July 18, 1933. A. SHAPIRO 1,918,569

CINEMATOGRAPH FOR SOUND FILMS

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Fig. 1.

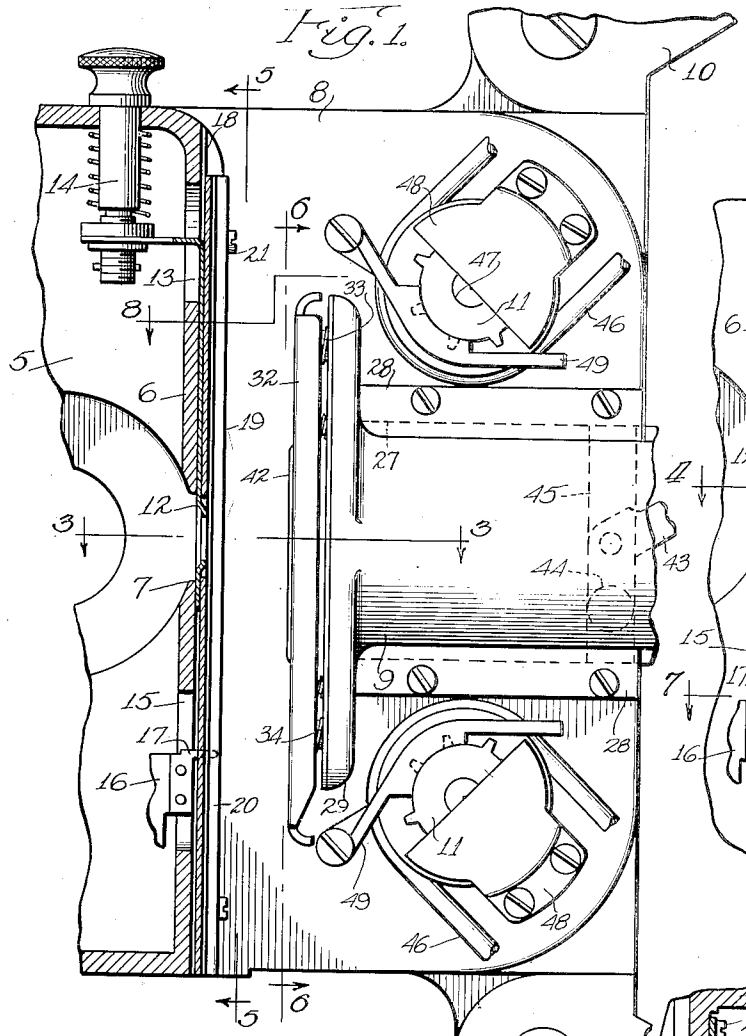


Fig. 2.

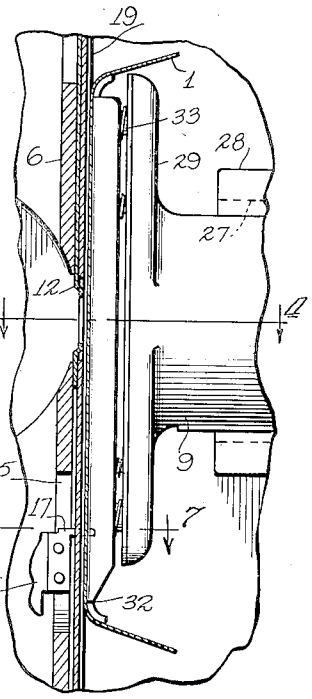


Fig. 3.

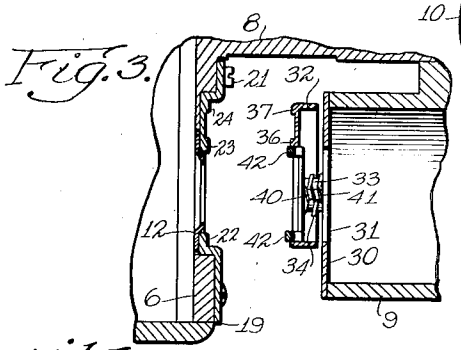
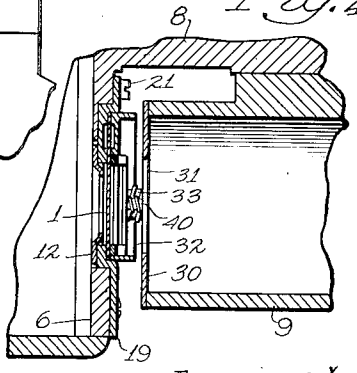


Fig. 4.



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Fig. 5.

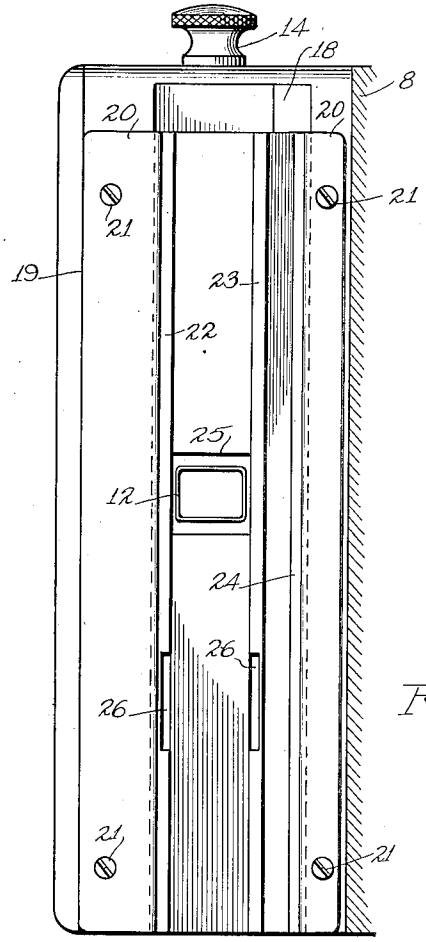


Fig. 6.

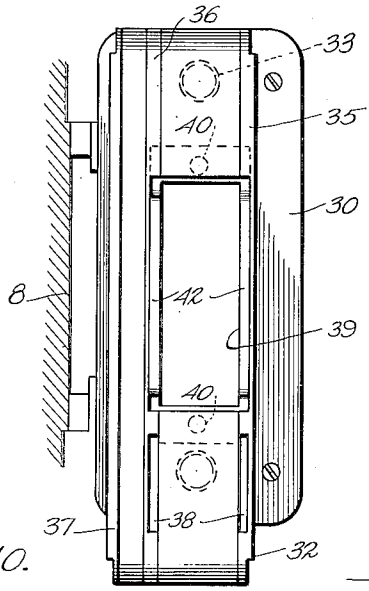


Fig. 10.

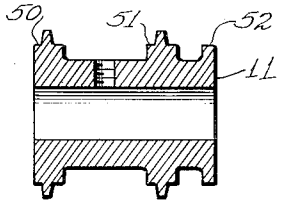


Fig. 9.

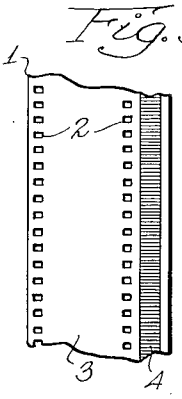


Fig. 8.

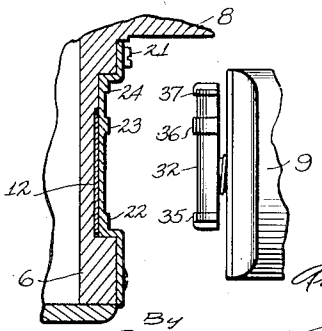
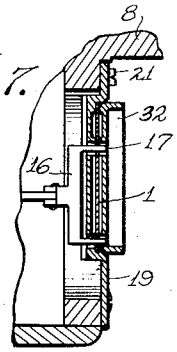


Fig. 7.



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Patented July 18, 1933 1,918,569

UNITED STATES PATENT OFFICE

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CINEMATOGRAPH FOR SOUND FILMS

Application filed September 25, 1930. Serial No. 484,374.

This invention relates to cinematographs used in connection with films which combine pictures with sound.

In cinematographs, the film is fed intermittently in front of the light aperture for momentarily positioning each picture in the path of light. This is usually effected either by means of a claw or by means of a sprocket actuated through a Geneva mechanism. In order that a cinematograph may operate with what is termed a high light efficiency, it is essential that each feeding step of the film be exceedingly rapid, so as to permit the pictures to enter and leave the path of light as quickly as possible. It has been determined that cinematographs employing a feeding claw are able to have a much greater light efficiency than those in which the film is fed by sprockets through Geneva mechanism. Feeding claws for cinematographs are shown in Patent No. 1,855,773, issued April 26, 1932, in the name of Sapier.

Heretofore, cinematographs employing sound films have generally been of the type having a Geneva mechanism and sprocket for intermittently feeding the films and, therefore, those machines have not had a very high light efficiency.

The main objects of this invention are to provide a cinematograph of the feeding claw type having improved means for accommodating a film on which pictures and sound have been recorded; to provide an improved form of guideway for guiding the sound film across the path of light; to provide an improved form of sprocket for feeding the sound film from one reel to the other; and to provide a cinematograph of this kind which is particularly adapted to accommodate films of non-professional size.

An illustrative embodiment of this invention is shown in the accompanying drawings, wherein:

Figure 1 is a fragmentary vertical section of the front part of a cinematograph to which this invention is applied; the pressure pad being shown in open position to permit insertion or removal of the film.

Fig. 2 is a view similar to Figure 1 but showing the pressure pad in closed position and also showing a portion of a film in section.

Fig. 3 is a fragmentary horizontal section taken on the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary horizontal section taken on the line 4—4 of Fig. 2.

Fig. 5 is a fragmentary vertical section taken on the line 5—5 of Fig. 1.

Fig. 6 is a fragmentary vertical section taken on the line 6—6 of Fig. 1.

Fig. 7 is a fragmentary horizontal section taken on the line 7—7 of Fig. 2.

Fig. 8 is a fragmentary horizontal section taken on the line 8—8 of Fig. 1.

Fig. 9 is a fragmentary elevation of a sound film adapted for use in the improved cinematograph.

Fig. 10 is an axial section of one of the improved sprockets.

Inasmuch as this invention relates particularly to only certain parts of the cinematograph, the accompanying drawings show only as much of the entire projector as will be of assistance in apprehending the invention.

Cinematographs generally include an upright casing having a rear compartment for housing the usual light bulb and a forward compartment in which is mounted a rotatable light interceptor arranged directly behind a light aperture in the film guideway. The film is fed from one reel to the other by means of sprockets and is intermittently moved through the guideway by suitable feeding means, such as a reciprocating claw for momentarily positioning each picture directly in the path of light. The projector casing is generally angularly adjustable, so as to permit the light field to be accurately positioned on the receiving screen. In addition to accurately positioning the light field on the receiving screen, it is necessary to project each picture onto the screen within the border of the light field, and for this reason, most projecting machines are equipped with a framing device for framing the film.

On most of the films heretofore in use having photographic records of sound and pictures, the sound track has been located between the pictures and one of the rows of sprocket perforations. In order to permit

"silent" films and sound films to be used on the same projector, it was necessary that the rows of sprocket perforations be spaced apart the same distance on both "silent" and sound films. For this reason, when the sound track was placed between the two rows of perforations it was necessary to decrease the width of the picture belt. Such films are objectionable because they do not accurately record the pictures.

In the form herein shown, the sound track of the film is located outside of the sprocket perforations so as not to necessitate a decrease in the width of the picture belt. The two rows of perforations are spaced apart the same distance as those on silent films so that both types of films may be used on the improved projector herein shown.

As illustrated in Fig. 9, a film 1 is provided with two rows of perforations 2, a picture belt 3, and a sound track 4. For non-professional work, silent films of 16 m. m. size have been in general use. A film of the non-professional type when used for recording pictures and sound, as illustrated in Fig. 9, would be approximately 20 m. m. wide, without any increase in the spacing between the rows of perforations.

In the construction illustrated, the casing of the machine, which is only partly shown, includes a front compartment 5 having a front wall 6 provided with a light aperture 7, and a side wall 8 which extends forwardly for supporting an axially movable lens mounting 9, a pair of hinged reel arms 10, and a pair of driving sprockets 11 of improved construction.

The compartment 5 houses the light interceptor, not shown, which interrupts the rays of light which are projected forwardly through the aperture 7 from a lamp located in the rear compartment, not shown.

Slidably mounted on the front wall 6, is a framer 12, which is similar to that shown in my Patent No. 1,855,775, issued April 26, 1932. The upper end of the framer is bent inwardly and projects through an opening 13 in the wall 6 for attachment to an adjusting stud 14, which is adapted to be rotated for adjusting the framer vertically relative to the aperture 7.

Formed in the front wall 6 below the light aperture, is an opening 15 for receiving a feeding claw 16 having a pair of prongs 17 which project forwardly for engagement with the perforations of the film. Mechanisms for reciprocating the feeding claw are illustrated in my said Patent No. 1,855,773.

Also formed in the front wall 6, is a vertically disposed recess 18 in which is seated an improved film guide 19, which preferably comprises a sheet metal stamping having a pair of side flanges 20 secured to the front wall 6 by screws 21.

The outer face of the film guide 19 is relieved to form three substantially parallel tracks 22, 23 and 24. The tracks 22 and 23 are located so as to engage the film at the perforations and the track 24 is located so as to engage the edge of the film which is outside of the sound record 4. The portions of the guide between the tracks 22, 23 and 24 are depressed so as not to contact with the record portions 3 and 4 of the film.

Formed in the central portion of the guide plate 19, is a light aperture 25 registering with the aperture 7. Formed in the tracks 22 and 23 are slots 26 registering with the opening 15 for receiving the feeding prongs 17.

The lens mounting 9 is preferably of the form shown in my Patent No. 1,855,775 and comprises a cylindrical shell having a pair of flanges 27, which are slidable in a pair of horizontal rails 28 secured to the wall 8.

Formed on the inner end of the shell 9, is a flange 29, on which is mounted a vertical plate 30 having a light opening 31. The plate 30 supports the tensioning device which exerts pressure on the film during the passage of the film through the guideway.

The tensioning device comprises a shoe 32 secured to the plate 28 by studs 33 which support springs 34 arranged to urge the shoe toward the film guideway for exerting pressure on a certain portion of the film.

The outer face of the shoe 32 is relieved to provide three substantially parallel tracks 35, 36 and 37 disposed directly opposite the tracks 22, 23 and 24 respectively. The tracks 35 and 36 are arranged to engage the perforated portions of the film and the track 37 is arranged to engage the edge of the film adjacent the sound record 4. Formed in the rails 35 and 36, are slots 38 registering with the slots 26 for receiving the feeding prongs 17.

The shoe 32 has a yieldable portion 39, which is similar in construction and operation to that shown in my Patent No. 1,855,775. The portion 39 is secured to the plate 38 by studs 40 having comparatively light springs 41 for independently urging the section 39 outwardly. The springs 41 are lighter than the springs 34 so that the section 39 is more sensitive than the body of the shoe. Formed on the section 39 are rails 42, which form continuations of the rails 35 and 36, but which project outwardly so as to engage the film in advance of the body of the shoe.

The lens mounting is axially shifted by means of a bell crank lever 43 having a boss 44 which rides in a vertical recess 45 formed in the shell 9, so that the movement of the lever around its axis effects an axial movement of the shell.

The outer ends of the arms 10 are provided with suitable mountings for the usual feed reel and take-up reel, not shown, which are

connected by belts 46 to the improved sprockets 11. The sprockets 11 are mounted on shafts 47 which are driven by a train of gears illustrated in my copending application Serial No. 438,497, filed March 24, 1930. A guard 48 and hinged shoe 49 are mounted on the wall 8 adjacent each of the sprockets.

In the form shown, each of the sprockets 11 comprises three rims 50, 51 and 52. The rims 50 and 51 are toothed for engagement with the film perforations, and the rim 52 has a substantially smooth periphery for engagement with the edge of the film adjacent the sound record 4.

In operation, the film is fed from the feed reel to the take-up reel by the improved sprockets 11 and is given a step-by-step movement through the film guideway by the feeding claw 16.

With the improved construction and arrangement of the parts herein shown, it is possible to use the projector in connection with films of the silent type or with films on which both pictures and sound have been recorded. If "silent" films are used, the tracks 24 and 37, and the sprocket rims 52 will not engage the films.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that certain details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. In a cinematograph, the combination with a film having two substantially parallel rows of sprocket perforations located on respectively opposite sides of a picture record and having a sound record located outside of one of said rows, of a casing having a guideway comprising several substantially parallel tracks spaced from one another, two of said tracks being adapted to engage the perforated portions of the film, the other of said tracks being adapted to engage the film edge adjacent the sound record, the portions of said guideway between said tracks being offset so as not to contact with the record portions of the film, and a reciprocable feeding claw having a pair of prongs projecting through said two tracks for engagement with the film perforations.

2. In a cinematograph, the combination with a film having two substantially parallel rows of sprocket perforations located on respectively opposite sides of a picture record and having a sound record located outside of one of said rows, of a casing having a front wall provided with a film guideway comprising a plate having several substantially parallel raised tracks offset from the plane of said plate, two of said tracks being adapted to engage the perforated portions of the film, the other of said tracks being adapted to engage the film edge adjacent the sound record, and a reciprocable feeding claw having a pair of prongs projecting through said two tracks for engagement with the film perforations.

3. In a cinematograph for use with a film having two substantially parallel rows of sprocket perforations located on respectively opposite sides of a picture record and having a sound record located outside of one of said rows, a casing having a front wall provided with a film guideway, a yieldable friction shoe located in front of said guideway for exerting pressure on the film, said guideway and shoe having opposed faces of similar contour, each of said faces having three raised tracks, two of the tracks of each face being adapted to engage the perforated portions of the film, the third track of each face being adapted to engage the film edge adjacent the sound record, a film feeding claw having two prongs projecting through said two tracks of both faces for engagement with the film perforations, and a pair of film feeding sprockets mounted on said casing, each of said sprockets comprising three rims, two of said rims having teeth for engaging the film perforations, the other of said rims being adapted to support the film edge adjacent the sound record.

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