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Dec. 7, 1926. 1,609,961

W. C. READEKER

MOTION PICTURE MACHINE

Filed Jan. 22, 1925

Fig. 1.

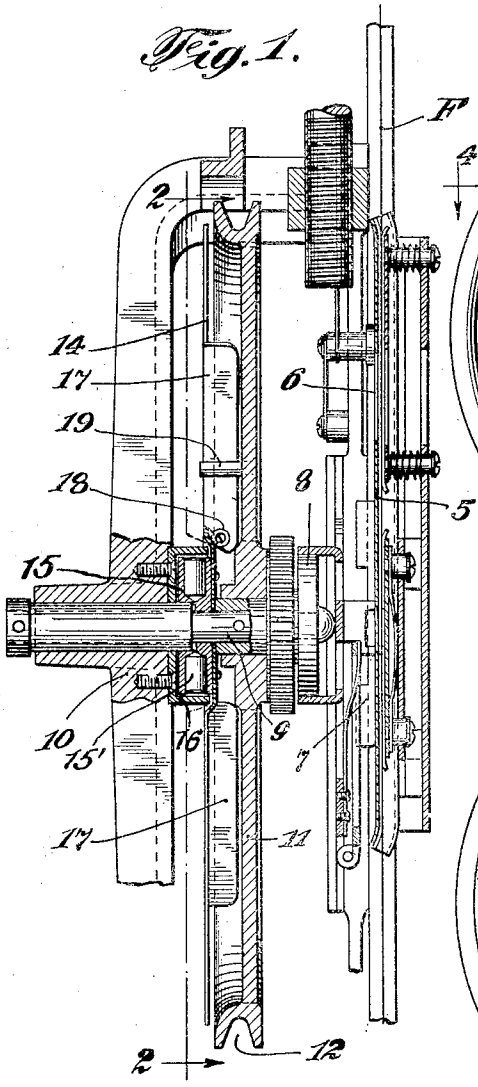


Fig. 2.

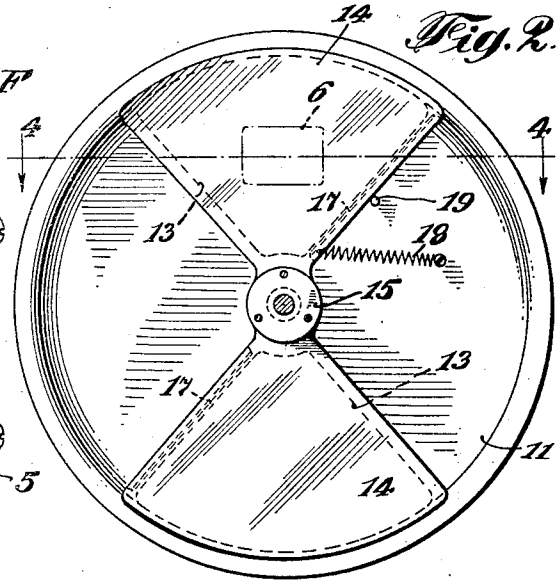


Fig. 3.

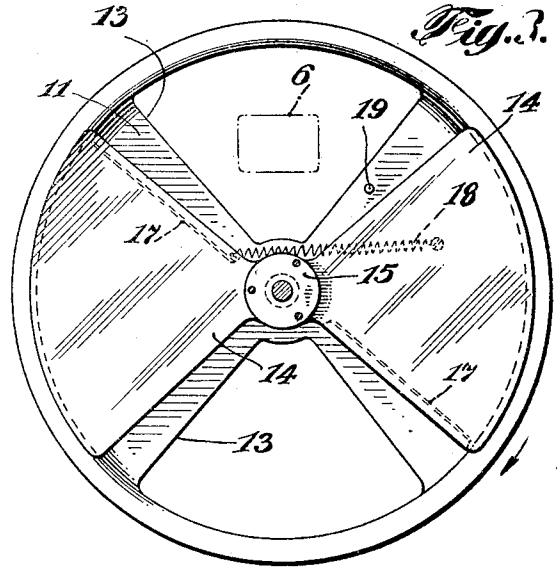
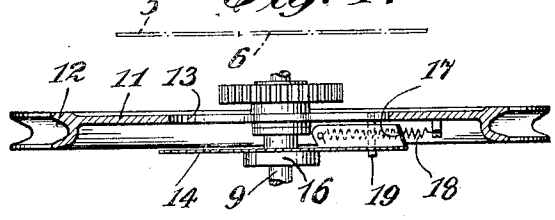


Fig. 4.



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Patented Dec. 7, 1926. 1,609,961

UNITED STATES PATENT OFFICE.

WILLIAM C. READEKER, OF NEW YORK, N. Y., ASSIGNOR TO CLAREMONT LABORATORIES, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MOTION-PICTURE MACHINE.

Application filed January 22, 1925. Serial No. 3,897.

This invention relates to motion picture machines and more particularly to a machine of the intermittent film feeding type such as that shown in my pending application for patent, Ser. No. 499,658, filed September 10, 1921, which has matured into Patent 1,542,409, June 16, 1925.

It is one of the objects of my present improvements to reduce the number of parts in a mechanism of this kind and provide a more compact arrangement thereof whereby production costs are reduced to a minimum and it becomes possible to mount or arrange such mechanism within a case or housing of small dimensions.

It is another object of my invention to provide simple, effective and automatically operating means for eliminating fire hazard in the operation of such machines by preventing the possible ignition of the film.

More particularly, in one embodiment of the present improvements I provide a light shutter fixed upon the actuating shaft of the film feeding mechanism which is also operatively connected with and driven by a suitable motor, said shutter serving as a combined driving and fly wheel for the actuating shaft. This wheel is provided with diametrically opposed openings and is interposed between the aperture of the film gate and the source of light so that the solid portions of the wheel between said openings intersect the light beam during periods of intermittent movement of the film. At one side of this wheel or light shutter, a fire screen is loosely mounted on the shaft and is yieldably connected with said wheel whereby the screen is normally held in position over the openings in said wheel. Upon rotation of said wheel at or above a normal operating speed, the fire screen, due to its inertia, assumes a position between said openings so that it will not obstruct the passage of the light beam therethrough.

It is one of the detail objects of the invention to provide an improved means whereby relative displacement between the openings in the light shutter and the fire screen at speeds below the normal operating speed is resisted, said means assisting the yieldable connecting means between the fire screen and the light shutter in maintaining the light screen in its normal position.

The invention also has for an additional object to provide an automatically acting brake device for retarding the closing movement of the fire screen under the action of said spring.

With the above and other objects in view, the invention consists in the improved form, construction and arrangement of the several parts, as will be hereinafter more fully described, illustrated in the accompanying drawing and subsequently incorporated in the subjoined claims.

In the drawing wherein I have illustrated one simple and practical embodiment of my present improvements and in which similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a vertical sectional view illustrating so much of the operating mechanism of the machine as will enable the present improvements to be clearly understood;

Figure 2 is a section taken on the line 2—2 of Figure 1, showing the fire screen in its normal position;

Figure 3 is a similar view showing the position of the fire screen in the operation of the machine; and

Figure 4 is a horizontal sectional view taken on the line 4—4 of Figure 2.

For the purposes of the present explanation, I have shown in Figure 1 of the drawings, a film gate 5 having an aperture 6 through which a beam of light is projected from a suitable light source (not shown). The film indicated at F is intermittently fed past this opening at one side of the gate plate 5 by means of a cam actuated feed mechanism, generally designated by the numeral 7, which is fully described and claimed in detail in my co-pending application above referred to.

The film feeding mechanism is actuated by a cam 8 fixed on one end of a shaft 9 journaled in a suitable supporting frame 10. Upon this shaft between the film feeding mechanism and the light source there is fixed a light shutter 11. As herein shown, this shutter is in the form of a wheel having a peripheral belt receiving groove 12 to receive a driving belt connected with the shaft of an operating motor. Thus it will be understood that the light shutter 11 also serves as a combined driving and fly wheel for the shaft 9.

The wheel 11 is provided at diametrically opposite points with the sector shaped openings 13. It will be noted that the plane of

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rotation of the wheel 11 intersects the path of the light beam through the aperture 6 and it will therefore be understood that in each revolution of the wheel, the projection of the light beam through said aperture is twice interrupted by the solid portions of the wheel between the openings 13 thereof. These periods of interruption of the projection of the light beam through said aperture corresponds with the periods of interruption in the movement of the film F, and during the intervals between these interrupted movements, while the film is stationary, one of the openings 13 traverses the path of the light beam so that said beam is projected through the aperture and the film and thereby projects the image from the film upon the display screen.

As is well known, moving picture film is very inflammable and it is usual to provide a fire screen in such machines which prevents the play of the light beam upon the screen during such time as the machine is not being operated, and minimizes the possibility of ignition of the film. In the present instance, I provide a novel form and construction of fire screen which is automatically positioned over the openings 13 in the light shutter wheel 11 when said wheel is stationary or is rotating at relatively low speeds. In a preferred embodiment this screen is in the form of a thin sheet metal member having spaced sector shaped wings 14 corresponding to the shape of the openings 13 in the wheel 11. These wings at their inner ends are fixed to a disc or collar 15 which loosely surrounds the shaft 9 and is disposed within a cup or drum 16 fixed to the frame 10. The collar 15 is provided with a plurality of radially disposed cylindrical pockets which loosely receive the tumbler members 15', the outer ends of which are rounded or convex and are adapted for frictional engagement with the inner face of the circumferential wall of the drum 16. Each blade or wing 14 of the fire screen is provided upon one of its lateral longitudinal edges with a flange 17 which is obliquely inclined inwardly at an acute angle from the plane of said wing towards the wheel 11.

One end of a contractile spring 18 is fixed to the face of the wheel 11 and the other end of said spring is attached to the flange 17 on one of the wings or blades 14. This spring normally acts to hold said flange on the latter blade against a stop pin 19 projecting from the face of the wheel 11, and as seen in Figure 2 of the drawings, in this normal position of the fire screen, the blades 14 thereof are positioned over the respective openings 13 in said wheel.

In the operation of the machine for the projection of pictures from the film F, when the shutter or wheel 11 is rotated at or above a normal operating speed, the fire screen loosely mounted on the shaft 9, due to its inertia, tends to retain a relatively stationary position so that the spring 18 is gradually expanded. The relative movement between the screen and the wheel 11 is retarded due to air resistance acting against the flanges 17 on the wings or blades 14 and by frictional contact between the tumblers 15' and the base of the drum 16. It will be readily understood that the air which exerts pressure against the outer faces of the inclined flanges 17 tends to shift the fire screen axially along the shaft 9 and thus urges the collar 15 of said screen against the collar 16. Thus the screen is retained in normal position when the spring 18 starts to expand after the wheel has acquired a predetermined normal operating speed. This frictional resistance to the rotation of the fire screen with the shutter is materially increased by reason of the frictional braking action of the radially movable tumblers 15' against the annular wall of the fixed drum 16. Accordingly, the tendency of the spring 18 to contract and move the fire screen from its normal position after the shutter has acquired the predetermined operating speed, is effectually overcome so that such shutter will rotate relative to the fire screen to dispose the openings 13 thereof in positions substantially between the spaced blades or wings 14 of said fire shutter. However, it will be apparent that further relative movement between the fire screen 9 and wheel 11 will be limited by engagement of one edge of one of the blades 14 with the pin 19, thus precluding the possibility of the blades 14 moving past the position shown in Figure 3 and over the openings 13 at very high operating speeds of the wheel 11. Upon stopping the operation of the machine, if the speed of rotation of the wheel 11 decreases below a normal operating speed, the fire screen is returned to its normal position by the spring 18 and the wings or blades thereof are again positioned over the openings 13 in said wheel as will be readily understood.

From the foregoing description considered in connection with the accompanying drawings, the construction and manner of operation of my present improvements will be clearly understood. It will first be observed that by eliminating the separate drive wheel for the actuating shaft 9 and combining this drive wheel with the fly wheel and light shutter, I have reduced the number of necessary parts so that the mechanism is more compact and can be mounted and arranged in a very limited space. Also it will be seen that the improved fire screen is entirely automatic in its action so that whenever it becomes necessary to stop the operation of the machine, the openings

through the shutter wheel are immediately closed without requiring any manual operation upon the part of the operator. Owing to the extremely simple form of this fire screen it will be appreciated that the same will not materially add to the manufacturing and selling cost of such machines.

I have herein illustrated and described an embodiment of the invention which I have found to be very satisfactory in practical operation, nevertheless it is to be understood that the device might be incorporated in various other alternative structures, and I accordingly reserve the privilege of adopting all such legitimate changes as may be fairly embodied within the spirit and scope of the invention as claimed.

I claim:

1. In combination with film feeding mechanism and an actuating shaft therefor, a drive wheel fixed on said shaft between said mechanism and a source of light and intersecting the path of the light beam, said wheel having spaced openings therein through which the light beam is intermittently projected in the rotation of the wheel, and means yieldingly connected with said wheel normally closing said openings, said means and the wheel automatically moving relative to each other when the wheel acquires a predetermined rotative speed to admit of the passage of the light beam through said openings.

2. In combination with film feeding mechanism and an actuating shaft therefor, a drive wheel fixed on said shaft between said mechanism and a source of light and intersecting the path of the light beam, said wheel having spaced openings therein through which the light beam is intermittently projected in the rotation of the wheel, and means rotating with said wheel and normally covering the openings therein, said means being constructed and arranged whereby relative rotation takes place between said means and the wheel upon rotation of the wheel at or above a normal operating speed to position said means out of obstructing relation to said openings and thereby permit of the projection of the light beam through said openings during the operative rotation of said wheel.

3. In combination with a film feeding mechanism and an actuating shaft therefor, a light shutter fixed upon said shaft between said mechanism and a source of light and intersecting the path of the light beam, a fire screen mounted at one side of said shutter for rotation with respect thereto, and yieldable means connecting said fire screen to the shutter for movement as a unit therewith, said means yieldably resisting relative rotation of said shutter and fire screen to retain said screen in a normal position obstructing the projection of the light beam past said shutter but permitting of such relative rotation when the shutter is rotated at or above a normal operating speed whereby the light beam is intermittently projected past said shutter in such rotation thereof.

4. In combination with mechanism for intermittently feeding a motion picture film past a light aperture and an actuating shaft therefor, a drive wheel fixed upon said shaft between the light aperture and the source of light and intersecting the path of the light beam, said drive wheel having spaced openings therein, a fire screen loosely mounted upon said shaft for rotation with respect to said wheel, yieldable means connecting said fire screen with the wheel for rotation as a unit therewith and retaining said fire screen in a normal position over said openings, said means permitting of such relative rotation when said wheel is rotated at or above a normal operating speed whereby the fire screen is automatically positioned out of obstructing relation to said openings during the continued unitary movement of the fire screen and said wheel, and additional means supplementing the action of said yieldable means in resisting the movement of the fire screen to the latter position.

5. In combination with mechanism for intermittently feeding a motion picture film past a light aperture and an actuating shaft therefor, a drive wheel fixed upon said shaft between the light aperture and the source of light and intersecting the path of the light beam, said drive wheel having spaced openings therein, a fire screen loosely mounted upon said shaft for rotation with respect to said wheel, yieldable means connecting said fire screen with the wheel for rotation as a unit therewith and retaining said fire screen in a normal position over said openings, said means permitting of such relative rotation when said wheel is rotated at or above a normal operating speed whereby the fire screen is automatically positioned out of obstructing relation to said openings during the continued unitary movement of the fire screen and said wheel, said fire screen including spaced blades and means on each of said blades for the impingement of air therewith to supplement the resistance of said yieldable means to the relative rotation of the wheel and fire screen.

6. In combination with mechanism for intermittently feeding a motion picture film past a light aperture and an actuating shaft therefor, a drive wheel fixed upon said shaft between the light aperture and the source of light and intersecting the path of the light beam, said drive wheel having spaced openings therein, a fire screen loosely mounted upon said shaft for rotation with respect to said wheel, yieldable means connecting said fire screen with the wheel for rotation as a unit therewith and retaining said fire

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screen in a normal position over said openings, said means permitting of such relative rotation when said wheel is rotated at or above a normal operating speed whereby the fire screen is automatically positioned out of obstructing relation to said openings during the continued unitary movement of the fire screen and said wheel, and a flange on one edge of each of said blades extending radially of the wheel for the impingement of air thereagainst to supplement the resistance of said yieldable means to the relative rotation of the wheel and fire screen.

7. In combination with mechanism for intermittently feeding a motion picture film past a light aperture and an actuating shaft therefor, a drive wheel fixed upon said shaft between the light aperture and the source of light and intersecting the path of the light beam, said drive wheel having spaced openings therein, a fire screen loosely mounted upon said shaft for rotation with respect to said wheel, yieldable means connecting said fire screen with the wheel for rotation as a unit therewith and retaining said fire screen in a normal position over said openings, said means permitting of such relative rotation when said wheel is rotated at or above a normal operating speed whereby the fire screen is automatically positioned out of obstructing relation to said openings during the continued unitary movement of the fire screen and said wheel, a flange on one edge of each of said blades extending radially of the wheel for the impingement of air thereagainst to supplement the resistance of said yieldable means to the relative rotation of the wheel and fire screen, and a stop on said wheel with which one of the blades of the fire screen is adapted to engage to limit relative rotation of the fire screen in both directions with respect to said wheel.

8. In combination with means for intermittently feeding a motion picture film past a light aperture and an actuating shaft therefor, a drive wheel fixed on said shaft between the aperture and the source of light and intersecting the path of the light beam, said wheel having spaced openings therein, a fire screen loosely mounted on said shaft for rotative movement relative to the wheel, yieldable means connecting the fire screen to said wheel and normally retaining the fire screen over said openings for rotation as a unit with the wheel, said yieldable means permitting of the relative rotation of said wheel and fire screen when the wheel is rotated at or above a normal operating speed whereby said openings will be unobstructed by the fire screen, and additional coacting means for applying an additional frictional resistance to such relative rotation of the wheel and fire screen.

9. In combination with means for intermittently feeding a motion picture film past a light aperture and an actuating shaft therefor, a drive wheel fixed on said shaft between the aperture and the source of light and intersecting the path of the light beam, said wheel having spaced openings therein, a fire screen loosely mounted on said shaft for rotative movement relative to the wheel, yieldable means connecting the fire screen to said wheel and normally retaining the fire screen over said openings for rotation as a unit with the wheel, said yieldable means permitting of the relative rotation of said wheel and fire screen when the wheel is rotated at or above a normal operating speed whereby said openings will be unobstructed by the fire screen, said fire screen consisting of spaced blades each having a flange on one edge extending radially of the wheel whereby additional air resistance is offered to the relative rotation of the fire screen and wheel and additional frictionally coacting parts providing a further resisting influence to such relative rotation.

10. In combination with the mechanism for intermittently feeding a motion picture film past a light aperture and an actuating shaft therefor, a drive wheel fixed upon said shaft between said aperture and a source of light and intersecting the path of the light beam, said wheel having spaced openings therein, a fire screen at one side of said wheel consisting of spaced blades, a collar loosely mounted on said shaft to which said blades are secured, yieldable means connecting said fire screen with the wheel for unitary rotation therewith but permitting of a relative rotation of said wheel and fire screen when the wheel is rotated at or above a normal operating speed whereby said openings will be unobstructed by the fire screen, an obliquely inclined flange on one edge of each of said blades extending towards the wheel whereby additional air resistance is offered to such relative rotation of the wheel and fire screen, a fixed part in opposed relation to said collar, the impingement of air against said flanges urging said collar into frictional relation with said part to apply further resistance against such relative rotation of the wheel and fire screen, said yieldable means returning the fire screen to a normal position over said openings to obstruct the passage of the light beam therethrough, and stop means for limiting the relative rotative movement of said wheel and fire screen in both directions.

11. In combination with a film feeding mechanism, and an actuating shaft therefor, a light shutter fixed upon said shaft between said mechanism and a source of light and intersecting the path of the light beam, a fire screen mounted at one side of said shutter for rotation with respect thereto and normally intersecting the path of the light beam and means resisting relative rotation

of the shutter and fire screen to retain said screen in its normal position until the shutter has acquired a predetermined operating speed and thereafter permitting rotation of the shutter relative to the fire screen for the projection of the light beam past the shutter in the continued rotation thereof.

12. In combination with a film feeding mechanism, and an actuating shaft therefor, a light shutter fixed upon said shaft between said mechanism and a source of light and intersecting the path of the light beam, a fire screen mounted at one side of said shutter for rotation with respect thereto and normally intersecting the path of the light beam, means resisting relative rotation of the shutter and fire screen to retain said screen in its normal position until the shutter has acquired a predetermined operating speed and thereafter permitting rotation of the shutter relative to the fire screen for the projection of the light beam past the shutter in the continued rotation thereof, said means including a centrifugal brake device automatically acting to frictionally resist rotation of the fire screen with said shutter.

13. In combination with a film feeding mechanism, and an actuating shaft therefor, a light shutter fixed upon said shaft between said mechanism and a source of light and intersecting the path of the light beam, a fire screen mounted at one side of said shutter for rotation with respect thereto and normally intersecting the path of the light beam, means resisting relative rotation of the shutter and fire screen to retain said screen in its normal position until the shutter has acquired a predetermined operating speed and thereafter permitting rotation of the shutter relative to the fire screen for the projection of the light beam past the shutter in the continued rotation thereof, said means including a fixed brake drum, and means carried by the fire screen and automatically coacting with said brake drum to frictionally resist rotation of the fire screen with said shutter.

14. In combination with a film feeding mechanism, and an actuating shaft therefor, a light shutter fixed upon said shaft between said mechanism and a source of light and intersecting the path of the light beam, a fire screen mounted at one side of said shutter for rotation with respect thereto and normally intersecting the path of the light beam, means resisting relative rotation of the shutter and fire screen to retain said screen in its normal position until the shutter has acquired a predetermined operating speed and thereafter permitting rotation of the shutter relative to the fire screen for the projection of the light beam past the shutter in the continued rotation thereof, a fixed brake drum, a collar fixed to the fire screen and positioned within the said drum and a plurality of radially movable tumblers carried by said collar adapted to be projected by centrifugal force into frictional coacting engagement with the wall of said drum to resist rotation of the fire screen with said shutter.

In testimony that I claim the foregoing as my invention. I have signed my name hereto.

WILLIAM C. READEKER.