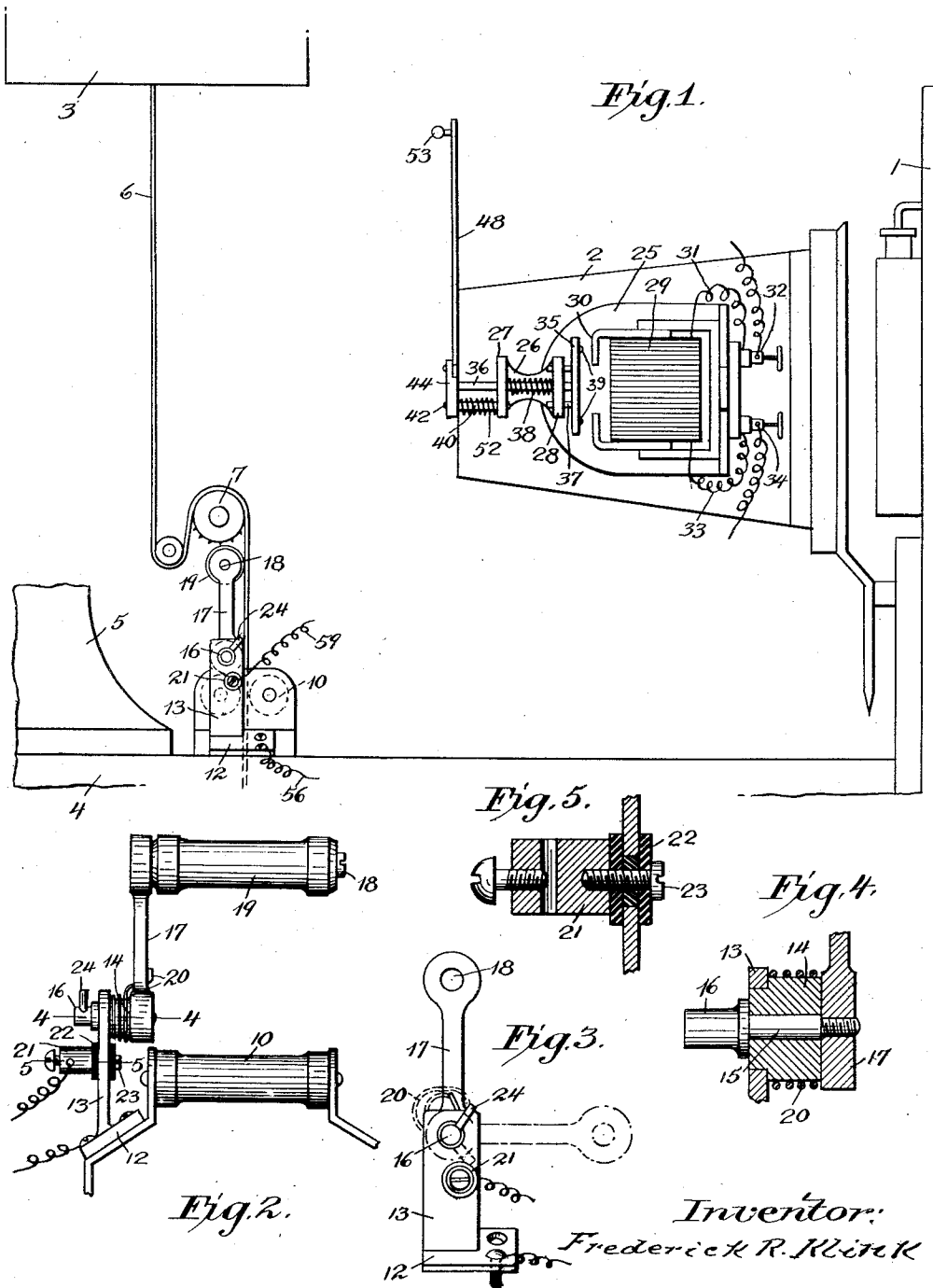


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SAFETY SHUTTER FOR MOTION PICTURE MACHINES.
APPLICATION FILED OCT. 8, 1913.

1,142,103.

Patented June 8, 1915.

2 SHEETS—SHEET 1.



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Fig. 6.

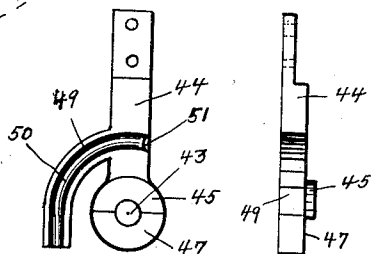
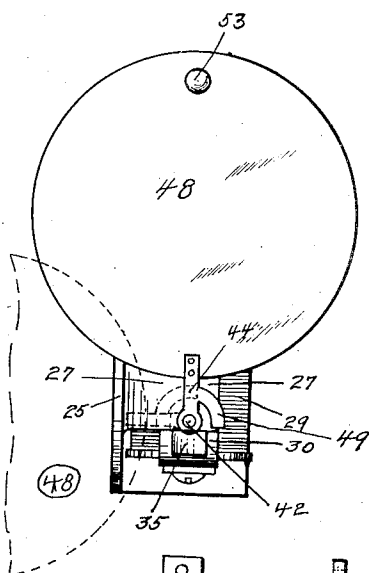


Fig. 7.

Fig. 8.

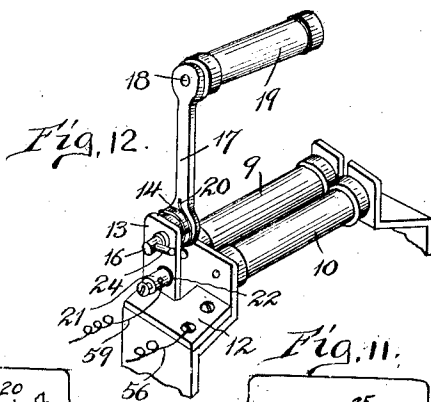


Fig. 11.

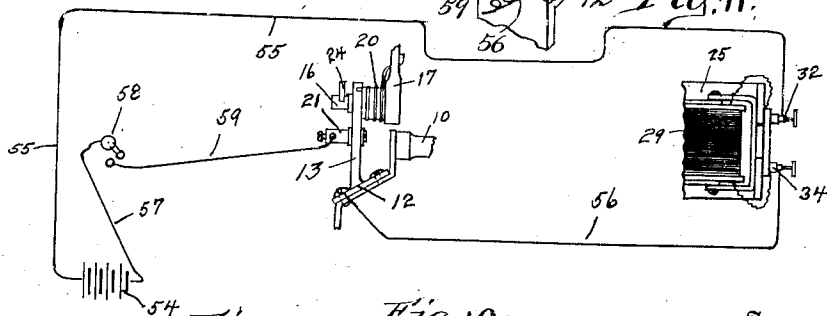
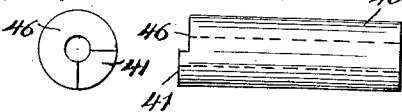


Fig. 9.

Fig. 10.



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UNITED STATES PATENT OFFICE.

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SAFETY-SHUTTER FOR MOTION-PICTURE MACHINES.

1,142,103.

Specification of Letters Patent.

Patented June 8, 1915.

Application filed October 8, 1913. Serial No. 793,981.

To all whom it may concern:

Be it known that I, FREDERICK B. KLINK, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Safety-Shutter for Motion-Picture Machines, of which the following is a specification.

My invention relates to improvements in motion picture machines and especially to a safety shutter whereby to prevent ignition of the film in cases of film breakage or slackness resulting from defective operation of the film-moving mechanism.

The objects of the invention are to generally improve devices of the character mentioned, to provide means whereby, when the film breaks, or becomes slack, the light from the condensing lens may be instantly cut off so as not to impinge upon the inflammable film.

Further objects are to so construct the device that it may be small, compact and will not interfere in any way with the operation of the machine upon which it is arranged.

Further, it is desired to accomplish the result intended in an instantaneous and automatic manner while being absolutely non-injurious to the film.

These objects, together with other objects readily apparent to those skilled in the art, may be attained by the construction disclosed in the accompanying drawings in which for the purpose of illustration I have shown that form of the device appropriate for use on a No. 6A Cameragraph, of well known construction.

In the drawings Figure 1 is a side elevation of a motion picture machine illustrating the application of my invention. Fig. 2 is a front elevation of the tension-contact device and one of the film guide rollers. Fig. 3 is a side elevation of the same, also showing the tension-contact device in position to actuate the shutter. Fig. 4 is a horizontal enlarged sectional view on the line 4-4 of Fig. 2. Fig. 5 is an enlarged sectional view on the line 5-5 of Fig. 2. Fig. 6 is a front elevation of the shutter somewhat enlarged. Fig. 7 is a rear view of the shutter arm. Fig. 8 is a side view of the same. Fig. 9 is a front end view of the shutter supporting stem. Fig. 10 is a side view of the same. Fig. 11 is a wiring diagram showing how the ten-

sion-contact device and shutter are included in the electric circuit for operating the device. Fig. 12 is a perspective view of the tension-contact device and the two film guide rollers.

Throughout the several views similar reference numerals indicate similar parts.

More specifically describing the construction disclosed in the said drawings, the numeral 1 indicates generally the lamp house, the numeral 2 the condenser hood, the numeral 3 the upper film magazine, the numeral 4 the lower film magazine and the numeral 5, generally the machine head. All of these parts, in the relation shown are to be found in motion picture machines now in common use and are not claimed herein.

As will be understood by those skilled in the art the film 6 is unwound from a reel in the upper film magazine, passes through the mechanism of the machine head, where the light issuing from the lamp house through the condensing lens impinges upon it, and thence passes to the take-up reel in the lower film magazine. As clearly shown in Fig. 1 the film passes from the take-up feed sprocket 7 downwardly through the base 8, on the upper surface of which are arranged the film-guide rollers 9 and 10. Between the sprocket 7 and said guide rollers the film is maintained taut by reason of the necessary tension in drawing the same through the machine head and onto the take-up reel. When the film breaks, however, that portion of it between the sprocket 7 and said guide rollers either separates entirely or instantly becomes slack. The tension of the film between said sprocket and rollers is therefore a most certain criterion of the condition of the said film with respect to breakage.

I therefore propose, by the present invention, to utilize a combination of electrical and mechanical means adapted to automatically cut off the light issuing from the condensing lens the instant that the film intermediate the sprocket 7 and rollers 9 and 10 becomes slack or separated.

Such means as just described comprises a shutter generally indicated by the reference numeral 11 arranged upon the condenser hood and normally tending to move into position to cut off the light issuing from the condensing lens. Said shutter is, however, prevented from movement into such position by means adapted to be actuated by a cur-

rent of electricity flowing through a circuit which is normally maintained in opened condition. For the purpose of closing said circuit, however, and thus actuating the restraining mechanism to release the shutter and permit it to cut off the light, the tension-contact device, most clearly illustrated in Figs. 3 and 5, is provided. Said device comprises a support which, in the form illustrated in the drawings, includes a base 12 and upright integral member 13. At the upper end of the member 13 is connected a round hub 14 which provides a bearing for the rotatable shaft 15 provided at one end with the projecting collared portion 16 and fixedly connected at the other end to the inner end of the arm 17. At the free end of said arm, on the screw 18 is rotatably mounted the roller 19.

Upon the hub 14 is coiled the spring 20, one end of which is fastened to the member 13, while the other end is connected to the arm 17 and normally tends to pivotally move said arm with the shaft 15 into the forward position illustrated in dotted lines in Fig. 3.

Below the hub 14 the binding post 21 is connected to the member 13, as by means of the insulating washers and thimble at 22 and the screw 23, whereby said binding post makes no conductive contact with the member 13.

Connected to the portion 16 is a pin 24 adapted to engage and form conductive contact with the binding post 21 when the arm 17 is in the forward position, as illustrated in dotted lines in Fig. 3.

The base 12 is firmly connected to some fixed portion of the motion picture machine, as for instance the support for the roller 10, as illustrated in Fig. 5, and the roller 19 is adapted to engage the film 6 intermediate the sprocket 7 and rollers 9 and 10, whereby the arm 17 is normally held in the upright position shown particularly in Figs 2 and 3, and in full lines in Fig. 3. So long as the tension of the film 6 is sufficient to overcome the tension of the spring 20 the arm 17 will be maintained in said upright position, but should said film break or become slack the roller 19 will be no longer restrained thereby and the spring 20 will instantly move said roller forward and downward into the position illustrated in dotted lines in Fig. 3, whereupon conductive contact will be made between the pin 24 and binding post 21.

Referring, now, to the mechanism upon the condenser hood 2, it will be noted that a base 25, preferably of brass or other non-magnetic material is provided, and adapted to be connected in any suitable mechanical manner to the side of the hood 2.

Formed integrally with the base 25, or fixedly connected thereto, is a forward projection 26, lying in the plane of the base 25,

and provided with two spaced, laterally extending flanges 27 and 28.

Fixedly mounted upon the base 25 is an electro-magnet 29 provided with the pole pieces 30. One of the ends 31 of the magnet winding is connected to the binding post 32 while the other end 33 is connected to the binding post 34. The pole pieces 30 are somewhat rearwardly spaced from the flange 28 and an armature 35 is arranged intermediate the flange 28 and said pole pieces. Fixedly connected to said armature is a trip pin 36 which extends forwardly through apertures in the flanges 27 and 28, within which apertures it is longitudinally slidable. If desired the armature 36 may also be provided with additional guide pins 37 slidably extending through spaced apertures in the flange 28. A coiled spring 38 arranged upon the trip pin 36 intermediate the flanges 27 and 28 has its forward end connected to said pin 36, and by bearing against the flange 28 normally urges the pin 37 with the armature 35 to its most forward position. The armature 35 and pin 36 are, however, adapted to be drawn backwardly against the tension of the spring 38 when the magnet 29 is energized.

For the purpose of preventing actual contact of the armature 35 with the pole pieces 30 some non-magnetic substance should be interposed between said armature and pole pieces. This may be accomplished by the attachment of small pieces of non-magnetic material, such as brass or aluminum to either the pole pieces or the armature. In the drawings I have illustrated such pieces 39, as attached to the armature.

Connected to the lower portion of the flange 27, the shutter supporting stem projects forwardly. Said stem is preferably round and tubular as shown in Fig. 9, and at the forward end is provided with a quadrantal projection 41.

Extending through the stem 40 and the flange 27 is a connecting screw 42, which at its forward end extends also through the central aperture 43 of the shutter arm 44 for the purpose of pivotally connecting said arm to the stem 40.

The face of the arm 44 engaging the forward end of the stem 40 is provided with a half-circular projection 45 adapted to fit into the three-quarter recess 46 on the end of the stem 40 produced by the projection 41. Said projection 41 will thus enter the half-circular recess 47, and, when the arm 44 and stem 40 are connected by means of the screw 42, the arm 44 is adapted to pivotally move, such pivotal movement being restricted to a one-quarter revolution of the arm 44 about the screw 42. The projection 41 is so disposed that the limitation mentioned will permit the arm 44 to assume the vertical position illustrated in full lines in

Fig. 6 or the horizontal position illustrated in dotted lines in Fig. 8. When in the vertical position the shutter proper 48, preferably consisting of a sheet metal disk, will be raised out of the path of the light emanating from the condensing lens, whereas, when said arm is in the horizontal position, as shown in dotted lines in Fig. 6, said shutter will completely cut off said light.

Connected to the arm 44 is a curved member 49 in which is arranged a groove 50 on a curved line concentric with the screw 42. The forward end of the trip pin 36 is adapted to be seated in said groove 50, and at the end of said groove on the arm 44 is a deeper recess 51, constituting a notch into which the forward end of the pin 36 extends to hold the shutter in the raised or vertical position.

Coiled about the stem 40, with one of its ends connected to the flange 27 and the other connected to the arm 44 is the spring 52, which normally urges the arm 44 into the horizontal position to cut off the light.

Connected to the shutter proper 48 is the small knob 53 whereby to conveniently, manually raise the shutter into the vertical position. As the shutter is raised from the horizontal to the vertical position it will be understood that the forward end of the pin 36 rides along the curved groove 50 until it drops into the recess 51. The shutter will then be held in vertical position, being restrained by the pin 36, until such time as the magnet 29 is energized to draw the armature 35 and pin 36 backward. It will be understood that in any position of the shutter 48 the pin 36 cannot move farther forwardly than the member 49, in the groove 50 of which the forward end of the pin 36 is constantly seated.

In wiring the device some source of current, as the battery 54, shown in Fig. 11, should be provided. From one side of said battery the wire 55 may lead directly to the binding post 32. From the binding post 34 the wire 56 may lead to the base 12. From the other pole of the battery 54 the wire 57 may lead to a switch 58, and from said switch the wire 59 may lead to the binding post 21. When the switch 58 is closed, it will be noted that a circuit is completed provided the arm 17 is in the lower, horizontal position, with the pin 24 making contact with the binding post 21.

When the moving picture machine is not in operation or is not provided with a film, it may be desired to open the switch 58 to prevent unnecessary flow of current. When the film is in the machine, however, the arm 17 will be normally held in upright position, as hereinbefore described, and the switch 58 should then be closed so that should the film break or become slack the circuit may be closed by the operation of the arm 17 as hereinbefore described and the

shutter thus released so as to cut off the light and prevent ignition of the film.

Attention should be called to the fact that by my invented device the light will be cut off in case the take-up reel is not properly rotated so as to keep the film in motion. This may happen as a result of many possible causes well known to those skilled in the art, and in such event, the film becoming slack, will permit the arm 17 to fall into the forward position instantaneously, as in the case of a broken film. It will thus be seen that my invented device affords protection against ignition of the film under either of the dangerous conditions indicated.

It should be pointed out that the invention herein described is capable of application to many other forms of apparatus than the No. 6A Cameragraph shown, and even in the case of this particular machine I do not desire to be limited to the details of construction herein disclosed, for while such construction is the best form in which I have contemplated embodying my invention, it will be understood that many changes may be made as circumstances require or experience suggests without departing from the spirit of the invention, within the scope of the appended claims.

I claim;—

1. In a device of the character described, a support, a shutter, a shutter arm connected thereto and having pivotal connection with said support, a curved member connected to said shutter arm and provided with a groove concentric with the axis of pivotal connection of said shutter arm and support said grooves provided with a recessed portion, and a trip pin connected to said support, engaging said groove, adapted to move into and out of engagement with said curved member, and adapted to be seated in said recessed portion to hold said shutter arm against pivotal movement.

2. In a device of the character described, a support, a shutter, a shutter arm connected thereto and having pivotal connection with said support, said arm provided with a curved portion concentric with the axis of pivotal connection of said shutter arm and support, a trip pin connected to said support, said curved portion provided with a recess, and said trip pin adapted to move into and out of said recess and adapted to normally bear against said curved portion, when out of said recess, said pin adapted to hold said shutter arm against pivotal movement when located in said recess.

3. In a device of the character described, a support, a shutter arm provided with a shutter and having pivotal connection with said support, said shutter arm being provided with a curved portion concentric with the axis of pivotal connection of said shutter arm and support and provided with a

recess, spring means normally tending to pivotally move said shutter arm, a trip pin slidably connected to said support, and provided at its rear end with an armature, 5 spring means tending to urge the front end of said pin into engagement with said curved portion and into said recess, said pin, when in said recess, adapted to prevent pivotal movement of said shutter arm and an elec- 10 tro-magnet mounted upon said support and adapted, when energized, to attract said

armature, whereby to retract said trip pin and free said shutter arm from the restraint of said pin.

In testimony that I claim the above, I 15 have hereunto subscribed my name in the presence of two witnesses.

FREDERICK R. KLINK.

Witnesses:

WILLIAM H. MILLER,
HAZEL OWEN.