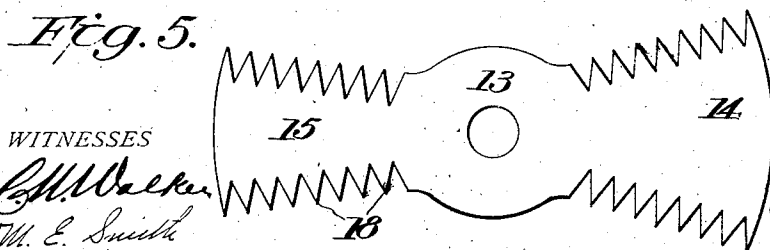
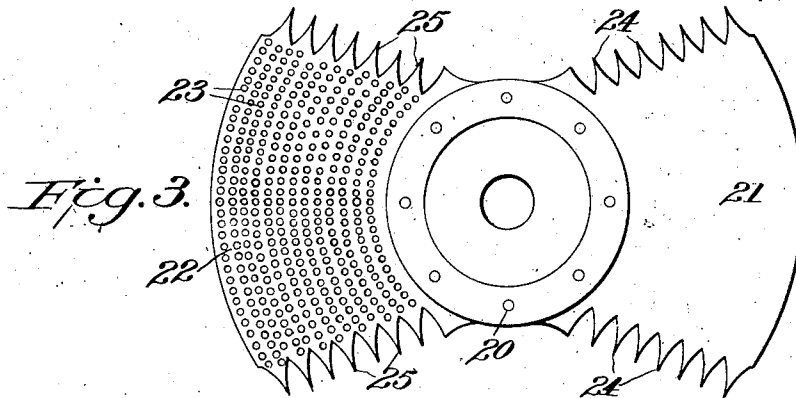
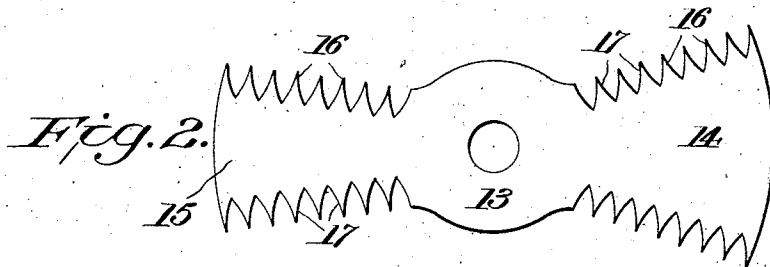
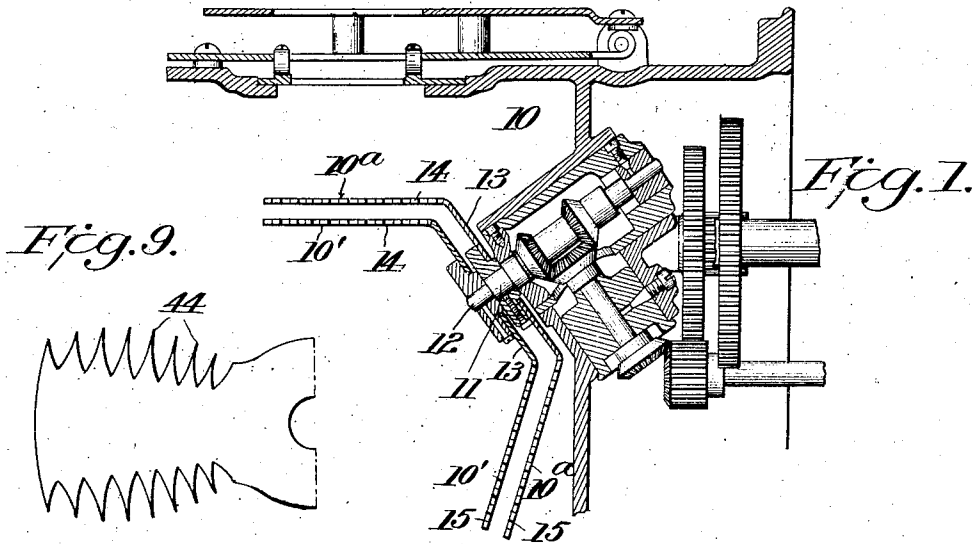


J. A. ENGLAND.
MOVING PICTURE APPARATUS.
APPLICATION FILED MAY 2, 1911.

1,012,344.

Patented Dec. 19, 1911.

2 SHEETS—SHEET 1.



WITNESSES

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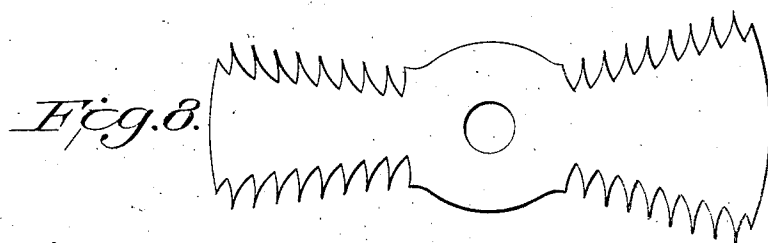
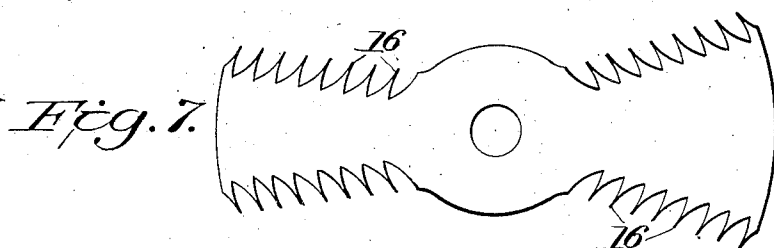
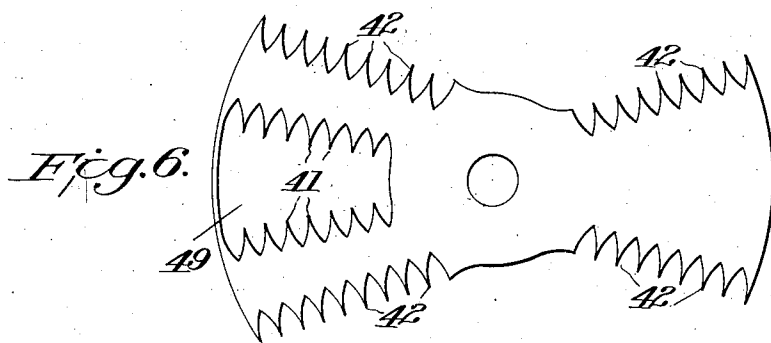
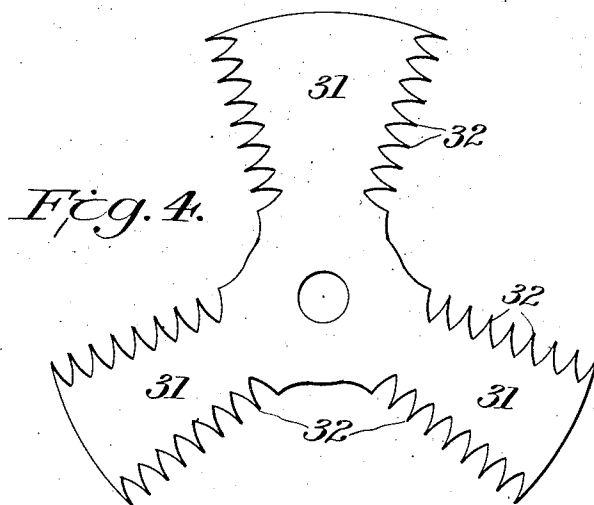
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOSEPH A. ENGLAND, OF WASHINGTON, DISTRICT OF COLUMBIA.

MOVING-PICTURE APPARATUS.

1,012,344.

Specification of Letters Patent. Patented Dec. 19, 1911.

Application filed May 2, 1911. Serial No. 624,642.

To all whom it may concern:

Be it known that I, JOSEPH A. ENGLAND, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Moving-Picture Apparatus, of which the following is a specification.

This invention pertains to certain new and useful improvements in moving picture apparatus, and relates more particularly to the construction of the shutter which passes before the lens to intermittently shut off the light rays projected therethrough in the operation of the machine.

In the operation of apparatus of the character above referred to great annoyance is caused to persons in an audience because of the so-called "flicker" caused by a sharp line of contrasting bright light and total darkness as the edge of the shutter passes across the lens to automatically and alternately shut off the light from and admit the same to the screen. This "flicker" is so pronounced that the eyesight of many persons has been permanently impaired by reason thereof and persons with sensitive eyes refrain from attending these moving picture exhibitions.

The object of the present invention is to provide an improved shutter so constructed that the sharp line caused by contrasting bright light and total darkness is destroyed and the light so diffused that the so-called "flicker" is practically destroyed.

A further object is to provide a shutter so constructed as to permit a maximum quantity of light to pass to the screen, thereby insuring a brilliant illumination of the picture projected upon the screen.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—Figure 1 is a view illustrating a portion of a moving picture apparatus with my invention applied thereto. Figs. 2, 3 and 4 are detail views illustrating shutters adapted to different types of apparatus with my invention applied thereto. Figs. 5, 6, 7, 8 and 9 are views of various modifications.

Referring to the drawing, 10 designates a moving picture apparatus, the type illustrated being that known as the "motionograph." It will be understood however, that I do not desire to limit myself in this particular as the type of apparatus is imma-

terial, the form mentioned being selected merely for illustrative purposes. In the machine illustrated, two shutters 10, 10^a, are employed and mounted on independent arbors 11, 12, and arranged to rotate in opposite directions. Each shutter comprises a central body portion 13, a shutter 14 and an oppositely disposed member or interrupter 15. The shutter 14 and interrupter are bent up at an angle with relation to the body 13 to form what is technically termed a "cone" and each is wider at its free end than at its junction with the body. The interrupter 15, however, is somewhat narrower than the shutter. The opposite side edges of both the shutter and interrupter are provided with teeth or serrations 16 the converging edges of each tooth being concaved as indicated at 17. While this is the preferred form because of the relatively long narrow teeth formed thereby, I have found that good results are obtained by making the teeth substantially triangular as illustrated at 18, Fig. 5.

In practice the two bodies 13 are rotated in opposite directions in such manner that the two shutters 14 close together over the lens to shut off the light and then pass off opposite sides of the lens opening to again permit passage of the light. The interrupters act in the same manner for reasons well recognized in the art. It will be noted that the teeth or serrations of the approaching edges of the two shutters do not define a sharply contrasted light and dark surface upon the screen, but the light passes between the side edges of the serrations and becomes diffused. A similar action takes place as the shutters separate. These actions are duplicated in the operation of the interrupters. As a consequence the severe strains placed upon the eyes of the observer in accommodating themselves to the sharply contrasting changes as heretofore experienced are overcome. By means of my improved construction, a neutral space is established between extreme light and extreme darkness, resulting in a gradual change from one to the other, so that the eyes are made to accommodate themselves to the changes without shock. It will also be noted in this connection that by providing the shutters with serrations, a much narrower shutter is employed than those heretofore in use, and as a consequence more light is permitted to reach the screen, there-

by greatly improving the quality of the exposure, as the picture improves proportionately with the quantity of light that is permitted to reach the screen. Another peculiarity of my improved shutter is that in operation the film starts to move before the shutters are entirely closed and is still moving before the shutters are entirely open in making the exposures. By concaving the edges of the teeth I am enabled to materially reduce the width of the shutter and yet provide means for effecting complete diffusion of the light with relatively short teeth.

In Fig. 3 I have shown a slightly modified form of shutter consisting in a circular body portion 20 provided with a shutter 21 and an oppositely disposed interrupter 22 provided with perforations 23. The opposite side edge of both the shutter and interrupter are provided with teeth 24 having converging concaved sides 25.

In Fig. 4 I have illustrated another form of shutter 30 provided with three radial members 31 *i. e.* a shutter member and two interrupter members each provided with teeth 32 as in the other forms above described. In this form one picture on the film is displayed for each revolution of the shutter.

In Fig. 6 instead of forming the interrupter solid, as in Fig. 2, the same is provided with an opening 49 the side edges of which are provided with teeth 41 similar to the teeth 42 on the outer edges of the interrupter and the shutter member.

In Figs. 7 and 8 the teeth 43 are shown as inclined at an angle with relation to a line intersecting the inner extremities of the teeth or serrations.

In Fig. 9 I have shown another slight modification in which the teeth 44 are of varying height.

Having thus explained the nature of my invention, and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, what I claim is:—

1. A shutter for moving picture machines provided with a radially elongated section having its opposite longitudinal side edges provided with teeth to permit a maximum quantity of light to pass the shutter.

2. A shutter for moving picture machines provided with a radially elongated

section having its opposite longitudinal side edges provided with teeth to permit a maximum quantity of light to pass the shutter, said teeth being provided with converging concaved edges.

3. A shutter for moving picture machines provided with a plurality of radially arranged sections, the opposite longitudinal side edges of each section being provided with teeth to permit a maximum quantity of light to pass the shutter.

4. A shutter for moving picture machines provided with a plurality of radially arranged sections, the opposite longitudinal side edges of each section being provided with teeth to permit a maximum quantity of light to pass the shutter, said teeth being provided with converging concaved edges.

5. A shutter for moving picture machines comprising a body provided with an elongated radial shutter member and an oppositely disposed elongated interrupter member provided with an opening therein, the opposite longitudinal side edges of said opening being provided with teeth, to permit a maximum quantity of light to pass through said opening.

6. A shutter for moving picture machines comprising a body provided with a radial shutter member and an oppositely disposed interrupter member, the opposite side edges of each member being provided with teeth, said interrupter being provided with an opening, the side edges of said opening being provided with teeth, to permit a maximum quantity of light to pass through said opening.

7. A shutter for moving picture machines comprising a body provided with a radial shutter member and an oppositely disposed interrupter member, the opposite side edges of each member being provided with teeth formed with converging concaved edges, said interrupter being provided with an opening, the side edges of said opening being provided with teeth formed with converging concaved edges, whereby a maximum quantity of light will pass through said opening.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOSEPH A. ENGLAND.

Witnesses:

CHAS. E. RIORDAN,
M. E. SMITH.