Feb. 26, 1935. L. J. SCHINDLER 1,992,776

TOY PROJECTOR

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Fig. 1.

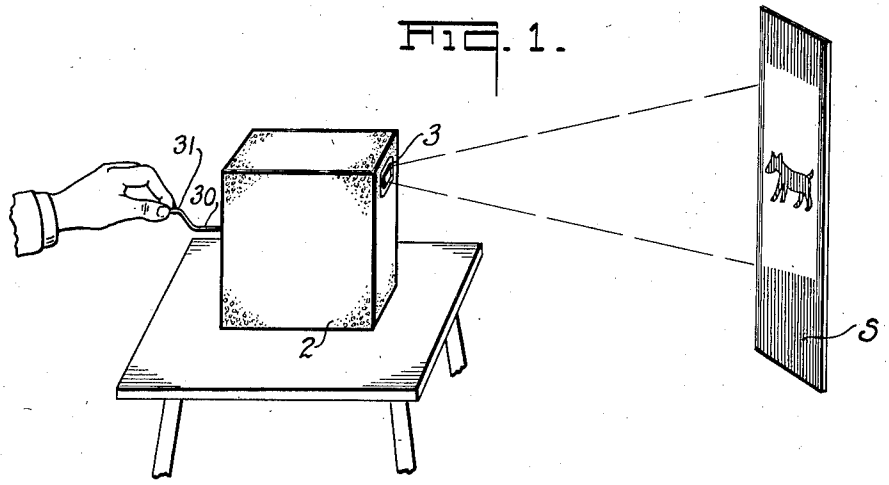
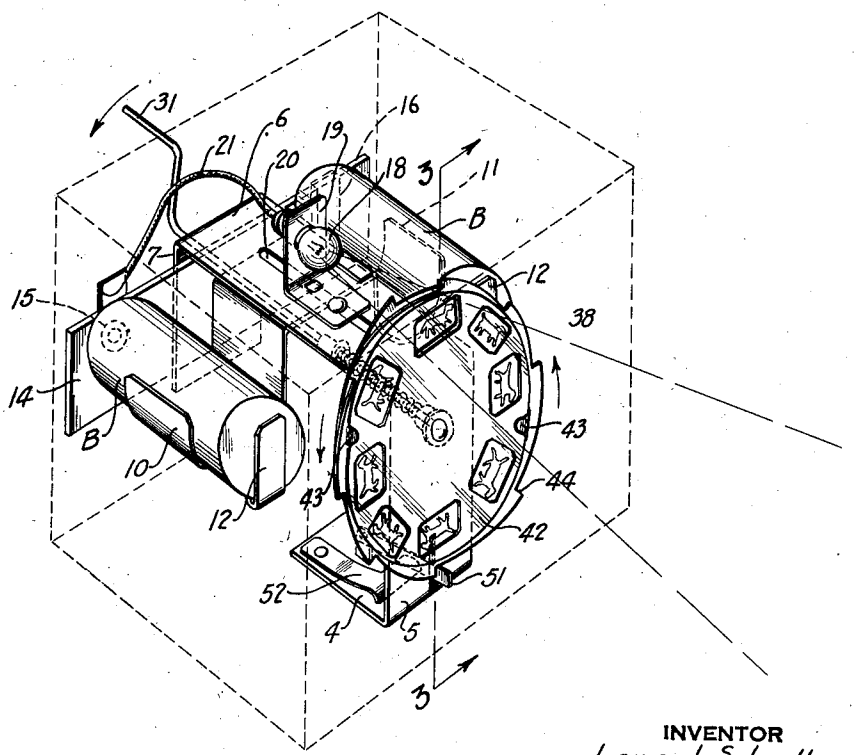


Fig. 2.



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Fig. 3.

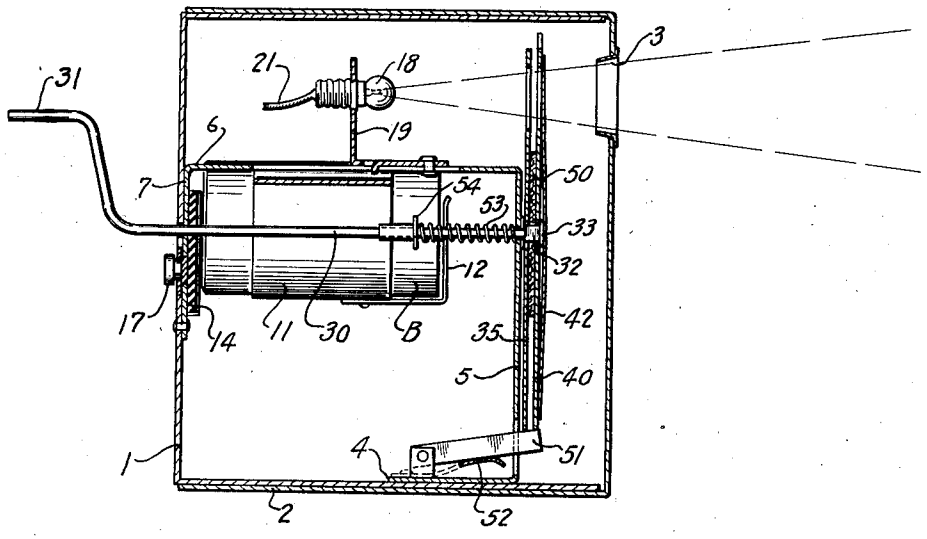
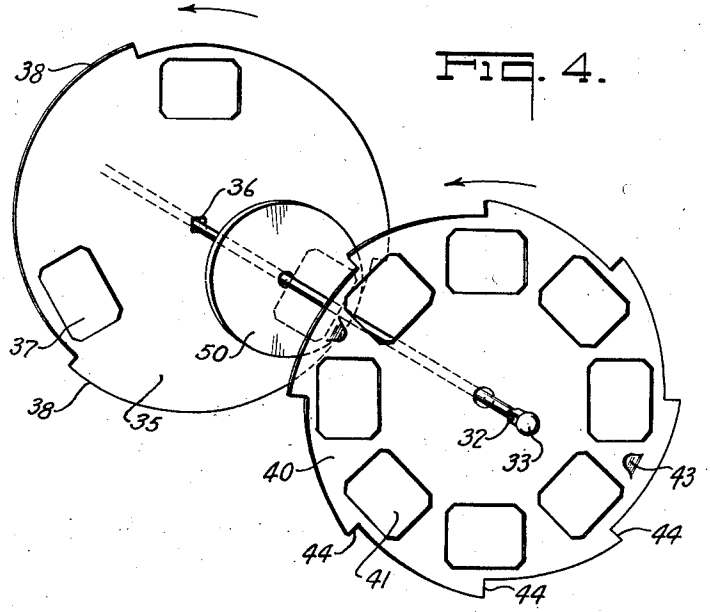


Fig. 4.



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UNITED STATES PATENT OFFICE

1,992,776

TOY PROJECTOR

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Application July 23, 1934, Serial No. 736,476

7 Claims. (Cl. 88—27)

This invention relates to toy projectors and is more particularly directed to the view changing mechanism of such apparatus.

The primary object of the invention is the provision of means to project a series of related pictures on a screen in rapid succession.

Another object of the invention is to provide a device of this character which is extremely simple in operation, inexpensive to manufacture and which does not readily get out of order when subjected to hard use.

Other objects and advantages of the invention will become apparent as the description proceeds, reference being had to the accompanying drawings, in which—

Figure 1 is a composite somewhat diagrammatic view of the device embodying the present invention in use; Fig. 2 is a phantom perspective view of the device; Fig. 3 is a section on line 3—3 of Fig. 2, and Fig. 4 is an assembly perspective view of the film carrying and shutter mechanism.

Referring to the drawings, the projector, in its present embodiment, includes a suitable telescoping box comprising an inner member 1 and an outer member 2, the latter having an opening 3 in the front wall.

Mounted within the inner box member 1 is a frame member, which may be made any desired shape, but which is preferably a strip of sheet metal bent to form a lower base 4, which is fastened to the bottom of the inner box member, a front upright member 5, a rearwardly extending horizontal part 6, and a downwardly turned rear support 7, which is fixed to the rear wall of the inner box member.

Battery cradles 10 and 11 are fixed to the frame member as by soldering to the horizontal part 6. Each of these cradles carries an upwardly extending clamp member 12 at the front, which may also serve as a contact for one of the terminals of dry batteries B.

A strip of insulating material 14 is fixed transversely of the rear support 7 of the frame member and carries suitable battery contacts 15 and 16 and a switch 17.

A lamp 18 is carried by an angle member 19, which has a sliding connection in a slot 20 in the frame member for a purpose which will presently become apparent. Suitable electrical connections for the lamp are provided and comprise the frame and battery cradle assembly, and a flexible connection 21. Inasmuch as the electric circuit is conventional, no detailed description thereof will be made.

Referring now to Figs. 3 and 4, the view changing mechanism with which the present invention is particularly concerned includes an operating shaft 30 journaled in the frame member and extending through the rear of the box member 1 where it is bent to form a crank 31. The end of the shaft 30 opposite the crank is formed with an angular, preferably square, boss 32 terminating in an enlarged head 33.

A shutter disc 35 and a film carrying disc 40 are mounted on the shaft. The central, shaft receiving opening 36 of the shutter disc is square and is, therefore, adapted to fit over the square boss 32 of the shaft so as to be positively driven thereby. The central opening of the film carrying disc is round, however, and of a diameter equal to or greater than the diagonal dimension of the square end of the shaft, so that the film carrying disc is free to turn independently of the shaft.

Spaced shutter openings 37 are formed in the shutter disc. Immediately ahead of each opening, in the direction of rotation, are cam surfaces 38. The purpose of these will presently become apparent.

The film carrying disc 40 has a plurality of equidistantly spaced circularly arranged view openings 41 formed therein. These openings are adapted to register with separate views on a film disc 42 which is detachably held in place by engagement under retaining lugs 43 struck from the surface of the film carrying disc. The periphery of the disc 40 is formed as a series of catch surfaces 44, each terminating centrally of a respective view opening.

A resilient clutch disc 50 is carried by the operating shaft 30 between the shutter disc and film carrying disc.

A suitable latch member 51 is mounted in the bottom of inner box member and is urged upwardly by a spring 52 so as to lie normally in the path of rotation of the catch surfaces 44.

The shutter and film carrying discs are urged toward each other by any suitable means such as a spring 53 carried on the operating shaft 30 ahead of a collar member 54. The rearward movement of the shutter disc being limited by the frame member, it will be seen that the spring 53 tends to pull the film carrying disc into engagement with the clutch disc 50 and the latter against the shutter disc.

In operation, assuming the lamp 18 is lighted by current from batteries held in the battery cradles 10 and 11, a film is placed on the film carrying disc so that a single view registers with each opening. The projector is then focused by moving lamp 18 back or forward in slot 20 until the image produced on the screen is the proper

size. Turning the crank 31 obviously causes rotation of the operating shaft and, by reason of the square end of this latter, of the shutter disc 35. The movement of the shutter disc drives the film carrying disc 40 through the medium of the clutch 50 until one of the catch surfaces 44 comes against the latch 51. The film carrying disc then stops with one of the views in position to be shown on a screen S by light projecting through the opening 3 in the outer box member 2. At this point the light beam is cut off by the shutter disc, but its continued rotation brings one of the openings 37 into registry so that the view is projected onto the screen. As the shutter disc continues to turn, the light beam is again cut off. At this time, one of the cam surfaces 38 of the shutter disc presses the latch 51 downward out of engagement with the particular catch surface 44 on the film carrying disc. The two discs then move around together by reason of the clutch between them, until the next successive catch surface 44 stops the film carrying disc. The above action is then repeated. Thus, the successive pictures are moved into projecting or showing position, then permitted to momentarily dwell while being projected, then blanked out and moved away while the next moves up. It will be appreciated, of course, that the above operation is rapid, so that the image projected on the screen is substantially continuous due to the persistence of vision of the observers.

Obviously, various modifications and changes may be made in the form and disposition of the parts without departing from the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent, is:

1. In a projector, a light source, a shutter disc, a film carrying disc having a series of view openings, a film having progressive views corresponding in number to the view openings in said film carrying disc, means detachably holding said film on said disc, an operating shaft driving said shutter disc, catch surfaces formed on said film carrying disc, latch means adapted to engage said catch surfaces, cam surfaces carried by said shutter disc for releasing said latch means, and clutch means interposed between said shutter disc and said film carrying disc, whereby successive views of said film are brought into registry with said light source for projection.

2. In a projector, a shutter disc, a film carrying disc having a series of film openings, a film detachably carried by said film carrying disc having progressive views corresponding to the openings in said disc, clutch means interposed between said shutter disc and said film carrying disc, means to drive said shutter disc, means to limit the movement of said film carrying disc to progressive steps, and means carried by said shutter disc to release said limiting means momentarily, whereby said film carrying disc is driven by said shutter disc in successive steps to bring successive film openings into projecting position.

3. In a projector, a shutter disc, a film carrying disc having a series of film openings, a film detachably carried by said film carrying disc having progressive views corresponding to the openings in said disc, means to drive said shutter disc, clutch means interposed between said shutter disc and said film carrying disc, whereby said film carrying disc is adapted to be driven from said shutter disc, latch means to limit the movement of said film carrying disc to successive steps and means to momentarily release said latch means, whereby said film carrying disc is moved to bring successive film openings into projecting position.

4. In a projector, a shutter disc, a film carrying disc, frictional clutch means to drive said film carrying disc from said shutter disc, latch means to limit the movement of said film carrying disc to successive steps, and means carried by said shutter disc to release said latch means.

5. In a projector, a light source, a shutter disc, a film carrying disc having a series of view openings, an operating shaft driving said shutter disc, catch surfaces formed on said film carrying disc, latch means adapted to engage said catch surfaces, cam surfaces carried by said shutter disc for releasing said latch means, and clutch means interposed between said shutter disc and said film carrying disc, whereby successive view openings of said film carrying disc are brought into registration with said light source.

6. In a projector, a shutter disc, a film carrying disc having a series of view openings, clutch means interposed between said shutter disc and said film carrying disc, means to drive said shutter disc, means to limit the movement of said film carrying disc to progressive steps, and means carried by said shutter disc to release said limiting means momentarily, whereby said film carrying disc is driven by said shutter disc in successive steps to bring successive view openings into projecting position.

7. In a projector, a shutter disc, a film carrying disc having series of view openings, means to drive said shutter disc, clutch means interposed by the said shutter disc and said film carrying disc, whereby said film carrying disc is adapted to be driven from said shutter disc, latch means to limit the movement of said film carrying disc to successive steps, and means to momentarily release said latch means, whereby said film carrying disc is moved to bring successive view openings into projecting position.

LOUIS J. SCHINDLER.