

J. T. WELLS.

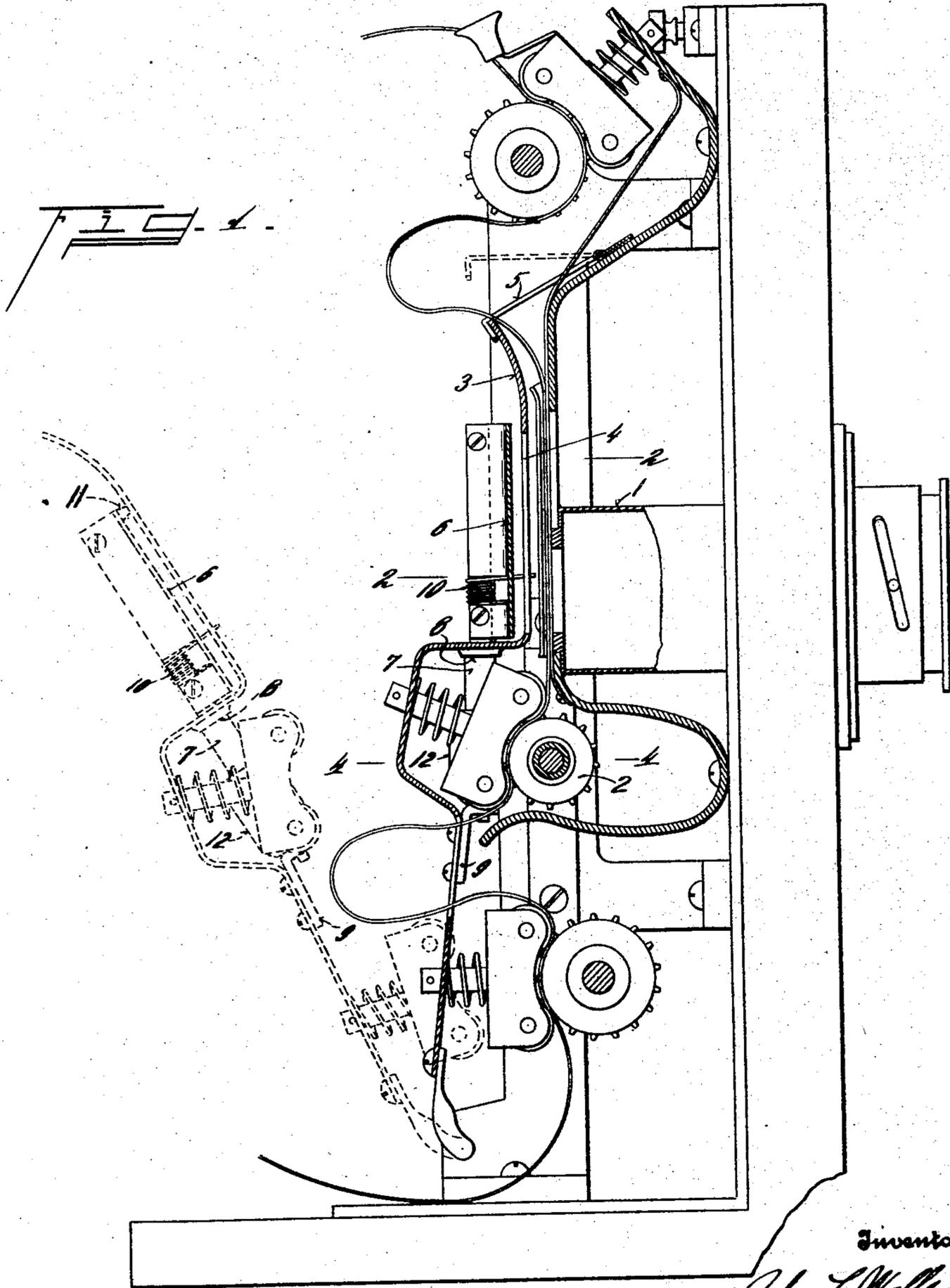
FILM FIRE PREVENTION SHUTTER FOR MOTION PICTURE MACHINES.

APPLICATION FILED OCT. 5, 1914.

Patented Sept. 28, 1915.

2 SHEETS—SHEET 1.

1,154,952.



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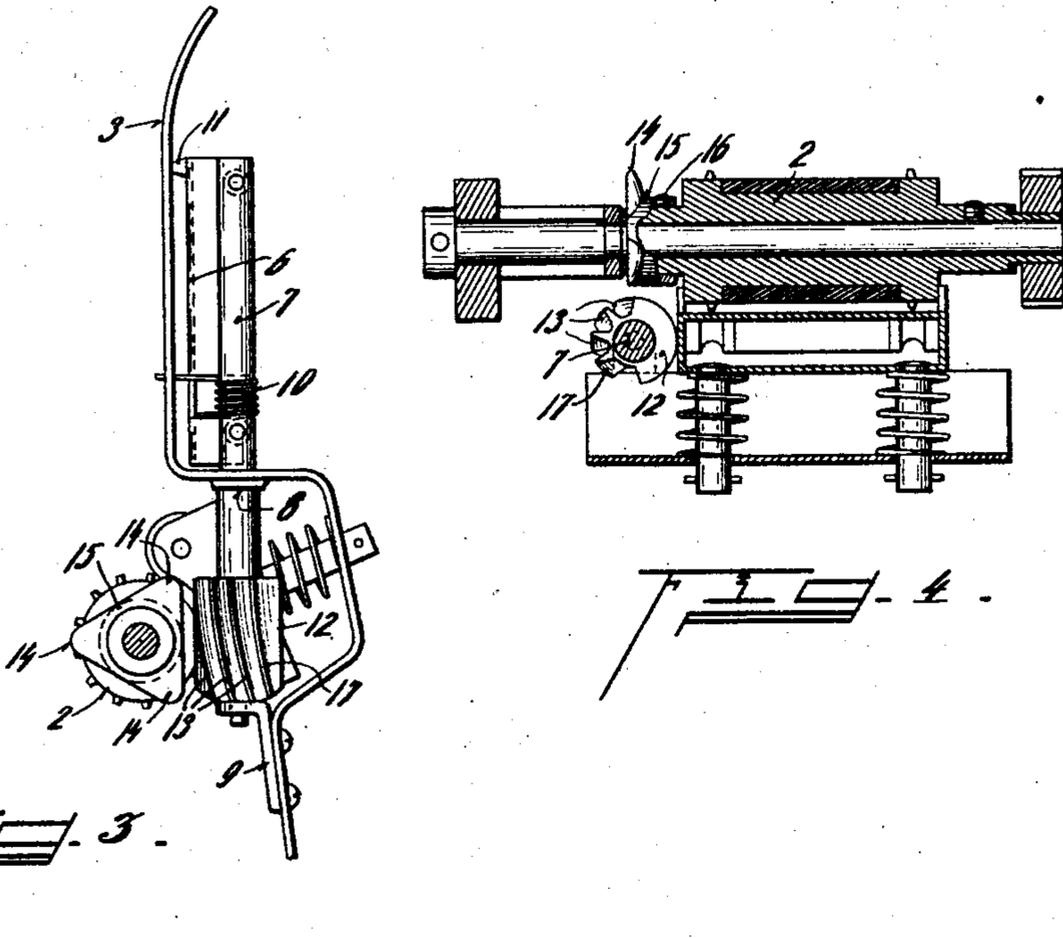
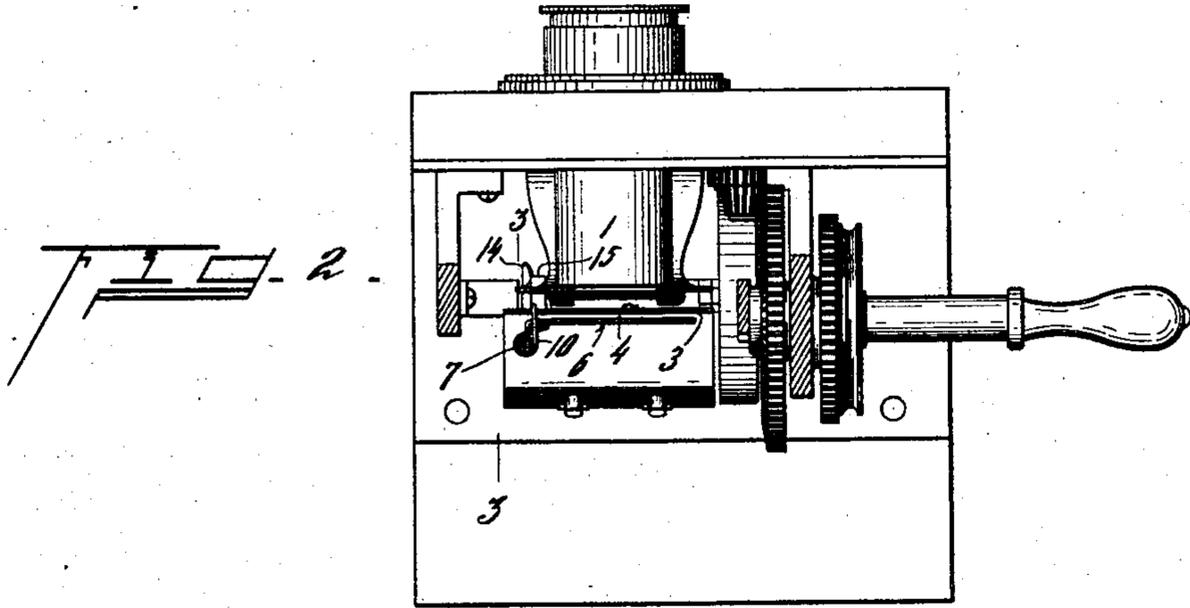
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# UNITED STATES PATENT OFFICE.

JOHN T. WELLS, OF NEWPORT, KENTUCKY, ASSIGNOR TO THE EDWARDS MANUFACTURING COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

FILM-FIRE-PREVENTION SHUTTER FOR MOTION-PICTURE MACHINES.

1,154,952.

Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed October 5, 1914. Serial No. 865,131.

*To all whom it may concern:*

Be it known that I, JOHN T. WELLS, a citizen of the United States, and residing at Newport, in the county of Campbell and State of Kentucky, have invented a new and useful Improvement in Film-Fire-Prevention Shutters for Motion-Picture Machines, of which the following specification is a full disclosure.

My invention relates to an improved fire-prevention film-shutter for a moving picture machine, and its speed controlled operating means.

One of the objects of the invention is to produce operating mechanism increasing the safety provision.

Therefore I have invented a mechanism, speed controlled, but not dependent upon governor actuation, friction clutch, or fluid pressure principles, but providing positive motion transmission at a selective safety speed for operating the shutter. To this end a member having speed ratio with the film travel, and preferably a film feed roll, such as the sprocket wheel, has escapement gear connection with a normally closed shutter pivot, the tension permitting the escapement at danger speeds, but rendering effective motion transmission at a predetermined safety speed. The controlling mechanism comprises pitch-mesh members, such as a tooth wheel and multi-thread worm wheel or segment wherein the angle of thread advance, the tension of the shutter closing or normalizing device, and the speed of the tooth member in ratio with the film travel, are so correlated that, at danger speeds the intermesh is non-effective or of an escapement nature, while at and after a predetermined safety speed the intermesh is progressive over a given space, rendering a predetermined-dimension motion transmission, for opening and holding open the shutter, the slowing down of the film feed normalizing the shutter, under the tension influence. The fact that the critical speed opens and closes the shutter by gear-type transmission, renders the operation mechanically positive and accurate, and in my preferred form shown, the elements are few, simple and effective in operation, and readily adjustable so that the safety speed can be easily and selectively predetermined and secured.

The features of the invention are more fully set forth in the description of the ac-

companying drawings, forming a part of this specification, in which:—

Figure 1 is a side elevation of a film and light controlling unit of a projecting machine, with one of the side frames removed and some of the parts in section. Fig. 2 is a plan section taken on line 2—2, Fig. 1. Fig. 3 is a detailed section on line 3—3, Fig. 2. Fig. 4 is a detailed plan section on line 4—4, Fig. 1.

The unit shown intermittently feeds the film past the focal tube 1, by an intermittently operated sprocket roller 2, which may be driven by any suitable means, such as the ordinary type of Geneva gearing.

A back plate 3, having a light aperture 4, is pivotally mounted in the side frames and held in position by a bale 5 engaging the upper end thereof.

As there is always danger of the film becoming ignited, by the heat of the light rays, when it is run too slowly or stopped, I provide a fire shutter 6, which is governed by the speed of the intermittent feed roller 2. This fire shutter extends over the full area of the light aperture 4 and is secured to an upright rod 7, journaled in the back plate at 8, and in a bracket 9 attached thereto. A coil spring 10 surrounds the rod, one end bearing against the face of the fire shutter and the other end extending into an orifice in the back plate. Said spring is normally under tension and tends to force the fire shutter against the back plate to close the light aperture 4, said movement being made noiseless by a rubber bumper 11, secured to the fire shutter. Secured to the lower end of the rod 7, opposite the shaft of the roller 2, is a cylinder 12, having a plurality of elongated spiral teeth 13, which are adapted to be engaged with a camming action by the teeth 14 of a triangular wheel 15, to expose the light aperture 4. The wheel 15 is secured to the hub of the roller 2 by a set screw 16 to provide for lateral adjustment. In starting the machine one of the teeth 14 will engage the first spiral tooth 13 and rotate the cylinder 12 sufficiently to bring the second spiral tooth into operative alinement with the plane of travel of the teeth 14, thereby commencing the opening movement of the fire shutter.

If the next tooth 14, of the wheel 15, is brought into action with the second spiral tooth with sufficient rapidity, the rotation

of the cylinder will be continued, otherwise the coil spring 10 will act when the triangular wheel 15 assumes the position shown in Fig. 3, and before the second tooth 14 has had time to engage the second spiral tooth 13. Thus it will be seen that as long as the speed of action of the teeth 14 against the spiral teeth 13 is quicker than the action of the spring 10, the opening movement of the fire shutter will continue until the last spiral tooth 17 is engaged. This tooth has less lead than the teeth 13, it being just sufficient to retain the shutter practically stationary in its open position. By laterally adjusting the triangular wheel 15, the point of contact between the teeth 13 and 14 will be varied with a corresponding variation in the speed required for effecting an opening movement of the fire shutter. This positive or gear-like opening and closing of the shutter, by speed control, and mechanically holding open solely under the influence of a safety film speed, eliminates every element of insecurity or failure of transmission at critical speeds, and the invention obviously involves principles of operation susceptible of various structural and mechanical embodiment.

Having described my invention, I claim:—

1. In a device of the class described, a normally closed fire-prevention shutter disposed in relation to the light exposure of the film, a rotary member having speed ratio with the film travel, and worm mechanism functioning under predetermined speed influence of said rotary member for operating the shutter.

2. In a device of the class described, a normally closed fire-prevention shutter disposed in relation to the light exposure of the film, a rotary member having speed ratio with the film travel, and worm mechanism functioning under predetermined speed influence of said rotary member to open and hold open the shutter at a predetermined rate of film travel, and means positively closing the shutter when the rate of film travel decreases.

3. In a device of the class described, a fire-prevention shutter disposed in relation to the film light exposure, a rotary member having speed ratio with the film travel, normalizing means for the shutter, and coördinating pitch members rendered operative by the speed influence of said member for overcoming the normalizing tension and moving the shutter.

4. In a device of the class described, a fire-prevention shutter movably disposed in relation to the film light exposure, a shutter pivot, a member movable in speed ratio with the film, and coördinating pitch members connecting said member and shutter and rendered operative or inoperative by the speed of said member.

5. In a device of the class described, a fire-

shutter for the film, means normally closing the shutter, a member having speed ratio with the film travel, and coördinating pitch members entraining the shutter with said film feed member, the pitch angle being such that the shutter is held closed at danger film speeds and progressively opened at safety speeds.

6. In a device of the class described, a normally closed fire-prevention film-shutter, and operating means therefor, comprising coördinating pitch members rendering positive motion transmission at a safety film speed to open the shutter.

7. In a device of the class described, a normally closed fire-prevention film-shutter, and operating means therefor, comprising members having a pitch-mesh rendering a predetermined dimension motion transmission at a safety film speed to open and hold open the shutter.

8. In a device of the class described, a fire-prevention film-shutter, a tension device normally closing said shutter, operating means therefor comprising members having a pitch-mesh, the tension degree of said tension device being predetermined in relation to said pitch mesh to prevent effective motion transmission at danger film speeds, and rendering a predetermined dimension motion transmission at a safety film speed.

9. In a device of the class described, a fire-prevention film-shutter, a tension device normally closing said shutter, operating means therefor, comprising members having a pitch-mesh, the tension degree of said tension device being predetermined in relation to said pitch mesh to prevent effective motion transmission at danger film speeds, and rendering a predetermined dimension, and means providing relative adjustability of the pitch-mesh enabling the securance of a selective critical film speed.

10. In a device of the class described, a fire-prevention film-shutter, operating means comprising members having a pitch-mesh, one of said members having a tension escapement preventing effective motion transmission until a predetermined speed of the other member is attained, and thereafter rendering a predetermined dimension motion transmission for opening the shutter, said tension normally holding the shutter closed.

11. In a device of the class described, a fire-prevention film-shutter, operating means comprising a driving and a driven pitch-meshed member, the driving member having speed ratio with the film travel, a tension device holding the shutter normally closed and influencing the said driven member to provide an escapement of effective motion transmission until a predetermined speed of the driving member is attained, said pitch mesh being arranged to produce a predeter-

mined dimension motion transmission at a safety film speed for opening the shutter and maintaining it open while said driving member is operated at a safety film-speed.

5 12. In a device of the class described, a fire-prevention film-shutter, and operating means therefor, comprising a speed controlled intermeshing escapement worm-type mechanism for operating the shutter.

10 13. In a device of the class described, a fire-prevention film-shutter, operating means therefor, comprising a speed controlled escapement mechanism for operating the shutter, and means enabling relative adjust-  
15 ment of the escapement mechanism providing a selective critical film-speed for shutter operation.

14. In a device of the class described, a fire-prevention film-shutter, a pivot member  
20 therefor, a rotary member having speed ratio with the film travel, pitch-mesh members connecting said rotary and pivot members, a tension device holding the shutter normally closed and influencing said pitch  
25 mesh engagement to prevent effective motion transmission until a predetermined speed of the rotary member is attained, said pitch mesh members functioning to open the shutter at a safety film speed.

30 15. In a device of the class described, a fire-prevention film-shutter, a pivot member therefor, a rotary member having speed ratio with the film travel, pitch-mesh members connecting said rotary and pivot members,  
35 a tension device holding the shutter normally closed and influencing said pitch mesh engagement to prevent effective motion transmission until a predetermined speed of the rotary member is attained, said pitch-  
40 mesh members functioning to open the shutter at a safety film speed, and means providing relative adjustment determining the critical speed for shutter operation.

45 16. In a device of the class described, a fire-prevention film shutter, a pivot member therefor, a worm mechanism on the pivot member, a toothed member for engaging the worm having speed ratio with the film travel, and tension means holding the shut-

ter normally closed and influencing said 50 worm mechanism to provide motion escapement of the tooth member until a safety film speed is attained, said tooth and worm mechanism coacting to definitely open and hold  
55 open the shutter at a predetermined safety film speed.

17. In a device of the class described, a fire-prevention film-shutter, tension means holding the same normally closed, a shutter-  
60 pivot, a worm member thereon, a film-feed sprocket wheel and a toothed member thereon adapted to progressively engage the shutter pivot worm threads when a predetermined sprocket wheel speed is attained to  
65 open the shutter.

18. In a device of the class described, a fire prevention film shutter, a film feed member and coördinating pitch members connecting the shutter with the film member,  
70 the pitch angle of advance being ineffective to open the shutter at low speeds, and functioning to open the shutter at predetermined high speeds, said coördinating members being provided with means functioning to  
75 hold the shutter open at said high or safety film speeds.

19. In a device of the class described, a normally closed fire-prevention film-shutter, a tension normalizer therefor, a member  
80 having speed ratio with the film travel, and pitch type connection between said member and shutter, the angle of advance, and the tension degree of the normalizer, being arranged in relation to the speed variation of  
85 said member to render the gearing action ineffective until a predetermined speed of the driver is attained, whereupon the shutter is positively opened or closed by the speed control, and mechanically held open  
90 under the sole influence of a safety film speed.

In witness whereof, I hereunto subscribe my name, as attested by the two subscribing witnesses.

JOHN T. WELLS.

Witnesses:

CLARENCE B. FOSTER,  
L. A. ROCK.