The film-advancing mechanisms such as the sprocket wheel 70 located in the apparatus are thus actuated and, in turn, advance the film through the machine to cause the feeding reel 1, by its rotation, to close the contacts 7 associated therewith. As the lower contacts 28 on the relay 21 were closed when it was initially excited, a second conducting path is thus provided through the film-actuated contacts 7 through the lower relay contacts 28 and 31 and through the normally closed switch contacts 23 and 26, whereby the relay 21 is retained in a state of excitation when the normally open switch contact 25 automatically returns to its initial position.

After the film has been advanced through the film handling apparatus, it is wound on a take-up reel 80 keyed to the shaft 90 on which the feed reel 1 is mounted and driven from a pulley 95 that is suitably energized from the motor 42.

However, when the last layer of film 2 is removed from the reel 1, it ceases to rotate, and the contacts associated therewith are opened, deenergizing the relay 21 and stopping the machine. The relay is provided with stops 45 that prevent the upper movable contact 27 from completing a circuit through the lower stationary contacts 31.

Furthermore, the second circuit may be broken at any time during its operation by moving the operating lever 33 in the direction of the legend Stop on the switch panel. The machine might thus be instantly stopped should an occasion for interrupting its motion arise.

In Fig. 3, the actual wiring of the apparatus is shown. A wire 46, traversing a dielectric tube 47 in the base 48 of the machine, connects a terminal of the transformer, (not shown) that feeds the sound lamp 41 and relay 21, to a terminal 24 of the switch. Another wire 48 is connected to the normally open contact 22 of the switch and passes up through an opening in the base 49 to the sound lamp 41 and relay 21 while a third wire 51 connected to the normally-closed contact 23 of the switch passes up through another opening in the base and makes contact with a reel-actuated spring 17.

A lead 52 from the power supply coming in through the dielectric tube 47 passes up through the base 48 and makes contact with a terminal of the picture-projection lamp 43. The other terminal of the lamp is connected to one terminal of the motor by a second lead 53.

A conductor 54 from a resistor, (not shown) used in connection with the motor, and a second conductor 55 from a terminal of the motor are connected to the power-supply lead. The remaining power-supply path of the lamp and the motor comprises a conducting lead 56 from the motor to an upper stationary relay contact 29, and a lead 57 from the remaining upper contact 29 that passes through the insulated tube 47 to the power supply.

Of the remaining leads shown, one, 58, provides a conducting path from the motor-resistor to the motor and the other provides the return path to the power-supply transformer. The return conducting path 59 from the film-operated contacts 7 to the lower relay contacts 31, and the lead 61 from the other lower relay contact 31 to the sound lamp 41 and relay coil 62 are above the base 48 and are consequently not shown in Fig. 3.

Although I have shown a certain specific embodiment of my invention, I am fully aware that many modifications thereof are possible. I may, in particular, dispense with the starting switch and relay and initiate the action of the apparatus directly from the contacts.

My invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim as my invention:

1. In combination in film-handling apparatus, means for advancing a film strip, means for energizing said advancing means, a normally open circuit and means for temporarily closing said circuit for temporarily bringing said energizing means into cooperative relationship with said advancing means, means to be rotated by said film-strip when it is advanced and means having only

frictional engagement with said film-rotated means to be actuated by said film-rotated means when and as long as it is rotated to close said circuit and thereby to maintain said film-advancing mechanisms in energized condition to advance said film-strip.

2. In film-handling apparatus means for advancing a film strip, means, including a relay device provided with contacts, for supplying power to energize said advancing means, a lock-in cir-

cuit for the relay device including a switching device to be actuated to close said circuit by the film only when it is being advanced by said film-advancing means and means to be manually operated to cooperate with said power supply means for momentarily energizing said advancing means to advance said film strip thereby to close said lock-in circuit to maintain said film-strip in motion.

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