A. C. RUTZEN.

MEANS OF RECORDING AND REPRODUCING SOUND AND MOTION IN SYNCHRONISM.

APPLICATION FILED JULY 6, 1914.

1,275,189.

Patented Aug. 6, 1918.

2 SHEETS—SHEET 1.

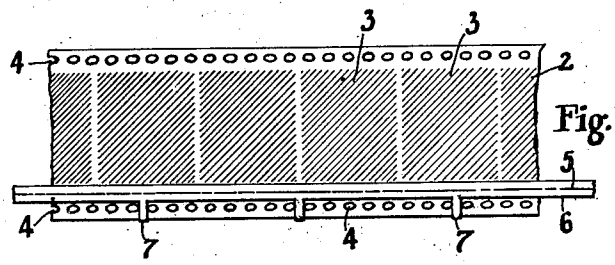


Fig. 1

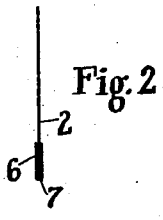
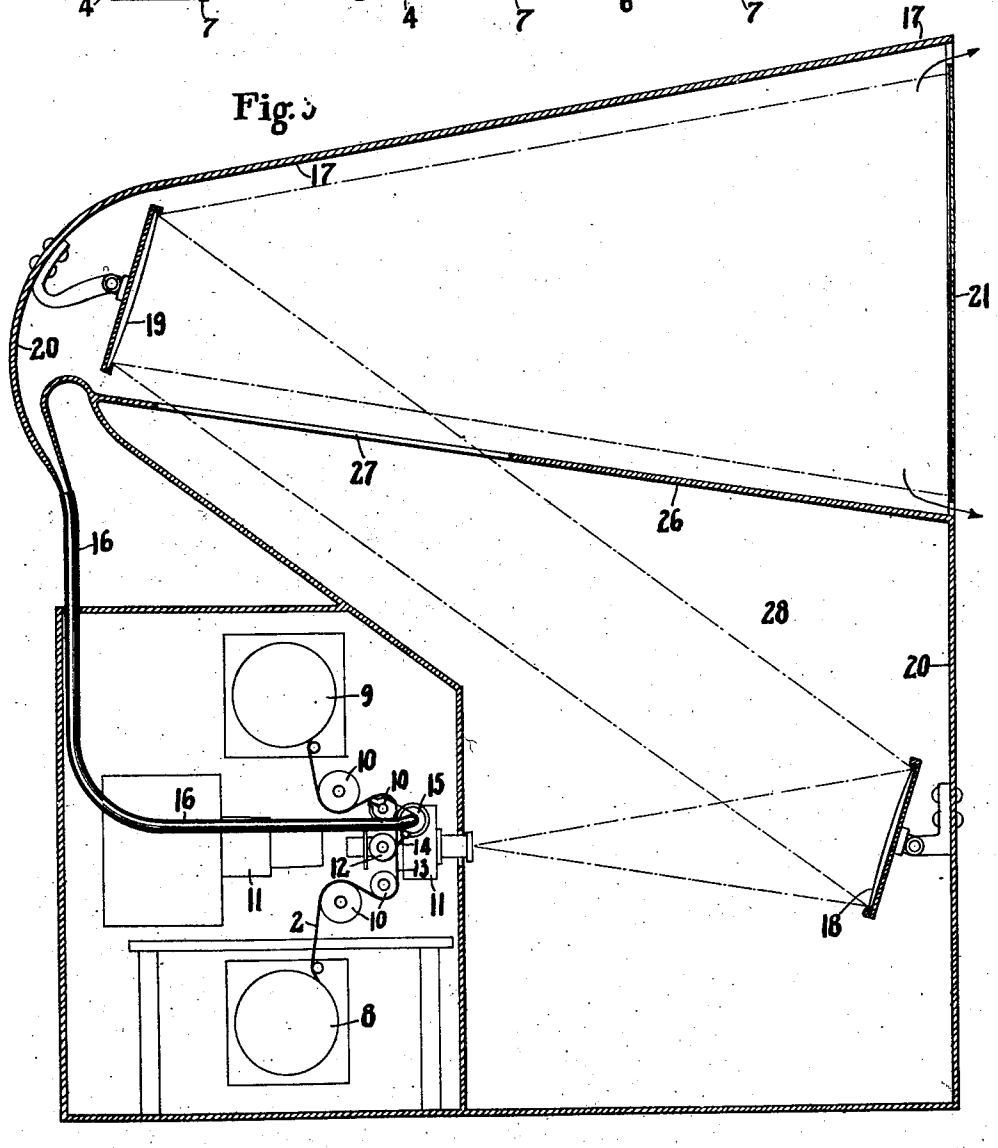


Fig. 2

Fig. 3



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2 SHEETS—SHEET 2.

Fig. 4

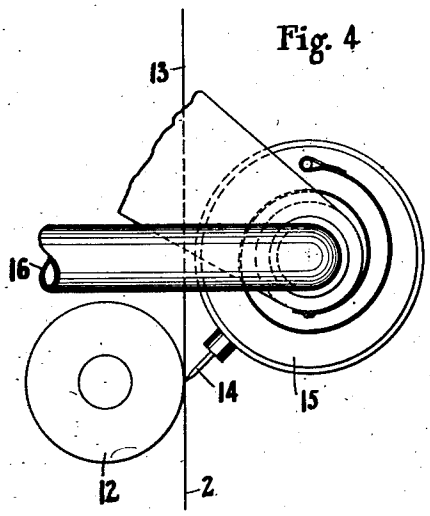


Fig. 5

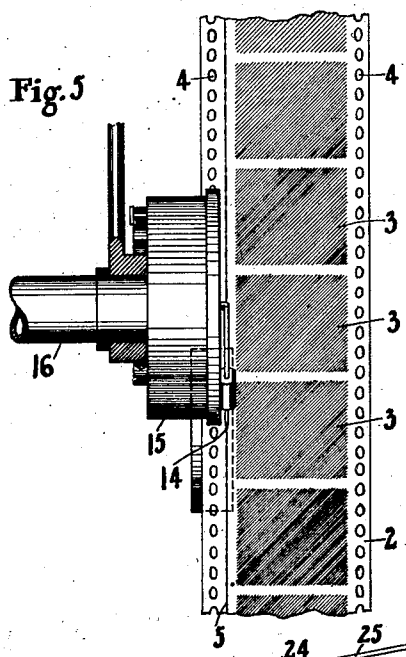
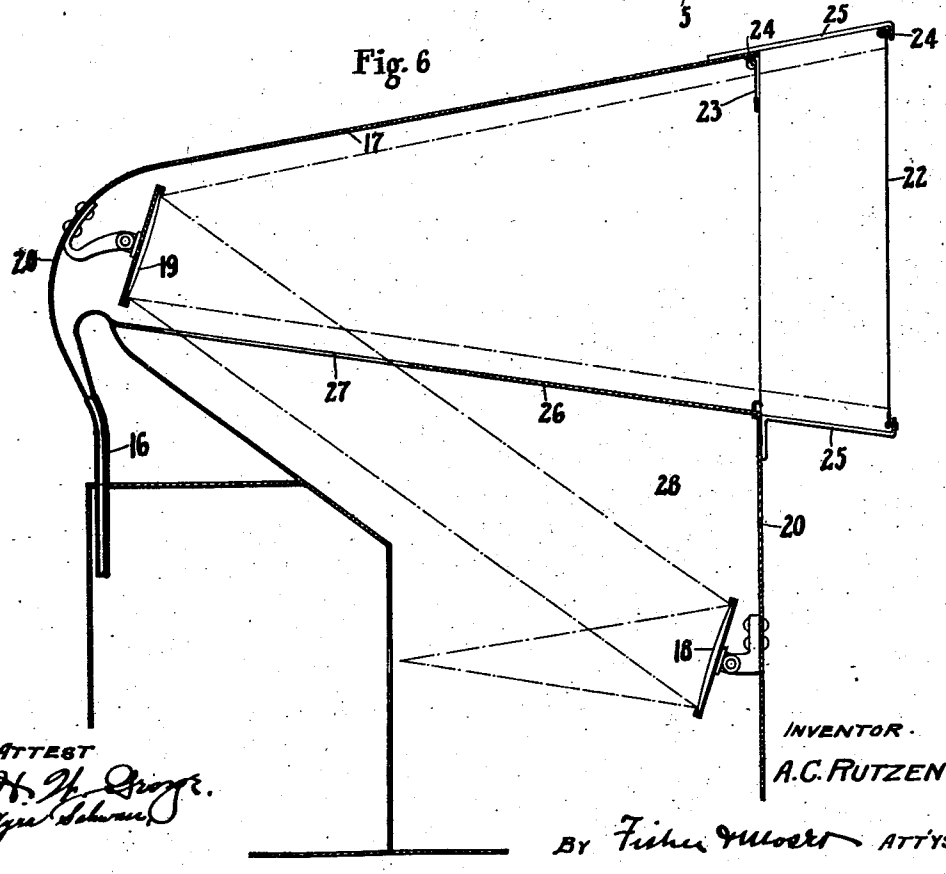


Fig. 6



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UNITED STATES PATENT OFFICE.

AUGUST C. RUTZEN, OF CLEVELAND, OHIO.

MEANS OF RECORDING AND REPRODUCING SOUND AND MOTION IN SYNCHRONISM.

1,275,189. Specification of Letters Patent. Patented Aug. 6, 1918.

Application filed July 6, 1914. Serial No. 849,235.

To all whom it may concern:

Be it known that AUGUST C. RUTZEN, citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, has invented certain new and useful Improvements in Means of Recording and Reproducing Sound and Motion in Synchronism, of which the following is a specification.

My invention relates to a means of recording and reproducing sound and motion in synchronism, substantially as herein shown and described and more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a face view of a kinetoscopic film which is provided with a separate sound-producing record in the form of a continuous strip, and Fig. 2 is a cross section of said film and strip. Fig. 3 is a sectional view of a combined sound producing and picture projecting apparatus which is adapted to utilize the combined film and record strip shown in the several figures. Fig. 4 is an enlarged side view of a sound recording or reproducing device, and showing an edge view of a kinetoscopic film and sound record in operating relation therewith, and Fig. 5 is front view of Fig. 4. Fig. 6 is a sectional view of a modified form of the apparatus shown in Fig. 3.

The invention involves the production of a kinetoscopic or moving-picture film and a sound record in synchronism, so that an object in motion may be pictured and the same event, if sound producing, be audibly reproduced at the same time. Thus, referring to Fig. 1, I show a transparent or translucent strip of photographic film (2), having thereon successive photographs of an object in motion, the square (3) representing such photographs diagrammatically. As the art of making such photographs of an object in motion at rapidly recurring intervals of time is well known, a more detailed description is unnecessary and not herein described, except to say that primarily it is by an action of sensitive substances under the influence of light. Such films (2) are also usually provided with perforated edges (4) whereby the film is fed through the moving-picture machine at a predetermined or required speed. The photographs are arranged in a continuous straight line sequence unlimited in number save by the length of film, but sufficient in number to represent the movements of the object throughout the extended period of time in taking a series of pictures. In addition to the foregoing, I also impress, cut or otherwise produce in or upon the film, a succession of waves, undulations or an irregular groove or channel corresponding with the sound waves made by the object or objects in motion as pictured on the film. The taking of the successive photographs and the recording of the successive sound waves is accomplished simultaneously by the motion-picture machine and the sound-recording machine, and the double record is produced on the single film in parallel. The sound wave record is represented by the dotted line (5) in Figs. 1 and 5, and the preferable location thereof is at one side of the succession of photographs (3) at an intermediate point between said photographs and the row of perforations (4) at that side. Said sound wave record may be made in the material or body of the film itself as shown in Fig. 5 or it may be formed in a separate strip (6) secured to the film (2) by a suitable adhesive or mechanical fastening, or by both. As shown in Fig. 1 the sound wave record strip (6) is provided with loops or extensions (7) in binding or fastening engagement with one border of the film. One advantage of a separate strip (5) is that a different material can be used from that of the film, such as a tougher and better wearing material than the film. However, strip (6) should be of substantially the same flexibility as the film to permit of its use in a moving picture machine using reels (8 and 9) and a series of rollers (10) which bring the film opposite the usual lenses in a machine (11) of this kind. In making a double record, a rubber or other suitable roller (12) is arranged in engagement with the straight stretch (13) of the film at a point intermediate the carrying roller (10) and opposite the sound recording or reproducing member (14) of the sound box (15) of the machine. The sound box (15) as shown represents a well known type of recording or reproducing instrument having a diaphragm and operating connections for the recording or reproducing member or needle (14), and a tube or pipe (16) extends from the sound box to the smaller end of a flaring chamber or box (17) adapted to distribute and amplify the sound in the same manner as a horn or the like, and which chamber or sound amplifying box (17) is

provided at its front and larger end with a ground glass or other suitable screen upon which the moving-picture is projected by a set of mirrors (18 and 19) which are pivotally mounted within the walls (20) of the apparatus. The mirror (18) is arranged opposite the front end of the motion picture machine (11) and the mirror (19) is arranged within the small end of the chamber or box (17), and both mirrors are inclined relatively as shown to project the picture upon the screen (21). The screen in Fig. 3, if of glass, is mounted apart from the walls of the chamber or box (17) so that the sound waves may escape through the border space in full volume and measure, or if the screen is of a suitable woven fabric it may be provided with suitable openings for the sound to pass therethrough. In Fig. 6 I show a pair of screens (22 and 23) which are made of suitable paper or woven fabric and adapted to be wound on rollers (24) in the same manner as a window shade or curtain, and either one of the two screens may be used depending upon whether a small or large picture is to be shown. The screen (22) is supported by brackets or arms (25) which project forward from the front wall (20) of the apparatus and an open space is thereby provided between said screen and said wall for a free discharge of sound. By raising screen (22) and lowering screen (23) by means of the rollers 24 respectively the projected picture is made smaller and the sound can be subdued. The bottom wall (26) of the chamber (17) is provided with an opening (27) to permit the picture to be projected from one mirror to the other but the sound is not permitted to escape by way of opening (27) as the chamber (28) containing the mirror (18) is inclosed by soundproof walls at all sides. The complete apparatus may be placed in any room, or upon any stage, facing an audience, and it may be built relatively large or small for public or home use. The mirrors (18 and 19) are shown as of the same size but they may be of relatively different sizes, and I do not wish to limit myself in this particular or to the particular form of sound recording and reproducing device shown, as the invention is susceptible of modification and as other types and styles of devices may be used for the same purpose without departing from the spirit and scope of the invention.

What I claim is:

1. An apparatus for producing motion-pictures and sound simultaneously, comprising a motion picture machine and a sound reproducing device, in combination with a sound-amplifying chamber relatively above said machine and flared outwardly and having a screen at its outer end for the pictures projected by said machine, a tube to convey the sound to said chamber from said sound reproducing device, and a set of mirrors on different planes arranged to reflect the pictures onto said screen, one of said mirrors being in the rear end of said chamber.

2. In an apparatus for producing motion-pictures and sound in synchronism, the combination of a motion-picture machine with a sound-reproducing device, a sound-amplifying chamber for and above said device having a screen at its outer end and mirrors to reflect the motion-pictures through said chamber upon said screen, one of said mirrors being directly in front of said machine and the other in said chamber, and the chamber having an opening in its bottom relatively between said mirrors.

3. In an apparatus for producing motion-pictures and sound concurrently, the combination of a motion-picture machine with a sound-reproducing device, a flaring sound-amplifying chamber for said device having a screen for the motion pictures at the front thereof and openings about the edge of said screen for the passage of sound, a mirror at the rear end of said chamber, and means to project a picture upon said mirror.

4. In an apparatus for producing motion-pictures and sound, a motion-picture machine and a sound-reproducing device, in combination with a motion-picture film having a sound-wave record on one edge thereof and a flaring sound-amplifying chamber for said device having a mirror at its rear and a screen at its front for the motion-pictures and openings about the edge thereof for the passage of sound, and a tube from said sound-reproducing device to the inner and smaller end of said chamber.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUST C. RUTZEN.

Witnesses:
H. T. FISHER,
F. J. GREER.