May 17, 1932. J. BURKHARDT 1,859,023

PROJECTION APPARATUS FOR MOTION PICTURES

Filed Dec. 18, 1929 2 Sheets-Sheet 1

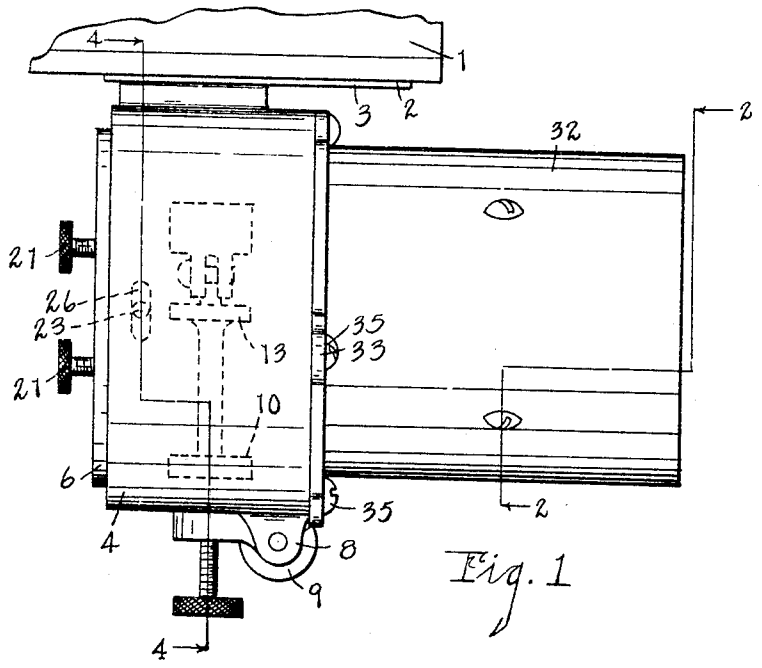


Fig. 1

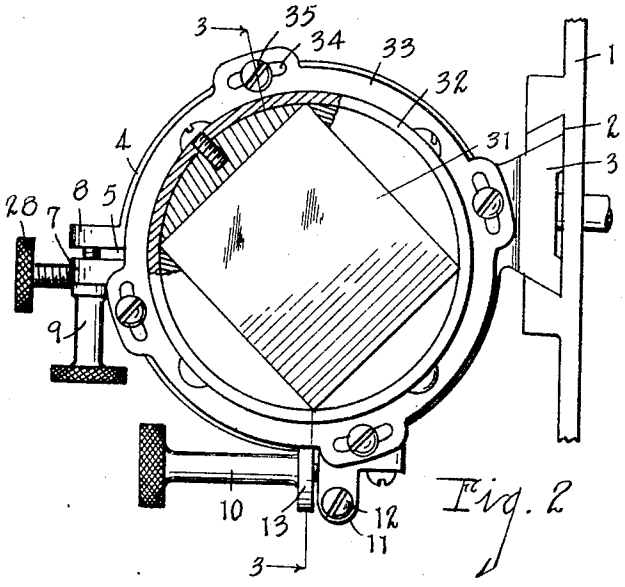


Fig. 2

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Search Room

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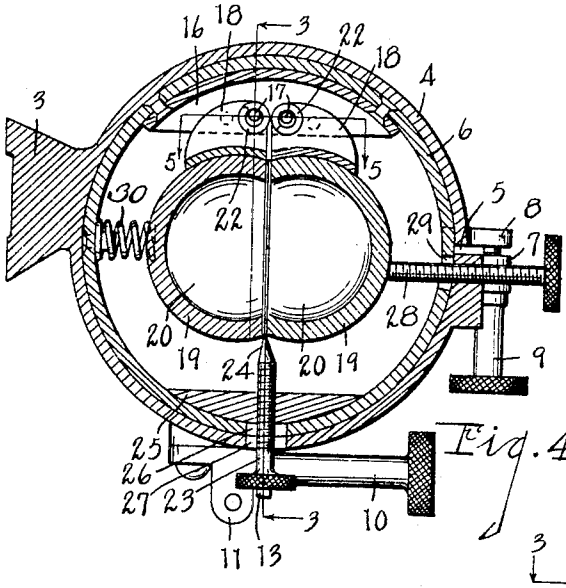


Fig. 4

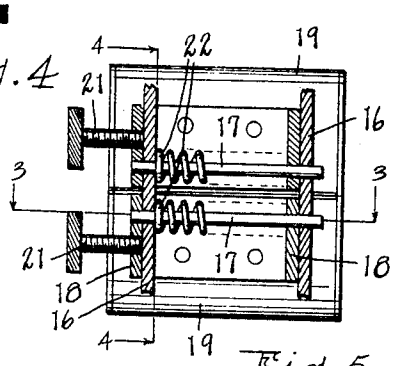


Fig. 5

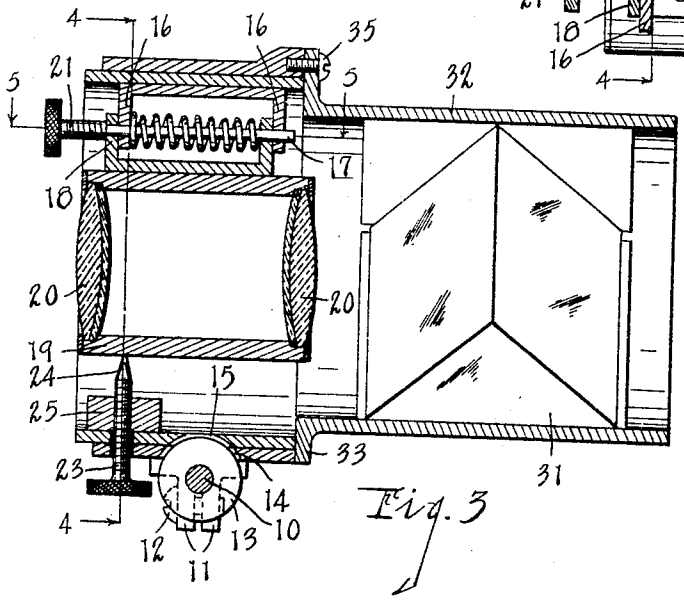


Fig. 3

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Patented May 17, 1932

1,859,023

UNITED STATES PATENT OFFICE

JAKOB BURKHARDT, OF DETROIT, MICHIGAN, ASSIGNOR TO THIRD DIMENSION PICTURES, INC., OF NEW YORK, N. Y.

PROJECTION APPARATUS FOR MOTION PICTURES

Application filed December 18, 1929. Serial No. 414,939.

My improved projecting apparatus is especially designed for the projection of motion pictures resulting in stereoptican or relief effects, the machine illustrated being designed for projecting a film such as shown in my application for Letters Patent Serial No. 357,146 filed April 22, 1929, in which associated pairs of foreground and background pictures are arranged in side by side relation on the film, the pictures being in miniature and the background picture having a mask of the foreground picture thereon.

The main objects of this invention are:

First, to provide a lens apparatus for projecting such a film with the paired foreground and background pictures in proper superimposed relation and in upright relation on the film.

Second, to provide an apparatus of this character which may be accurately adjusted to register the pairs of pictures.

Third, to provide a lens box unit adapted for the purpose above indicated which may be employed on standard types of projecting machines, or types now extensively used.

Objects pertaining to details and economies of my invention will definitely appear from the description to follow. The invention is defined in the claims.

A structure which embodies the features of my invention is clearly illustrated in the accompanying drawings, in which:

Fig. 1 is a plan view of a lens box unit embodying the features of my invention, a fragment only of the projecting machine being illustrated.

Fig. 2 is a fragmentary view partially in section on line 2—2 of Fig. 1.

Fig. 3 is a detail view mainly in longitudinal section on line 3—3 of Figs. 2, 4 and 5.

Fig. 4 is a detail view mainly in transverse section on line 4—4 of Figs. 1, 3 and 5.

Fig. 5 is a detail section on line 5—5 of Figs. 3 and 4.

Referring to the drawings, 1 represents portions of the frame of a moving picture projecting machine having a horizontal way 2 therein adapted to receive the supporting slide 3 of the lens box bracket 4. This lens box bracket is mounted for adjustment in the slide for purposes well understood.

The lens box bracket 4 is preferably cylindrical and is longitudinally split at 5 so that it may be clamped upon the cylindrical lens box 6 which is rotatably adjustable within the bracket. The bracket is provided with opposed ears 7 and 8 and a coacting clamping screw 9. The lens box is rotatively adjusted within the bracket by means of the screw 10 which has threaded engagement with the split ears 11. The ears are provided with a screw 12 for clamping the screw 10 in its adjusted position.

The screw 10 is provided with a flange or collar-like projection 13 projecting through an opening 14 in the bracket to engage a slot 15 in the lens box so that, by adjusting this screw 10, the lens box is accurately adjusted and secured in its adjusted positions by a locking screw 12 clamping the bracket thereon.

Within the lens box are spaced lens holder supports 16 carrying pivots 17 engaging the ears 18 on the lens holders 19. These lens holders are segmental and disposed in side by side relation as clearly shown in Fig. 4 with flattened sides adjacent. The lenses are shown at 20.

The ears 18 of the lens holders are arranged one on the inside and one on the outside of the supports 16 so that the lens holder may be adjusted longitudinally relative to the lens box.

In the embodiment illustrated this is effected by means of the screws 21 which are carried by one pair of ears to coact with one of the supports, see Fig. 5. Coiled springs 22 are arranged on the pivots to engage the other pair of ears of the lens holders, acting to urge the lens holders in the opposite direction. This provides for very accurate independent adjustment of the lens holders.

The lens holders are adjusted to and from each other by means of the screw 23 having a tapered tip 24. This screw is carried by a segmental block 25 arranged within the lens box and projecting through slots 26 and 27 in the lens box and lens box bracket, respectively.

Further lateral adjustment and support of the lens box is effected by means of the adjusting screw 28 carried by the lens holder and projecting through a slot 29 in the bracket so that the screw engages one of the lens holders. A coiled spring 30 is arranged opposite the screw 28 to yieldingly support the other lens holder.

With this arrangement of parts very accurate adjustment of the lens is possible to focus the same and to project pairs of foreground and background pictures in superimposed and proper registering relation. Inasmuch as these pairs of pictures are arranged in transverse side by side relation on the film, I provide a reversing prism 31 which is mounted in a barrel-like holder 32 having a flange 33 at its inner end with segmental slots 34 therein engaged by the screws 35 so that the prism holder may be rotatively adjusted on the lens box bracket and the projected picture properly positioned on the screen.

I have illustrated and described only such portions of a projecting machine as seem necessary for the proper disclosure of my improvements. It will be understood that in use means are provided for feeding the film in timed relation to a shutter and suitable illuminating means.

While I have illustrated and described my improvements in detail in an embodiment especially designed for the projection of films such as illustrated and described in my said application, I desire to state that my present improvements may be readily adapted and are desirable for use in projecting other films or negatives, or modifications of the film illustrated in my said application.

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

1. In a projecting apparatus, the combination of a cylindrical longitudinally split lens box bracket, a cylindrical lens box mounted within said bracket for rotative adjustment and provided with longitudinally spaced lens holder supports, a clamping screw for said bracket, an adjusting screw for said lens box having a flange engaging said lens box through an opening provided therefor in said bracket, said bracket being provided with a split ear with which said screw has threaded engagement, said ear being provided with a clamping screw, a pair of segmental lens holders provided with pivot ears disposed in overlapping relation to said supports, pivots arranged through said ears and said supports on said lens box, springs arranged on said pivots to engage one of said supports and one pair of said ears, adjusting screws on the other pair of ears coacting with one of said supports for longitudinally adjusting said lens holders, an adjusting screw carried by said lens box and provided with a tapered tip engaging between said lens box holders opposite their said pivots, an adjusting screw carried by the lens box and engaging one of said holders, a spring on said lens box engaging the other of said lens box holders opposite said screw, a prism, a tubular holder for said prism provided with a slotted flange at its rear end abutting the forward end of said bracket, and screws on said bracket engaging said slots whereby said prism holder is supported for rotative adjustment.

2. In a projecting apparatus, the combination of a cylindrical longitudinally split lens box bracket, a cylindrical lens box mounted within said bracket for rotative adjustment and provided with longitudinally spaced lens holder supports, a clamping screw for said bracket, an adjusting screw for said lens box having a flange engaging said lens box through an opening provided therefor in said bracket, said bracket being provided with a split ear with which said screw has threaded engagement, said ear being provided with a clamping screw, a pair of segmental lens holders provided with pivot ears disposed in overlapping relation to said supports, pivots arranged through said ears and said supports on said lens box, springs arranged on said pivots to engage one of said supports and one pair of said ears, adjusting screws on the other pair of ears coacting with one of said supports for longitudinally adjusting said lens holders, an adjusting screw carried by said lens box and provided with a tapered tip engaging between said lens box holders opposite their said pivots, an adjusting screw carried by the lens box and engaging one of said holders, a spring on said lens box engaging the other of said lens box holders opposite said screw, a prism, a tubular holder for said prism provided with a slotted flange at its rear end abutting the forward end of said bracket, and screws on said bracket engaging said slots whereby said prism holder is supported for rotative adjustment.

3. In a projecting apparatus, the combination of a lens box bracket, a lens box mounted within said bracket for rotative adjustment and provided with longitudinally spaced lens holder supports, a pair of segmental lens holders provided with pivot ears disposed in overlapping relation to said supports, pivots arranged through said ears and said supports on said lens box, springs arranged on said pivots to engage one of said supports and one pair of said ears, adjusting screws on the other pair of ears coacting with one of said supports for longitudinally adjusting said lens holders, an adjusting screw carried by said lens box and provided with a tapered tip engaging between said lens box holders opposite their said pivots, an adjusting screw carried by the lens box and engaging one of said holders, a spring on said lens box engaging the other of said lens box holders opposite said screw, a prism, a tubular holder for said prism provided with a slotted flange at its rear end abutting the forward end of said bracket, and screws on said

bracket engaging said slots whereby said prism holder is supported for rotative adjustment.

4. In a projecting apparatus, the combination of a lens box bracket, a lens box mounted within said bracket for rotative adjustment and provided with longitudinally spaced lens holder supports, a pair of segmental lens holders provided with pivot ears disposed in overlapping relation to said supports, pivots arranged through said ears and said supports on said lens box, springs arranged on said pivots to engage one of said supports and one pair of said ears, adjusting screws on the other pair of ears coacting with one of said supports for longitudinally adjusting said lens holders, an adjusting screw carried by said lens box and provided with a tapered tip engaging between said lens box holders opposite their said pivots, an adjusting screw carried by the lens box and engaging one of said holders, and a spring on said lens box engaging the other of said lens box holders opposite said screw.

5. In a projecting apparatus, the combination of a lens box bracket, a lens box mounted within said bracket for rotative adjustment and provided with longitudinally spaced lens holder supports, a pair of segmental lens holders provided with pivot ears disposed in overlapping relation to said supports, pivots arranged through said ears and said supports on said lens box, springs arranged on said pivots to engage one of said supports and one pair of said ears, adjusting screws on the other pair of ears coacting with one of said supports for longitudinally adjusting said lens holders, and an adjusting screw carried by said lens box and provided with a tapered tip engaging between said lens box holders opposite their said pivots.

6. In a projecting apparatus, the combination of a lens box provided with longitudinally spaced lens holder supports, a pair of segmental lens holders provided with pivot ears disposed in overlapping relation to said supports, pivots arranged through said ears and said supports on said lens box, springs arranged on said pivots to engage one of said supports and one pair of said ears, adjusting screws on the other pair of ears coacting with one of said supports for longitudinally adjusting said lens holders, and an adjusting screw carried by said lens box and provided with a tapered tip engaging between said lens box holders opposite their said pivots.

7. In a projecting apparatus, the combination of a lens box bracket, a lens box mounted in said bracket for rotative adjustment, a threaded means for effecting such rotative adjustment, lens holders mounted within said lens box for pivotal adjustment to and from each other and for independent longitudinal adjustment, screws for independently adjusting said lens holders longitudinally of their pivots, an adjusting screw disposed opposite said lens holder pivots and having a tapered tip coacting with both of said lens holders, a spring supporting one of said lens holders laterally, an adjusting screw engaging the other holder in opposed relation to said spring, a prism, and a holder for said prism mounted on said bracket for rotative adjustment.

8. In a projecting apparatus, the combination of a lens box mounted for rotative adjustment, a threaded means for effecting such rotative adjustment, lens holders mounted within said lens box for pivotal adjustment to and from each other and for independent longitudinal adjustment, screws for independently adjusting said lens holders longitudinally of their pivots, an adjusting screw disposed opposite said lens holder pivots and having a tapered tip coacting with both of said lens holders, a spring supporting one of said lens holders laterally, and an adjusting screw engaging the other holder in opposed relation to said spring.

9. In a projecting apparatus, the combinations of a lens box bracket, a lens box mounted in said bracket for rotative adjustment, a threaded means for effecting such rotative adjustment, lens holders mounted within said lens box for pivotal adjustment to and from each other and for independent longitudinal adjustment, screws for independently adjusting said lens holders longitudinally of their pivots, an adjusting screw disposed opposite said lens holder pivots and having a tapered tip coacting with both of said lens holders, a prism, and a holder for said prism mounted on said bracket for rotative adjustment.

10. In a projecting apparatus, the combination of a lens box mounted for rotative adjustment, a threaded means for effecting such rotative adjustment, lens holders mounted within said lens box for pivotal adjustment to and from each other and for independent longitudinal adjustment, screws for independently adjusting said lens holders longitudinally of their pivots, and an adjusting screw disposed opposite said lens holder pivots and having a tapered tip coating with both of said lens holders.

11. In a projecting apparatus, the combination of a lens box, lens holders mounted within said lens box for pivotal adjustment to and from each other and for independent longitudinal adjustment, screws for independently adjusting said lens holders longitudinally of their pivots, an adjusting screw disposed opposite said lens holder pivots and having a tapered tip coacting with both of said lens holders, a spring supporting one of said lens holders laterally, and an adjusting screw engaging the other holder in opposed relation to said spring.

12. In a projecting apparatus, the combi-

nation of a lens box, lens holders mounted within said lens box for pivotal adjustment to and from each other and for independent longitudinal adjustment, screws for independently adjusting said lens holders longitudinally of their pivots, and an adjusting screw disposed opposite said lens holder pivots and having a tapered tip coacting with both of said lens holders.

13. In a projecting apparatus, the combination of a lens box, lens holders mounted within said lens box for pivotal adjustment to and from each other and for independent longitudinal adjustment, means for independently adjusting said lens holders longitudinally of their pivots, and an adjusting means disposed opposite said lens holder pivots and having a tapered tip coacting with both of said lens holders.

In witness whereof I have hereunto set my hand.

JAKOB BURKHARDT.