



PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

A Movie Projector

We, KENNER PRODUCTS COMPANY, a company organised under the Laws of the State of Delaware, United States of America of 912 Sycamore Street, Cincinnati, Ohio, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to movie projectors and, more specifically, to a toy movie projector for children by means of which a child may project moving pictures onto a blank wall or screen.

It is an object of the present invention to provide a movie projector mainly for children that is simple in construction and which is easy to use.

It is a further object of the invention to provide a movie projector having a film cartridge with which it is easy to change films. It is a further object of the invention to provide a movie projector having instructional value for the education of children while maintaining simplicity of operation for ease of comprehension. It is an additional object to provide a movie projector the structural characteristics of which are such that it will withstand the abuse and rough handling to which toys of this type are subjected to in the normal course of play by children.

According to the present invention we provide a movie projector which includes a housing, a door for the housing, a pair of runs of film positioned within the housing, a driving sprocket mounted between said pair of runs for simultaneously driving the runs and guide means mounted on the door such that, upon closing of the door with respect to the housing, the runs are positioned and maintained in operational contact with the sprocket.

The guide means may have inclined faces for camming the film runs into operational contact with the sprocket and the guide means may be constituted by projections on the door

arranged to enter apertures in the housing on closing of the door.

The projector may include a crank rotatably mounted on the outside of the door, there being a prong integral with said crank for rotation on the inside of the door to contact the sprocket and to effect rotation of the sprocket in either clockwise or anti-clockwise direction upon turning of the crank in the appropriate direction.

The movie projector may be formed of a synthetic plastics material by conventional moulding techniques.

The invention will now be described by way of example with reference to the accompanying drawings in which:—

FIGURE 1 is a side perspective view of a toy movie projector,

FIGURE 2 is a partially cut away side perspective view of the projector from the side opposite that shown in Figure 1,

FIGURE 3 is an enlarged partially cut away side elevation of the projector from the side shown in Figure 1,

FIGURE 4 is a top view of the toy movie projector when in the film loading position,

FIGURE 5 is a cross-sectional view taken along the line 5—5 of Figure 3,

FIGURE 6 is a side perspective view of the film cartridge holder shown in cross section in Figure 5 and guide means associated therewith.

FIGURE 7 is a front view of the guide means associated with the drive means of the projector when it is in a partially open position,

FIGURE 8 is a front view of those parts of the projector shown in Figure 7 in which said parts are in a closed or operational position, said Figure 8 being a cross-section along the line 8—8 of Figure 3,

FIGURE 9 is a fragmentary cross-section taken along the line 9—9 of Figure 3, and

FIGURE 10 is a partially cut away front view of the base of the housing of the projector

showing the hinge means that allows the door of the housing to be opened when the housing is resting on a supporting surface.

As shown in the drawings the toy movie projector includes a housing having a body portion 1 to which a door 2 is hingedly attached by means of pins 3. The main body portion 1 and the door 2 are maintained in the closed position by means of a snap-fit engagement at the top of the housing. Said snap-fit engagement is effected by providing an aperture 4 in the body portion 1 which receives a projection 5 integral with the door 2 and a raised portion on the end of said projection 5. The housing can be considered as being divided into a lower chamber 6 and an upper chamber 7 which has a front section 8, a middle section 9 and a rear section 10.

The lower chamber 8 contains three batteries 11 which provide the power for the movie projector light. The central terminal 12 of the foremost battery 11 is connected to one end of a metallic strip 13 the other end of which is in contact with the sides of a light bulb 14 in the front section 8 of the upper chamber 7. To maintain the battery 11 in contact a helical spring 15 is arranged to abut the rearmost battery 11 and to urge it forwardly of the lower chamber 6. A second metallic strip 16 is connected to the spring 15 and this strip 16 terminates just to the rear of the light bulb 14. In this way the electrical circuit comprising the battery 11, the two metallic strips 13 and 16 and the light bulb 14 may be completed by operation of a switch means as hereinafter described to energise the light bulb 14.

The front section 8 of the upper chamber 7 contains the projection system of the movie projector, i.e. the lens system and the light source. The lens system includes a cup 17 which has outwardly flaring sides and which is fixed on the end of a tube 18; the cup 17 has an aperture in its base of approximately the same diameter as the internal diameter of the tube 18. Within the tube 18 there is fixed a pair of lenses 19 such as to enable an image to be projected from the film strip 20 onto a wall, screen or other convenient surface. The tube 18 is rotatably engaged with a cylindrical mounting 21 for focussing the image so projected and the mounting 21 is rigidly attached to the main body 1 by means of a holder 69.

The film strip 20 is held against movement axially of the lens system as it moves past the lens system by means of conical springs 22 which are mounted on pins 23 integral with the main body portion 1. The apex of each conical spring 22 is secured to the main body portion 1 so that the base portion of each spring is spaced from the body portion 1 and exerts a spring effect on the film strip as the strip is moved along the wall 24 of the main body portion 1. The wall 24 is

formed with an aperture therein the size of one frame on the film strip, this aperture being in direct axial alignment with the lens system and with the light source to enable projection of the images on the film. Detents 70 are integral with the wall 24 (said detents 70 being best shown in Figure 3), said detents 70 cooperate with the perforations in the film strip to provide the strip with an intermittent motion as it passes the aperture in the wall 24. During advancing movement of the strip, a force is exerted on one side of the film loop against the action of the adjacent spring 22 and the spring is deflected while the strip remains engaged with the adjacent detent 70. When the strip is deflected a predetermined amount it becomes disengaged from the detent and the spring returns to its at rest position and the film strip advances one frame length so that the detent 70 engages the next perforation in the film strip. In this way each frame on the film strips resides for a finite period in alignment with the aperture in the wall 24 before a subsequent frame is moved onto the viewing surface.

The light source which includes the bulb 14 is energised from the battery 11 by means of the metallic strip 13 and 16 upon operation of a switch 25. The bulb 14 is held by a clip 26 shown in Figures 3 and 9 and the clip 26 is directly attached to one end of the metallic strip 13. The front and rear portions of the bulb 14 rest in holders 27 and 28 integral with the main body portion 1 to ensure centering of the light bulb 14 with respect to the aperture in the wall 24 and the lens 19. Channels 29 and 30 are disposed adjacent and to each side of the holders 27 and 28 to receive feet 31 and 32 integral with the switch 25 which, on the inner and rear end thereof, has a conical spring 33 fixed to it. When the door 2 is closed the switch 25 projects through an aperture 35 in the door 2 so that it can be operated by hand. Upon forward movement of the switch 25, as directed by the feet 31 and 32 slidably engaged in the channels 29 and 30, the conical spring 33 engages the rearward end of the light bulb 14 whilst simultaneously contacting a rivet 34 by means of which the metallic strip 16 is connected to the main body portion 1. The electrical circuit of the light bulb is thus completed to project an image from the film strip 20 through the aperture in the wall 24 and through the lens 19 onto the viewing surface.

The middle section 9 of the upper chamber 7 of the body of the projector houses the drive means for moving the continuous film strip 20 past the aperture in the wall 24 and also the means for automatically positioning the film strip 20 in engagement with the drive means as the door 2 of the main body 1 is closed to prepare the projector for operation. The drive means includes a sprocket wheel

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36 in the form of a cylinder with one end thereof closed and this sprocket is divided into four compartments by internal walls 37. The sprocket wheel 36, at the closed end thereof is rotatably mounted on the main body 1 by means of a rivet 38 and the other end of the wheel has sprocket teeth 39 spaced around the circumference of the wheel with the spacing between adjacent teeth equivalent to the spacings between the perforations of the film strip 20.

A circular plate 40 is rotatably mounted on the inside of the door 2 and this plate 40 has a pair of pins integral therewith and arranged in diametrically opposed positions. The plate 40 is so mounted on the door 2 that, upon closure of the door 2, the pins 41 engage two of the four walls 37 of the sprocket wheel 36. Integral with the plate 40, and on the outside of the door 2, there is a crank 42 which has a handle 43 so that the crank may be rotated manually by means of the handle 43 to rotate the plate 40, the pins 41 and hence the sprocket wheel 36 in either a clockwise or anti-clockwise direction to cause the images projected on the viewing surface to be seen with either a forward or backward motion.

To maintain the strip 20 in operative engagement with the sprocket 36 and the sprocket teeth 39, and to guide the upper and lower runs of the film strip 20 into such engagement when the door is closed, guide means are provided which engage the runs of the strip 20 to move them into the required positions and to keep them there during operation of the projector. As best shown in Figures 3, 4, 7 and 8, there are a pair of apertures 44 in the main body 1 at each side of the sprocket wheel 36. At corresponding positions on the inside of the door 2 there are projections 45 which have tapered ends 46 such as to automatically guide and keep the runs of the film strip 20 in engagement with the sprocket teeth 39 upon closure of the door 2. The projections 45 have walls 47 associated therewith and these walls 47 serve to assist in maintaining engagement of the film strip 20 with the sprocket wheel by preventing fouling of the film strip 20 as it approaches or leaves the drive means.

The rear section 10 of the upper chamber of the projector houses the continuous film cartridge 48 from which the upper and lower runs of the film strip are obtained and to which said runs return. As best shown in Figures 3, 5 and 6, the cartridge includes a rotatable hat-shaped holder 49 on which the film roll is mounted and this hat-shaped holder 49 is engaged with a clamp 50 by means of a rivet 51 for rotation about the axis of the rivet. The clamp 50 has legs 52, feet 53 and stops 54 and the clamp is fixedly engaged with the main body 1 by passing the feet 53 through apertures 55 in the body

with a snap-fit engagement so that the holder 49 does not touch the main body 1 but is free to rotate relative to the clamp 50.

The clamp 50 and the door 2 have associated with them guide means whereby the film strip 20 is guided on and off the continuous film roll on the holder 49.

The rearward end 56 of the clamp 50 is provided with guides 57 for maintaining the film roll in a substantially flat position on the brim 58 of the holder 49 and, to maintain the film in a substantially rolled-up condition, the leg 52 at the rearward end 56 of the clamp 50 co-operates with a projection 60 on the guide 57 as shown in Figure 5. The leg 52 of the clamp 50 at the forward end 61 thereof is so shaped as to assist in maintaining this rolled-up condition of the film strip. In addition the projection 60 serves to maintain the inner circumference of the film roll spaced from the crown 59 of the hat-shaped holder 49 at approximately the position where the upper run of the film strip 20 separates from the continuous film roll. The forward end 61 of the clamp 50 has guides 62 and 63 for guiding the upper run of the film strip 20 out of the rear section 10 of the projector body and into the middle section 9 of the upper chamber 7 or vice versa depending on the direction of movement of the film strip 20. The inside of the door 2 also has guide means for guiding the film strip 20 into and out of the rear section 10 and onto and from the continuous film roll so that fouling of the film strip is prevented as it is wound onto and from the film roll from or to the drive means constituted by the sprocket 36. Of the guide means on the door 2, guides 64, 65 and 66 on the door 2 are shaped to guide the upper run of the film strip 20 and guides 67 and 68 guide the lower run of the film strip 20. Said guides 67 and 68 are also so shaped and positioned as to assist in maintaining the continuous film roll in a flat position on the brim 58 of the holder 49.

To operate the projector the door 2 is opened as shown in Figure 4 and the cartridge comprising the film roll, the holder 49 and the guide means associated therewith are snapped into position with the main body 1 by passing the feet 53 on the clamp 50 through the apertures 55 in the body 1. A loop of film which affords upper and lower runs is then withdrawn from the film so that it loosely engages the sprocket wheel 36. The size of the loop must be sufficient to pass around the conical springs 22 so that it rests against the wall 24 and the perforations in the film strip 20 are engaged by the detents 70. The door 2 is then closed and the projections 45 thereon which have tapered ends 46 automatically guide the upper and lower runs of the film strip 20 into engagement with the sprocket wheel 36 and with the teeth 39 thereon. The projections 45 serve to maintain the film strip

20 in operative engagement with the drive means during operation of the toy projector. The switch 25 is then moved upwardly so that the light of the projector is energised and the picture image is focussed by adjusting the slidable lens system. The crank 42 is then turned in either a clockwise or anti-clockwise direction so that the operator can view the movie with either forward or reverse action of the movie scenes.

During such operation of the projector the film strip is continuously wound off and from the film cartridge and, during such operation, said strip is guided by the guide means as hereinbefore described whereby fouling of the strip as it is wound onto and from the cartridge is prevented.

WHAT WE CLAIM IS:—

1. A movie projector which includes a housing, a door for the housing, a pair of runs of film positioned within the housing, a driving sprocket mounted between said pair of runs for simultaneously driving the runs and guide means mounted on the door such that, upon closing of the door with respect to the housing, the runs are positioned and maintained in operational contact with the sprocket.

2. A movie projector as claimed in Claim 1 in which the guide means have inclined faces for camming the film runs into operational contact with the sprocket.

3. A movie projector as claimed in either preceding claim in which the guide means are constituted by projections on the door arranged to enter apertures in the housing on closing of the door.

4. A movie projector as claimed in any preceding claims which includes a continuous film cartridge having a loop extending from said cartridge to provide the pair of runs.

5. A movie projector as claimed in Claim 4 which includes further guide means for maintaining the film on the cartridge uniformly wound.

6. A movie projector as claimed in any preceding claim which includes a crank rotatably mounted on the outside of the door, there being a prong integral with said crank for rotation on the inside of the door to contact the sprocket and to effect rotation of the sprocket in either clockwise or anti-clockwise direction upon turning of the crank in the appropriate direction.

7. A movie projector as claimed in Claim 4 which includes film holder means, a bracket and means for rotatably mounting said holder means on said bracket, said holder means and bracket serving to mount the continuous film cartridge in the housing.

8. A movie projector as claimed in Claim 7 in which said bracket is attached to said housing with a snap-engagement.

9. A movie projector as claimed in Claim 8 in which said bracket has further guide means associated with it.

10. A movie projector as claimed in Claim 4 which includes additional guide means mounted on the door and the housing for winding the two runs of film onto and from the continuous film cartridge and the sprocket.

11. A toy movie projector substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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