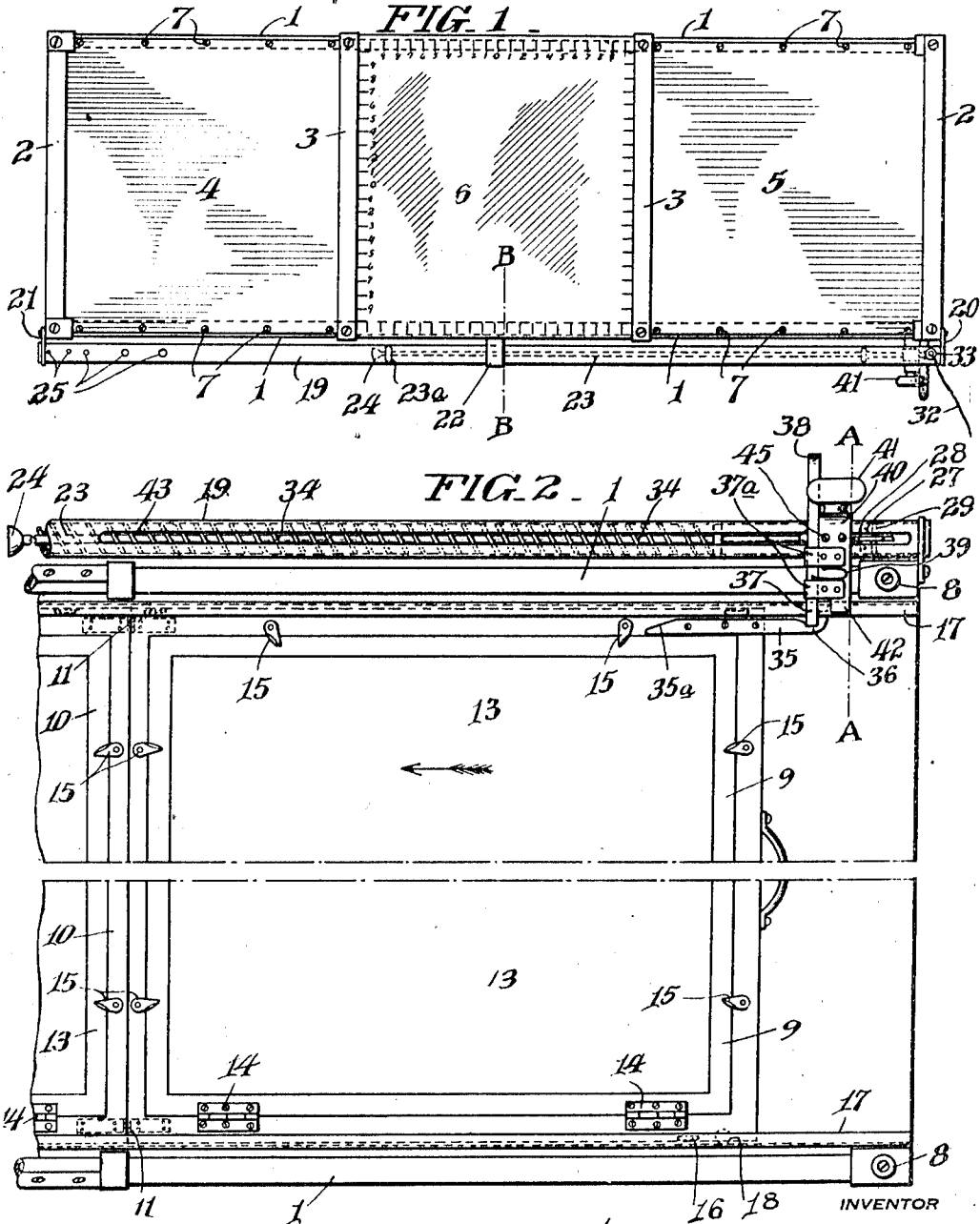


E. W. KELLY.
STEREOSCOPE PLATE CHANGER.
APPLICATION FILED AUG. 1, 1910.

998,618.

Patented July 25, 1911.

3 SHEETS-SHEET 1.



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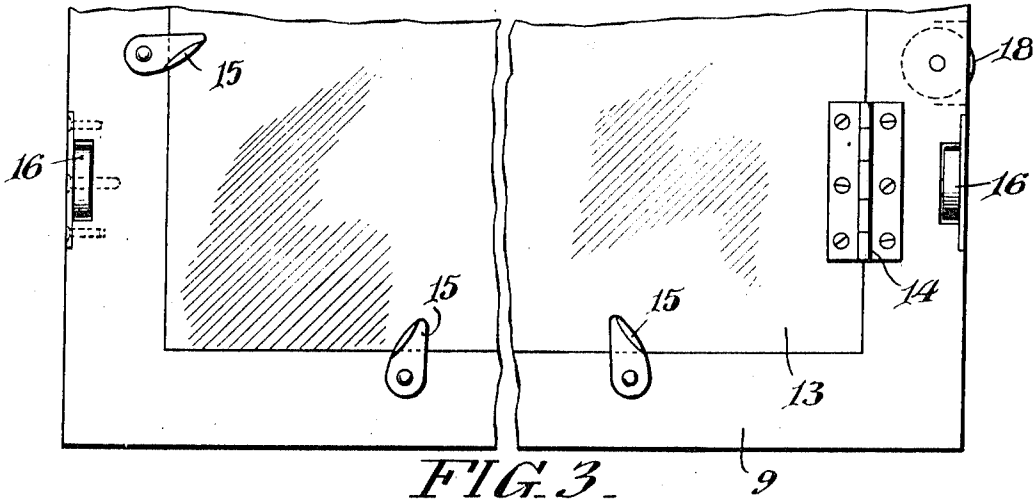


FIG. 3.

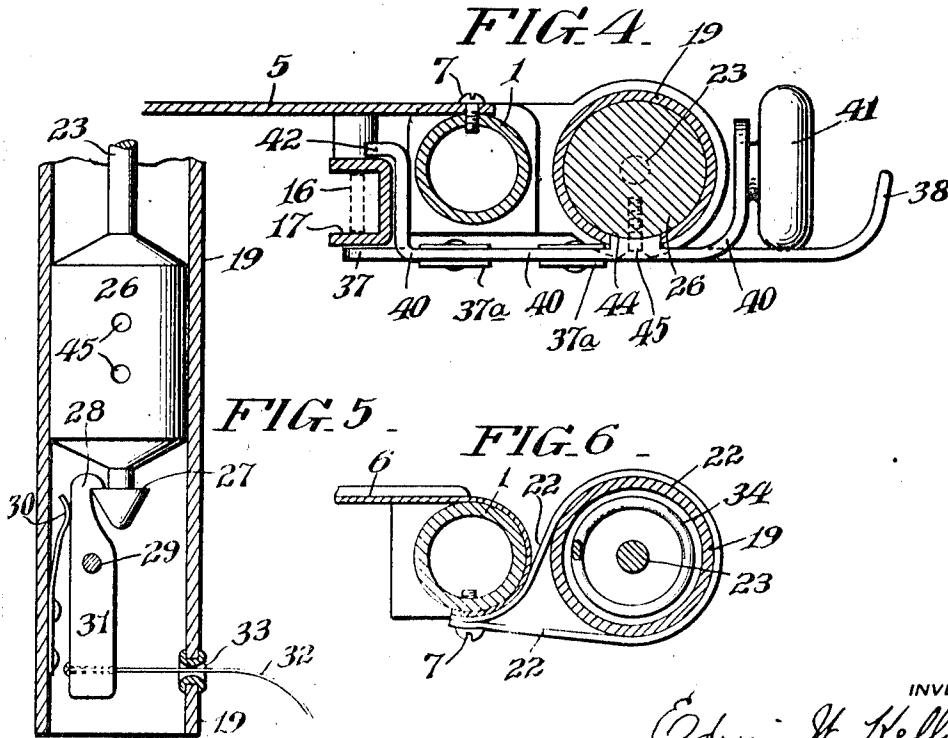


FIG. 5.

FIG. 6.

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EDWIN W. KELLY, OF PHILADELPHIA, PENNSYLVANIA.

STEREOSCOPE-PLATE CHANGER.

998,618.

Specification of Letters Patent. Patented July 25, 1911.

Application filed August 1, 1910. Serial No. 575,000.

To all whom it may concern:

Be it known that I, EDWIN W. KELLY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Stereoscope-Plate Changer, of which the following is a specification.

My invention relates to means for shifting or changing radiographic or photographic plates, whereby successive exposures may be quickly made, as, for example, in stereoscopic X-ray examinations.

My invention resides in a plurality of plate holders, preferably secured together, and a frame or "tunnel" member therefor, means being provided for automatically shifting the plate holders whereby successive plates may be exposed, as, for example, in stereoscopic X-ray examinations.

My invention resides in other features hereinafter described and claimed.

For an illustration of one of the forms my invention may take, reference is to be had to the accompanying drawings, in which:

Figure 1 is a top plan view of the frame or tunnel member with the plate changing or shifting means attached. Fig. 2 is a bottom plan view, on larger scale, of a portion of the apparatus shown in Fig. 1. Fig. 3 is a fragmentary plan view of a plate holder. Fig. 4 is a transverse sectional view through a part of the frame or tunnel and the plate changing or shifting mechanism, taken on line A—A, Fig. 2. Fig. 5 is a fragmentary longitudinal sectional view through a part of the plate changing or shifting mechanism. Fig. 6 is a fragmentary transverse sectional view taken on the line B—B, Fig. 1.

Referring to Fig. 1, the frame or tunnel member is shown in top plan view, and comprises the side members 1, 1, preferably of metallic tubing, as seen in Figs. 4 and 6. At their ends they are secured together by the cross pieces 2, 2, and intermediate cross pieces 3, 3 are provided. The top face of the frame or tunnel member is divided into three sections, when two plate holders, hereinafter referred to, are employed. The end sections 4 and 5 are of sheet iron or steel, or other material opaque to X-rays or other radiations employed, while the middle panel or section 6 is of sheet aluminum, or other material translucent or transparent to X-rays or the other radiations employed. These sheets are secured to the side tubular

members 1 by screws, rivets, or any other suitable means, as 7, the middle panel 6 of aluminum extending practically half way around the tubular member 1, as shown in Fig. 6.

At the four corners of the frame or tunnel member and on its under side, as viewed in Fig. 2, are provided feet 8.

The frame or tunnel member is open to receive a plurality of plate holders, as 9 and 10, Fig. 2. These plate holders may be secured to each other, as by hinges 11, whereby they may be folded back to back and carried by handle 12. These plate holders are adapted to receive a photographic or radiographic plate and have backs of material opaque to ordinary light and the covers 13, hinged to the plate holders at 14 also of material opaque to ordinary light. Either the back or the cover of each plate holder must be of material translucent or transparent to X-rays or other radiations used. On the plate holder frames are provided clips 15 which may be moved over on top of the cover 13 to hold the same in place. Each plate holder is provided with a plurality of rollers 16 on each side thereof, the same engaging in the channels 17 extending along the inside edges of the frame or tunnel and acting as guides or tracks for the plate holders. The plate holders may then roll when the frame or tunnel and the plate holders are lying flatwise upon these rollers 16 in the channels 17. If, however, the frame or tunnel and the plate holders are moved to edgewise position, the plate holders then roll upon rollers 18, in one side only of the plate holders, such rollers engaging in this case in the bottoms of the channels 17. The pivotal axes of the rollers 16 and 18 are at right angles to each other, as seen in Fig. 3.

Extending along one side of the frame or tunnel member is a tube 19 secured at its ends at 20, 21, to the frame or tunnel member and at its center steadied by the strap 22, see Fig. 6, surrounding the tube 19 and secured by screws 7 to the tubular member 1. Within the tube 19 is the longitudinally movable rod 23 carrying at its left end, Figs. 1 and 2, a piston or plunger 24 fitting snugly within the tube 19 and adapted to be retarded in the movement toward the left, Figs. 1 and 2, of the rod 23, the air escaping from the tube 19, which is closed at its left end, Fig. 1, through a series of suitably di-

minishing apertures 25, whereby the movement of the rod 23 and the parts moving therewith, are retarded and come to rest without jar. Approximate its other end the rod 23 carries a head 26 fitting loosely within the tube 19 and serving as a guide for said rod, the member 26 carrying at its lower end, Fig. 5, a flanged or mushroom member 27 adapted to be engaged by the latch 28 pivoted at 29 upon the tube 19, and engaged by spring 30, carried by the tube 19, urging the latch 28 to the position shown in Fig. 5 to catch the member 27. The latch 28 has a tail 31 to which is connected a string, or cord, or other member 32 extending through the opening 33 in the tube 19. A spiral spring 34 surrounds the rod 23, within the tube 19, and is connected at its one end to the rod 23 and at its other end to the bushing 23^a which serves also to guide rod 23. When the rod 23 has been moved to the position shown in Fig. 5, where the latch 28 engages member 27, the spring 34 is under tension and so locked by the latch 28.

Upon one of the plate holders, as 9, there is secured a member 35 notched at 36 to receive the transversely movable member 37 having the grip or handle 38, whereby it may be pulled upwardly, Fig. 2, or toward the right, Fig. 4, in opposition to spring 39, secured at its one end to the member 37 and at its other end upon the member 40, having the handle 41 and the projection 42 adapted to partially embrace one of the channels 17 to guide the moving parts with respect thereto. The tube 19 is longitudinally slotted at 43, see Fig. 2, and through the slot extends a projection 44 upon the member 40, which is secured by screw 45 to the member 26 which, as before stated, is secured upon rod 23.

The member 37 is carried by the member 40, being transversely movable, as before stated, the member 37 being transversely movable in the members 37^a carried by the member 40.

The operation is as follows: The X-ray tube is placed above panel 6, as viewed in Fig. 1, and the plate holders are beneath the panels 5 and 6. When the plate holders, as 9 and 10, have been properly loaded with sensitized plates and their covers replaced to exclude daylight or ordinary light, they may be carried out of a dark room by handle 12 to the frame or tunnel member. The plate holders are then swung upon their hinges 11 as they are passed into the frame or tunnel from the right, as viewed in Figs. 1 and 2. The spring 34 has previously been put under tension by moving the handle 41, upon member 40, toward the right, as viewed in Fig. 1, the latch 28 engaging the member 27 to hold the rod 23 under such spring tension, the cam surface 35^a having forced back member 37 as plate

holders were inserted, and 37 automatically snaps into notch 36 when the plate holders are in proper position. The plate holders 9 and 10 are thus mechanically connected to the movable member 40 which is, in turn, mechanically connected to the rod 23. When in this position, the left-hand plate holder, as 10, Fig. 2, is under or registers with the panel 6 which, as aforesaid, is translucent or transparent to the X-rays or other radiations to be employed. Exposure is then made in the well known manner by exciting the X-ray tube or other source of radiations. For stereoscopic work the X-ray tube is then moved a short distance, for example, $2\frac{3}{8}$ inches, the average distance between human eyes. Then the operator pulls the string 32 which releases the member 27, and therefore the rod 23, from latch 28, whereupon spring 34 contracts and forces the rod 23 toward the left, as viewed in Fig. 2, which, through the medium of members 40, 37 and 35, moves the plate holders 9 and 10 toward the left, as viewed in Fig. 1, the extent of travel being the distance between centers of the two plates to bring the right-hand plate holder 9, Fig. 2, into position beneath the panel 6, while the previously exposed plate in holder 10 is now beneath the left-hand panel 4, Fig. 1, which is opaque to X-rays. And before this movement of the plate holders toward the left, the plate in the right-hand holder 9, Fig. 2, was beneath opaque panel 5, shielding it during the exposure of the first plate. This movement toward the left is retarded as aforesaid by the plunger or piston 24, which is cushioned by the air to the left of the same, Figs. 1 and 2, within the tube 19, the air escaping gradually or at desired rate from the progressively smaller apertures 25. When the parts have come to rest in this new position, the second exposure is made. Then the parts are returned to original latched position and then the grip 38 is pulled outwardly to remove detent 37 from notch 36, whereupon the plate holders may be lifted out of the frame or tunnel member by handle 12 and carried to a dark room for development.

What I claim is:

1. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, and an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel.

2. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to or-

ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, and a mechanical connection between said automatic motive device and said plate holders.

3. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, and means for locking said automatic motive device against actuation.

4. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, and a disengageable mechanical connection between said automatic motive device and said plate holders.

5. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, a disengageable mechanical connection between said automatic motive device and said plate holders, and means for locking said automatic motive device against actuation.

6. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders hinged together and movable in substantially the same plane with each other upon said frame, said plate holders being opaque to ordinary light and translucent to X-rays, said frame having different panels opaque and translucent to X-rays, and an automatic motive device upon said frame for moving said plate holders with respect to a translucent panel.

7. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different

panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, and means for retarding the movement of said plate holders.

8. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, and a disengageable latching connection between said plate holders and said automatic motive device.

9. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plate holder opaque to ordinary light and translucent to X-rays, said frame having panels translucent and opaque to X-rays, an automatic motive device carried by said frame for shifting said plate holder with respect to a translucent panel, a member carried by said automatic motive device adapted to engage said plate holder, and means on said plate holder for actuating said member upon insertion of said plate holder into said frame.

10. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, and means for progressively retarding the movement of said plate holders.

11. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, said automatic motive device comprising a tube secured upon said frame, a member movable within said tube, and a spring associated with said tube for moving said member.

12. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays,

an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, said automatic motive device comprising a tube secured upon said frame, a member movable within said tube, and a spring associated with said tube for moving said member, means for connecting said plate holders with said member, and means for restraining said spring.

13. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, said automatic motive device comprising a tube secured upon said frame, a member movable within said tube, and a spring associated with said tube for moving said member, means for connecting said plate holders with said member, means for restraining said spring, and means for actuating said last mentioned means for releasing said spring.

14. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, said automatic motive device comprising a tube secured upon said frame, a member movable within said tube, and a spring associated with said tube for moving said member, and means for restraining the movement of said plate holders.

15. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, said automatic motive device comprising a tube secured upon said frame, a member movable within said tube, and a spring associated with said tube for moving said member, and means for retarding said plate holders comprising a plunger movable in said tube.

16. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque

to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, said automatic motive device comprising a tube secured upon said frame, a member movable within said tube, and a spring associated with said tube for moving said member, and means for retarding said plate holders comprising a plunger movable in said tube, said tube having a plurality of perforations disposed at different positions longitudinally thereof.

17. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, said automatic motive device comprising a tube secured upon said frame, a member movable within said tube, and a spring associated with said tube for moving said member, and means for retarding said plate holders comprising a plunger movable in said tube, said tube having a plurality of perforations disposed at different positions longitudinally thereof, said perforations diminishing in size in the direction of movement of said plunger.

18. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, and rollers on said plate holders having their axes at angles to each other, the differently disposed rollers adapted to engage said frame according to the position of said frame.

19. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, channel members supported by said frame, and rollers on said plate holders having their axes at angles with respect to each other adapted to engage the different surfaces of said channel members according to the position of said frame.

20. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, said automatic motive device comprising a tube secured upon said frame, a member movable within said tube, and a spring associated with said tube for moving said member, and a latch within said tube for restraining said member.

21. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, a notched member upon one of said plate holders, and a sliding member carried by the movable member of said motive device adapted to engage in the notch of said notched member.

22. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plurality of separate plate holders translucent to X-rays and opaque to ordinary light movable with each other upon said frame, said frame having different panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holders with respect to a translucent panel, a notched member upon one of said plate holders, a sliding member carried by the movable member of said motive device adapted to engage in the notch of said notched member, and an inclined surface on said notched member adapted to actuate said sliding member upon the insertion of said plate holders in said frame.

23. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plate holder supported thereby

and movable with respect thereto, said plate holder having a side opaque to ordinary light and translucent to X-rays, said frame having panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holder with respect to a translucent panel comprising a tube disposed longitudinally of said frame and a power actuated member disposed within said tube, and a disengageable mechanical connection between said plate holder and said power actuated member.

24. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plate holder supported thereby and movable with respect thereto, said plate holder having a side opaque to ordinary light and translucent to X-rays, said frame having panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holder with respect to a translucent panel comprising a power actuated member movable longitudinally of said frame, and a disengageable mechanical connection between said power actuated member and said plate holder.

25. In apparatus for purposes of stereoscopy described, the combination with a frame, of a plate holder supported thereby and movable with respect thereto, said plate holder having a side opaque to ordinary light and translucent to X-rays, said frame having panels opaque and translucent to X-rays, an automatic motive device carried by said frame for moving said plate holder with respect to a translucent panel comprising a power actuated member movable longitudinally of said frame, a disengageable mechanical connection between said power actuated member and said plate holder, and means for retarding the movement of said plate holder near the end of its movement.

In testimony whereof I have hereunto affixed my signature in the presence of the two subscribing witnesses.

EDWIN W. KELLY.

Witnesses:

ELEANOR T. McCALL,
A. E. STEINBOCK.