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CLUTCH FOR FIRE SHUTTERS

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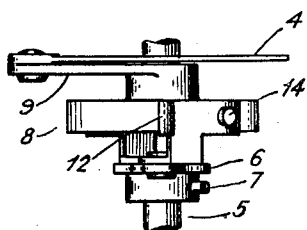


Fig. 1

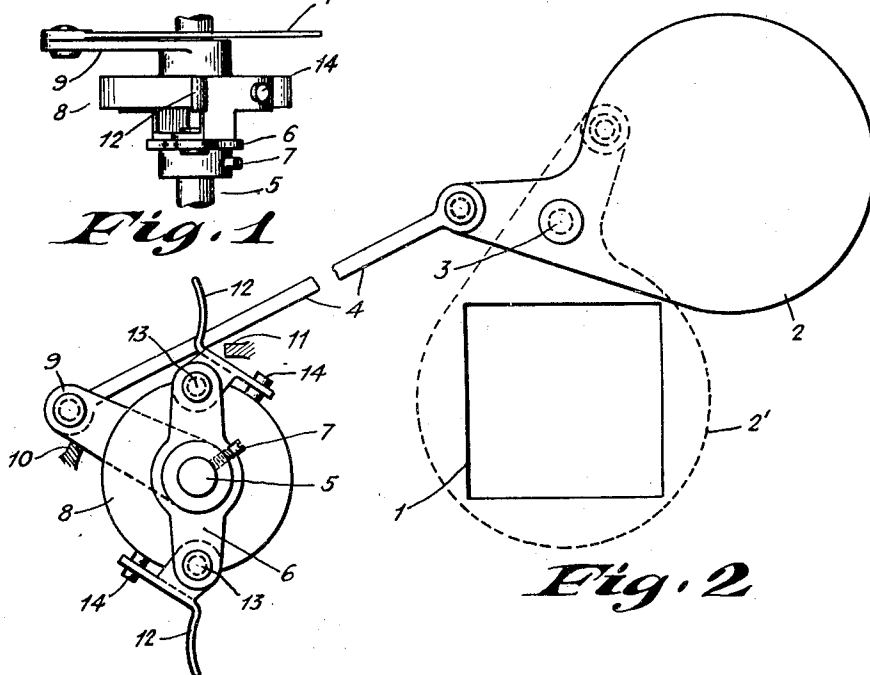


Fig. 2

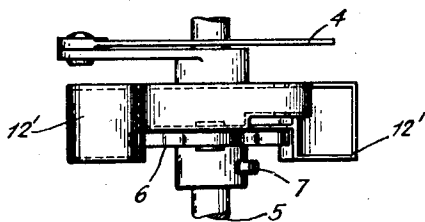


Fig. 3

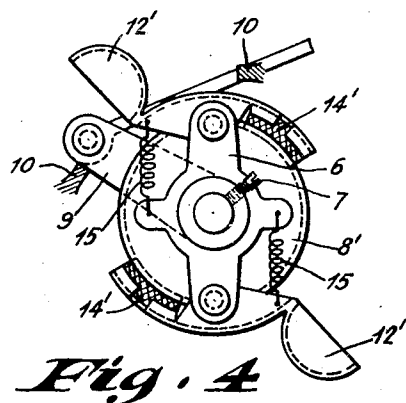


Fig. 4

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CLUTCH FOR FIRE SHUTTERS

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3 Claims. (Cl. 192—105)

The present invention relates to a fire shutter of the type used in motion picture apparatus to protect the film from the heat of the projection lamp when the apparatus is stationary or moving at a slow speed. Such fire shutters are ordinarily controlled by a flyball governor or some equivalent mechanism which causes the shutter to open when the projector has reached a predetermined speed. In devices of this nature, the inertia of the governor sometimes causes difficulty particularly when the apparatus is driven by a synchronous motor as such a motor has a very rapid acceleration, and the strain upon the connected gearing is greatly increased by the inertia of the governor.

One object of my invention is to provide a fire shutter wherein the control mechanism has a minimum of inertia.

Another object of my invention is to provide a fire shutter which will open promptly and effectively during acceleration of the apparatus.

Another object of my invention is to provide a fire shutter which is actuated by the reaction of air against one or more rotating vanes.

Another object of my invention is to provide a fire shutter wherein the parts are so arranged that the tendency of the fire shutter to open when the apparatus is being accelerated is greater than the tendency to open at a constant speed which is the same at that which the fire shutter would open if the device were accelerated.

Referring now to the drawing:

Fig. 1 is a top view of one form of my device.

Fig. 2 is an elevation of the device of Fig. 1.

Fig. 3 is a top view of a modified form of the device, and

Fig. 4 is an elevation of the device of Fig. 3.

Referring first to Fig. 2, the aperture through which light passes to the film is generally indicated at 1. The shutter 2 rotates about the pivot 3, and when the projector is not operated the shutter 2 falls to the dotted line position 2', thereby closing the aperture and preventing light from reaching the film. When the projector is started and reaches proper speed, the shutter 2 is pulled open by tension of the rod 4.

The mechanism which actuates the rod 4 is shown in both Figs. 1 and 2.

A shaft 5 which may be any shaft of the projector rotating at a sufficient and uniform speed, carries the yoke 6 which is secured thereto in any appropriate manner as, for example, by the set screw 7 and rotates therewith. Freely rotatable on this same shaft 5 is the drum 8 which carries the arm 9 to which the rod 4 is attached. The

arm 9 is free to oscillate together with the drum 8 between the stops 10 and 11 which limit the movement of the arm 9 and thereby define the two positions of the fire shutter 2.

At each end of the yoke 6 there is located a brake member 12, which is pivoted to the yoke 6 at 13. The members 12 are each provided with a shoe of appropriate friction material 14 which rides against the drum 8 during operation. The members 12 are provided with curved or cupped extending faces with the concave side of the curve facing in the direction of rotation to increase the wind resistance.

It will be apparent that counter-clockwise rotation of the shaft and the yoke will cause wind resistance to react against the curved faces of the members 12, thereby tending to rotate them about the pivots 13 and will cause the friction members 14 to be thrust against the periphery of the drum 8 with a force depending on the speed of rotation. By making the members 12 of proper size, the device can be made to open the fire shutter 2 at almost any desired speed.

The rotational speed at which the fire shutter is opened is dependent of course upon the friction of the members 14 on the drum 8 and the weight of the shutter 2.

Since the pivots 13 are materially closer to the shaft than the center of mass of the shoes 12, it will be apparent that acceleration of the shaft and of the shoes will tend to cause the shoes to move backward, and thereby increase the friction independent of the wind pressure, while if the apparatus is decelerated the momentum of the shoes will tend to throw them forward and will permit the fire shutter to close at a slightly higher speed than during acceleration.

In the form of the device shown in Figs. 3 and 4, the same reference numerals are applied as in Figs. 1 and 2 in so far as the parts are similar.

The second form of the device, as shown in Figs. 3 and 4, differs from the device of Figs. 1 and 2 in the following respects: The drum 8' instead of having a flat smooth surface is made slightly concave across its face, thereby insuring that the friction members will track accurately in the middle of the drum and also providing a greater friction surface. The friction members 14' are made in the form of elongated blocks rather than in the form of round blocks illustrated in Fig. 2, thereby increasing the frictional surface. The members 12' are provided with cups at their outer extremities instead of merely being curved, and the air friction is thereby increased. The members 12' are urged forwardly by the springs 15, 55

and the speed of rotation of the shaft at which the shutter will be opened can be determined largely by adjustment of these springs.

I claim:

5 1. A speed controlled device comprising a drum freely rotatable upon a shaft, a yoke driven by said shaft, a plurality of clutch members carried by said yoke and provided with friction members arranged to co-operate with said drum, and vanes
10 extending from said clutch members for actuating the said clutches by air resistance when the yoke is rotated.

2. A speed controlled device comprising a drum
15 freely rotatable upon a shaft, a yoke driven by said shaft, a plurality of clutch members carried by said yoke and provided with friction means arranged to co-operate with said drum, and vanes

extending from said clutch members whereby the said clutches are actuated by air resistance when the yoke is rotated, the said clutch members being pivoted nearer to the said shaft than their center of gravity.

3. A speed controlled device comprising a drum 5 freely rotatable upon a shaft, a yoke driven by said shaft and provided with a plurality of clutch members, friction means arranged on said clutch members to co-operate with said drum, vanes extending from said clutch members whereby the
10 said clutches are actuated by air resistance when the yoke is rotated, the said clutch members being pivoted nearer to the said shaft than their center of gravity, and resilient means urging the said
15 clutch members toward released position.

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