June 24, 1930. H. C. CORNETTA 1,766,607

SAFETY ATTACHMENT FOR MOVING PICTURE PROJECTING MACHINES

Filed Aug. 6, 1924 2 Sheets-Sheet 1

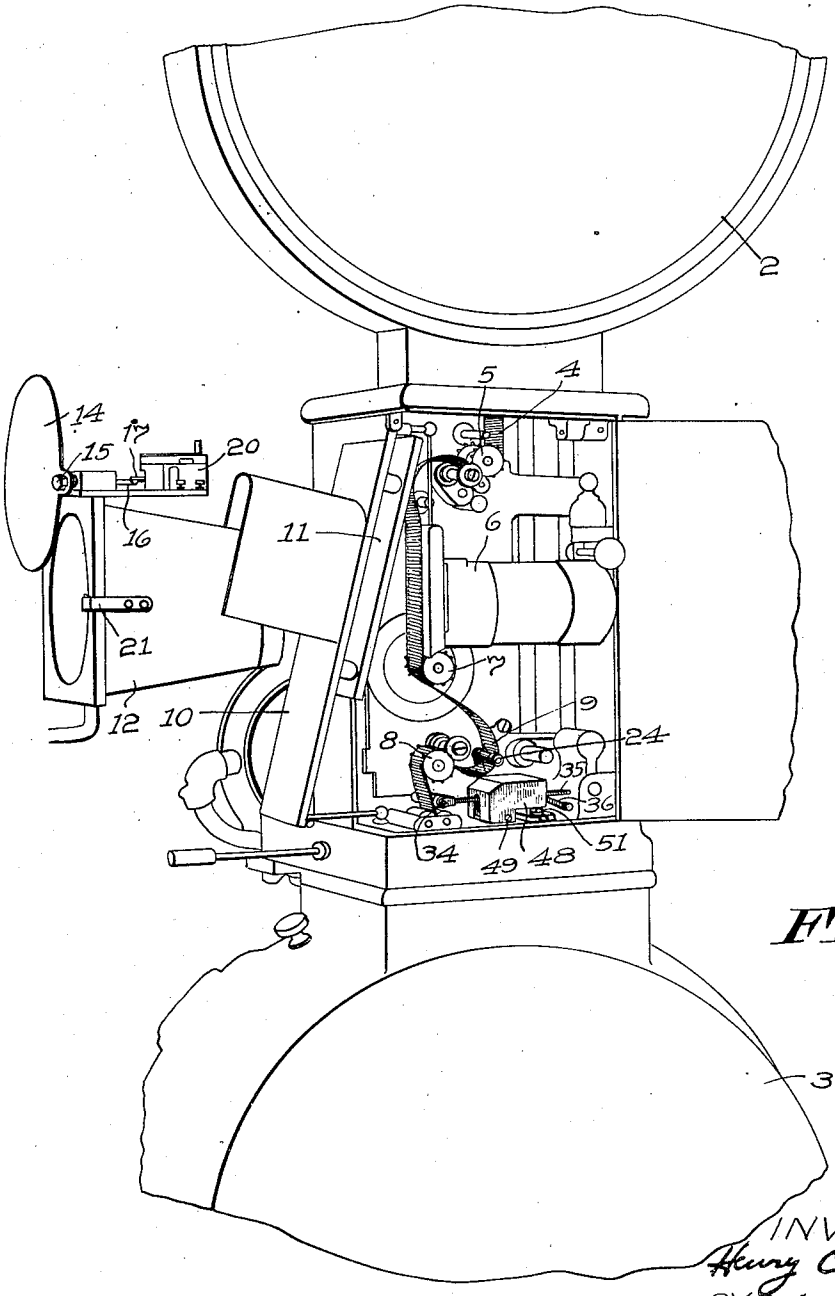


Fig. 1

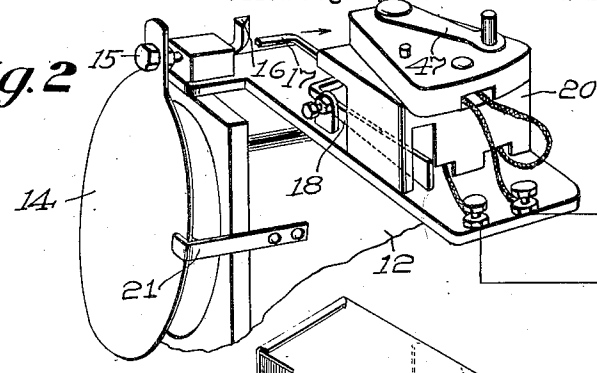
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Fig. 2



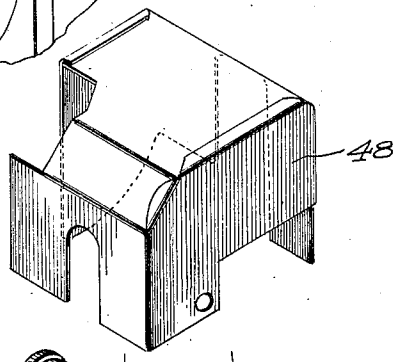


Fig. 3

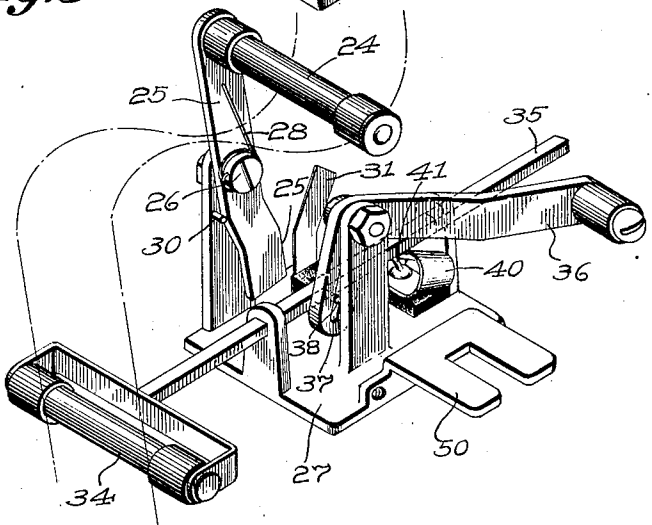
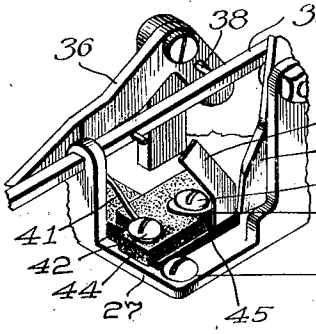


Fig. 4





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Patented June 24, 1930 1,766,607

UNITED STATES PATENT OFFICE

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SAFETY ATTACHMENT FOR MOVING-PICTURE-PROJECTING MACHINES

Application filed August 6, 1924. Serial No. 730,380.

This invention relates to moving picture projecting apparatus and more especially to means for preventing the ignition of the film under abnormal conditions.

In the normal operation of a moving picture projector, the film is fed past a window through which a strong light is directed. The heat of this light is sufficient to ignite the film if the film is subjected to it for even a very brief interval, as for example, two seconds, but during normal operation such ignition is prevented by the fact that the film is moving. The movement of the film may, however, be interrupted in many ways, as for example by the breaking of the film, the stripping of the sprocket holes on the film, and many other ways. When such an accident occurs, it is practically certain that the film will be ignited unless some protective apparatus is employed to cut off the light. Several forms of apparatus of this general character have been proposed heretofore. The present invention is especially concerned with safety apparatus of this character and it aims to improve such apparatus with a view to reducing the expense of manufacturing and installing it and making such apparatus more reliable.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

Referring now to the drawings,

Figure 1 is a perspective view of the portion of a moving picture projecting machine with which the present invention is more especially concerned, showing such a machine equipped with an apparatus embodying this invention,

Fig. 2 is a perspective view of a dowser which forms a part of the present apparatus,

Fig. 3 is a perspective view on a large scale of the parts of the apparatus which are attached to the head of the machine, and

Fig. 4 is a perspective view of certain of the details of the mechanism shown in Fig. 3, this view and Fig. 2 being connected to show the electrical circuits used.

Referring more particularly to Fig. 1, 2 designates the upper film magazine, 3 the lower magazine, and 4 the strip of film running through the machine head between the two magazines. The film is fed by an upper sprocket 5 and travels past the window at the end of the lens barrel 6, and thence over an intermittent sprocket 7 to a take-up sprocket 8. From the latter sprocket it is guided between the usual rolls into the lower magazine. The sprockets 5 and 8 rotate continuously while the sprocket 7 rotates intermittently, as is well understood by those skilled in this art, and in normal operation there should always be a loop 9 of film between the intermittent sprocket 7 and the take-up sprocket 8. It will be understood that in Fig. 1 the board or plate 10 is shown swung forward out of its normal position and that usually this board occupies substantially an upright position with the board 11 bearing against the film. If the film should break above the intermittent sprocket 7, this sprocket would feed the end of the film down past the window and while the picture would be interrupted, the film would not be ignited. If the sprocket holes should be stripped, the sprocket 7 could not feed the film, but the take-up sprocket 8 would continue to feed, thus taking up the slack in the loop 9 so that "the loop would be lost." There is also much danger that the film will be broken below the lower sprocket 8 so that this sprocket will feed the film upwardly into the light where it will be ignited. The present apparatus provides mechanism which operates automatically either when the loop 9 is tightened or the film is broken below the sprocket 8 to immediately cut off the light.

It will be understood that the light is supplied from a lamp house located at the left of the machine head shown in Fig. 1, and that the light is directed through the cone 12 on to the film 4. In order to cut off the light, a dowser 14 consisting essentially of a circular metal plate is pivoted at the top of the cone 12 as indicated at 15. The pivot includes a rod having an end 16 turned at right angles to the axis thereof. Normally

the part 16 is engaged by a detent 17, shown in Fig. 1, which holds the dowser in its inoperative position. This detent forms part of a spring 18 which constitutes an armature for an electro-magnet mounted in a housing 20. The armature is so biased or tensioned that it normally holds the tail 16 of the pivot in the position shown in Fig. 1, but when the electro-magnet is energized the armature is withdrawn far enough to release the tail piece 16, thus permitting the dowser 14 to drop into the position shown in Fig. 2 where it cuts off the light from the film. The stop 21 prevents the dowser from swinging too far.

The energization of the magnet or solenoid is controlled by devices on which the film acts. These devices include a roll 24 positioned inside the loop 9 and mounted on the upper end of an arm 25 which is pivoted at 26 on a part of a bracket 27. A spring 28 normally holds the arm 25 against a stop pin 30. When the loop 9 is tightened for any reason, it engages the roll 24 thus swinging the arm 25 far enough to bring its lower end into engagement with the stationary contact 31 which is supported on but insulated from the bracket 27. Referring to Figs. 2 and 4, it will be seen that this action completes an electrical circuit through the magnet in the casing 20, thus acting through the armature 18 to release the dowser 14. The current may be supplied from any convenient source such, for example, as the battery 32.

Another roll 34 is arranged to engage the film immediately below the take-up sprocket 8. This roll is mounted on the forked end of a rod 35 which is supported in arms of the bracket 27 so that it can slide longitudinally toward and from the film. The roll is urged forward by a weighted bell crank lever 36 which is also fulcrumed on the bracket 27 and has a slot 37 in one arm thereof to engage a pin 38 which projects laterally from the rod 35. In normal operation the roll 34 and rod 35 are held backwardly by the film. If the film should break, however, the rod 35 would then be free to move forward under the action of the weighted lever 36 and this lever would drop into engagement with a stationary contact 40 which is connected to the contact 31 by means of a wire 41 (Figs. 3 and 4), a screw 42 and a short copper plate which connects this screw with another screw 43 which is secured to the contact 31. The plate just mentioned lies between the two insulating blocks 44 and 45 shown in Fig. 4. It will be observed that one terminal of the battery 32 is connected directly to the bracket 27 so that when the lever 36 strikes the contact 40 a circuit will be completed through the magnet in the casing 20, thus releasing the dowser 14 as above described.

If, therefore, the film should break in the neighborhood of the intermittent sprocket 8 or the loop 9 should be lost for any reason, the dowser will be released instantly, thus cutting off the light and preventing any possibility of igniting the film. In order to reset the apparatus, it is simply necessary to repair the film, place it properly on the sprockets, and then swing the dowser 14 into its inoperative position. The bevel on the tail 16 of the dowser pivot will force the detent 17 backwardly in the direction of the arrow (Fig. 2) until it passes below the detent when the latter will spring over it as shown in Fig. 1. A switch 47 is mounted upon the casing 20 and provides a hand control for the apparatus.

Attention is particularly called to the fact that both of the rolls 24 and 34 and the contacts which they operate are carried by a bracket 27. The contacts and the moving parts preferably are enclosed in a sheet metal casing 48 which is secured to the bracket 27 by two screws, one of which is shown at 49 in Fig. 1. The bracket has a laterally extending slotted ear 50 which may be secured to the machine head by a bolt or screw 51 so that this entire piece of mechanism can be very easily secured to or removed from the machine head. In other words, this bracket and the parts carried thereby can be installed as a unit within the machine head. This is a great convenience in making insulations as will be evident to those skilled in this art.

Having thus described my invention, what I desire to claim as new is:

1. In a safety attachment for moving picture projecting machines, the combination of two rolls arranged to engage the film, a pivoted arm supporting one of said rolls, a slidable rod supporting the other roll, means acting through said arm and rod to yieldingly hold said rolls in position to be engaged by the film at spaced points, and electrical contacts arranged to be closed by predetermined movements of said rolls.

2. A safety attachment for moving picture projecting machines comprising, in combination, two rolls arranged to engage the film, a pivoted arm supporting one of said rolls, a slidable rod supporting the other roll, means acting through said arm and rod to yieldingly hold said rolls in position to be engaged by the film at spaced points, a bracket on which said arm and rod are mounted, electrical contacts arranged to be closed by predetermined movements of said rolls, and a casing secured to said bracket and enclosing said contacts.

3. A safety attachment for moving picture projecting machines comprising, in combination, a bracket, an arm pivotally mounted on said bracket, a roll carried by said arm and adapted to engage the film, a

rod slidably mounted in said bracket, a second roll carried by said rod and adapted to engage the film, a weighted lever connected with said rod and operative to urge said rod and roll toward the film, a spring acting on said arm to hold it normally in a certain position, and two electrical contacts arranged to be engaged respectively by said arm and said lever.

HENRY C. CORNETTA.