Apr. 3, 1923. 1,450,455.

D. O. SEAMAN.

MOVING PICTURE MACHINE.

FILED AUG. 6, 1920. 3 SHEETS—SHEET 1.

Fig. 1.

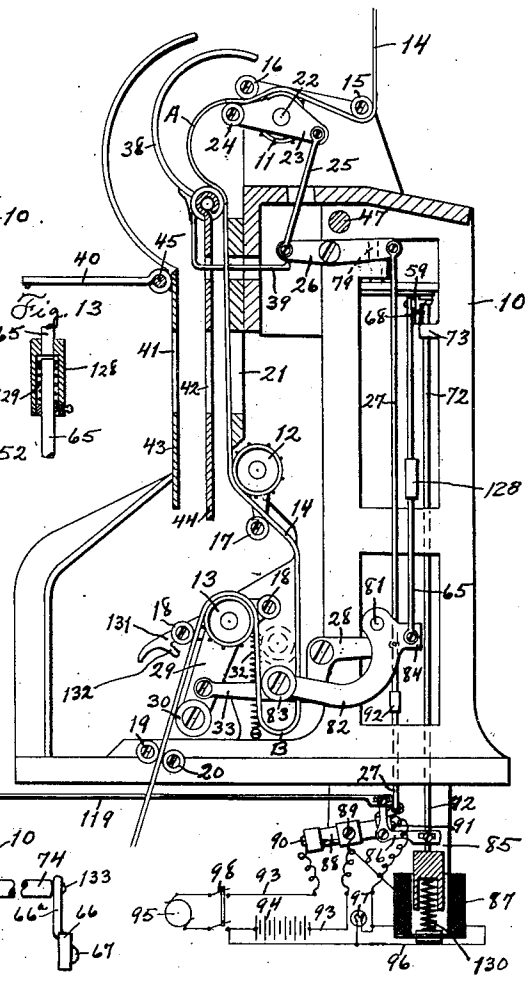


Fig. 2.

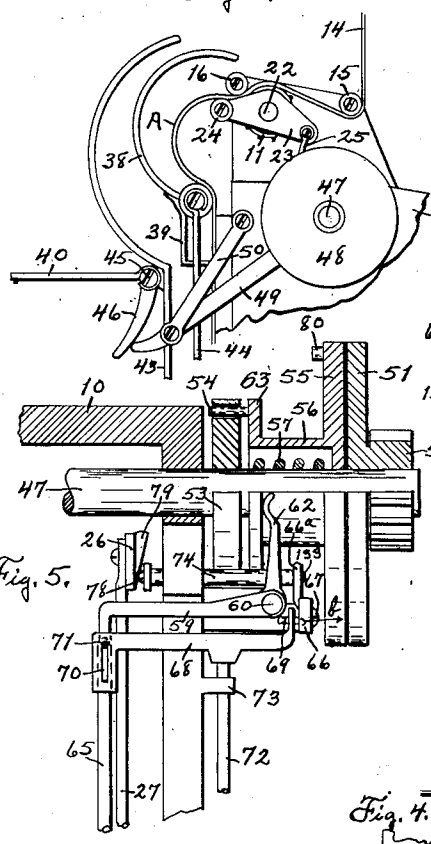


Fig. 5.

Fig. 13

Fig. 4.

Fig. 6.

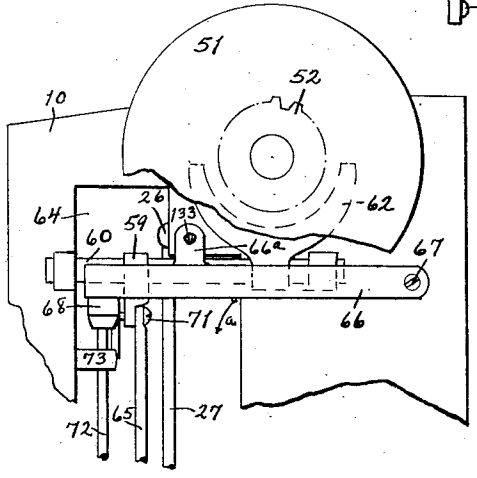
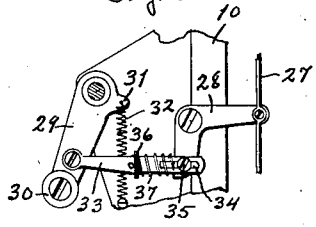


Fig. 3.



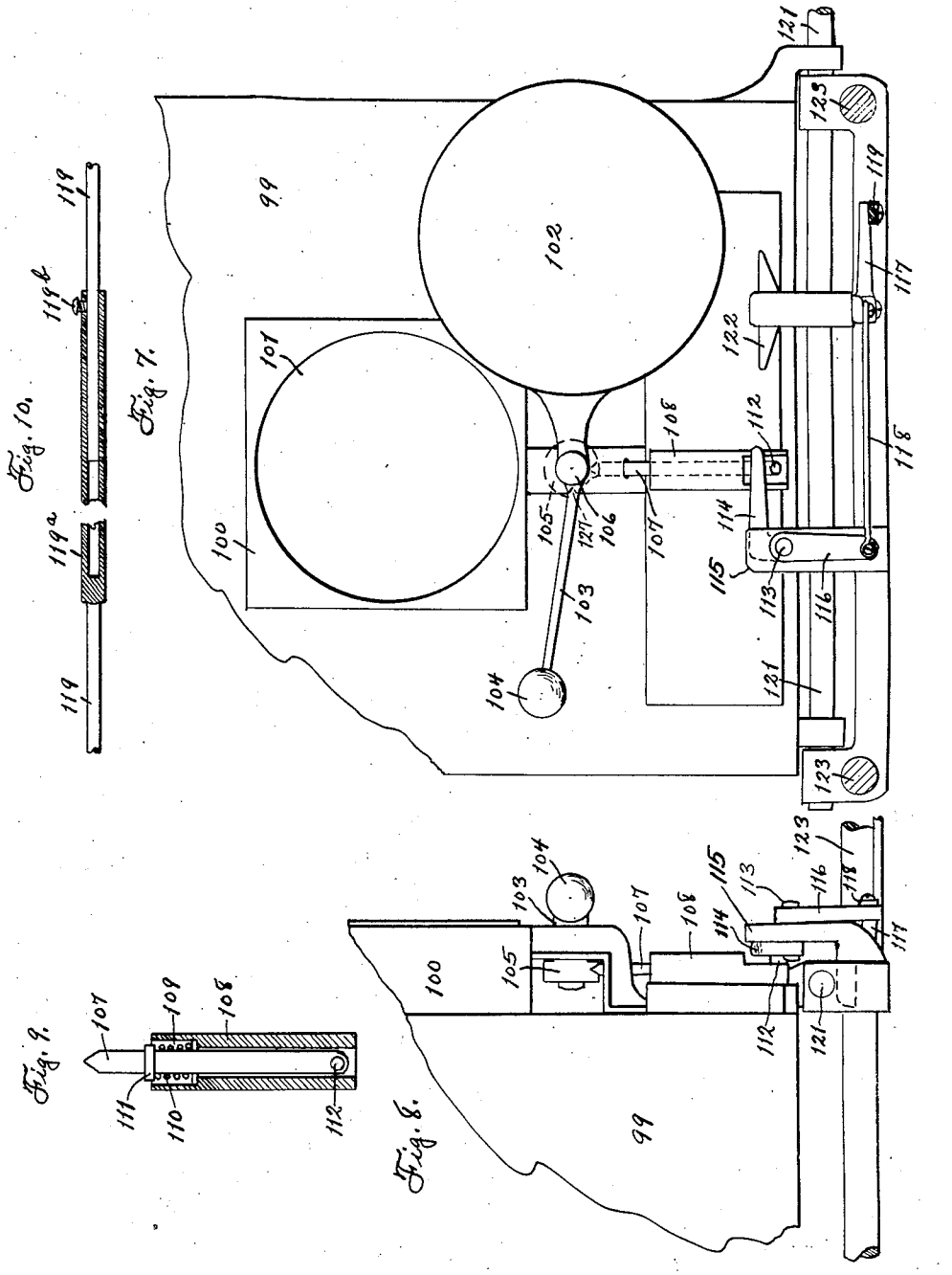
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MOVING PICTURE MACHINE.

FILED AUG. 6, 1920. 3 SHEETS—SHEET 2.



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MOVING PICTURE MACHINE.

FILED AUG. 6, 1920. 3 SHEETS—SHEET 3.

Fig. 11.

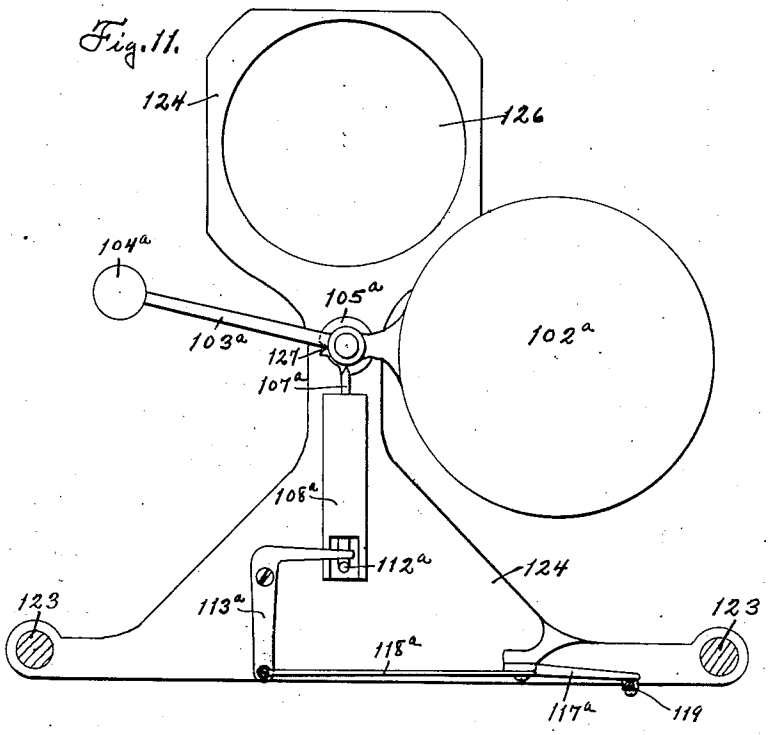
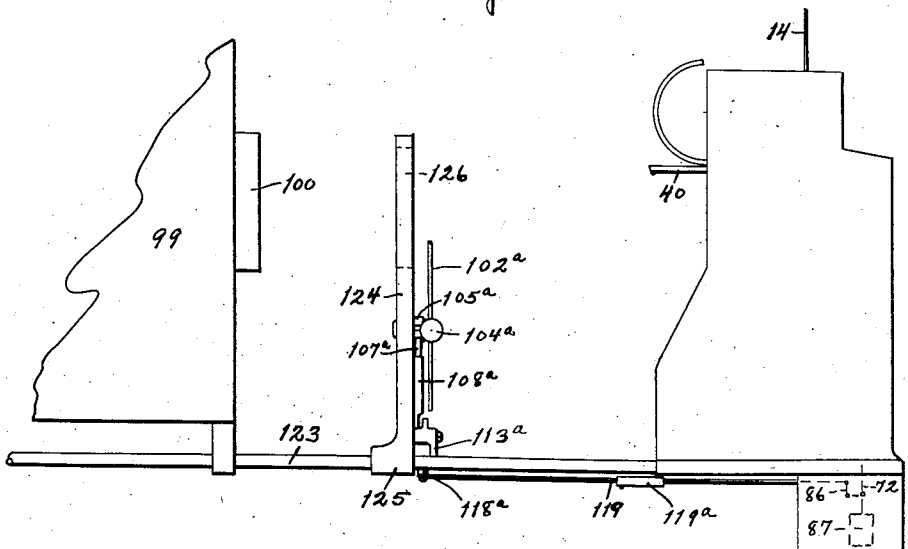


Fig. 12.



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Patented Apr. 3, 1923. 1,450,455

UNITED STATES PATENT OFFICE.

DELBERT O. SEAMAN, OF DES MOINES, IOWA.

MOVING-PICTURE MACHINE.

Application filed August 6, 1920. Serial No. 401,575.

To all whom it may concern:

Be it known that I, DELBERT O. SEAMAN, a citizen of the United States of America, and resident of Des Moines, Polk County, Iowa, have invented a new and useful Improvement in Moving-Picture Machines, of which the following is a specification.

The object of this invention is to provide improved fire protection mechanism for films of moving-picture machines, which mechanism may be readily incorporated in or attached to any standard moving picture machine.

A further object of this invention is to provide an improved fire protection mechanism for films of moving picture machines, which shall operate automatically whenever for any reason normal travel of the film through the machine is interrupted or interfered with.

A further object of this invention is to provide an improved fire protection mechanism for films of moving picture machines which will operate both mechanically and electrically whenever normal travel of the film is interrupted or interfered with, to permit a fire shutter to drop to closed position, to throw a douser plate across the path of rays from the projector, to protect the film from fire in case the loop is not properly reformed, and under certain conditions to stop the operation of the machine and to actuate an alarm.

With these and other objects in view, my invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in my claims and illustrated by the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through a portion of a moving picture machine equipped with my improved fire protection mechanism. Figure 2 is a detail side elevation, illustrating the means for operating the fire shutter. Figure 3 is a detail elevation of a part of the mechanism shown in Figure 1. Figure 4 is a detail section of a plunger device employed in releasing the fire shutter. Figure 5 is a vertical detail section, on an enlarged scale, of mechanism employed to release the fire shutter. Figure 6 is a side elevation of the members shown in Figure 5, from the side opposite to Figure 1. Figure 7 is a front elevation showing the lamp housing, douser plate and means for operating same, being partly in section. Figure 8 is a side elevation of the members shown in Figure 7. Figure 9 is a detail vertical section of the latching means for the douser plate. Figure 10 is an elevation, partly in longitudinal section, of the rod employed to release the latch for the douser plate.

Figure 11 is a front elevation, partly in section, illustrating a modified means for mounting the douser plate, Figure 12 is a side elevation illustrating such means in relation to the lamp housing and moving picture machine, and Fig. 13 is a detail of a motion-absorbing connection.

In the construction of the mechanism as shown the numeral 10 designates generally the frame of a moving picture machine which may be of any suitable construction. Suitably mounted on the frame 10 is a top feed sprocket 11, an intermittent feed sprocket 12, and a lower feed sprocket 13, which may be of the ordinary types well known in the art, and over which a film 14 is adapted to travel, said film being held in position by guide rollers 15, 16, 17, 18, 19 and 20. The film 14 is fed through the machine in such a way that a loop or slack portion A is provided between the upper feed sprocket and the intermittent feed sprocket and a depending loop B between the intermittent feed sprocket and the lower feed sprocket, said film passing in vertical position across an opening 21 through which the light is projected. It is to be understood that in the ordinary arrangement the films are provided with marginal perforations engaged by teeth on the various feed sprocket rollers, which are rotated by suitable means to cause travel of the film, the upper and lower feed sprockets being rotated steadily while the intermittent sprocket is rotated intermittently, pausing during the projection period of each portion of the film.

Pivotally mounted on the shaft 22, which carries the upper feed sprocket 11, is a lever 23, which carries at one end a roller 24 extended into the path of the upper loop A of the film 14. Pivoted to the opposite end of the lever 23 is a downwardly extending link 25. A lever 26 is pivoted between its ends on the machine frame, one end of which lever is pivoted to the link 25. Pivotally connected to the opposite end of the lever 26 is a downwardly extending rod 27. A bell-crank lever 28 is suitably pivoted on the frame and has an arm pivoted to and

between the ends of the rod 27. A forwardly and downwardly extending arm 29 is pivoted on the axis of the lower feed sprocket 13 and said arm carries at its lower end a roller 30, which extends adjacent to the path of travel of the film 14 when the parts are in normal position. The arm 29 is formed at its upper end with a laterally extending ear 31, and a coil spring 32 is secured to said ear and to the frame 10 below the feed sprocket 13. Ordinarily the arm 29 is held against upward and forward movement by contact of the film 14 with the roller 30, but when such contact ceases, as by a break occurring in the film, the spring 32 acts to oscillate said arm and cause said roller to move across the normal path of the film. A link 33 is pivoted at one end to the lower portion of the arm 29 and extends rearwardly and is formed with a longitudinal slot 34 (Figure 3) receiving a stud or pin 35 carried by the lower arm of the bell-crank lever 28. A collar 36 is secured to the link 33 and a spring 37 is coiled on said link between said collar and the lower arm of the bell-crank lever 28. It is the function of the spring 37 to apply light pressure to the bell-crank lever to hold it in normal position as shown.

A curved shield 38 is pivoted at its lower end on a transverse axis and said shield is adapted normally to occupy an upright position at the rear of the upper loop A of the film. An arm 39 is fixed to and extends downwardly from the shield 38 and thence forwardly and has its free end engaging beneath the rear end of the lever 26. When rearward pressure is applied to the shield 38, as by accumulation of an excess amount of film in the loop A, that is to say by undue enlargement of the loop from any cause such as a break in the film above the intermittent sprocket 12, or improper feeding action of said sprocket on the film, the arm 39 presses upwardly on the rear end of the lever 26 and oscillates said lever, with a result hereinafter to be made plain.

As in the ordinary construction, a fire shutter 40 is pivoted at its upper margin on a transverse axis and normally occupies a horizontal position during operation of the film, but at times may drop to a depending vertical position and close the light apertures 41, 42 formed in the plates 43, 44 and registering with the light aperture 21. As shown the fire shutter is mounted on a shaft 45 to which is fixed a curved arm 46 (Figure 2). On a shaft 47 extending transversely through the machine is a friction disk 48 operatively connected with an arm 49, the movement of which is partially controlled, guided and limited by a link 50 in a common manner. In its operation the arm 49 engages the arm 46 and raises and supports the fire shutter 40 in open position, or inoperative. This mechanism is of ordinary construction now in common use, and will not be further described.

On the opposite end of the shaft 47 from the friction disk 48 is loosely mounted a friction disk 51 to which is fixed a pinion 52 (Figures 5 and 6), adapted to be run from the mechanism which operates the machine. Fixed to the shaft 47 just outside of the frame 10 is an apertured plate 53. A coacting friction disk 55 is loosely and slidably mounted on the shaft 47 and adapted for contact with the disk 51. The disk 55 is formed with an elongated hollow hub 56 in which is mounted a coil spring 57 engaging at one end the plate 53 and normally acting to hold the disk 55 into operative engagement with the disk 51, so that it is driven by said disk 51. On the inner end of the hub 56 are pins 54 extending within the apertures of the plates 53. In this manner the friction disk 51 is normally operatively connected to and adapted to drive the shaft 47.

A lever 59 is fulcrumed on a bolt or screw 60 seated in a bracket 61 formed on the frame 10, and said lever is formed at its outer end with an upstanding fork 62 engaging a flange 63 on the hub 56 of the friction disk 55. The lever 59 projects inside the frame 10, extending through an aperture 64 in the side thereof. To the inner end of the lever 59 is pivotally connected the upper end of a downwardly extending rod 65. When the rod 65 is moved downwardly, as hereinafter set forth, the lever 59 is oscillated in such manner as to cause the work 62 thereof to press against the flange 63 of the hub 56 and release the friction disk 55 from operative contact with the disk 51, against the tension of the spring 57. The effect of this action is to stop the rotation of the shaft 47 and of the friction disk 48, thus withdrawing the supporting action through the curved arm 49 and arm 46, and permitting the fire shutter 40 to fall by gravity. When the shaft 47 is again rotated the shutter is raised and held in raised position in the manner ordinarily provided.

A lever 66 is fulcrumed at one end on a screw 67 and extends in a substantially horizontal position, on the outside of the frame, beneath the friction disk 55. The lever is adapted for movement through an arc on its fulcrum in the direction of the arrow *a* in Figure 6 and also is adapted for slight lateral movement at its free end, in the direction of the arrow *b* in Figure 5. A cross-head 68 is mounted through the aperture 64 of the frame and and has its outer end turned upwardly and formed with a hole engaging a pin 69 in the adjacent end of the lever 66. The opposite

end of the cross-head 68 is turned downwardly and formed with a vertical slot 70 receiving the pin 71 by which the rod 65 is pivoted to the lever 59. Between the ends of the cross-head 68 is secured a downwardly extending rod 72, just outside of the frame and passing slidably through a bearing 73 on said frame. A plunger rod 74 is mounted slidably through a bearing in the frame 10 and has its outer end abutting the free end portion of the lever 66; or more correctly, as shown, an upward extension 66a. A coil spring 75 is mounted around the inner end portion of the plunger rod 74, within a recess 76 in the frame, and the outer end of said spring impinges a head 77 on the end of said rod and normally presses said rod inwardly relative to the frame. The inner end of the plunger rod 74 preferably carries an anti-friction ball 78. Formed on the inner face of the lever 26 is an inclined cam face 79 adapted to engage the inner end of the plunger rod 74, and, in downward movement of the forward end of said lever, apply pressure to and cause outward movement of said plunger rod. This movement of the plunger rod causes an outward movement of the free end of the lever 66, toward the friction disk 55. On the inner face of the friction disk 55 is a projecting pin 80 adapted to engage the free end of the lever 66 when moved outwardly as above described, in the rotation of said disk, and apply downward pressure to said lever. Downward movement of the lever 66 causes a downward movement of the cross-head 68, through the pin connection at 69, said pin being of sufficient length to permit the lever 66 to move away from the cross-head without severing the connection. Downward movement of the cross-head 68 causes a downward movement of the rod 72 and also of the inner end of the lever 59, through the pin 71, thus oscillating the lever 59 and causing a disengagement of the friction disk 55 from the driving disk 51 as hereinbefore described, such action stopping rotation of the shaft 47 and permitting the fire shutter 40 to close by gravity.

Pivoted at the point 81 on the frame 10 is a curved lever 82, which extends downwardly and forwardly from said pivot and carries at its free end a roller 83 within the lower loop B of the film. In case the loop B becomes unduly shortened from any cause it engages and forces upwardly the roller 83 to the position shown by dotted lines in Figure 1. The lower end of the downwardly extending rod 65 is connected to an ear 84 formed on the curved portion of the lever 82, the arrangement being such that upward oscillation of the free end of the lever, as above set forth, causes downward draft on said rod. The effect of this action is to oscillate the lever 59 as previously described, and disengage the friction disk 55 from the driving disk 51. In such downward movement of the rod 65 the pin 71 moves downwardly freely in the slot 70 and causes no movement of the cross-head 68 and members connected therewith.

A bracket 85 is formed on and extends below the frame 10 and on this bracket a bell-crank lever 86 is fulcrumed. The lower end of the downwardly extending rod 72 is pivotally connected to the horizontal arm of the bell-crank lever 86, and a solenoid coil or magnet 87 is mounted adjacent and the lower end of said rod extends within the core of said coil. A mercury switch 88 is pivoted between its ends on the bracket 85. The switch 88 comprises a tube closed at its ends and containing a quantity of mercury adapted to move from one end to the other of the tube as it is oscillated, thus forming an electrical connection selectively between the central contact point 89 and the end contact points 90, 91. The rod 27 is extended downwardly from its connection to the bell-crank lever 28 and is pivotally connected at one end to the switch 88 adjacent the end contact point 91. The lower portion of the rod 27 contains an insulating block 92, by which it is insulated from the metallic parts of the mechanism. The central point 89 and end point 90 of the switch 88 are connected to conductors 93 forming a circuit through a source of energy 94 and through a motor 95 by which the moving picture mechanism is operated. The opposite end of the switch 88, at the terminal 91, is connected by a conductor 96 to the circuit wires 93, and said conductor 96 includes the magnet 87 and also a signal device 97, which may be a lamp or audible signal of any desired kind. When the mercury switch 88 is tipped rearwardly in the position shown in Figure 1 the mercury therein forms an electrical connection between the points 89 and 90 and the circuit is completed through the source of energy and motor and, providing the manual switch 98 is closed, the mechanism is operated by said motor. In the event, however, the switch 88 is tipped in the opposite direction the mercury flows to the opposite end and forms a connection between the points 89 and 91 and breaks the primary circuit, thus stopping the motor and the operation of the mechanism. The connection through the point 91 energizes the magnet 87 and operates the signal 97, so that the operator knows something is wrong, and the machine not functioning properly.

Assuming the parts to be assembled as shown and described, and a film 14 threaded through the machine and in operation, the functions of my fire protection mechanism will now be explained.

In the event a break occurs in the film 14, thus permitting the roller 30 to move upwardly across the normal path of the film under the impulse of the spring 32, the lever 28 is oscillated through the link 33, thus causing a downward pull on the rod 27. This has the effect of oscillating the lever 26, pushing the plunger rod 74 outwardly through action of the cam 79, thus carrying the lever 66 into the path of the pin 80 of the friction disk 55, which oscillates the lever 66 to the end of applying downward pressure on the cross-head 68 and rods 72 and 65. Downward movement of the rod 72 oscillates the bell-crank lever 86 and performs a function to be explained later. Downward movement of the rod 65 has no function, but merely idly oscillates the lever 82. The downward movement of the cross-head 68 also has the effect of oscillating the lever 59 and causing withdrawal of the friction disk 55 from the disk 51, in a manner hereinbefore explained, thus permitting the fire shutter 40 to drop to closed position. The downward movement of the rod 27 above referred to also has the effect of tipping the mercury switch 88, breaking the main circuit 93, and stopping the motor 95 and operation of the mechanism of the machine; as well as making the secondary circuit through 96, energizing the magnet 87, and operating the signal 97. The energizing of the magnet exerts a pull on the rod 72, through attraction, which is supplemental to the downward movement of said rod through the mechanical means above described.

In the event the upper loop A of the film is either unduly shortened or lengthened the upper lever 26 is oscillated with the resultant effects just above described, namely closing the fire shutter, tipping the mercury switch and stopping the mechanism, as well as energizing the magnet and operating the alarm. This oscillation of the lever 26 is effected, in the case of a shortening or "loss" of the loop A, by pressure on the roller 24, oscillation of the lever 23, and pulling on the lever 26 through the link 25; and in the case of undue lengthening of the loop A is effected by pressure on the shield 38 and upward pressure through the arm 39 on the end of lever 26.

In the event the lower loop B is lost or unduly shortened the roller 83 is engaged and raised, thus oscillating the lever 82 and exerting a downward pull on the rod 65. This oscillates the lever 59 and releases the friction disk 55, permitting the fire shutter to close, but does not affect the cross-head 68 because of the play permitted by movement of the pin 71 in the slot 70. It is to be understood, however, that common means is provided in such machines for automatically reforming the loop B when tension is applied to a roller such as 83, so that operation of the machine may occur with little interruption. As such mechanism forms no part of my present invention, no further description thereof will be given. What I have done in this connection is to provide means for closing the fire shutter when the lower loop B is lost.

I have also provided means for dousing or throwing a shutter or douser plate across the path of light from the projector, when certain of the above mentioned contingencies arise. The ordinary moving picture machine is used in connection with a lamp or light contained in a lamp housing 99, on which is a condenser case 100, from which the light is projected through an aperture 101 upon and through the film. A douser plate 102, adapted to cover the aperture 101 at times, is secured to one end of an arm 103 pivoted between its ends at a point below said aperture. On the opposite end of the rod or arm 103 is a handle or weight 104. The arm 103 is provided with a collar 105 which is mounted on the pivot 106 thereof, and said collar is formed with a notch adapted to receive the upper end of a latching rod 107 when the plate 102 is in open position as shown in Figures 7 and 8. The latching rod 107 is mounted for vertical reciprocation in a sleeve 108 formed at its upper end with a recess 109 containing a spring 110 coiled on said rod and impinging at its upper end a collar 111 thereon, by means of which the latching rod is yieldingly pressed to locking position. The latching rod 107 projects at its lower end from the sleeve 108 and is provided with a forwardly projecting pin or stud 112. A rock shaft 113 is journaled in a bracket 115 and is formed at its rear end with a laterally extending tapered arm 114 projecting across the latching rod just above the stud 112; and said shaft is formed at its outer end with a downwardly projecting arm 116, thus forming in effect a bell-crank lever. A bell-crank lever 117 is pivoted in horizontal position on another portion of the support for the lamp housing 99, at one side of the rock shaft 113, and said bell-crank lever has one arm pivotally connected by a link 118 to the downwardly extending arm 116 of said rock shaft. The other arm of the bell-crank lever 117 is pivotally connected to a rod 119 which extends to the moving picture mechanism and is pivotally connected to the upstanding arm of the bell-crank lever 86. When ever the bell-crank lever 86 is oscillated, through depression of the rod 72 (which occurs, as above stated, when the film breaks or the upper loop A is lost or unduly lengthened), a pull to the right is exerted on the rod 119, thus oscillating the bell-crank 117 and through the link 118 oscillating the members 116, 113 and 114, the latter member in its oscillating

contacting the stud 112 and pulling downwardly on the latching rod 107, against the spring 110, and withdrawing said rod from its seat in the notch of the collar 105. This permits the member 103 to oscillate under the influence of the weight 104, and carry the douser plate 102 to closing position across the aperture 101, thus cutting off the rays of light from the projector.

The lamp housing 99 and members carried thereby is movable laterally on rods 121 ordinarily. A wedge-shaped lug 122, having an inclined lower face, is fixed to the support for the lamp housing and projects laterally toward the median line of the housing. When the housing is moved laterally far enough for the stud 112 to engage the lower surface of the wedge-shaped lug 122, said stud is depressed by continuation of such movement, and the latching rod 109 withdrawn to permit closing of the douser plate.

The rod 119 preferably is formed in two pieces and is adjustable in length, as shown in Figure 10, to permit movement of the lamp housing and members carried thereby in the operation of focusing the projecting devices. For this purpose one member of the rod is formed with an elongated socket 119^a adapted to receive the other member thereof, which is secured in its adjusted position by means of a set screw 119^b.

In Figures 11 and 12 I have shown a douser attachment which may be mounted between the projecting devices and the mechanism, being carried, independently of the lamp housing itself, by the longitudinal rods 123 on which said housing is adjustably mounted. This attachment comprises a mask plate 124 having bearings 125 slidably mounted on the rods 123 and rising in front of the lamp housing and formed with a light aperture 126 corresponding to and registering with the light aperture 101 of the condenser box 100. Douser devices are carried by the mask plate 124, corresponding in structure and function to those previously described, as follows: an arm 103^a having a weight 104^a at one end and a douser plate 102^a at the opposite end and a notched collar 105^a adapted to receive the end of a spring-pressed latching rod 107^a slidable in a sleeve 108^a; a bell-crank lever 113^a suitably fulcrumed on the mask plate and having one end overlying a stud 112^a on the latching rod and its other end connected by a link 118^a to a horizontally arranged bell-crank lever 117^a secured in turn, pivotally, to the rod 119.

In this mechanism I have provided both mechanical and electrical means, functioning surely, effectively and promptly, in the event of improper travel of the film, to prevent the occurrence of fire such as might destroy the film and cause injury to the apparatus. It is believed the functioning of the mechanism in all contingencies will be thoroughly understood from the foregoing description, taken in connection with the drawings. It is to be understood, however, that the mechanical and electrical devices may, if desired, be employed independently rather than in supplemental relations as here shown and described.

The collars 105 and 105^a preferably are formed with spaced notches 127 for engagement by the latching rod 107 or 107^a, whereby the douser plate may be latched in either open or closed position.

If desired the slot 70 of the cross-head 68 may be omitted, thus preventing movement of the lever 59 without corresponding movement of said cross-head. In such event the rod 72 would be depressed when the lever is oscillated through downward pull of the rod 65 because of loss of the lower loop B, thus acting to close the douser plate and stop the motor when said lower loop is lost.

The rod 65 preferably is formed in two parts, to one of which is secured a sleeve 128 (Figure 13) slidably mounted on the other member of said rod, and a spring 129 is interposed between said members within the sleeve. It is the function of this spring to absorb trembling motion which might be communicated from the curved lever 82 because of rapid changes in the state of the loop B; the result being that the trembling motion is not transmitted to the fire shutter, which is closed only when a decided shortening of the loop occurs.

The solenoid coil 87 preferably includes a coil spring 130 engaging beneath the lower end of the rod 72 and acting to return said rod upwardly when the coil is de-energized.

The lever 131 which carries the rollers 18 is formed with a forwardly projecting lug 132. When the lever 131 is depressed manually for the purpose of threading a film through the mechanism, the lug 132 engages and depresses the arm 29, against the action of the spring 32, and moves said arm, and the members connected therewith, to their normal position during operation of the mechanism. In this way the fire-proofing mechanism is automatically reset and moved to position for operation without any additional move on the part of the operator.

The upward extension 66^a of the lever 66 is secured by a screw 133 to the adjacent end of the plunger 74, whereby said lever is returned to its normal position by action of the spring 75 after pressure of the cam face 79 is released.

I claim as my invention—

1. In a device of the character described, the combination of a moving picture machine having a light aperture and a mechanism for feeding a film past said aperture, a movable fire shutter adapted in one position to cover said aperture, a support for a source of light

spaced from said machine, a movable douser plate mounted between said support and said light aperture, a member adapted to contact a normally taut portion of said film, a spring acting to hold said member in contact with the taut portion of the film and to carry it across the path of such portion when its tautness is released, mechanical means connected with said members for releasing and closing said fire shutter and also said douser plate when said member is spring-pressed through release of the tautness of said film, and electrical means set in motion by the operation of said mechanical means and supplementing the action of said mechanical means in the operation of closing said fire shutter and douser plate.

2. In a device of the character described, the combination of a moving picture machine having a light aperture and a motor driven mechanism for feeding a film past said aperture, a movable fire shutter adapted in one position to cover said aperture, a support for a source of light spaced from said machine, a movable douser plate mounted between said support and said light aperture, a member adapted to contact a normally taut portion of said film, a spring acting to hold said member in contact with the taut portion of the film and carry it across the path of such portion when its tautness is released, mechanical means connected with said member for releasing and closing said fire shutter and also said douser plate when said member is spring-pressed across the path of said taut portion of the film, and electrical means set in motion by the operation of said mechanical means and supplementing the action of said mechanical means in the operation of closing said fire shutter and douser plate, the operation of said electrical means also acting to stop the operation of the motor which drives said moving picture mechanism.

3. In a device of the character described, the combination of a moving picture machine having a light aperture and a mechanism for feeding a film past said aperture, a movable fire shutter adapted in one position to cover said aperture, means for normally holding said shutter in open position during operation of said mechanism, a plunger adapted for movement to release said holding mechanism, a support for a source of light spaced from said machine, a movable douser plate mounted between said support and said light aperture, a member mounted for reciprocation and adapted in one direction of movement to release said douser plate, a member adapted to contact a normally taut portion of said film, means acting to hold said member in contact with the taut portion of the film and carry it across the path of such portion when its tautness is released, mechanical means connected with said member for actuating said plunger and closing said fire shutter and also for operating said reciprocating member and closing said douser plate, and electrical means set in motion by the operation of said mechanical means and supplementing the action of said mechanical means in the operation of said plunger and reciprocating member when said member is moved across the path of the film.

4. In a device of the character described, the combination of a moving picture machine having a light aperture and a mechanism for feeding a film past said aperture, a movable fire shutter adapted in one position to cover said aperture, means for normally holding said shutter in open position during operation of said mechanism, a plunger adapted for movement to release said shutter holding means, a spring-pressed member adapted to contact a normally taut portion of film and to move across the path of such portion when its tautness is released, mechanical means connected with said member for actuating said plunger and closing said fire shutter, and electrical means set in motion by the operation of said mechanical means and supplementing said mechanical means in the operation of said plunger upon movement of said spring-pressed member across the path of the film.

5. In a device of the character described, the combination of a moving picture machine having a light aperture and a mechanism for feeding a film past said aperture, a movable fire shutter adapted in one position to cover said aperture, means for normally holding said shutter in open position during operation of said mechanism, a plunger adapted for movement to release said shutter holding means, a lever fulcrumed on said machine and formed with a cam face adapted to engage and actuate said plunger, means for maintaining a loop in said film, a movable member having a portion adapted to extend within said loop, and connections between said movable member and said lever for oscillating the latter when said loop is taken up.

6. In a device of the character described, the combination of a moving picture machine having a light aperture and a mechanism for feeding a film past said aperture, a movable fire shutter adapted in one position to cover said aperture, means for normally holding said shutter in open position during the operation of said mechanism, a plunger adapted for movement to release said shutter holding means, a lever fulcrumed on said machine and having a cam face adapted to engage and actuate said plunger, means for maintaining a loop in said film, and separate means acted upon in the event of either shortening or lengthening of said loop to oscillate said lever and actuate said plunger.

7. In a device of the character described, the combination with a moving picture machine having a light aperture and a mechanism for feeding a film past said aperture, a movable fire shutter adapted in one position to cover said aperture, means for normally holding said shutter in open position during operation of said mechanism, a plunger adapted for movement to release said shutter holding means, a lever fulcrumed on said machine and having a cam face adapted to engage and actuate said plunger, means for maintaining a loop in said film, a movable member having a portion adapted to extend within said loop, connections between said movable member and the lever for oscillating the latter when said loop is taken up, a shield member pivotally mounted and substantially embracing said loop and adapted to be engaged and oscillated by said loop when the latter is unduly lengthened, and means connected with said shield for oscillating said lever when said shield is oscillated.

8. In a device of the character described, the combination with a moving picture machine having a light aperture and a mechanism for feeding a film past said aperture, a movable fire shutter adapted in one position to cover said aperture, means for normally holding said shutter in open position during operation of said mechanism, a plunger adapted for movement to release said shutter holding means, a lever fulcrumed on said machine and having a cam face adapted to engage and actuate said plunger, means for maintaining a loop in said film, a movable member having a portion adapted to extend within said loop, connections between said movable member and the lever for oscillating the latter when said loop is taken up, a shield member pivotally mounted and substantially embracing said loop and adapted to be engaged and oscillated by said loop when the latter is unduly lengthened, mechanical means connected with said shield for oscillating said lever when said shield is oscillated, and electrical means set in operation by the oscillation of said lever for supplementing the action thereof in closing said fire shutter.

9. In a device of the character described, the combination with a moving picture machine having a light aperture and a mechanism for feeding a film past said aperture, a movable fire shutter adapted in one position to cover said aperture, means for normally holding said shutter in open position during operation of said mechanism, a plunger adapted for movement to release said shutter holding means, a lever fulcrumed on said machine and having a cam face adapted to engage and actuate said plunger, means for maintaining a loop in said film, a movable member having a portion adapted to extend within said loop, connections between said movable member and the lever for oscillating the latter when said loop is taken up, a support for a source of light spaced from said machine, a movable douser plate mounted between said support and the light aperture, a member mounted for reciprocation and adapted in its movement in one direction to release and permit closing of said douser plate, mechanical means connecting said lever and said reciprocating member to actuate the latter when said lever is oscillated, thereby closing said douser plate coincident with the closing of said fire shutter, and electrical means acted upon by said lever for supplementing the mechanical means employed in shifting said reciprocating member.

10. In a device of the character described, the combination of a moving picture machine having a light aperture and a mechanism for feeding a film past said aperture, a support for a source of light spaced from said light aperture, a douser plate movably mounted between said support and light aperture, a latching device normally holding said douser plate in open position, a bell-crank lever fulcrumed on said machine, mechanical connections between said bell-crank lever and latching device, and electrical and mechanical means supplementing each other and adapted to oscillate said bell-crank lever and release said latching means, said electrical and mechanical means being acted upon and put into action by abnormal travel of said film.

11. In a device of the character described, the combination of a moving picture machine having a light aperture and a mechanism for feeding a film past said light aperture, a support for a source of light spaced from said machine, a support slidably mounted between said light support and the machine and having an aperture corresponding to the aperture of said machine, a movable douser plate mounted on the last named support and adapted to cover the aperture therein at times, means for latching said douser plate in open position, and means connected with said mechanism for releasing said douser plate and permitting it to move to closed position, said means being acted upon and set in motion by abnormal travel of said film.

12. In a moving picture mechanism having a take-up sprocket and a pivoted arm controlling a fire-proofing mechanism, a lever pivoted on the axis of said sprocket and formed with a lug adapted when said lever is depressed to engage said arm and move it to position for resetting said fire-proofing mechanism.

13. In a motion picture machine employing a film ribbon and having a shutter; a normally active mechanism holding the shut-

ter open and including a clutch having co-operating clutch elements normally engaged, a trip controlled by the tension in the film, and means actuated by the trip and arranged to release the clutch elements whereby to permit the shutter to close, said means including a resiliently yieldable lost motion device whereby minor variations in the tension of said film will be ineffective to release the clutch.

14. In a motion picture machine employing a film ribbon and having a shutter; a normally active mechanism holding the shutter open and including a clutch having co-operating clutch elements normally engaged, a trip controlled by the tension in the film, means actuated by the trip and arranged to release the clutch elements whereby to permit the shutter to close, said means including a resiliently yieldable lost motion device whereby minor variations in the tension of said film will be ineffective to release the clutch, and a circuit breaker operatively connected to the trip.

Signed at Des Moines, in the county of Polk and State of Iowa, this 17th day of July, 1920.

DELBERT O. SEAMAN.