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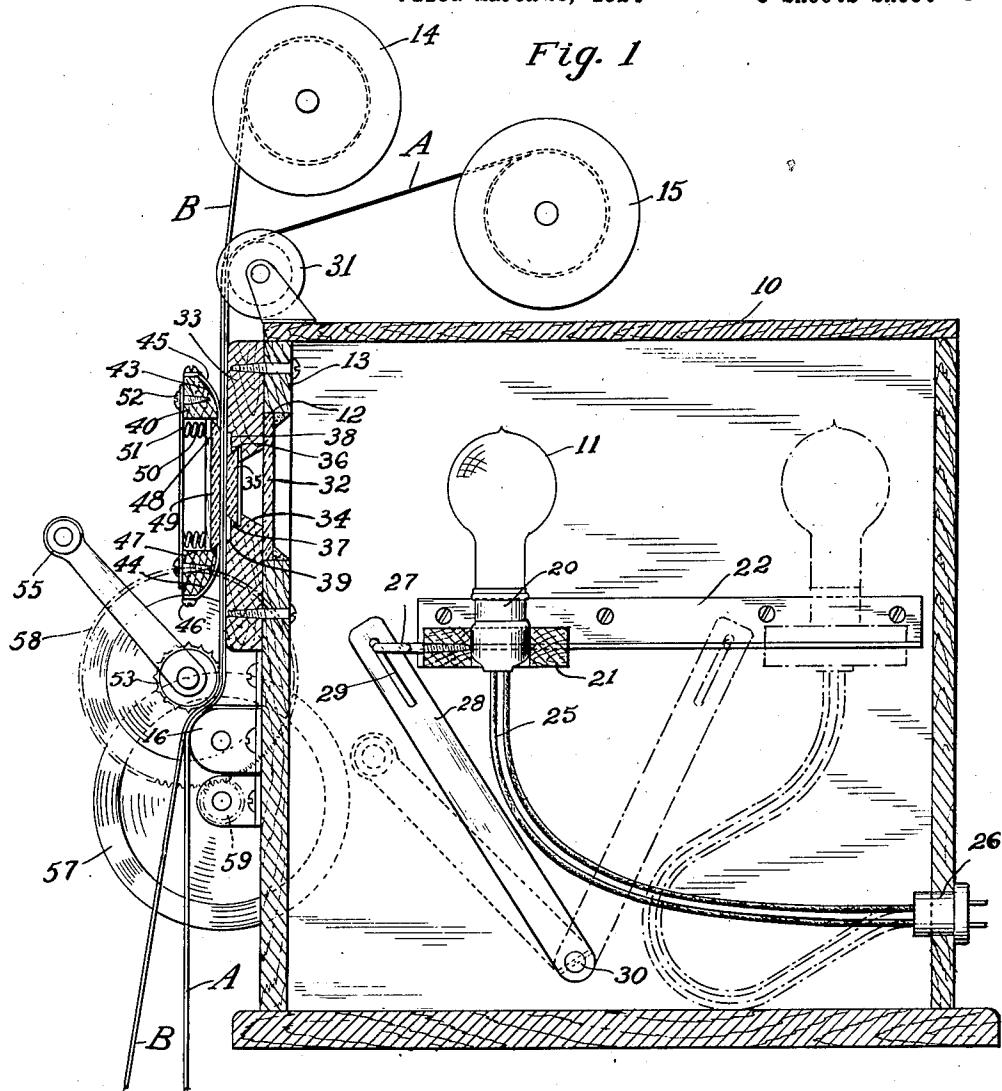
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F. E. OILER

MOTION PICTURE PRINTING MECHANISM

Filed March 28, 1924

3 Sheets-Sheet 1



INVENTOR

Frank E. Oiler

BY Frank D. Gray

ATTORNEY

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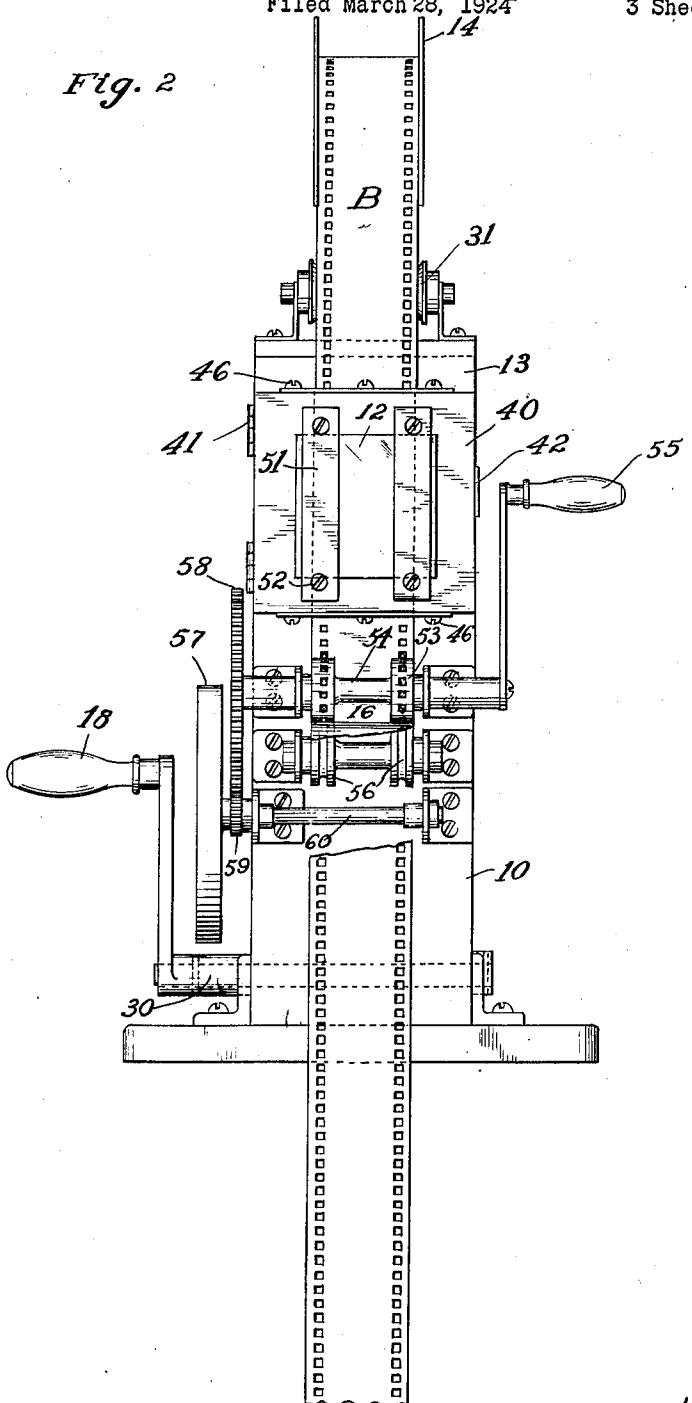
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Fig. 2



INVENTOR
Frank E. Oiler

BY Frank D. Gray
ATTORNEY

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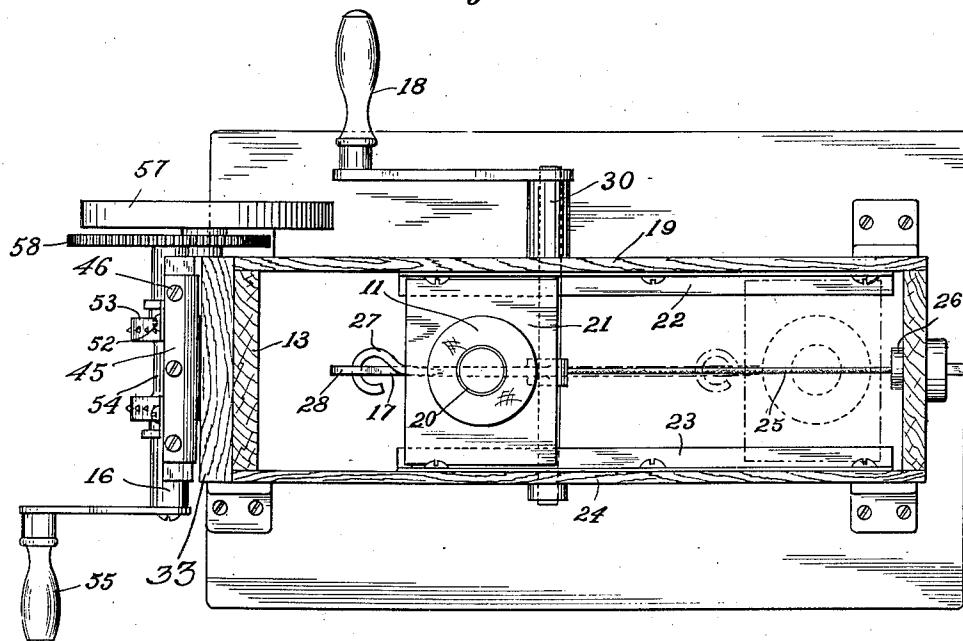
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Fig. 3



INVENTOR
Frank E. Oiler

BY Frank D. Gray

ATTORNEY

UNITED STATES PATENT OFFICE.

FRANK E. OILER, OF DETROIT, MICHIGAN, ASSIGNOR TO MANTOR, INC., OF NEW YORK,
N. Y., A CORPORATION OF DELAWARE.

MOTION-PICTURE-PRINTING MECHANISM.

Application filed March 28, 1924. Serial No. 702,552.

This invention relates to improvements in printing machines for moving picture films and the primary object of the invention is to provide such apparatus for facilitating 5 the transfer and improving the quality of the positive film obtained in the operation.

The printing machine comprises a light proof box containing an illuminator which is movable toward and from a printing window in the box by means of an externally controlled actuator. By means of this construction it is possible to vary the relative intensity of the light on the sensitive film during the printing operation, and in order 10 to carry this out visual means are provided comprising a window to the rear of the film through which the light may be observed and thus controlled.

A further object of the invention is to 20 provide an improved driving means for feeding the film past the printing window in the light box.

Further features, details and objects of the invention will appear as described in 25 connection with the accompanying drawings and hereinafter set forth and claimed.

Referring to the drawings forming a part 30 of this specification, like numerals of reference designate corresponding parts throughout the several views, in which,—

Figure 1 is a vertical sectional view of a printing equipment in accordance with this invention,

Figure 2 is an end elevation of the equipment showing the various exterior operating mechanisms, and

Figure 3 is a horizontal sectional view through the equipment.

The printing machine comprises an enclosed casing 10 preferably of wood, aluminum, or other light material, the parts being constructed so as to be light-proof as well understood. The casing provides a housing for an illuminator 11 such as an electric 40 lamp bulb which is adapted for photographic printing, and is provided with a printing and observing window 12 in the upper portion of the end 13 of the casing. On top of the casing are supported roll 45 holders 14 and 15 for the film to be printed and the negative, respectively, and on the end 13 of the casing below the window 12 the feeding mechanism 16 for drawing the negative and film is mounted. Control 50 mechanism 17 for the illuminator is also

mounted within the casing 10 and is provided with a handle 18 which projects through the side 19 of the casing for adjusting the light from the exterior of the casing.

In construction of the machine, the lamp 55 11 is mounted in its socket 20 in a movable block 21. This block is positioned on angle guide brackets 22 and 23 mounted horizontally on the sides 19 and 24 respectively of the casing and substantially midway up therein. The lamp socket 20 is provided with flexible leads 25 which pass through a bushing 26 in the rear of the casing 10 to suitable switches and source of 60 current supply (not shown). A connector member 27 is secured in one end of block 21 which couples the illuminator with its control mechanism 17. As shown this mechanism comprises a lever 28 having a 65 slot 29 which engages with the connector member 27 at one end, and at its other end it is secured to a pivot member 30 which extends through the sides of that casing and upon which the handle 18 is mounted.

The unexposed positive film B and negative A are drawn from their respective holders 14 and 15 over a guide roller 31 mounted on the top of the casing where they are brought into engagement with each other. From 70 this point they are drawn by the window 12 for the light exposure, and from there they pass through the feeding mechanism 16 after which they are separated and the film B is passed ready for the developing 75 process.

The window 12, as shown, comprises a rectangular opening in the end 13 of the casing in which is secured a correspondingly shaped piece of ground glass 32. On the 80 outer side of the end casing member is fastened a block 33 which holds the ground glass in place from that side and provides a spacer member for guiding the film and negative at a proper distance from the 85 ground glass. This block likewise has a rectangular opening 34 converging toward its outer face and having a width sufficient to expose a film of the standard width to the light. The block 33 is recessed around the 90 outer portion of the opening 34 for receiving a clear glass 35 with beveled upper and lower edges 36 and 37 and for plates 38 and 39 which engage these edges of the glass for retaining the glass 35 in position.

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The window 12 also has a door 40 hinged at 41 adjacent to the side 19 of the casing and adapted to be swung to closed position, as shown, after the negative and film have been properly placed across the window glass 35, and held in such position by means of a retainer member 42, such as a spring or hook. The upper and lower edges of the door are beveled or rounded at 43 and 44, and the inner side of the door as well as these rounded portions is lined with sheet metal 45, such as "tin" and the lining is secured in position by means of screws 46 in the upper and lower edges of the door. 15 The door has its cooperating rectangular opening 47 and the lining 45 projects somewhat within the opening so as to engage beveled edges 48 of a piece glass 49, preferably red glass. The glass 49 is urged inwardly by 20 means of springs 50 fastened to plates 51 secured at their ends with screws 52 to the door 40. It will be noted that the beveled edges of the door 40 and glasses 35 and 49 will guide the negative and film in their 25 course and that the springs 50 press them into close contact during the exposure.

Passing from the window 12, the feeding mechanism 16 comprises a pair of sprocket wheels 53 mounted on a shaft 54 which has 30 a crank handle 55 for rotating it. Below these sprocket wheels 53 and cooperating therewith are guide wheels 56 grooved to receive the sprocket teeth and having outer cylindrical portions which cooperate with 35 similar portions of the sprocket wheels. As shown in Figures 1 and 2, the negative and film pass between these sprocket and guide wheels, with the sprocket teeth passing through the outer edges of them so that by 40 rotation of the shaft 54 with handle 55, the film and negative are fed positively through the machine.

In order to feed the film and negative at a uniform speed a fly wheel 57 may be provided. On the end of shaft 54 is a large 45 gear 58 which is adapted to drive a small gear 59 secured on the end of a shaft 60 to which the fly wheel is fastened. By this means the film may be fed through the machine more uniformly and a more even exposure made as will readily be seen.

The operation of the machine will be apparent to those skilled in the art. It will readily be seen that during the operation 55 of the equipment the operator may turn the handle 55 for feeding the film and negative through with his right hand, and while watching the window 12, control the illumination by means of handle 18 with his left 60 hand so as to increase the illumination where the negative is overexposed or too dense and diminish it where the negative is weak while the machine is feeding at a constant speed. In this way the illumination may be increased or diminished gradually between the 65

full line maximum position and the dotted line minimum positions of the lamp shown in Figures 1 and 3 of the drawings, instead of by steps as in the case where a plurality of lamps may be used and the illumination varied by employing different numbers of lamps.

The advantages of the sight method for regulating the exposure and of various mechanical construction will readily present themselves to those skilled in the art.

The equipment disclosed in the form shown in the drawings is adapted for use in a dark room, but, obviously an exterior casing might be provided and means for observing the intensity of illumination passing through the negative to the film under such conditions, as well as other minor changes in the exact construction of the equipment. It is not desired to have the invention limited to the specific embodiments shown, it being understood that various changes may be made without departing from the spirit of the invention as indicated by the scope of the following claims.

What is claimed as the invention and is desired to be secured by Letters Patent is:

1. A printing machine comprising a casing having a window in one of its walls, guide members within the casing extending toward and away from said window, an illuminator having a mounting on said guide members permitting movement of the illuminator in the line of the window, a lever connected with said mounting having an operating handle to the exterior of the casing for adjusting the position of the illuminator, a ground glass diffuser mounted within the window, a spacer member beyond said ground glass provided with means for guiding positive and negative films and holding them in contact and provided with means for permitting the inspection of the film during its exposure, and means for feeding the film past the window.

2. An exposure window for printing machines comprising a frame construction having a rectangular opening, a ground glass diffuser mounted in the opening, a spacer member over the diffuser provided with a similar opening recessed around its outer sides, a glass cover mounted in the latter recess with means for retaining it in position, and a frame construction beyond said spacer provided with a rectangular opening similar to the aforesaid openings, said last named frame construction carrying a glass member in its opening forming a rear cover member and provided with means for pressing said glass toward said first glass cover.

3. A printing machine comprising a casing having a window in one of its walls, an illuminator within said casing and having therein a mounting permitting movement toward and away from said window, mean

exterior of the casing but connected with
said mounting for adjusting the position of
the illuminator, a ground glass diffuser
mounted within the window, a spaced mem- 15
ber beyond said ground glass provided with
means for guiding positive and negative
films and holding them in contact and pro-
vided with means for permitting the inspec-
tion of the film during its exposure, and
means for feeding the film past the window. 20

4. An exposure window for printing ma-
chines comprising a frame construction hav-
ing a rectangular opening, a ground glass
diffuser mounted in the opening, a spacer

member over the diffuser provided with a 15
similar opening, and an opposing frame con-
struction beyond said spacer provided with
a rectangular opening similar to the afore-
said openings, said opposing frame construc-
tion carrying a glass member in its opening 20
forming a cover member and provided with
means for pressing said glass member and
thereby the films toward said glass diffuser
and against the spacer.

In testimony whereof I hereunto affix my 25
signature.

FRANK E. OILER.