

## UNITED STATES PATENT OFFICE

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## TOY CINEMATOGRAPH AND SOUND APPARATUS

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3 Claims. (Cl. 88—16.2)

At present there are on the market various kinds of toy picture projectors for children, but none on which a picture projector is combined with talking or music which ought to accompany the pictures. In order to reach this aim an apparatus has been constructed which is described with the aid of drawings as follows:—

Figure 1 is a side elevation with the wall of the casing removed.

Figure 2 is a perspective view showing particularly the arrangement by which the cinematograph objective acquires a vertical movement of oscillation, and a portion of a roll of paper having pictures and apertures for producing the sounds.

Figure 3 is a section on the line 3—3 of Fig. 1 looking in the direction of the arrows.

Figure 4 is a detailed view of a section of the paper with figures to which the apparatus communicates the cinematograph movements, and apertures for producing the sounds which accompany the movements of these figures.

Fig. 5 is a perspective view of the bellows and the air chamber.

Figs. 6, 7 and 8 are detail views of connections in the mechanism for oscillating the objective.

The device includes a casing preferably of thin sheet metal in which the bellows and most of the moving parts are encased.

As can be seen by Figures 1 and 3, the handle 1 of a crank 2 forms the means for setting in motion all the working parts of the apparatus. Its circular movement produces the different secondary movements transforming them in order to obtain each object in the way hereinafter explained.

At the inner extremity of its shaft, the crank 2 (Figure 3) is joined to a connecting-rod 3 which is connected at its upper extremity 5 to the balance lever 4 pivoted at 5 to a plate 37, rigidly attached to the casing. A link 7 is pivoted to the free end of the lever 4. By these means the circular movement of the handle 1 is transformed into a rectilinear vertical oscillating movement of the link 7.

The link 7 broadens into a plate 7a at its lower portion. Said plate has ears 7b, 7c at the two corners furthest from the main part of the lever, a perforated projection 7e in its own plane on the opposite edge and a perforated projection 7d perpendicular thereto at the remaining lower corner. A plate 8 is pivotally attached to the link 7 by a bolt through the perforated projection 7e and a perforated projection 8e on the plate 7a. Plate 8 has ears 8b and 8c extending from its inner surface and extensions 8d and 8f as shown. Plate 8 has also a slot 12 near its free edge extending vertically in the normal position of the device.

The assembled position of link 7 and plate 8

is shown in Fig. 8. The projection 8e extends across the inner surface of plate 7a and is pivoted thereto. The extensions 8d and 8f are on the outer side of plate 7a and compression springs 38 and 39 are held between the corresponding ears, described above, of plates 7a and 8. The springs modify the movements of plate 8 as will hereinafter appear. The objective 19 is mounted on a slide bar 18 on the front wall of the casing to slide vertically in guides 20. This sliding movement is effected by the slide bar 18 having a slot in its lower portion whereby it is guided to move vertically by a button 21 on the wall of the casing. A lever 14 is pivoted on the casing at 15 and connected to the slide bar 18. At the extremity of the other arm of the lever it is bent at right angles at 13 and passes through a slot in the casing and the previously mentioned slot 12 of the plate 8. Thus on the revolution of the crank 2 the bent end of lever 14 is undisturbed by part of the motion of the plate 8 but upon the end wall of the slot reaching said bent end one of the springs is placed under slight compression and then the lever 14 is moved abruptly and with it the objective 19 which is thus given an oscillating movement from one row of figures to another as hereinafter referred to.

Delivery and receiving reels 32, 32' as shown in Fig. 3 are removably supported on either side of the front face of the casing. The spindle of reel 32 has on its lower end a toothed wheel 32". On crank 2 there is a screw thread 32''' adapted to be engaged by said toothed wheel. A plate 40 is secured on the casing and the spindle 32 passes through a slot therein, a second plate 41 is pivoted to said first named plate and has a cam slot through which the spindle also passes. The toothed wheel is thrown into and out of engagement by manually moving the pivoted plate 41. Thus when the toothed wheel is in engagement the turning of the crank 2 not only oscillates the objective but also draws the film wound on the reels across the face of the casing behind the objective. There is, of course, an aperture in the front face of the casing registering with the objective. Within the casing adjustably supported from an inwardly extending portion 37, thereof and to the rear and above said aperture is a light preferably an electric lamp as shown.

The appropriate sounds are produced by the following means.

An air chamber 24 (Figs. 1 and 5) is formed within the casing of any suitable material as wood with an opening 42 to the front of the casing over which opening a harmonic plate 27 is placed and secured to the casing. Said harmonic plate 27 has a series of grooves 28 and a series of flexible tongues 28' fitting said grooves as clearly shown in Fig. 3. Apertures 28" in the casing register with said grooves.

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A portion 25 of one side of the air chamber is flexibly connected to the walls of the chamber and thus forms an air storage addition to the chamber 24. A coil spring 26 presses wall 25 to collapse it and thus tends to compress the air in the chamber. A double bellows 23 at the base of the air chamber and communicating with the latter and with the outside air through one way valves has a bottom 23', and a top 23" consisting of a block of triangular cross-section upon the ridge of which the bottom 23' is adapted to oscillate and thus maintain pressure in the air chamber 24. This oscillation is produced by the link 7 through a triangular plate 34 (see Fig. 3) secured to the bottom 23' of the bellows and pivoted to the link 7 at 7d.

The film (see Fig. 4) has a double row of figures or pictures to be exhibited and a perforated area, the perforations being in rows corresponding to the openings 28" in the casing and the figures or pictures, when the reel of film in the machine is mounted, register in succession with the opening to the objective. The oscillations of the objective move it the distance between the center line of one row of pictures to the center line of the other row of pictures.

In the operation of the device the reels being mounted, the lamp lit and the toothed wheel 32" placed in gear with the screw thread 32"', the crank 2 is revolved by the handle 1. The film is fed across the front face of the casing but behind the objective, the objective is oscillated to throw the pictures of each row alternately on the screen. The perforations of the film expose the proper openings in the casing and the air from the air chamber vibrates the corresponding tongue of the reel.

The apparatus can be made of any kind of suitable material and of various sizes, and may be modified in part, and its shape and the disposition and use of its elements may be varied so long as these modifications do not alter the principles described or the result of the animation of the figures by the movement of the objective, and the joint action of the production of sounds by the use of the harmonic plate, all contained in the same apparatus and operated by a unitary motion.

Notwithstanding that which has been described, the reel which produces a sound film is the fundamental part, and I am going to describe its character, which forms the important part of the sound picture apparatus I am describing. Figure 4 is a representation of this reel.

It comprises a film made of any suitable kind of material, which is synchronized for the projection of animated pictures with musical audition obtained by means of a harmonic plate or a similar arrangement.

The chief feature of the reel or film referred to, consists in the disposition of the elements necessary for producing at the same time the synchronization of the animated projection of figures with musical audition.

To obtain this result, the figures are arranged along one of the longitudinal sides of the film or according to the disposition of the objective used for projection, and the rest of the film is provided with a series of rectangular or other shaped perforations so that, when these per-

forations pass before the apertures of the outlet of the air apertures of an harmonic plate, the musical notes engraved on the film by means of the perforations, are unfolded.

The perforations of the film or reel, (which we could call music, seeing that by means of these, the audition of sounds from the harmonic plate is produced, due to the air passing through the small tongues in conjunction with these perforations) are formed in the film by means of mechanical or manual elements, seeing that the important point of these perforated reels consists virtually in the object and the application forming an integral part of the figures and designs.

The reel or film may be made of paper, celluloid, cloth or any kind of suitable material. With regard to the means used to obtain the musical audition already mentioned, the harmonic plate can be used as mentioned, or any other means with which the same results can be obtained.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed I declare that what I claim is:—

1. A toy cinematograph and sound producing apparatus comprising a casing, a source of illumination therein, an objective mounted on the front face of said casing for vertical reciprocal motion, an aperture in said front face receiving light from said source and registering with said objective, reels adapted to guide a film having a plurality of rows of pictures across the front face of said casing behind the objective, an air chamber in said casing, a bellows in said casing for forcing air into said air chamber, an aperture in the front face of said air chamber and a harmonic plate secured over said aperture, apertures in the front face of the casing registering with the tongues of the harmonic plate, a crank and means operatively connecting said crank with the objective, the winding reels and with the bellows whereby said objective, said winding reels and said bellows may be operated simultaneously by said crank.

2. The device as claimed in claim 1 in which the means for reciprocating the objective comprises a link, a plate pivoted to said link, two lugs on said link and corresponding lugs on said plate, coiled springs between each link lug and the corresponding plate lug, a vertical slot in said plate, a slidable plate connected to the objective and having a projection movable in said slot whereby on vertical movement of said first named plate when said vertical projection reaches an end of said slot one of said springs is compressed and imparts an abrupt movement to the objective.

3. In a toy cinematograph, a film having a double row of pictures and rows of sound perforations, an objective, an air chamber, and a harmonic plate in the path of air escaping from said chamber, a bellows for compressing air in said air chamber and a single manually operated means feeding the film behind the objective and in front of the harmonic plate, reciprocating the objective to register alternately with the rows of pictures and actuating the bellows.

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March 30, 1937.

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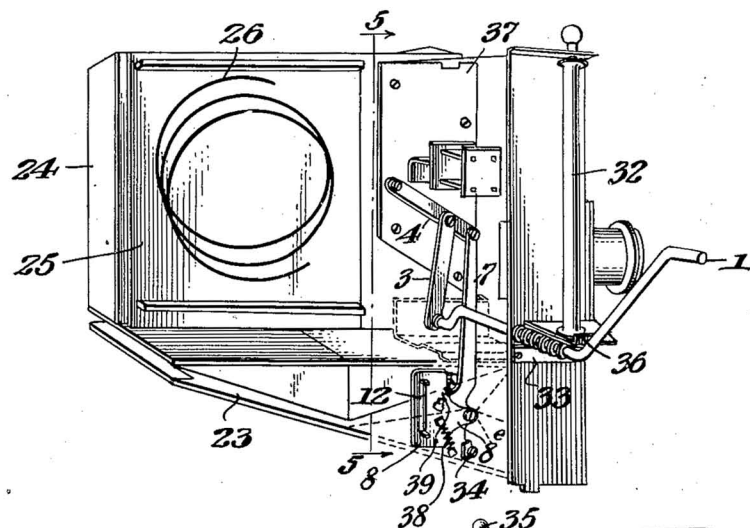
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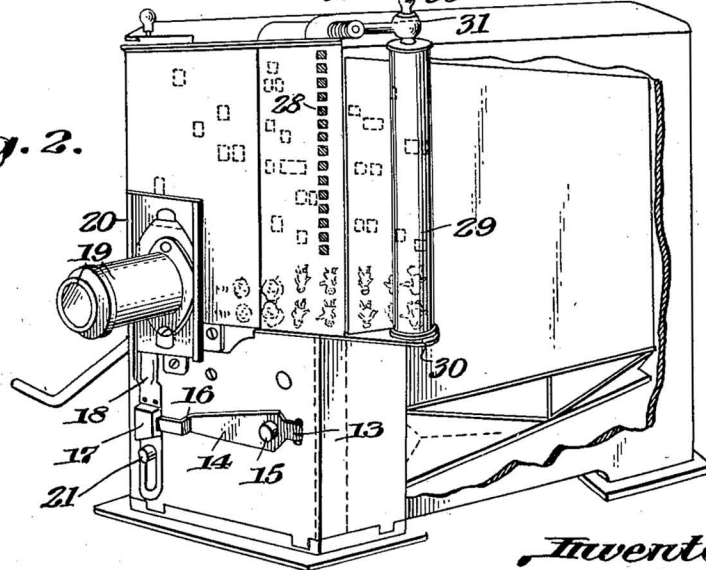
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*Fig. 1.*



*Fig. 2.*



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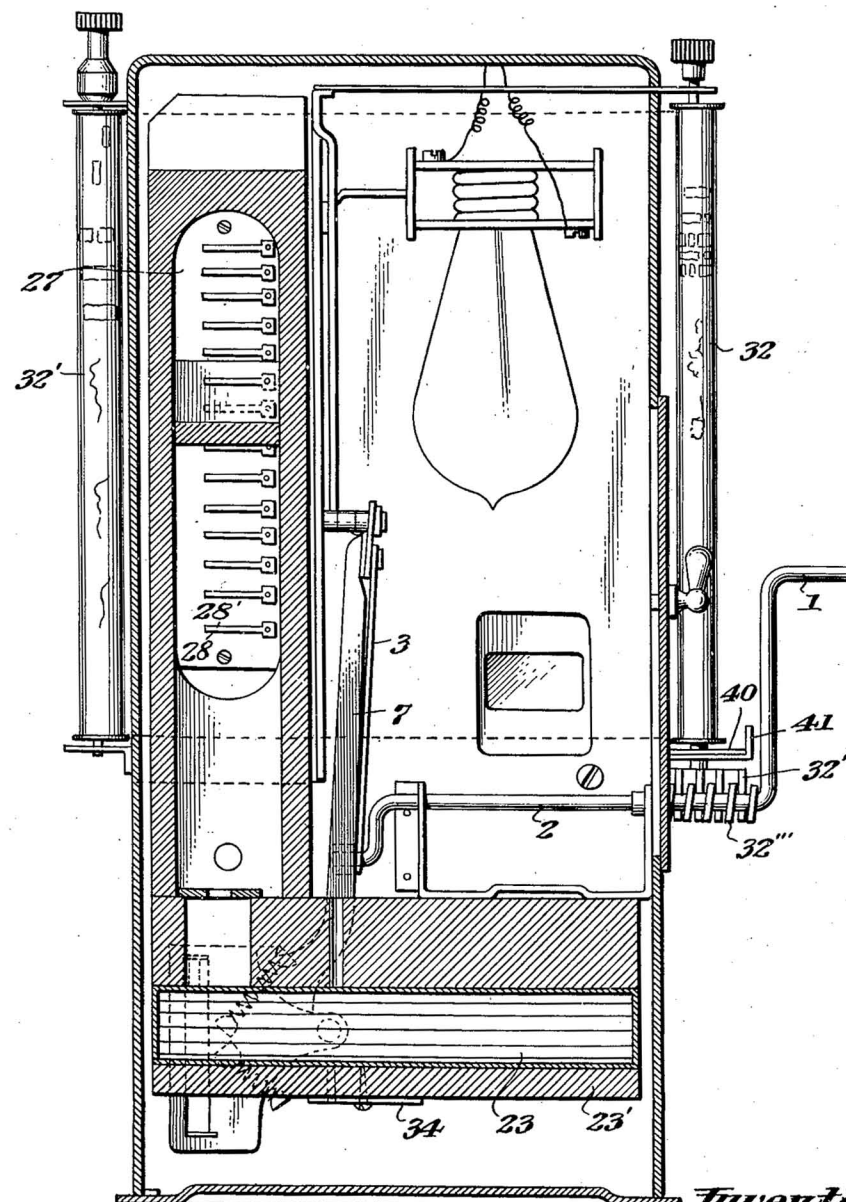
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*Fig. 3.*

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Fig. 4.

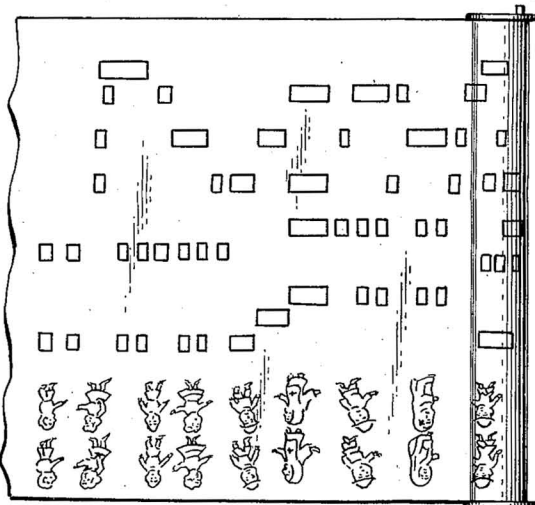
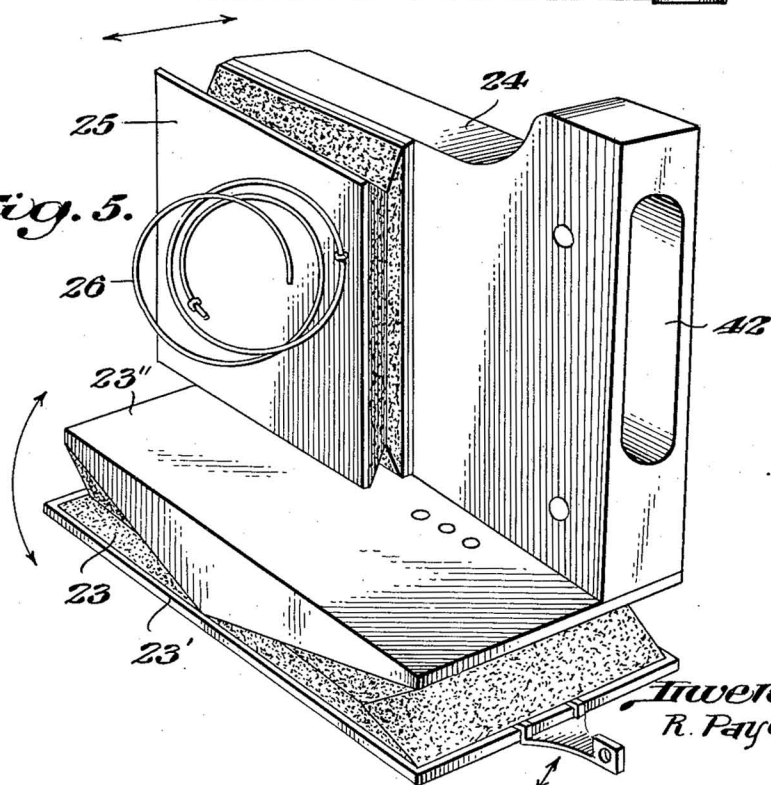


Fig. 5.



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Fig. 6.

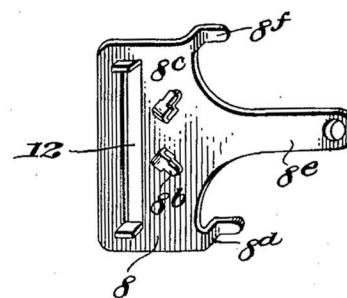


Fig. 7.

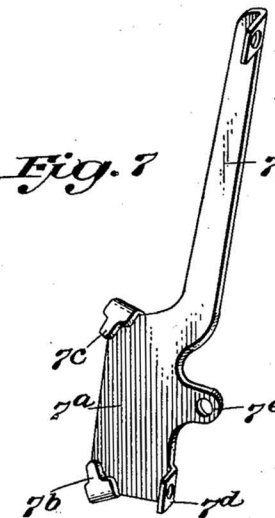
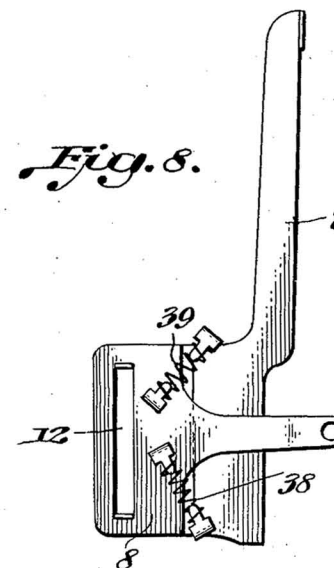


Fig. 8.



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