A. MUTSCHELLER AND K. STOYE.

RADIOGRAPHIC PLATE CHANGER.

APPLICATION FILED FEB. 15, 1919.

1,426,899. Patented Aug. 22, 1922.

4 SHEETS—SHEET 1.

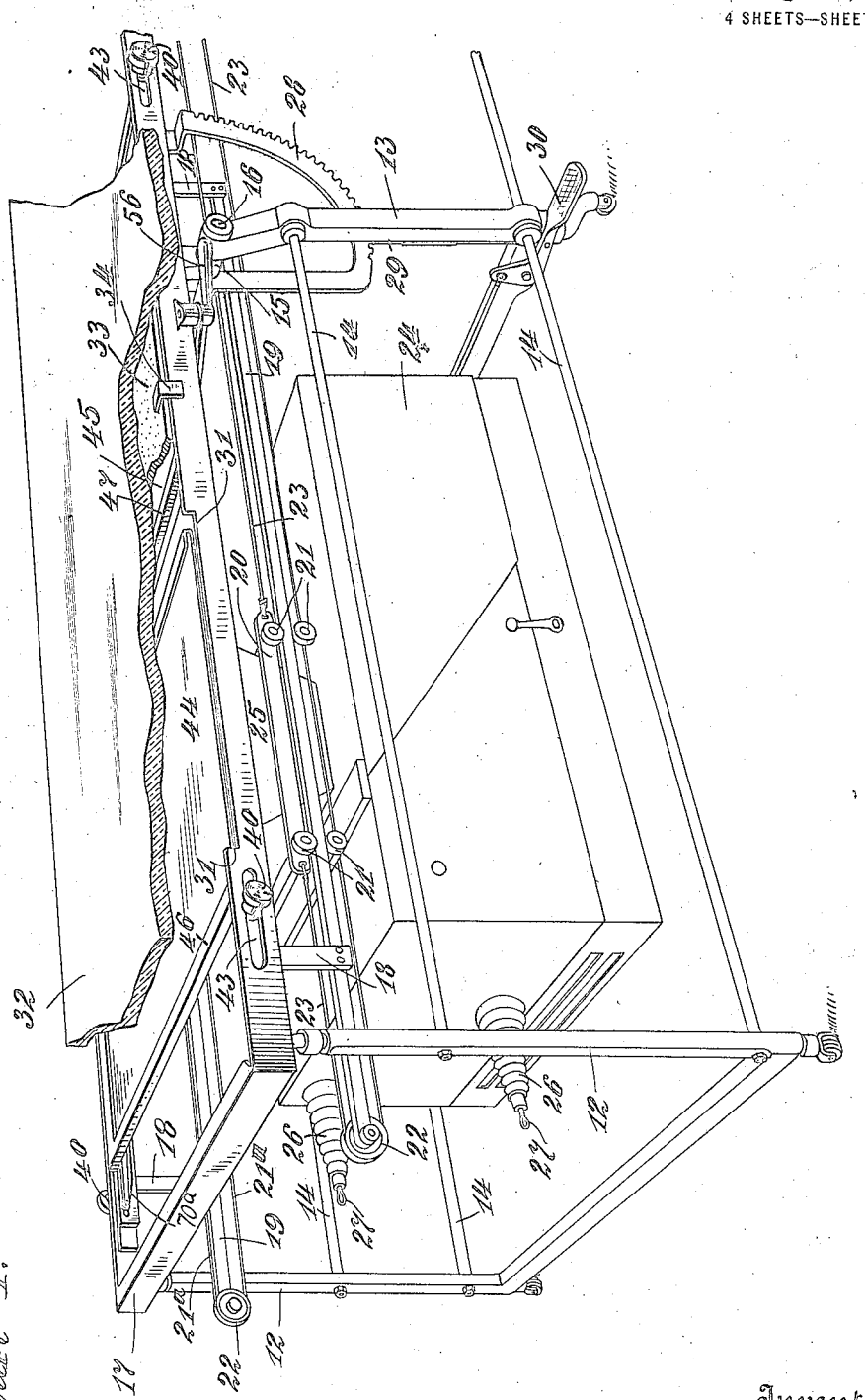


Figure 1.

Inventors
Arthur Mutscheller
Kurt Stoye
By their Attorneys Walton Harrison

A. MUTSCHELLER AND K. STOYE.

RADIOGRAPHIC PLATE CHANGER.

APPLICATION FILED FEB. 15, 1919.

1,426,899. Patented Aug. 22, 1922.

4 SHEETS—SHEET 2.

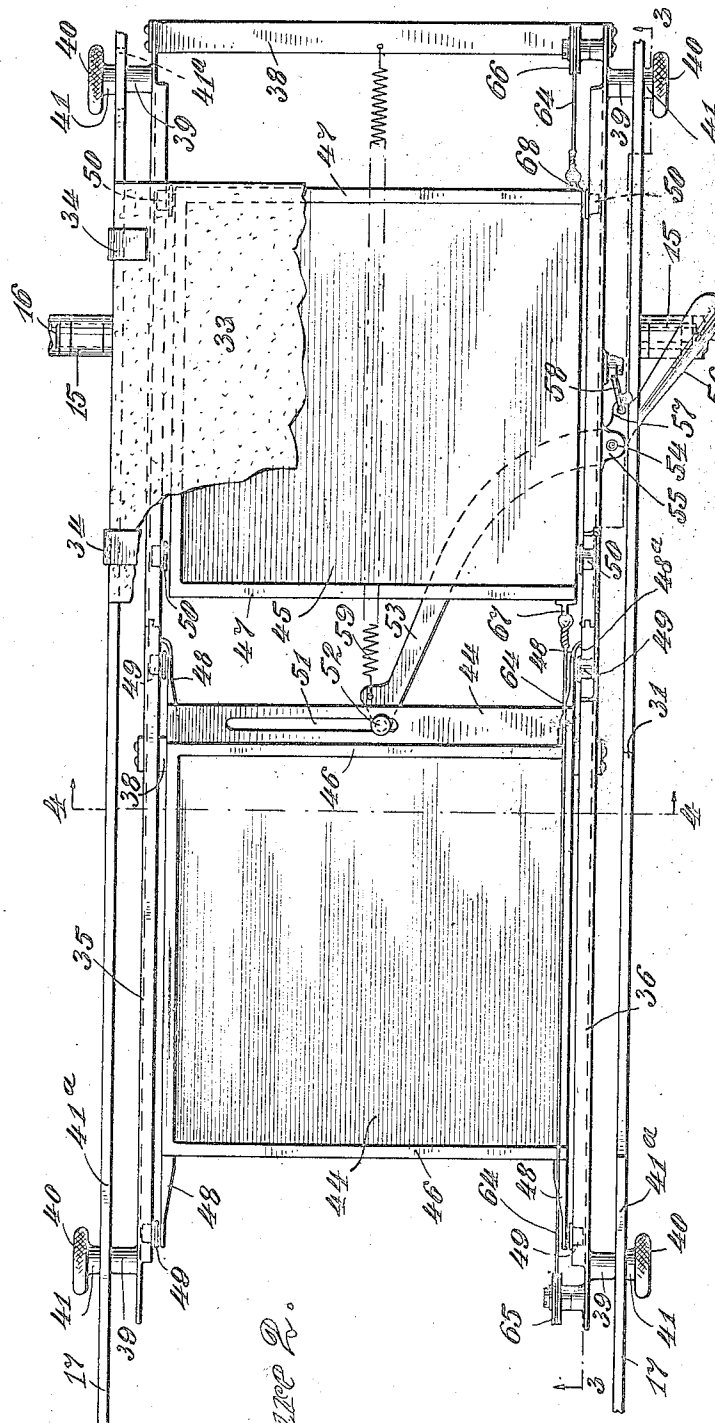


Figure 2.

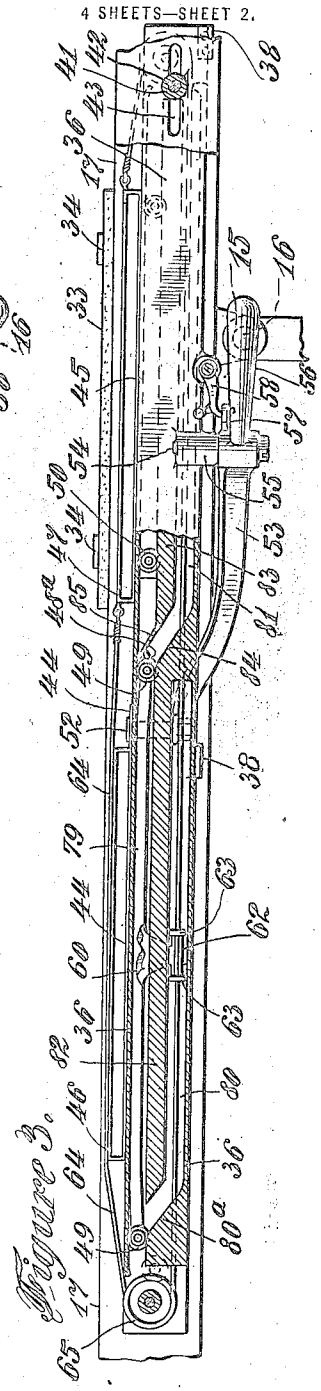


Figure 3.

Inventors
Arthur Mutscheller
Kurt Stoye
By their Attorney
Walton Harrison.

A. MUTSCHELLER AND K. STOYE.

RADIOGRAPHIC PLATE CHANGER.

APPLICATION FILED FEB. 15, 1919.

1,426,899.

Patented Aug. 22, 1922.

4 SHEETS—SHEET 3.

Figure 4.

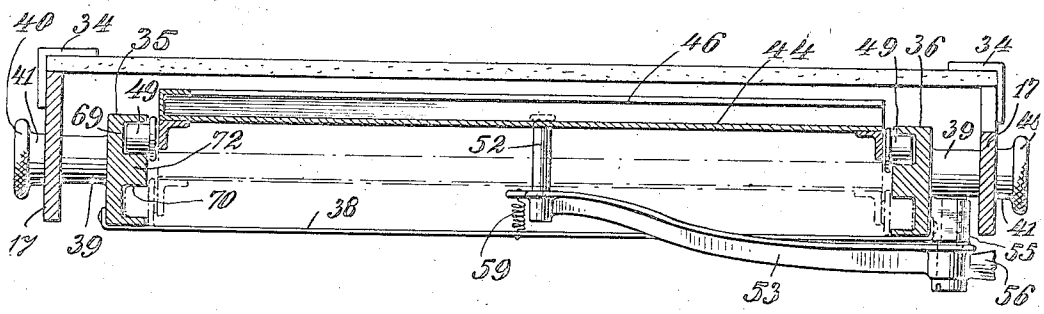


Figure 5.

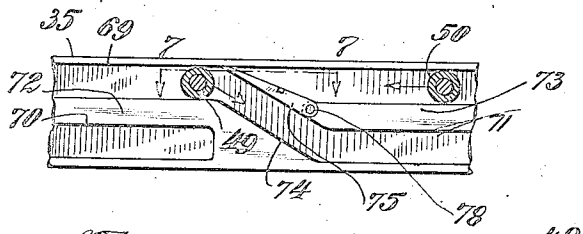


Figure 6.

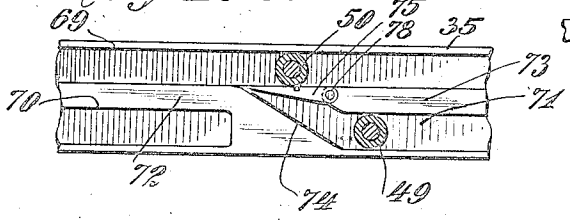


Figure 7.

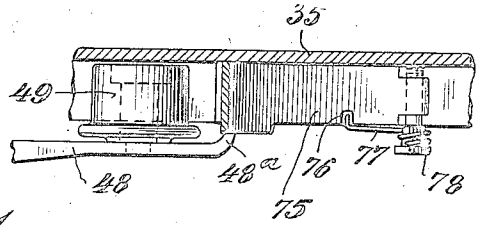


Figure 9.

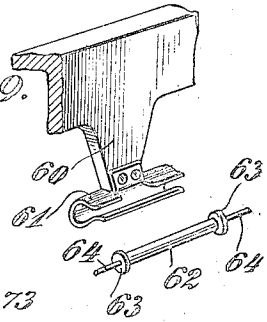
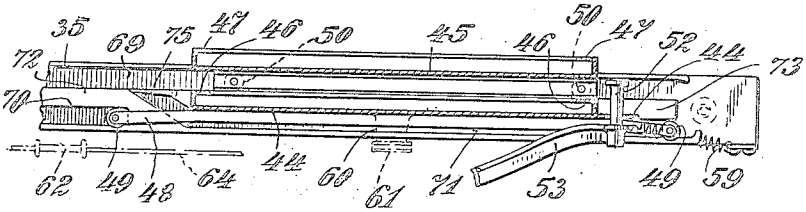


Figure 8.



Inventors
Arthur Mutscheller
Kurt Stoye
By their Attorney Walton Harrison

A. MUTSCHELLER AND K. STOYE.

RADIOGRAPHIC PLATE CHANGER.

APPLICATION FILED FEB. 15, 1919.

1,426,899. Patented Aug. 22, 1922.

4 SHEETS—SHEET 4.

Figure 10.

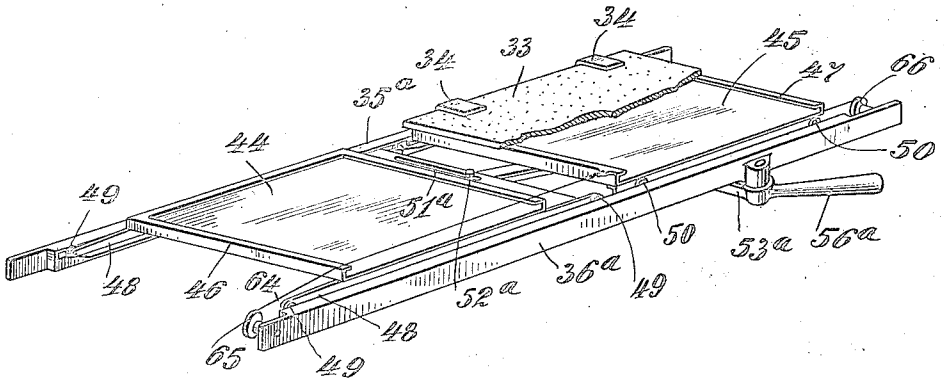
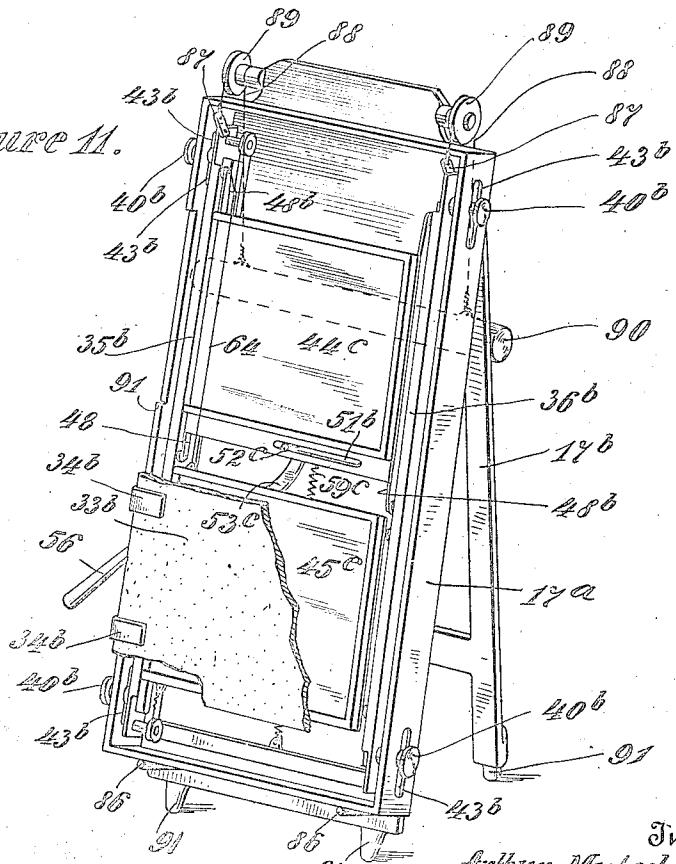


Figure 11.



Inventors
Arthur Mutscheller
Kurt Stoye
By their Attorney Walton Harrison

UNITED STATES PATENT OFFICE.

ARTHUR MUTSCHELLER AND KURT STOYE, OF NEW YORK, N. Y., ASSIGNORS TO WAPPLER ELECTRIC COMPANY, INC., A CORPORATION OF NEW YORK.

RADIOGRAPHIC PLATE CHANGER.

1,426,899. Specification of Letters Patent. Patented Aug. 22, 1922.

Application filed February 15, 1919. Serial No. 277,213.

To all whom it may concern:

Be it known that we, ARTHUR MUTSCHELLER and KURT STOYE, both citizens of the United States, residing at New York city, county of New York, and State of New York, have invented certain new and useful Improvements in Radiographic Plate Changers, of which the following is a full, clear, and concise description.

Our invention relates to radiographic plate changers and admits of general use in connection with X-ray photography, and to some extent with fluoroscopy. It is especially adapted, however, for use in making stereoscopic X-ray plates.

More particularly stated, our invention comprehends a tray-holder carrying a pair of movable trays each adapted to carry a photographic plate, the tray holder having its various parts so arranged and co-related that the device as a whole has a wide range of adaptability and may be used in various relations, as follows:

1. In connection with a table embodying a fluoroscope and which can be tilted to different degrees of inclination.

2. In conjunction with an upright stand used for making stereoscopic plates.

3. As an attachment or self-contained unit, adapted to be temporarily mounted upon any suitable fluoroscopic mechanism as convenience may suggest.

Among the various objects we seek to accomplish by our invention are the following:

I. To counterbalance the two trays each against the other, so that when our device is inclined or tilted to any desired extent the trays can be shifted quickly and with uniform motion, without the necessity for using a shock absorber or for changing the adjustment of the spring mechanism used in connection with the trays.

II. To render our device as a whole adjustable bodily in relation to the table or other radiographic device upon which it is ordinarily to be mounted.

III. To facilitate shifting the plates when making stereoscopic X-ray exposures through the top of a table, whether such top to be horizontal, vertical or inclined.

IV. To provide for releasing the connections from one tray to the other so that one tray may occupy a position directly over the other to enlarge the space available as a fluorescent field.

V. To so mount the trays and parts associated therewith that each of the plates carried by the trays, when in position for exposure, is supported at a minimum distance from a patient resting upon the device.

VI. To guide the trays when shifted into exact predetermined positions so that one plate will occupy the precise position previously occupied by the other.

VII. To enable the operator to readily shift the photographic plate so as to bring the center thereof into vertical alignment with any predetermined point upon the table top or analogous member and thus to effect an ideal adjustment of the plate relatively to the position of a patient resting thereupon.

VIII. To facilitate the removal and replacement of the plates, by passing them through the edge of the device, in instances where this is preferably to passing them in and out at the end-portion of the mechanism.

IX. To render the changing of the plates automatic to the extent that under suitable conditions the operator can cause the plates to be shifted by merely actuating a releasing member.

Reference is made to the accompanying drawings forming a part of this specification, and in which like reference characters indicate like parts throughout the several figures.

Figure 1 is a fragmentary perspective of an X-ray table equipped with our invention, certain portions being broken away.

Figure 2 is a fragmentary plan of the mechanism shown in Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2, looking in the direction indicated by the arrows.

Figure 4 is a section on the line 4—4 of Figure 2, looking in the direction indicated by the arrows.

Figure 5 is a fragmentary side elevation of certain details appearing in the middle of Figure 3.

Figure 6 is a side elevation of the mechanism shown in Figure 5, but with certain movable parts occupying positions different from those they occupy therein.

Figure 7 is a section on the line 7—7 of Figure 5, looking in the direction indicated by the arrows.

Figure 8 is a fragmentary central vertical section through the right-hand portion of the table according to Figure 2, but showing certain movable parts as occupying positions different from those they occupy in said last mentioned figure.

Figure 9 is a fragmentary perspective showing a detail of the device for disconnecting the trays from control by the movable cable.

Figure 10 is a perspective of our device as used without a table, or independently thereof.

Figure 11 is a perspective of a form of our device as applied to an upright stand used with stereoscopic X-ray plates.

A number of posts 12, 13 are connected together by brace rods 14 and constitute a framework. The posts 13 are provided with bearings 15 and extending through these bearings are trunnions 16 which support a table 17, so that the latter is adapted to be tilted relatively to the framework upon which it is thus supported. The table 17 is an X-ray table, that is, it is suitable for use in connection with X-ray photography and fluoroscopy. The table 17 carries hangers 18 extending downwardly from it and secured to these hangers are a pair of guide bars 19. A movable truck 20 is supported by the guide bars 19, and for this purpose is provided with wheels 21 engaging said guide bars. Associated with the truck 20 are guide pulleys 22 and a cable 23, this cable passing over the guide pulleys and being used by the operator for shifting the position of the truck 20. A tube casing 24, having the form of a lead-lined box, is secured to the truck 20 and carried thereby, being thus movable at the will of the operator.

This tube casing may be of the usual or any desired construction suitable for containing an X-ray tube. It is provided with a flared portion 25 through which the X-rays are emitted upwardly, as is customary in this art. The tube casing 24 carries insulators 26, and terminals 27 for making electrical connections in order to excite the X-ray tube. Mounted rigidly upon the table 17 and movable therewith is sector 28. Disposed adjacent this sector and adapted to detachably engage the same is a pawl 29 which is connected with a foot lever 30 and in connection therewith is instrumental in locking the sector 28 in different analogous positions, thus causing the table 17 to be locked in corresponding angular positions after being first tilted into said positions by the operator.

The table 17 is provided with a slot 31. This slot is used for facilitating the loading of the photographic plates as hereinafter described and may be placed in any convenient position, upon either side or at the end of the table. In the particular instance here shown, it is located upon the same side as the foot lever 30 being thus readily accessible.

The table 17 is covered with a slab 32 or board which is transparent to X-rays. It is also provided with a plate 33 of material opaque to X-rays. This plate is ordinarily made of lead. It is held in position by clamps 34, or is otherwise arranged in the usual or any desired manner.

The plate changer carries a pair of rail bars 35, 36 as shown more particularly in Fig. 2. These rail bars are held together by a cross bar 38. The rail bars 35, 36 are provided with necks 39, and adjacent these necks are knobs 40 provided with necks 41, each neck 41 carrying a screw 42 which extends through a slot 43. There are four of these slots. The operator by turning the knobs 40 and slightly rotating the screws 42 loosens the knobs; he can then move the bars 35, 36 bodily in a direction lengthwise of the table, to an extent permitted by the length of the slots 43. Thus the rail bars 35, 36 and parts carried thereby are as a whole adjustable relatively to the length of the table. Two trays 44, 45 are provided. The tray 44 has an overhanging flange 46, and the tray 45 has a similar overhanging flange 47. The tray 44 has four arms 48, two of these arms being provided with fingers 48ª mounted rigidly upon them and used as hereinafter described. The tray 44 is mounted upon four rollers 49. The tray 45 is similarly supported upon four rollers 50.

The tray 44 is provided adjacent one of its edges with a slot 51, as shown more particularly in Figure 2. Extending vertically through this slot is a pin 52. This pin is of sufficient length to remain stationary while the tray 44 is raised or lowered a short distance. The pin 52 is mounted upon an operating arm 53 the latter being mounted to swing upon a pin 54, this pin being supported in a bearing 55 carried by the rail bar 36. Connected to the operating arm 53 is a handle 56 to be grasped by the operator and moved angularly in relation to the pin 54 as a center, thus causing the operating arm 53 to swing upon its pivotal point of support.

The handle 56 carries an eye 57. A hook 58 is mounted upon one side of the rail bar 36 and is adapted to engage the eye 57, as

shown in Figure 2, for the purpose of holding the handle 56 and the operating arm 53 each in the position here indicated. The spring 59 is connected with the arm 53 and also with the cross bar 38. This spring is normally under tension and is adapted to draw the tray 44 to the right, according to Figure 2, the other parts being shifted in position accordingly. The tray 44 carries a downwardly extending lug 60 of the form shown more particularly in Figures 3 and 9. This lug at its lower end carries a spring clasp 61 for the purpose of detachably holding the locking bar 62 of the form shown in Figure 9. This locking bar is provided with heads 63, and secured to these heads are the ends of a cable 64. This cable passes around and engages a pair of guide pulleys 65, 66, and the ends of the cable are secured to eyes 67, 68 carried by the tray 45. Thus the tray 45 is controllable by the cable 64, and this cable is controllable by the tray 44 which is in turn controllable by the operating arm 53. The operator by grasping the handle 56 and actuating the operating arm can shift the tray 44 to the right or left according to Figure 2, and the movement of this tray 44 causes the movement of the cable 64 and this causes the movement of the tray 45. When, therefore, the handle 56 is swung to the left according to Figure 2, the tray 44 has a tendency to move to the right, and the tray 45 has a tendency to move to the left. When, however, the handle 56 is swung in the reverse direction, the trays 44 and 45 are each caused to move in a direction contrary to the one just mentioned.

It is desirable that each tray 44, 45 shall, when in actual use, be disposed as closely as possible to the top of the table. In accomplishing this purpose, however, it is essential that the trays 44 and 45 shall not come into engagement with each other, and that neither shall get into the way of the other. On this account, we make provision whereby the tray 44 can pass below the tray 45, this movement being effected, however, at a time when the plates are not for the moment in actual use for purposes of exposure of the photographic plate to the X-rays. The rail bar 35 is provided with a slot 69 extending for nearly the entire length of the rail bar, and with two shorter slots 70 and 71, arranged as indicated in Figures 5, 6 and 8. This rail bar is further provided with an inclined surface 74, extending from the bottom of the slot 69 to the bottom of the slot 71, as shown in the Figures just mentioned. Similarly, an inclined surface extends from the bottom of the slot 70 to an adjacent portion of the slot 69. The rail bar 35 is also provided with webs 72, 73 which form boundaries for the slots and are so arranged that the slot 69 merges into the slot 71, whereas the slot 70 does not merge into the slot 69. Disposed adjacent the inclined surface 74 is a gate 75 having generally the form of a pawl and provided with a notch 76. A spring 77 is mounted upon a bolt 78 and is provided with an end portion fitting into the notch 76 as may be understood from Figure 7. The spring 77 by its tension normally forces the gate 75 downwardly so that the gate occupies the position indicated in Figure 6. The gate may be raised, however, by pressure applied beneath it.

The rail bar 36 is of approximately the same construction as the rail bar 35, the difference between these rail bars being that they are mated together as a pair,—that is, right and left members. The rail bar 36 is provided with a lengthy slot 79 and with shorter slots 80, 81, these three slots corresponding to the slots 69, 70, 71 above described. The rail bar 36 is also provided with webs 82 and 83, and with inclined surfaces 84, and 80^a (see Figure 3), these parts corresponding to the webs 72 and 73, and the inclined surfaces 74 above described. The rail bar 36 is also provided with a gate 85 corresponding to the gate 75.

With the parts arranged as indicated in Figures 2 and 3, the trays 44 and 45 are in the same horizontal plane, the tray 44 being disposed adjacent the slot 31. With the parts in the positions here contemplated an X-ray plate or a cassette charged with a plate and an intensifying screen, can readily be inserted through the slot 31 and thus placed upon the tray 44, or it may be readily removed from this tray and carried out through the slot 31. With photographic plates resting upon trays 44 and 45, the plate upon the tray 44 is ready for use, the plate resting upon the tray 45 being protected by the covering 33 of lead from exposure. The lid covering 33 is located toward one end of the frame 17 and has an area equal to about one half the area of the top of the table. This lead covering 33 is displaced, relatively to the supporting member transparent to the X-rays, so as to avoid overlapping the same.

Suppose now that the plate resting upon the tray 44 has been exposed and that the operator wishes to shift the tray 44 and its plate out of the way and to bring into use the tray 45 and the plate resting upon it. He simply lifts the hook 58 away from the eye 57, whereupon the spring 59 contracts and by so doing shifts the trays into their second positions; that is, the tray 44 is carried to the right and the tray 45 is moved to the left according to Figure 2. If desired, the hook 58 may be actuated from a distance, by any suitable mechanical expedient suitable for the purpose.

Thus the plate carried by the tray 45 is brought into position for exposure to the X-rays. The plate carried by the tray 45

may now be moved through the slot 31, or may remain adjacent the center of Figure 2. The rollers 48 and 49 (see top and bottom of said figure) are now in engagement with the respective gates 75 and 85, and are holding the same open. This is because the last movement of the tray 44 to the left according to Figure 3 caused the fingers 48^a to engage the under sides of the respective gates and raise them, so as to hold them open. If now the operator releases the handle 56 so that the spring 59 comes into play and the handle 56 swings to the left according to Figures 2 and 3, the tray 44 tends to move to the right according to these figures. Hence the two rollers 49 adjacent the inclined surfaces 74 and 84, travel down these surfaces, and by so doing cause the gates 75 and 85 to be lowered. At the same instant the other two rollers 49, for the moment adjacent the corresponding inclined surfaces, travel down the same. Thus all four of the rollers 49 glide gently downward, so that the tray 44 as a whole is lowered gently as it starts moving to the right. The rollers 49 now enter the respective slots 80, 81, and the tray 44, moving upon a lower level than it occupied at first, moves to the right. At the instant this occurs, the tray 45 without changing its level moves straight to the left and passes over the tray 44. The result is that the tray 44 is lodged at the right and the tray 45 at the left, according to Figure 3, and tray 45, however, occupying a level a little higher than that of the tray 44. The handle 56 being swung backwardly or into its normal position shown in Figure 2, the parts are, of course, restored to their respective normal positions, as shown in these figures.

In some instances, it is desirable that the trays 44 and 45 be disconnected from each other. In other words, it is desirable that the cable 64 be disconnected from the clasp 62 (see Figure 3) so that the movement of one tray will not disturb the other. This is essential where the table is for the time being to be used in fluoroscopy, rather than photography. As shown in Figure 8, the tray 44 may be moved back under the tray 45. This is because after the tray 45 is lowered in position, the clasp 61 is disconnected from the locking bar 62.

After the use of the device as thus described, the parts are again rendered serviceable for photography by meredy slipping the locking bar 62 into the clasp 61, the tray 44 being moved by hand for this purpose.

In the construction shown in Figure 10, the rail bars 35^a, 36^a, having nearly the same form as the rail bars 35, 36 above described, are provided as the basis for the frame shown. This frame is not necessarily used with a table of the type shown in Figure 1, but may be employed independently thereof, as, for instance, for taking X-ray photographs of some part of a person lying in bed or sitting in a chair. The tray 44 is provided with a slot 51^a through which extends a pin 52^a controllable by an arm 53^a and handle 56^a, these parts having the same function as above described with reference to the slot 51, pin 52, operating arm 53 and handle 56, except as otherwise noted. The action of the device shown in Figure 10 is the same as that of the corresponding structure forming a part of the mechanism shown in Figures 2 and 3.

In Figure 11 we show still another construction which is essentially an upright stand 17^a provided with a prop 17^b and adapted to be tilted to different inclinations somewhat after the manner of an easel. The lead plate is here shown at 33^b, the clamps for holding the same at 34^b, the rail bars at 35^b, 36^b, and a set of knobs at 40^b. The frame is provided with slots 43^b. The trays appear at 44^c, 45^c, and the arms of the tray 44^c are shown at 48^b. Pins 86 are provided for supporting the frame 17^a at the lower end thereof. The upper ends of the rail bars 35^b, 36^b are provided with lugs 87, and connected with these lugs are cables 88 which pass over guide pulleys 89 and are secured to a movable weight 90. This weight serves as a counterbalance for rail bars 35^b, 36^b, and facilitates the adjustment or other handling thereof. The knobs 40^b are for the purpose of tightening and loosening the rail bars 35^b, 36^b relatively to the frame 17^a. The frame 17^a and its prop 17^b are provided with ground lugs or feet 91 which may rest upon the ground or upon a floor or table as desired. Except as otherwise indicated the mechanism shown in Figure 11 is identical with that shown in Figures 1 and 2.

We do not limit ourselves to the precise construction shown, as variations may be made therein without departing from the spirit of our invention.

We claim:

1. In a device of the character described, a self-contained unit comprising a frame, a plurality of photographic trays carried by said frame and movable relatively to each other, and mechanism connected with said trays and controllable at the will of the operator for guiding each of said trays in succession into a single predetermined exact position.

2. In a device of the character described, a self-contained unit comprising a frame, a plurality of trays carried by said frame and movable relatively to each other, means controllable at the will of the operator for shifting said trays into predetermined relative positions, mechanism connected with

said trays for automatically retracting them into other positions, and means controllable at the will of the operator for temporarily holding said trays in said first mentioned relative positions, and for releasing said trays.

3. In a device of the character described, the combination, with a source of X-rays, of a self-contained unit comprising a frame, a photographic tray carried by said frame and mounted to move back and forth relatively thereto in a straight path, a second photographic tray, means for guiding said second tray into and out of said path and mechanism connected with both of said trays for shifting them in opposite directions.

4. In a device of the character described, the combination, with a source of X-rays, of a self-contained unit comprising a frame and a plurality of trays carried by said frame and movable relatively thereto, one of said trays being so mounted as to have a straight path of travel, the other of said trays being movable into and out of said straight path of travel, and means for actuating said trays.

5. The combination, with a tube casing, a supporting member transparent to X-rays and a screening member opaque to X-rays, of a self-contained plate supporter carrying a plurality of trays and also carrying means for moving said trays one at a time out of proximity to said screening member and into proximity to said supporting member transparent to X-rays, and means for moving said trays in opposite directions with respect to each other.

6. In a device of the character described, the combination with a table member to be tilted and a tube casing connected with said table member so as to be tilted therewith, of a frame carried by said table, a pair of trays mounted upon said frame and movable in opposite directions with respect to each other, and mechanism connected with said trays and controllable at the will of the operator for moving said trays in opposite directions.

7. In a device of the character described, the combination with a table to be tilted and a tube casing connected with said casing so as to be tilted therewith, of a frame carried by said table, means controllable at the will of the operator for adjusting the position of said frame relatively to said table, a pair of trays mounted upon said frame and movable relatively thereto in opposite directions, and mechanism controllable by movements of one of said trays for preventing said trays from interfering with each other.

8. In a device of the character described, the combination with a table to be tilted and a tube casing connected with said table so as to be tilted therewith, of a frame carried by said table, a pair of trays mounted upon said frame and movable relatively thereto in opposite directions, and guiding mechanism for bringing one of said trays edge to edge with the other of said trays and for shifting said trays in opposite directions so as to prevent interference of the trays with each other.

9. In a device of the character described, the combination of a frame, a tube casing connected with said frame and adjustable relatively thereto, said frame being provided with a pair of rail bars having slots, a pair of trays for supporting photographic plates, supporting members carried by said trays and extending into said slots for enabling said trays to be supported, a flexible connection from one of said trays to the other for the purpose of moving said trays, and a pulley engaging said flexible connection in such manner as to enable said trays to counterbalance each other.

10. In a device of the character described, the combination with a table to be tilted and a tube casing connected with said table so as to be tilted therewith, of a frame carried by said table, a pair of trays mounted upon said frame and movable relatively thereto in a direction substantially parallel with the length of said table, mechanism connected with said trays and controllable at the will of the operator for moving said trays in substantially opposite directions, and guiding mechanism for controlling the direction of travel of one of said trays so as to cause it to miss the other of said trays.

11. In a device of the character described, the combination with a table to be tilted and a tube casing connected with said table so as to be tilted therewith, of a pair of trays movable relatively to said table, means for bringing one of said trays into a predetermined position relatively to said table and for shifting said tray out of this position and shifting the other of said trays into said position, and guiding means for causing said first-mentioned tray to miss said second-mentioned tray in order to avoid collision therewith.

12. In a device of the character described, the combination with a table to be tilted and a tube casing connected with said table so as to be tilted therewith, of a frame carried by said table, means for adjusting said frame bodily in relation to said table, a plurality of trays for holding photographic plates, said trays being movable in opposite directions with respect to each other, and mechanism controllable at the will of the operator for presenting said trays in succession each to a predetermined part of said table for the purpose of exposing said trays in succession to the action of X-rays.

13. In a device of the character described, the combination of a frame provided with

slots disposed parallel with each other, trays provided with supporting members extending into said slots so as to support said trays, mechanism connected with said trays for moving the same, and mechanism controllable by movements of one of said trays for preventing collision between said trays.

14. In a device of the character described, the combination with a table to be tilted and a tube casing connected with said table so as to be tilted therewith, of a frame carried by said table, means for adjusting said frame relatively to said table and enabling the operator to clamp said frame into the position in which it is thus adjusted, a pair of trays mounted upon said frame and movable relatively thereto, said trays being movable in opposite directions with respect to each other, means for guiding each of said trays in succession into a predetermined position relatively to said table, and mechanism controllable at the will of the operator for restoring said trays into a predetermined normal relative position.

15. In a device of the character described, the combination with a table to be tilted and a tube casing connected with said table so as to be tilted therewith, of a frame carried by said table, a pair of trays mounted upon said frame and movable relatively thereto, mechanism connected with said trays and controllable at the will of the operator for moving said trays in opposite directions, and means controllable at the will of the operator for disconnecting one of said trays in order that it may be moved aside for the time being.

16. In a device of the character described, the combination of a frame, an X-ray tube casing connected with said frame and movable relatively thereto, a plurality of plate carriers supported by said frame and movable relatively to said tube casing and to each other, the mechanism connected with said plate carriers and controllable at the will of the operator for the purpose of guiding each of said trays in succession into a single predetermined exact position relative to said tube casing.

17. In a device of the character described, the combination of a frame, an X-ray tube casing connected with said frame and movable into different positions relatively thereto at the will of the operator, a plurality of plate holders supported by said frame and movable relatively thereto at the will of the operator, said plate holders being so mounted as to be each movable in succession into a single predetermined exact position relatively to said X-ray tube casing, and a flexible tensile member extending from one of said plate holders to another for the purpose for enabling movements of one plate holder to shift the position of another plate holder.

18. In a device of the character described, the combination of a frame, an X-ray tube casing supported by said frame and movable into different positions relative thereto at the will of the operator, a plurality of plate carriers supported by said frame and so mounted as to be each movable in succession into a single predetermined exact position relative to said X-ray tube casing, and a flexible tensile member extending from one of said plate carriers to another for enabling one of said plate carriers to be actuated by the movements of another plate carrier.

19. In a device of the character described, the combination of a frame, an X-ray tube casing supported by said frame and movable into different positions relatively thereto at the will of the operator, a plurality of plate carriers supported by said frame and movable into different positions relatively thereto, said plate carriers being each so mounted as to be each movable in succession into a predetermined exact position at a predetermined distance from said tube casing, means controllable at the will of the operator for shifting the position of one of said plate carriers, and a flexible tensile member extending from one of said plate carriers to another.

20. The combination, of a tube casing, a supporting member transparent to X-rays, a screening member opaque to X-rays and displaced relatively to said supporting member so as to avoid overlapping the same, a frame, a plurality of plate carriers mounted upon said frame and movable relatively to said screening member and to said supporting member, and mechanism connected with said plate carriers and controllable at the will of the operator for shifting said plate carriers in opposite directions relatively to each other, in order to move said plate carriers one at a time out of proximity to said screening member and into proximity to said supporting member.

ARTHUR MUTSCHELLER.
KURT STOYE.