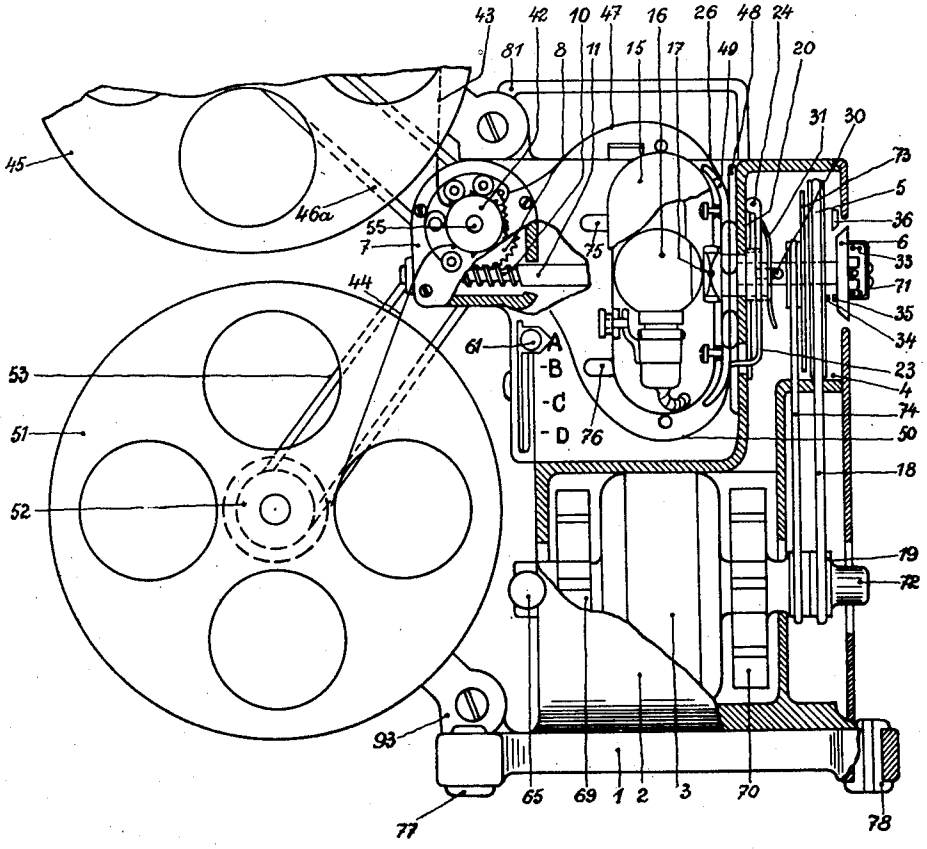
April 21, 1931. J. BOGOPOLSKY 1,802,045

CINEMATOGRAPHIC APPARATUS FOR THE PROJECTION OF FIXED AND MOVING PICTURES

Filed March 24, 1927 5 Sheets-Sheet 1

FIG.1.



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Fig. 2.

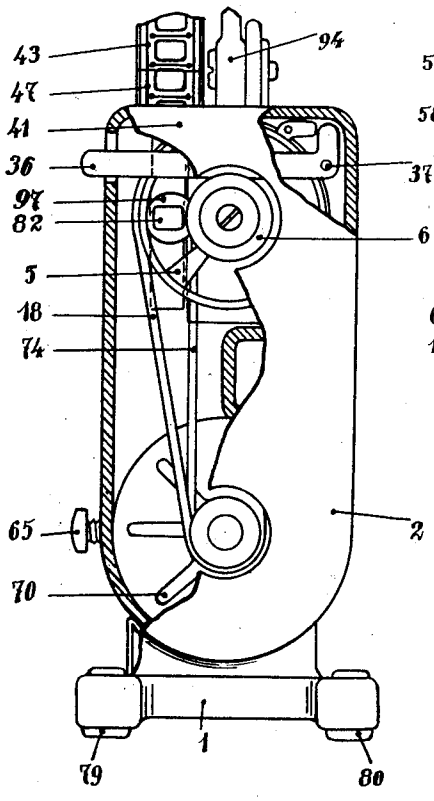
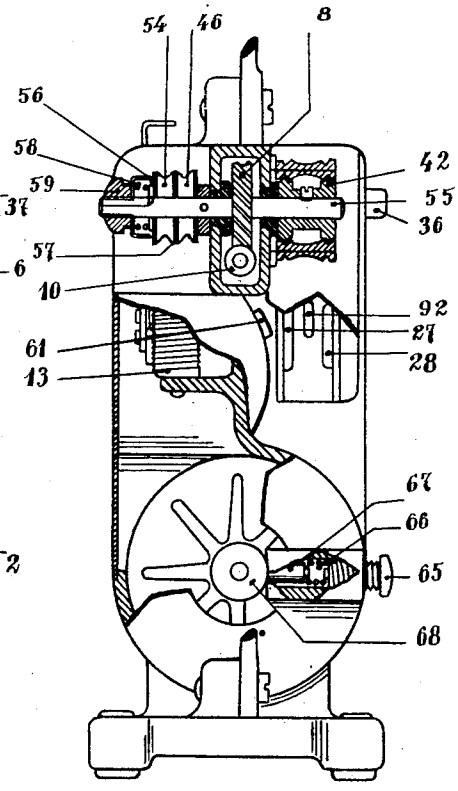


Fig. 3.



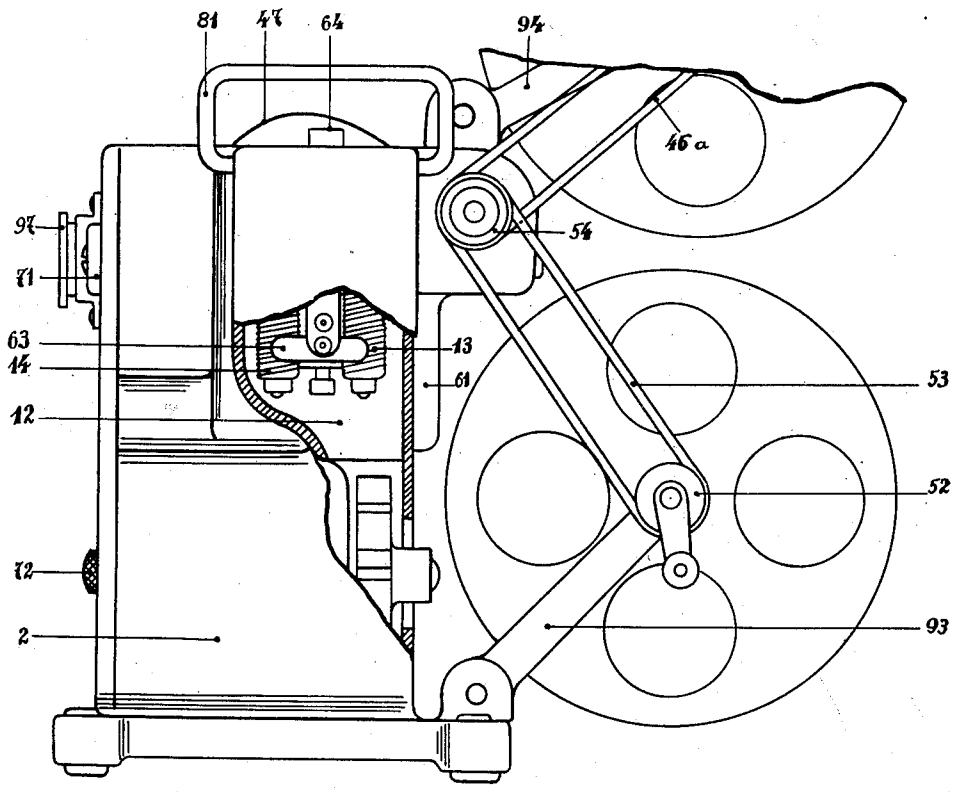
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Fig. 4.



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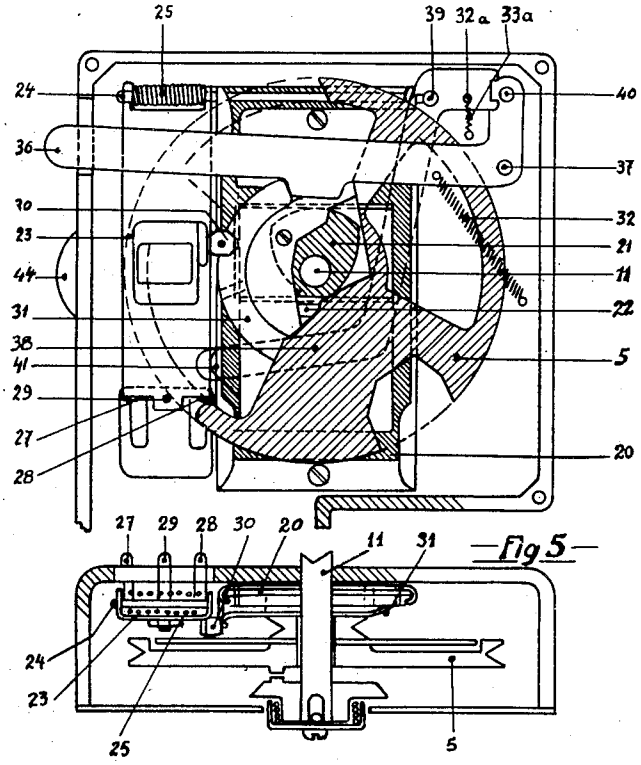


Fig 5

Fig 8

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CINEMATOGRAPHIC APPARATUS FOR THE PROJECTION OF FIXED AND MOVING PICTURES

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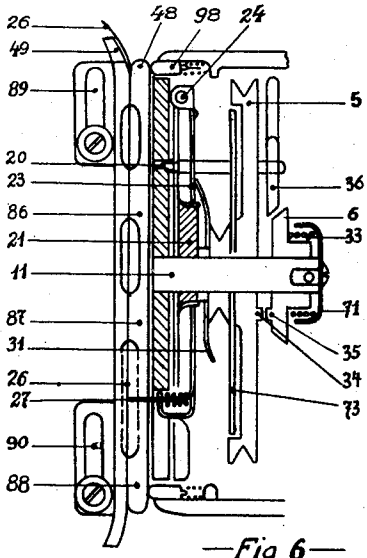


Fig 6

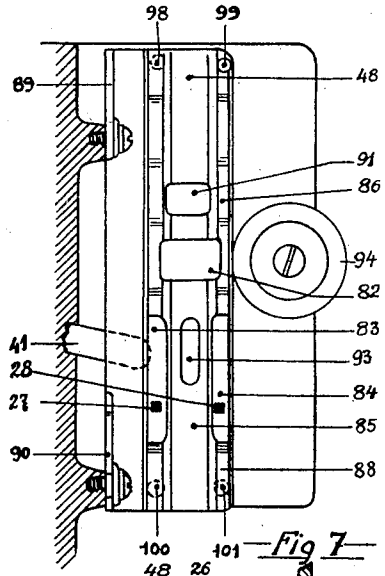


Fig 7

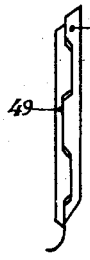


Fig 9

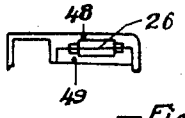


Fig 10

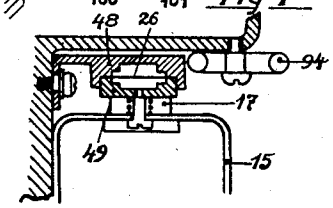


Fig 11

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UNITED STATES PATENT OFFICE

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CINEMATOGRAPHIC APPARATUS FOR THE PROJECTION OF FIXED AND MOVING PICTURES

Application filed March 24, 1927, Serial No. 178,034, and in Switzerland November 2, 1926.

The subject of the present invention is a cinematographic apparatus for projecting both fixed and moving pictures. It is characterized by a framework and a number of separate compartments each provided with independent means giving access to them and adapted to form a complete assembly. One of the compartments contains the film driving mechanism, shutter, fly wheel and clutch mechanism, another contains the illuminating device, a third contains the resistance, a fourth contains the driving means for effecting a steady driving movement of the film and a further compartment contains the motor and the adjacent parts. The said projector comprises at least one central horizontal shaft driven directly by a motor, which shaft in its turn drives on the one hand the film feed mechanism and on the other hand the film driving mechanism, the shutter and the members connected therewith. The said projector may employ at least two different kinds of film having different characteristics. A gate is provided formed of at least two separate members permitting the formation of at least two different types of gate, each having features suited to the type of film being used, the said gate co-operating with a suitable film driving mechanism in such a manner as to bring only the necessary parts of said driving mechanism into operation.

The accompanying drawings show by way of example one form of apparatus embodying the present invention.

Fig. 1 shows a part sectional side elevation of the apparatus.

Fig. 2 is a part sectional front elevation.

Fig. 3 shows a view from the rear of the apparatus partly in section.

Fig. 4 is a further view partly in section of the complete apparatus.

Figs. 5, 6, 7 and 8 show details of the preceding figures.

Figs. 9, 10 and 11 show details of Figs. 1 to 6.

The apparatus comprises a framework carried upon a base 1 and carrying upon its respective sides the following compartments: A base compartment 2 containing a motor 3 and fans 69 and 70; a compartment 4 enclosing the driving mechanism for the film 23, the shutter pulley 5 and the clutch mechanism 6; a compartment 7 in the rear part of the apparatus containing a wheel 8 driven by a worm gear 10 integral with the central shaft 11; a space 12, Figs. 3 and 4 containing resistances 13 and 14 and a compartment 15, Fig. 1 containing a lamp 16 and the condenser 17.

The mechanism comprises a central shaft 11, Figs. 1, 5, 6 and 8 driven by the fly wheel 5 which is driven from the motor 3 by means of a belt 18 passing round a pulley 19 on the shaft of the motor. A carrier 20, Figs. 1, 5, 6 and 8 guided in a slideway is rocked by a cam 21 rigidly mounted on the shaft 11 and turning in a rectangle 22 formed by the outwardly projecting edges of the carriage 20. This carrier carries a claw 23 pivoted at 24 and urged by a spring 25 at the side of the film 26. The claw carries marginal hooks 27 and 28 and a yieldingly mounted central hook 29, Figs. 1 and 8. The claw 23 carries a roller 30, Fig. 5, which rolls upon a disc 31 of spiral form and serves to impart a return movement to the claw as soon as it has moved the film. The shutter 5 is freely mounted upon the shaft 11.

Clutching is carried out by means of a movable member 6 (Figs. 1 and 6) sliding on the shaft 11. The spring 33 urges the member 6 towards the fly wheel 5 so that the dogs 34 and 35 contact with one another and the drive of the motor is transmitted to the mechanism. A lever 36 Fig. 5 pivoted at 37 serves to effect declutching by moving the member 6 longitudinally, and to stop the shaft 11 by friction. Declutching can be carried out automatically by means of a lever 38 pivoted at 39 and engaging by its extension 32*a* with a pin 40 on the lever 36. The opposite end 41 of the lever 38, which rubs constantly upon the edge of the film, may enter a slot formed in said film edge whereby it is lowered and the end 32*a* is thereby moved to free the pin 40 and the lever 36. Two springs 32 and 33*a* urge the two levers in the desired directions. The declutching stops the travel of film and to restart it is only necessary to raise the lever 36.

The worm gear 10, (Fig. 1) drives the wheel 8 and the film feed sprocket 42 with which the film contacts twice, at 43 and at 44.

The upper film feed spool is carried upon an axis not shown, which is connected with the pulley 46, Fig. 3, through a belt 46*a*, Fig. 4. The film unwinding from the spool passes to the film feed sprocket 42, Fig. 1, being pressed against said sprocket by a pair of rollers, forms a first loop 47, enters the gate formed by a member 48 and a tension plate 49 yieldingly mounted upon the lantern 15, then forms a second loop, returns again to the film feed sprocket 42, being again pressed against the latter but by other rollers and is then wound on the receiving spool 51 driven by a pulley 52, through a belt 53 from a further pulley 54, Figs. 1, 3 and 4. The pulleys 46 and 54 are freely mounted upon a shaft 55, Fig. 3, and are frictionally driven through friction washers 56 and 57, pressed into contact by a spring 58 controlled by a screw 59. The pulley 46 is arranged to rotate with the upper spool 45 in the case of a reversal of the direction of travel, when the direction of rotation of the motor is effected through the commutator 61, Fig. 1.

The pulleys of the spools are provided with free wheel mountings to ensure drive in one direction only.

The arms 93 and 94, Fig. 4, carry the spools and can be moved into a folded position against the apparatus.

The resistance elements 13 and 14, Figs. 3 and 4, are in the lamp circuit and a contact 63 controlled by a rod 64 permits the brightness of the light to be varied. The rod 64 serves to shut off the lighting current when pushed downwards to its limit.

The speed of the motor 3 is regulable by a brake comprising a screw 68 which, through a spring 66 urges a friction pad 67 against a cylindrical member 68 rigidly mounted on the motor shaft.

The fans 69 and 70, Fig. 1, drive air into the chamber containing the resistance and into the film driving system whence it passes onto the film and the condenser. Openings in the walls of the frame also facilitate cooling of the motor and the lamp. Studs 71 and 72, Figs. 1 and 4, serve to convert the apparatus to hand control for projecting fixed pictures, for example by means of a handle not shown, mounted on the shaft 55.

The fly wheel pulley 5, Figs. 1 and 5, serves also as the shutter, suitable apertures being formed therein for this purpose. A second shutter 73, Figs. 1 and 6, coupled directly to the motor through a pulley 74, and rotating at a greater speed serves as an anti-scintillating device during slow working of the projector.

The threading of the film into the gate is assisted by drawing back the lantern 15 which slides on two rails 75 and 76. The base of the apparatus is furnished with four rubber feet 77, 78, 79 and 80 which serve to reduce noise. A handle 81 facilitates carrying the apparatus.

The arrangement about to be described is provided to permit the use of different kinds of films, for example large films with two sets of marginal perforations and narrower films centrally perforated.

When the former are used the gate 48 occupies the position shown in Fig. 6. The large opening 82, Fig. 7, is now in line with the objective. Only the marginal hooks 27 and 28 of the claw member come into operation, passing through the openings 83 and 84. The central hook 29, Fig. 8, being yieldingly mounted by means of a spring which is less rigid than the spring 25 on the claw is held out of action by the solid part 85 of the gate.

The edges of the film slide upon the projecting parts 86, 87 and 88 of the members 48 and 49 of the gate (Fig. 6).

In the second case the gate 48 is moved downwards being arranged to slide by virtue of slideways 89 and 90. The small opening 91, (Fig. 7), corresponding to a narrow film is then brought into line with the projection opening. The opening 93 is brought to a position opposite the central hook 29 on the claw member which thus is alone able to drive the film, the marginal hooks 27, 28 passing outside the edges of the narrow film.

If this second film should be of the same width as the first film mentioned above, the marginal hooks can be rendered inactive in the manner previously described in connection with the central hook. The narrow film carried by a support not shown, enters directly into the gate without passing by way of the film driving sprocket and is wound on to the receiving film spool.

The selection of the hooks on the film driving claw may also be carried out by hand.

The rewinding of the film may be carried out by mechanism adapted to be driven either by the motor or by means of a handle.

In the case where the distance travelled in one step by the film varies for different films the stroke of the driving claw can be varied by changing the excentricity of the cam 21, for example by means of an external control. The gate 48 is movable through a roller 94 to permit the proper positioning or framing of the picture.

To obtain a proper lateral guidance of the film, a passage of suitable size is formed in each case, Figs. 9, 10 and 11. Guides 98, 99, 100, 101 prearranged in the desired position serve to satisfactorily guide a narrow film. Figs. 10 and 11 respectively show the two forms the gate may assume, and illustrate the manner in which their centre parts are spaced from one another to avoid scratching the film at the picture carrying part.

The shutter 5 may be arranged between the

lamp and the film, an arrangement which serves to reduce the extent to which the film becomes heated. Fins carried by the shutter assist in the cooling of the film and the adjacent parts. The anti-scintillating device may be so arranged as to serve this same purpose. Alternatively, at the moment when the movement of the film ceases, the anti-scintillator may be halted also to oppose the transparent section to the rays of light, which section filters the light in such a manner as to avoid the transmission of heat to the film.

The three hooks on the claw may be replaced by a single hook or a pair of hooks capable of being displaced laterally across the width of the film. In this case it is sufficient to arrange the hooks in alignment with the row of perforations according to the kind of film in use.

What I claim is:

1. In a moving picture projector, the combination of a compartment for containing a driving motor, a compartment at the front of the projector and above said motor compartment for containing a shutter and an intermittent film driving means, and two compartments located side by side behind said shutter compartment, one for containing a source of light and the other for containing a resistance element.

2. In a moving picture projector having a main driving shaft, continuous film feeding mechanism operatively connected to the shaft, intermittent film driving mechanism operatively connected to the shaft, a pulley mounted for free rotation upon the shaft, said pulley constituting the shutter, means for driving said pulley from the motor, means for locking said pulley to the shaft, a hand operable lever for controlling said locking means, and automatic means controlled by the film in the machine for operating said lever.

3. In a moving picture projector having a main driving shaft, continuous film feeding mechanism operatively connected to the shaft, intermittent film driving mechanism operatively connected to the shaft, a pulley mounted for free rotation upon the shaft, said pulley constituting the shutter, means for driving said pulley from the motor, means for locking said pulley to the shaft, said second named means comprising a coupling member axially movable on the shaft, a hand operable lever for controlling said locking means, and automatic means controlled by the film in the machine for operating said lever whereby said film feeding and driving means may be stopped without stopping the shutter.

4. In a moving picture projector having a main driving shaft, gearing positively connecting a film feeding mechanism to the shaft, cam mechanism operatively connecting the film driving mechanism to the shaft, a pulley mounted for free rotation upon the shaft, said pulley constituting the shutter, a belt connecting said pulley to the motor, a lug on said pulley, a collar axially slidable on the shaft, spring means for forcing said collar into engagement with said lug to couple said pulley to the shaft, a hand operable lever adapted to be moved into engagement with said collar to displace it on said shaft and uncouple said pulley and automatic means controlled by the film in said machine for operating said lever.

5. In a moving picture projector having a main driving shaft, gearing positively connecting a film feeding mechanism to the shaft, cam mechanism operatively connecting the film driving mechanism to the shaft, a pulley freely mounted on the shaft, said pulley constituting a shutter, a second pulley mounted on the shaft and carrying a disc serving as an anti-scintillating device, belts connecting said pulleys to the motor, said second pulley being connected to rotate at a higher speed, spring means for locking said first named pulley to the shaft, and a manually operable lever adapted to displace said spring means and uncouple said first named pulley from the shaft, whereby the film feeding and film driving mechanism may be stopped without stopping the shutter, and automatic means for operating said lever.

In testimony whereof I affix my signature.

JACQUES BOGOPOLSKY.