

Aug. 9, 1938.

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2,126,108

FIRE PREVENTION APPARATUS FOR MOTION PICTURE PROJECTING MACHINES

Filed March 15, 1937

3 Sheets-Sheet 1

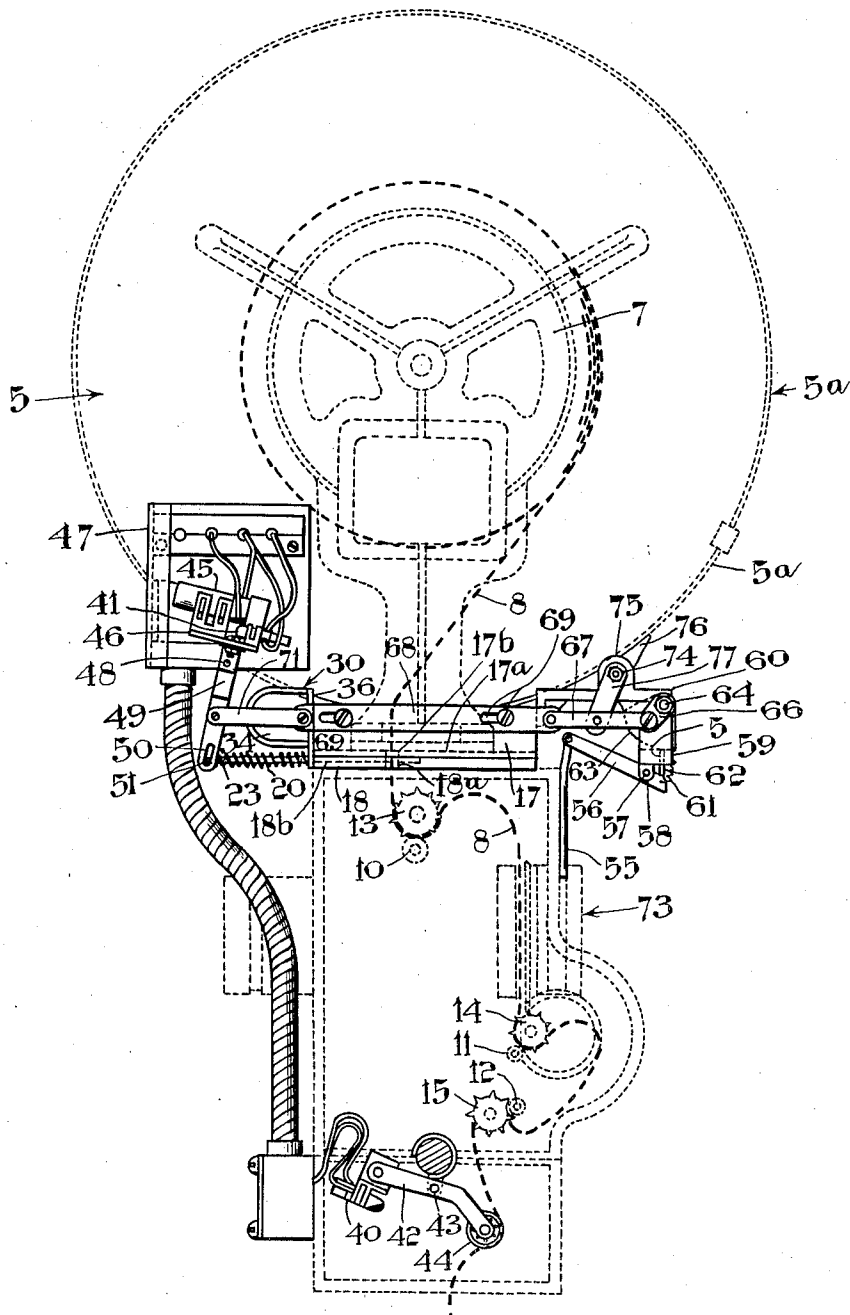


FIG. 1

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3 Sheets-Sheet 2

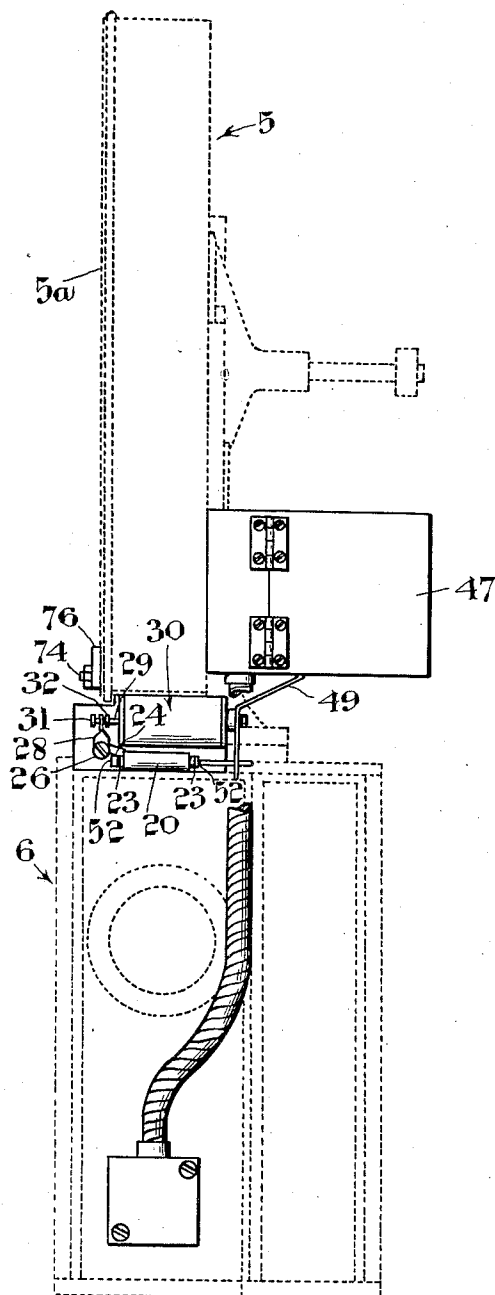


FIG. 2

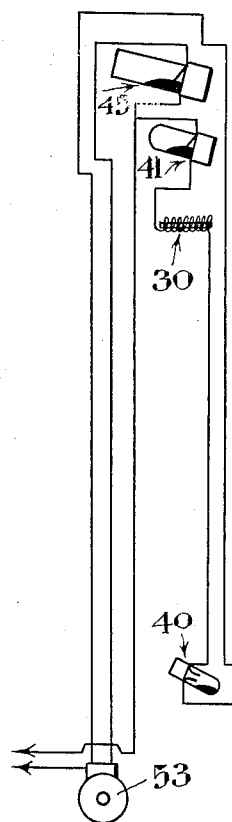


FIG. 6

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3 Sheets-Sheet 3

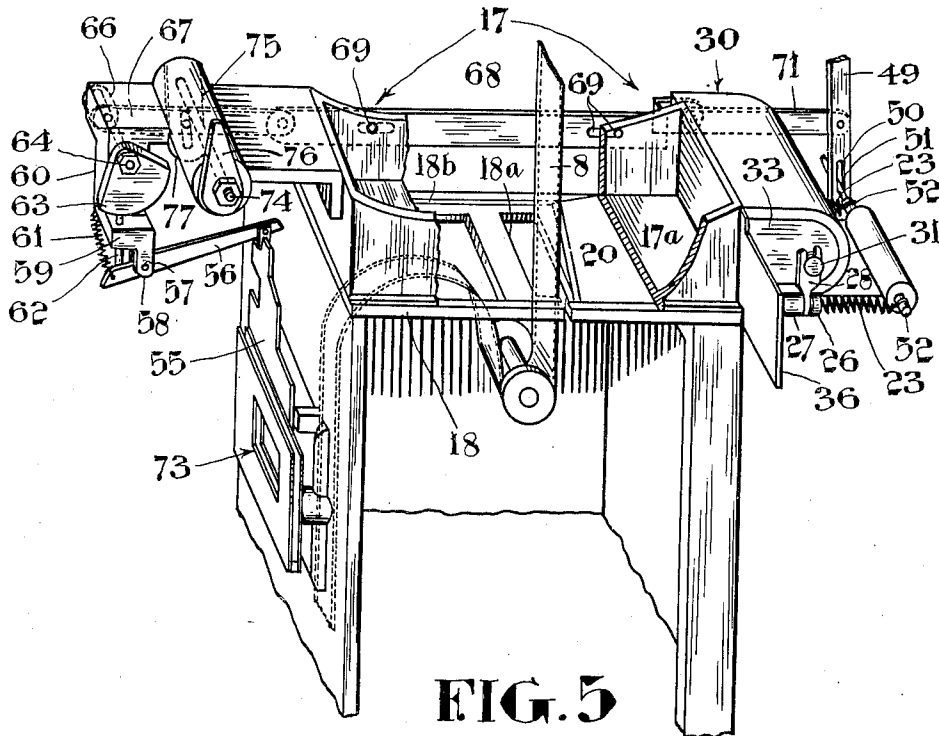


FIG. 5

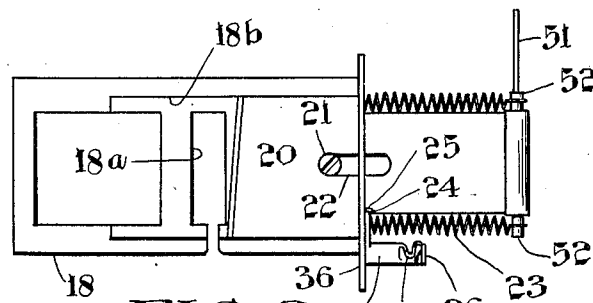


FIG. 3

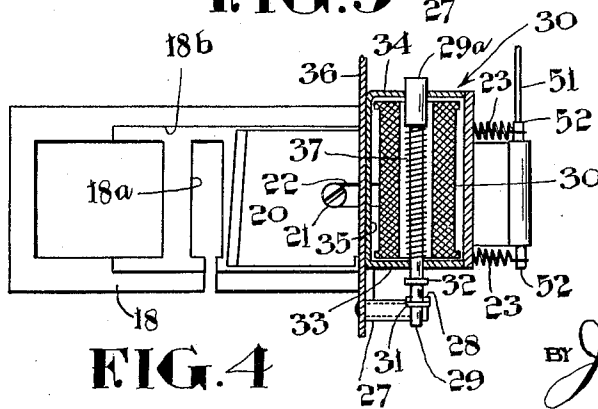


FIG. 4

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FIRE PREVENTION APPARATUS FOR MOTION PICTURE PROJECTING MACHINES

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Application March 15, 1937, Serial No. 130,820

11 Claims. (Cl. 88—17)

This invention relates to motion picture projecting machines and particularly to fire prevention apparatus of the type disclosed in our co-pending application Serial No. 89,826, filed July 9, 1936.

The fire prevention apparatus disclosed in said application comprises a plurality of electrically actuated control devices arranged to perform their respective functions automatically in response to breakage of the film, said devices comprising (1) a switch which is operated to open-circuit the film operating motor and thus interrupt feeding of the film past the exposure opening; (2) a dowser which is operated to a light intercepting position between the light source and the film to prevent ignition of the film; (3) a cutter which is operated to sever the film at a point close to the film outlet of the upper film magazine and to simultaneously close said outlet so that, in the event of film ignition in the projector head, the fire will be prevented from spreading into the upper film magazine; and (4) a locking device which is operated to lock the door of the upper film magazine in closed position. In this prior apparatus the switch, film cutter, dowser and magazine lock are independently mounted in rather scattered relation and separate coils or solenoids are employed for controlling the operation of the cutter, dowser and magazine lock.

The purpose of the present invention is to provide a more compact, convenient and commercially desirable assembly in which the switch, cutter, dowser and magazine lock are mechanically interlinked and controlled by a single control coil or solenoid, thus dispensing with the two control coils or solenoids previously employed for controlling the dowser and magazine lock.

In the preferred embodiment of this invention, the film cutter, dowser and magazine lock are associated with a common base interposed between the upper film magazine and the projector head. This base also carries a control coil or solenoid which is operated at the proper time to release a latch normally holding the cutter in a retracted or inoperative position. This solenoid is controlled by a momentary contact switch which, together with the main motor switch, may be mounted either on the upper film magazine or on the same base which carries the cutter, dowser and magazine lock. The two switches, together with the dowser and magazine lock, are mechanically interlinked with the cutter so as to be automatically operated thereby when the cutter is released and operated to its film shearing and

magazine sealing position. The control coil or solenoid which governs the operation of the cutter is energized to release the cutter at the proper time through the agency of a normally open control switch arranged to be automatically closed in response to breakage of the film passing through the projector head.

Proceeding now to a more detailed description of this invention reference will be had to the accompanying drawings, in which—

Fig. 1 is a partial rear elevation of the film feeding mechanism of a motion picture projecting machine. In this view the elements entering into the present invention are shown in full lines while the conventional elements are shown in dotted outline.

Fig. 2 is a side elevation looking toward the left hand side of the assembly appearing in Fig. 1.

Fig. 3 is a detail view of the cutter assembly including the latch by which the cutting blade is normally held in a retracted or inoperative position.

Fig. 4 is a view similar to Fig. 3 but showing the solenoid by which the cutter releasing latch is controlled.

Fig. 5 is a fragmentary perspective view, partly in section, showing the manner in which the cutter, dowser and magazine lock are mechanically interlinked and associated with a common base interposed between the upper film magazine and the projector head.

Fig. 6 is a wiring diagram.

In these drawings the upper film magazine and the projector head of a conventional motion picture projecting machine are respectively indicated at 5 and 6. The magazine contains the reel 7 from which the film 8 is fed past the exposure opening 9 by guide rolls 10, 11 and 12 and co-operating feed sprockets 13, 14 and 15. The lower film magazine and other conventional elements that would normally appear have not been shown since such disclosure is not essential to an understanding of the invention hereinafter described.

As best shown in Figs. 1 and 5, a hollow box-like casting 17 and a knife guide 18 are interposed between the magazine 5 and the projector head 6. The casting 17 is shown as a rectangular structure open at the top and having the upper edges of its side and end walls curved to fit the circular wall of the magazine 5. The bottom wall of the casting, designated 17a, is provided with a slot 17b for the passage of the film 8. This slot registers with a similar slot 18a formed in the underlying knife guide 18.

The upper surface of the knife guide 18 (compare Figs. 3 and 4) is recessed to provide a guide-way 18b in which the knife blade 20 is slidably arranged. The travel of the blade 20 in either direction is limited by a stop pin 21 (Fig. 3) having its lower end fixed to the knife guide 18 and its upper end engaged in the knife slot 22 which is elongated in the longitudinal direction of the blade.

The knife blade 20 is shown held in a retracted position against the resistance of the blade actuating springs 23 which normally tend to project the blade across the previously mentioned film slots 17b and 18a. The blade is held in this retracted position by a pivotally mounted catch 24 engaged in the notch 25 shown in Fig. 3. The catch 24 is pivotally mounted on a suitable pivot 26 by means of the sleeve portion 27 which is provided with a vertically extending arm 28. The upper end of arm 28 is bifurcated to straddle the armature 29 of the knife release solenoid 30 and lies between inner and outer abutments 31 and 32 fixed to said armature.

As shown more particularly in Fig. 4, the coil portion of solenoid 30 is supported between the arms 33 and 34 of a bracket 35 fastened to a vertically disposed plate 36 mounted at one end of casting 17, said plate being provided with a suitable slot (not shown) for the passage of the knife blade 20. The armature 29 is normally biased to a latch applying position by a spring 37 confined between the bracket arm 33 and the enlarged end 29a of the armature. When the solenoid 30 is energized the armature 29 is moved axially against the resistance of the spring 37 to swing the catch 24 clear of the notch 25, thus releasing the knife blade 20 and permitting it to be projected across the slots 17b and 18a by the knife actuating springs 23. When thus operated the knife blade 20 serves to sever the film and to simultaneously close off the film outlet of the upper magazine.

As shown in Fig. 6, the coil of solenoid 30 is connected in series with a normally open film actuated switch 40 and a normally closed momentary contact switch 41. Switch 40 (see Fig. 1) is carried by one end of a lever 42 mounted to swing vertically about an intermediate pivot 43. The remaining end of lever 42 is equipped with a film engaging roller 44. Under normal operating conditions the film serves, through its engagement with the roller 44, to hold the lever 42 and switch 40 in the position shown in Fig. 1. When the film breaks the lever 42 swings in a counter-clockwise direction so that the switch 40 is tilted to a circuit closing position, thus energizing the coil of the solenoid 29 to release the knife holding catch 24.

The switch 41, together with the main motor switch 45, is carried by a tiltably mounted support 46 located within a switch housing 47 fastened to the film magazine 5. The support 46 is mounted to swing about a pivotal axis 48 and is provided with a depending arm 49. The lower end of arm 49 is slotted as at 50 to receive a lateral extension 51 provided at the outer end of the knife blade 20. The extension 51 is preferably formed as an integral or rigid continuation of one of the knife lugs 52 to which the outer ends of the knife actuating springs 23 are connected, the inner ends of said springs being suitably anchored to the previously mentioned plate 36.

When the knife blade 20 is projected to its operative position by the action of the springs

23 the extension 51 acts, through the arm 49, to tilt the support 46 to the left so that the normally closed switches 41 and 45 are tilted to circuit opening positions. The opening of the switch 41 disrupts the supply of current to the knife release solenoid 30 while the opening of the switch 45 disrupts the supply of current to the operating motor 53 (Fig. 6) which operates the conventional film drive gearing (not shown).

The dowser which is interposed between the light source and the film to prevent ignition of the latter in case of breakage is indicated at 55. This dowser is attached to one end of a lever 56 by which it is normally held in the retracted or elevated position shown in Fig. 1. The lever 56 is mounted to swing about an intermediate pivot 57 carried by a pair of lugs 58 depending from the laterally projecting arm 59 of a suitable bracket 60. The free end of lever 56 is held, by spring 61, in contact with a vertically slidable pin 62 working in a vertical opening formed in the bracket arm 59. The upper end of pin 62 is engaged by a cam 63 fixed to one end of a shaft 64 which extends transversely through a bearing opening in the bracket 60. A crank arm 66, fixed to the opposite end of shaft 64, is connected by link 67 to one end of a bar 68 which is slidably attached to one side of the casting 17 by the pin and slot connections 69. The opposite end of bar 68 is fastened by link 71 to the arm 49 of the tiltably mounted switch support 46.

Under normal operating conditions the cam 63 is positioned as shown in Figs. 1 and 5 and acts, through the pin 62 and lever 56, to hold the dowser 55 in its elevated position. When the cutter is projected to its film shearing position by the springs 23 the resulting movement of the switch tilting arm 49 acts, through link 71, bar 68, link 67 and arm 59 to swing the cam 63 in an anti-clockwise direction. The profile of the cam is such that this swinging movement permits the pin 62 to move upwardly thus allowing lever 56 to swing in an anti-clockwise direction until the dowser 55 is lowered to a position closing the exposure opening 73.

The bracket 60 which is fixed to or formed integral with one end of the casting 17 also carries a transversely extending shaft 74 mounted in a suitable bearing 75. One end of shaft 74 carries a latch arm 76 which, when the shaft is rotated in a counter-clockwise direction from the position shown in Fig. 1, is adapted to swing to a position overlying the outer side of the magazine cover to thus secure the cover in its closed position. An arm 77, fixed to the opposite end of shaft 74, is connected at its free end to the previously mentioned link 67. It will thus be seen that the catch 76 is mechanically interlinked with the cutter blade 20 so as to be automatically operated thereby when the cutter blade is actuated by the springs 23.

Having thus described our invention, what we claim is:—

1. Fire prevention apparatus for motion picture projecting machines comprising normally inoperative film cutting means adapted to automatically sever the film close to the upper film magazine in response to breakage of the film within the projector head and normally inoperative auxiliary control devices mechanically interlinked with said cutting means so as to be automatically actuated thereby, said auxiliary devices including a switch which is operated to open-circuit the film operating motor and thus interrupt feeding of the film past the exposure

opening, a dowsers which is operated to a light intercepting position between the light source and film to prevent ignition of the film and a locking device which is operated to lock the door of the upper film magazine in closed position.

2. Fire prevention apparatus for motion picture projecting machines comprising normally inoperative film cutting means adapted to automatically sever the film close to the upper film magazine in response to breakage of the film within the projector head and normally inoperative auxiliary control devices mechanically interlinked with said cutting means so as to be automatically operated thereby, said auxiliary devices including a dowsers which is operated to a light intercepting position between the light source and film to prevent ignition of the film and a locking device which is operated to lock the door of the upper film magazine in closed position.

3. Fire prevention apparatus for motion picture projecting machines comprising normally inoperative film cutting means adapted to automatically sever the film close to the upper film magazine in response to breakage of the film within the projector head and a normally inoperative locking device mechanically interlinked with said cutting means so as to be automatically operated thereby to a position locking the door of the upper film magazine in closed position.

4. Fire prevention apparatus for motion picture projecting machines comprising a motor control switch included in the circuit of the film operating motor, means functioning automatically in response to breakage of the film within the projector head to operate said switch to a position disrupting the flow of current to said motor and a normally inoperative locking device mechanically interlinked with said switch so as to be mechanically operated thereby to a position locking the door of the upper film magazine in closed position.

5. Fire prevention apparatus for motion picture projecting machines comprising a motor control switch included in the circuit of the film operating motor, means functioning automatically in response to breakage of the film within the projector head to operate said switch to a position disrupting the flow of current to said motor and normally inoperative auxiliary control devices mechanically interlinked with said switch so as to be automatically operated thereby, said auxiliary devices including a dowsers which is operated to a light intercepting position between the light source and film to prevent ignition of the film and a locking device which is operated to lock the door of the upper film magazine in closed position.

6. Fire prevention apparatus for motion picture projecting machines comprising a cutter for severing the film close to the upper film magazine, means normally biasing said cutter to a film cutting position, means releasably holding said cutter in a retracted position, means functioning automatically in response to breakage of the film in the projector head to release said holding means and permit the cutter to move to its film cutting position under the influence of said biasing means, a motor control switch included in the circuit of the film operating motor, a tiltably mounted support carrying said switch, said support being normally tilted to a switch closing position and means mechanically interlinking said support with said

cutter whereby the support is tilted to a switch opening position as the cutter moves to its film cutting position.

7. Fire prevention apparatus for motion picture projecting machines comprising a cutter for severing the film close to the upper film magazine, means normally biasing said cutter to a film cutting position, means releasably holding said cutter in a retracted position, means functioning automatically in response to breakage of the film in the projector head to release said holding means and permit the cutter to move to its film cutting position under the influence of said biasing means, a normally inoperative dowsers adapted to be moved to an operative position between the light source and the film to prevent ignition of the film, means including a cam for operating the dowsers to and from its light intercepting position and means mechanically interlinking said cam with said cutter whereby the dowsers is operated to its light intercepting position in response to movement of the cutter to its film severing position.

8. Fire prevention apparatus for motion picture projecting machines comprising a cutter for severing the film close to the upper film magazine, means normally biasing said cutter to a film cutting position, means releasably holding said cutter in a retracted position, means functioning automatically in response to breakage of the film in the projector head to release said holding means and permit the cutter to move to its film cutting position under the influence of said biasing means, a film magazine lock including a rotary shaft equipped with a locking member at one end adapted to be moved to and from a locking position over the cover of the upper film magazine and means mechanically interlinking the opposite end of said shaft with said cutter whereby said locking device is automatically operated to its locking position as the cutter moves to its film severing position.

9. Fire prevention apparatus for motion picture projecting machines comprising a cutter adapted to sever the film at a point close to the upper film magazine, means for biasing the cutter to a film cutting position, a latch normally holding the cutter in a retracted position against the resistance of said biasing means, a normally deenergized solenoid adapted, when energized, to release said latch and permit said cutter to move to its film cutting position under the influence of said biasing means, a normally open film actuated switch and a normally closed momentary contact switch connected in series with said solenoid and with a suitable source of current, means for automatically closing the film actuated switch in response to breakage of the film within the projector head, a tiltably mounted support on which the momentary contact switch is carried, said support being normally tilted to a switch closing position and means mechanically interlinking said switch support with said cutter whereby said support is automatically tilted to a switch opening position in response to movement of the cutter to its film cutting position.

10. Fire prevention apparatus as set forth in claim 9 including a normally closed motor control switch mounted on said switch support and connected in series with the film driving motor, said motor control switch being movable with said support to a circuit opening position simulta-

neously with the aforesaid movement of the cutter to its film cutting position.

11. Fire prevention apparatus for motion picture projecting machines comprising a cutter adapted to sever the film close to the upper film magazine, means biasing said cutter to a film cutting position, a releasable latch normally holding the cutter in a retracted position against the resistance of said biasing means, a normally de-energized solenoid connected to said latch and adapted, when energized, to withdraw the latch to a cutter releasing position to thereby permit the cutter to move to its film cutting position under the influence of said biasing means, a normally open film actuated switch connected in series with said solenoid and with a source of current, means for automatically closing said switch in response to breakage of the film within the projector head, a normally closed momentary con-

tact switch connected in series with said solenoid and said film actuated switch, a normally closed motor control switch connected in series with the film operating motor, a tiltably mounted support carrying said momentary contact switch and said motor control switch, said support being normally tilted to a switch closing position, and an arm fixed to said support and secured to said cutter whereby said support is automatically tilted to a switch opening position as the cutter moves to its film severing position, the arrangement being such that the resulting opening of the momentary contact switch serves to deenergize the solenoid while the resulting opening of the motor control switch serves to interrupt the supply of current to the film driving motor.

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