June 28, 1932. T. W. CASE 1,865,055

PHOTOGRAPHIC APPARATUS

Filed Dec. 14, 1928

FIG. 1.

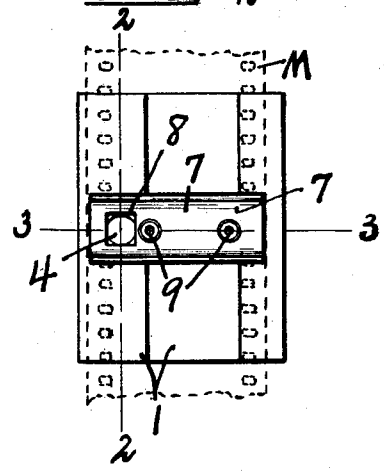


FIG. 2.

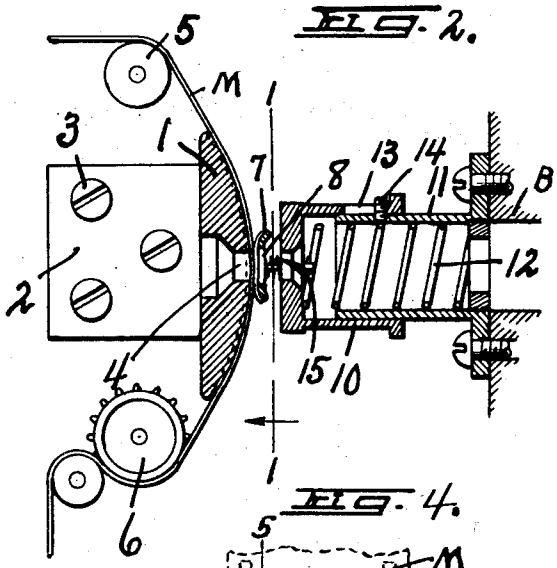


FIG. 3.

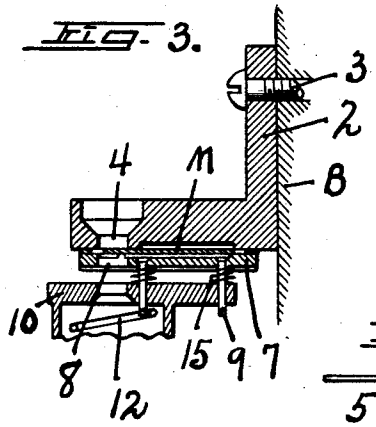


FIG. 4.

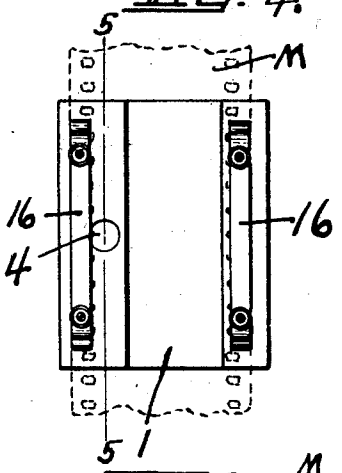


FIG. 5.

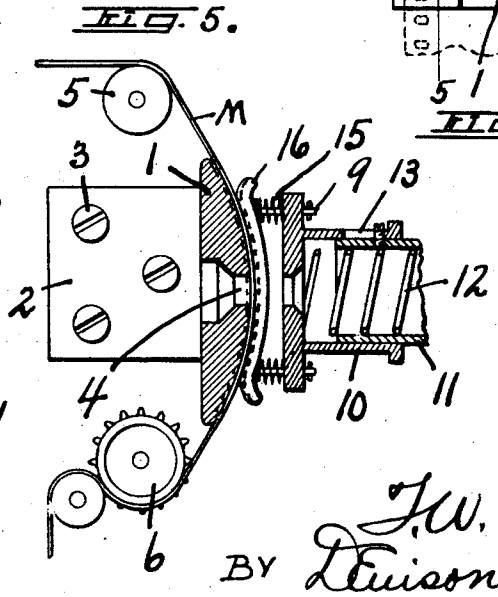


FIG. 6.

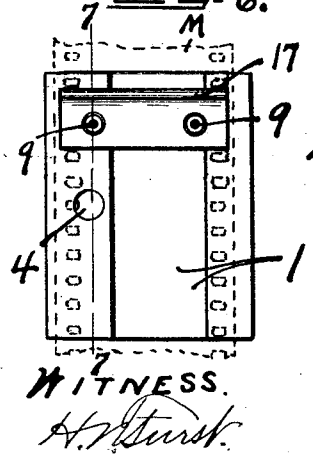
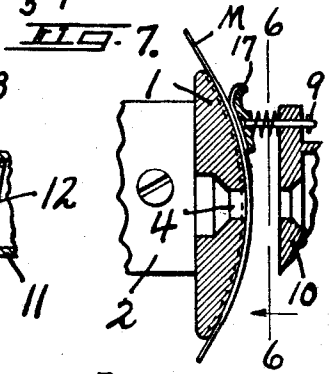


FIG. 7.



WITNESS.

A. Sturst.

INVENTOR

T. W. Case

BY Dennison Thompson

ATTORNEYS.

Patented June 28, 1932 1,865,055

UNITED STATES PATENT OFFICE

THEODORE WILLARD CASE, OF AUBURN, NEW YORK, ASSIGNOR TO CASE RESEARCH LABORATORY INC., OF AUBURN, NEW YORK, A CORPORATION OF NEW YORK

PHOTOGRAPHIC APPARATUS

Application filed December 14, 1928. Serial No. 326,108.

This invention relates to certain new and improved apparatus for producing or reproducing a photographic record of light wave variations corresponding to sound wave variations.

It is found that when such a photographic record is produced or taken, or is reproduced while a film is moving over a support or runner that it is quite essential if an accurate record is to be produced, or if reproduction is to be accurate, that the film shall move smoothly and uniformly in tight contact with the runner or track. Various forms of apparatus have been designed in an attempt to accomplish the desired film movement, such as the use of a spring-pressed shoe for maintaining the film in tight contact with the track, and in such constructions it has been customary and quite necessary that comparatively large shoes should be used which extend across the film and in operation act to press the film against the track, but the resultant friction injures the film and is apt to remove portions of the film, which in a short time decreases the effectiveness of the pictures.

And the main object of this invention is the production of an apparatus for the production or reproduction of sound pictures which may be used without pressure shoes, or with various forms of comparatively small pressure shoes, but in which the film is always maintained in tight contact with the track due to the formation of the track and the positioning of the means by which the film is drawn over the runner or track.

In my co-pending application Serial No. 733,560 I have disclosed a moving and sound picture camera in which the sound picture is taken while the film is moving around and with a rotating sprocket, and the fact that the film is curved longitudinally tends to prevent lateral flexing or bending while the picture is taken, and the broad claims to that apparatus are contained in said application.

This application among other features, differs in the stationary position of the supporting shoe and the fact that light may be projected through the runner for taking or reproducing the record, and the further fact that the film is driven independently of the runner.

Other objects and advantages relate to the details of the structure and the form and relation of the parts thereof, all as will more fully appear from the following description taken in connection with the accompanying drawing in which:—

Figure 1 is an elevation of an apparatus of this invention taken on line 1—1, Figure 2.

Figure 2 is a section taken on line 2—2, Figure 1.

Figure 3 is a section taken on line 3—3, Figure 1.

Figure 4 is an elevation illustrating a modified form of shoe.

Figure 5 is a section taken on line 5—5, Figure 4.

Figure 6 illustrates a further modified form of shoe taken on line 6—6, Figure 7.

Figure 7 is a section taken on line 7—7, Figure 6.

It is customary to draw the film over a flat runner having a pair of spaced tracks at opposite edges of the film. These tracks maintain the film flat in a lengthwise direction, but in view of the fact that the film is not supported at its intermediate portion, it is liable to buckle laterally, and the essential feature of this invention resides in the fact that the stationary runner —1— embodies a pair of spaced curved tracks over which the film M is drawn. A section of these surfaces of the runner constituting the tracks for supporting the opposite edges of a film is in the form of a segment of a circle, as illustrated in Fig. 2, and this runner may be supported in the camera in any suitable manner, as by bracket —2— secured by screws —3— to any portion of the camera or projector wall B. The film is curved longitudinally as it moves across the light aperture —4— and it is found that when a film is curved longitudinally, the tendency to bend or buckle laterally is removed.

This track or runner —1— has an opening —4— passing substantially radially through it to permit exposure of a film moving over the track to light rays passing through the opening. These light rays may

be focussed in the form of a line of light upon the film, or a slit of desired form may be provided in the runner —1—.

The roll —5— over which the film moves toward the track —1— is positioned as shown, with its effective surface slightly at the rear of the track —1— and the film is drawn downwardly along the roll —5— and over the track —1—, as by sprocket —8— likewise positioned at the rear of the track —1— with its effective surface so positioned as to form a tensioning means which holds the film tightly against the curved surface of the runner —1— as the film moves over the runner.

It will be apparent that the tension exerted by sprocket —6— is under ordinary circumstances sufficient in itself to draw the film tightly against the surface of the runner —1— as it moves over the opening —4—. However, additional means may be provided, if desired, and in the different figures various forms of shoes are illustrated, altho any means additional to the shape of the runner —1— and the position of the sprocket —6— may be provided for, additionally insuring proper contact of film A with the curved surface of the runner —1—.

In Fig. 1 there is shown a comparatively narrow shoe —7— which extends substantially the entire width of the film and has an opening —8— in alignment with the opening —4— through the runner —1—.

This shoe may be spring-tensioned against the film in any suitable manner, as for instance by mounting the shoes upon studs —9— which extend through a portion of the front wall of a tubular member —10— telescopically mounted upon a second tubular member —11— secured to the camera-frame, spring —12— being enclosed within the co-operating tubular members to normally tension the member —10— toward the shoe —7—.

The tube —10— may be formed with a slot —13— in which a limiting pin —14— is positioned, such pin being secured to the tube —11—. In addition, springs —15— are interposed between the front wall of tube —10— and the shoe —7—. The shoes are recessed to conform with the recess in the runner and are adapted to contact with the film only at the points where the film overlies the tracks.

In Figs. 4 and 5 a slightly different form of construction is shown in that two comparatively narrow shoes —16— are positioned at opposite edges of the film and extend throughout substantially the entire length of the curved track —1— and conform in curvature to the track. Means for mounting the shoes —16— may be substantially the same as that shown in Figs. 1, 2 and 3.

In Figs. 6 and 7 a further modified form of shoe is shown in that the shoe 17 extends substantially the entire width of the film, but is positioned above the opening —4—. This shoe acts to maintain the film against the upper portion of the curved surface of the track —1— and exerts sufficient pressure upon the film so that the tension produced by rotation of sprocket —6— in drawing the film over the runner —1— will maintain the film tightly in contact with the track —1—, particularly at the aperture —4— through which the picture is taken.

As before stated, the essential feature of the curved surface of the track or runner —1— in combination with the tensioning or drawing means for the film, as for instance the sprocket —6—, is so positioned that the direction of travel of the film is such as to maintain the film tightly in contact with the curved surface of the runner —1—. Preferably the sprocket —6— should be positioned so that its effective surface is positioned slightly at the rear of a continuation of the curved surface of the runner so that the film is at all times tensioned against the curved surface of the runner as it is drawn around the same, with roll —30— maintaining the film in engagement with the teeth of sprocket —6—.

Additional means, such as the shoes illustrated, may be provided, if desired, as additional safeguards, and altho I have shown and described specific constructions as constituting embodiments of the invention, I do not desire to restrict myself to the details of the same as various changes and modifications may be made within the scope of the appended claims.

I claim:

1. In an apparatus of the class described, a film-supporting member having a pair of spaced continuously curved convex runners, one of which is provided with an aperture for the passage of light rays, a guide roller and pull sprocket, the film bearing surfaces of which substantially form a continuation of the curved runner surfaces, and a film-tensioning member disposed to the rear of said runners adapted to maintain a film against the supporting surfaces as the sound track portion of said film moves across said aperture.

2. In an apparatus of the class described, a film-supporting member having a pair of spaced continuously curved convex runners, one of which is provided with an aperture for the passage of light rays, the film guiding surfaces of said runners being substantially greater in length than the greatest cross-sectional dimension of said aperture, a guide roller and pull sprocket, the film bearing surfaces of which substantially form a continuation of the curved runner surfaces, and a film tensioning member of comparatively small contact pressure area disposed to the rear of

said runners adapted to maintain a film against the supporting surface as the sound track portion of said film moves across said aperture.

In witness whereof I have hereunto set my hand this 6th day of December 1928.

THEODORE WILLARD CASE.