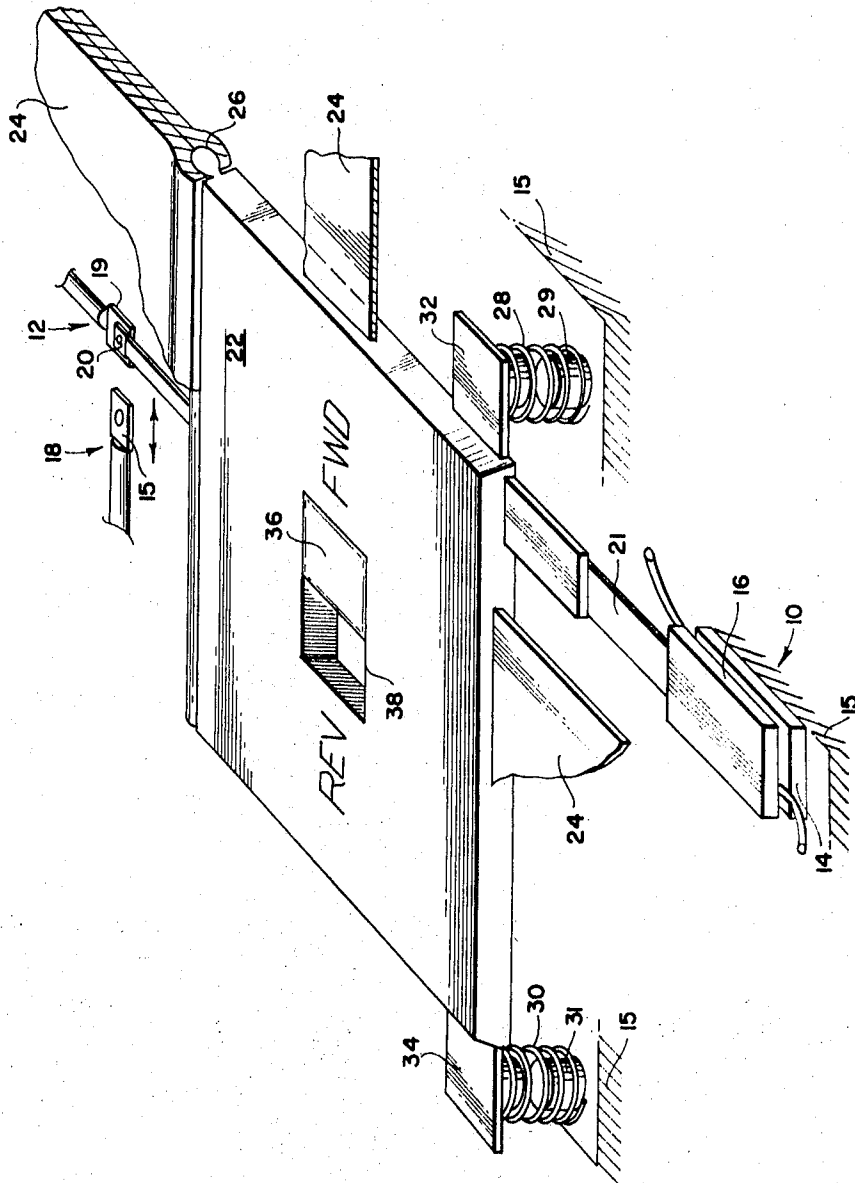


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COVER PLATE SWITCH ACTUATOR INTERLOCKED
WITH A SECOND SWITCH
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**COVER PLATE SWITCH ACTUATOR INTER-
LOCKED WITH A SECOND SWITCH**

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10 Claims

ABSTRACT OF THE DISCLOSURE

A switch interlock mechanism is provided wherein a first switch is actuated by depression of a plate member. The control knob for a second switch is located within an aperture in the plate member of the first switch, flush with or below the surface of the plate member. To gain ready access to the control knob of the second switch the plate member must be depressed, thereby actuating the first switch, and thus the second switch cannot conveniently be actuated until the prior actuation of the first switch.

The present invention relates to switching mechanisms and more particularly to switching mechanisms of the type wherein the operation of one switch is dependent on the prior operation of another switch.

In a number of different types of systems it is important that one operation take place before another. For example, in the control of motion of a system, it may be necessary that one operation, such as stopping of motion, be performed before a second operation, such as reversal of motion, is performed to avoid damage to the system resulting from attempted reversal of motion in the system at a time when forward motion is still taking place. The likelihood of initiating a chosen operation at the wrong time is substantially increased in applications where the various operations are controlled by a series of switches at the same location, such as in a remote control device for a motion picture projector.

It is a primary object of the present invention, therefore, to provide a novel switching mechanism wherein actuation of one switch is made dependent on the prior actuation of another switch.

It is another object of the present invention to provide a switching mechanism of the type described which is reliable, compact and relatively simple in design.

It is a particular object of this invention to provide a combined stop and reverse control switch for a motion picture projector system wherein the stop switch can be actuated at will to effect still projection of selected frames, but wherein actuation of the stop switch is a condition precedent to convenient actuation of the reverse switch, thus ensuring that the film advancing claw is retracted from the film before its in-and-out movement is changed in phase relative to its pull down movement to reverse the direction of film feed.

In accordance with the present invention a switching mechanism is provided wherein a first switch includes a plate member which, when depressed, actuates the switch. The control member for a second switch is located in an aperture in the plate member of the first switch. To gain ready access to the control member for the second switch, the plate member of said first switch must be depressed. Because depression of the plate actuates the first switch, actuation of the second switch normally cannot take place without prior actuation of the first switch.

Other objects, features and advantages of the present invention will become apparent upon consideration of the following detailed description of a presently preferred embodiment of the invention, reference being made to the accompanying drawing wherein the single figure shown

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is a perspective view of a presently preferred embodiment of the present invention.

The present switch mechanism is particularly suited for use in a motion picture projector system of the type disclosed in copending application Ser. No. 659,718, entitled Motion Picture Projector System filed concurrently herewith by Richard C. Painton and assigned to the same assignee as the present invention. The aforementioned application discloses a control system for a motion picture projector which includes means for stopping the movement of a filmstrip through the projector through the energization of a stopping solenoid (which withdraws the film advancing claw from the film) and means for reversing the movement of the filmstrip through the projector through the energization of a reversing solenoid (which changes the film engaging phase of the claw relative to its pull down movement). It is important that the motion of the filmstrip through the projector be completely stopped before reversing the movement of the filmstrip so that tearing or other destruction of the filmstrip or jamming the projector may be avoided. The present invention provides means whereby this end may be achieved.

Referring to the single figure of the drawing, the present invention is shown as incorporated in a device including a first switch 10 and a second switch 12. Switch 10, which may be utilized as a stop switch in the above mentioned application Ser. No. 659,718, is a normally open switch comprising a fixed contact 14 which is rigidly affixed to a switch housing indicated at 15 and a movable contact 16. Switch 12, which may be utilized as a reversing switch in said copending application Ser. No. 659,718, is a conventional single-pole, single-throw slide switch comprising fixed contacts shown rather schematically at 18 and 19, rigidly affixed to the switch housing indicated at 15, and a movable slide contact 20.

Switch 10 is closed through the depression of stop plate 22, depression of plate 22 causing downward movement of movable contact 16 which is affixed thereto by means of connecting member 21. Stop plate 22 is hinged at one side thereof by hinge 26, and is further supported by springs 28 and 30 disposed between outwardly extending flanges 32 and 34 of the stop plate 22 and lugs 29 and 31 rigidly affixed to the switch housing 15. Under normal conditions stop plate 22 is biased by the biasing action of springs 28 and 30 to a position wherein the surface of the plate 22 extends above the cover 24 of the switch housing as indicated in the drawing.

A conventional control or actuator member or knob 36 is used to control the position of sliding contact 20 of switch 12. Control member 36 is located slidably in an aperture 38 in stop plate 22 and with stop plate 22 in its normal raised position, is not easily accessible to an operator in that the top of the knob 36 is located below the surface of stop plate 22 under these conditions. With stop plate 22 depressed, control knob 36 extends through aperture 38 and is, therefore readily accessible to an operator. Depression of stop plate 22 actuates switch 10 in a manner described hereinbefore. Therefore, in summary, to gain access to switch 12, stop plate 22 must first be depressed, thereby actuating switch 10 and thus switch 12 cannot be actuated easily without first actuating switch 10.

As incorporated in the motion picture projector control switch 12 can be actuated. In this way it is assured that is necessary first to actuate stop switch 10 before reverse switch 12 can be actuated. In this way it is assured that advancement of the filmstrip through the projector will be stopped before reversal of the movement of the filmstrip can take place.

It will be understood by those skilled in the art that the embodiment of the invention shown and described herein is subject to various modifications without departing from the scope and spirit of the invention. Accordingly, it

should be understood that the invention is not limited by the exemplary embodiment shown and described, but rather only by the subjoined claims as construed in light of the foregoing specification and drawings.

I claim:

1. A switching mechanism comprising,
 - a first switch including plate means having an aperture therein, said plate means having a first normal position and a second depressed position, said plate means in the depressed position thereof actuating said first switch,
 - a second switch including control means located substantially wholly within said aperture in said plate means when said plate means is in said normal position, but projecting through and from said aperture when said plate means is in said depressed position, so that said control means is accessible for easy actuation only when said plate means has been depressed, whereby actuation of said second switch is dependent on the prior actuation of said first switch.
2. A switching mechanism in accordance with claim 1 wherein said plate means is hinged along one side thereof and is supported by spring means urging it to said normal position.
3. A switching mechanism in accordance with claim 1 wherein said switches are located within a single housing, and the surface of said plate means extends above the surface of said housing when in the normal undepressed position thereof.
4. A switching mechanism in accordance with claim 1 wherein said first switch is normally open and is closed by depressing of said plate means and said second switch is a single-pole, single-throw slide switch.
5. For use in controlling motion of a system of the type which includes means for effecting forward and reverse motion of the system and means for stopping of the motion of the system, a switching mechanism comprising,
 - a forward reverse switch for actuating the forward and reverse motion effecting means,
 - a stop switch for actuating the stop motion means, said stop switch comprising plate means capable of movement from a normal position to a depressed position wherein said stop switch is actuated, said plate means having an aperture therein,
 - said forward-reverse switch including control means aligned with said aperture for actuating said forward-reverse switch, said control means projecting through and from said aperture, and hence being readily ac-

cessible, only when said plate means of said stop switch is depressed,

whereby said stop switch must be actuated before said forward-reverse switch can be actuated thereby preventing operation of the forward-reverse switch when the system is in motion.

6. A switching system in accordance with claim 5 wherein said plate means is hinged along one side thereof and is supported by spring means.

7. A switching system in accordance with claim 6 wherein said switches are located within a single housing, and the surface of said plate means extends above the surface of said housing when said plate means is undepressed.

8. A switching system in accordance with claim 7 wherein said stop switch is normally open and is closed by depressing said plate means, and said reverse switch is a single-pole, single-throw slide switch.

9. A switching mechanism as claimed in claim 1 wherein said control means is slidably mounted for movement in said aperture in directions normal to the directions of movement of said plate means.

10. A mandatory sequence switching mechanism comprising, first and second switches; a first manually actuatable member for controlling the state of the first switch; and a second manually actuatable member for controlling the state of said second switch, for normally preventing actuatable access to said first member, and for exposing said first member for manual actuation only when said second member is in a predetermined position and said second switch is in a predetermined state, whereby said first switch can be actuated only when said second switch is in a predetermined state.

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