Sept. 11, 1951 A. J. KIZAUR 2,567,566

X-RAY APPARATUS

Filed July 15, 1949 2 Sheets-Sheet 1

Fig. 1

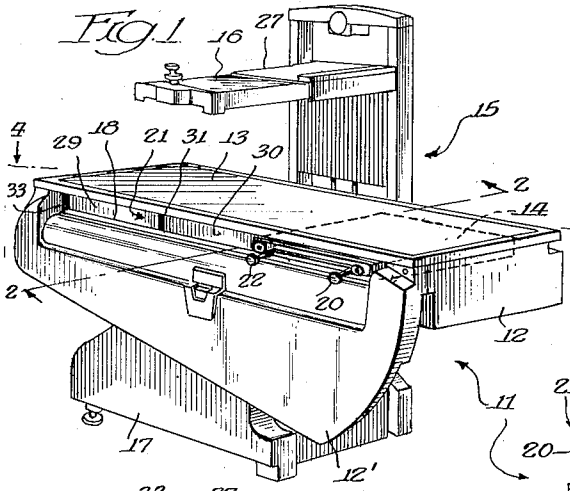


Fig. 2

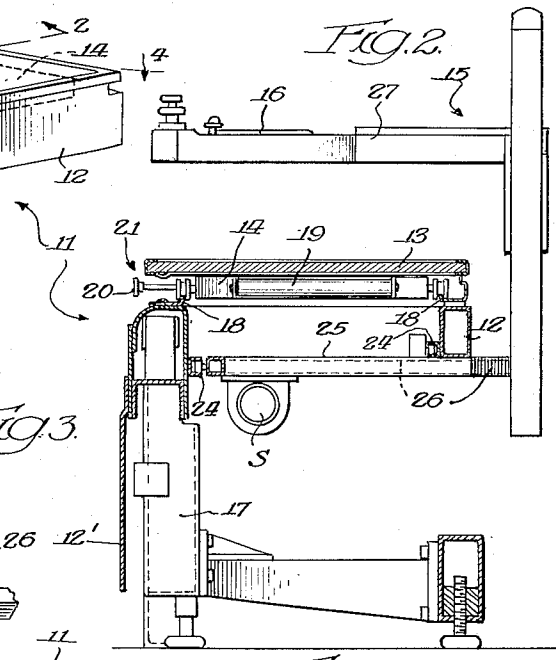


Fig. 3

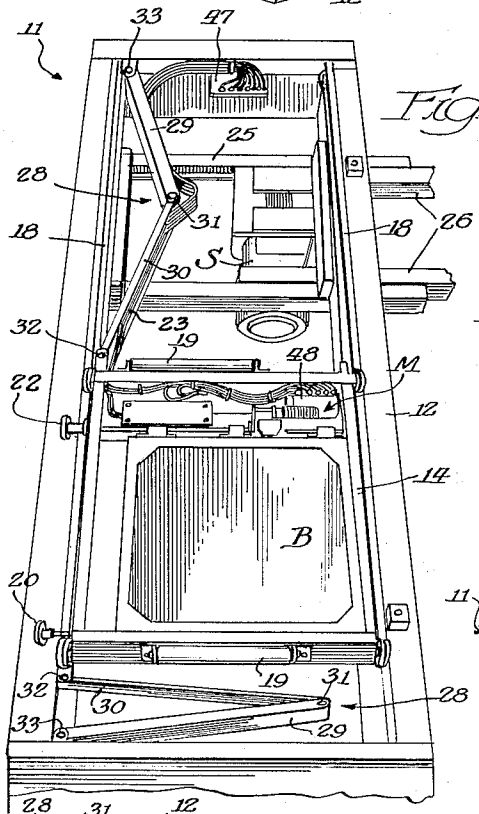


Fig. 4

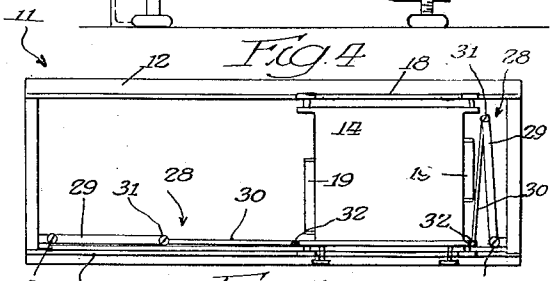


Fig. 5

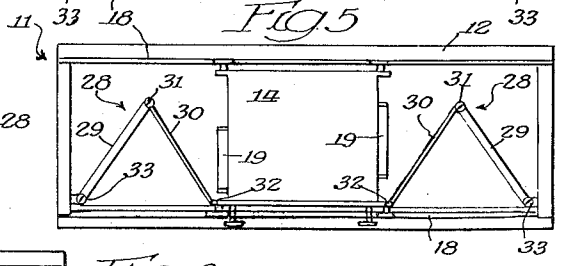
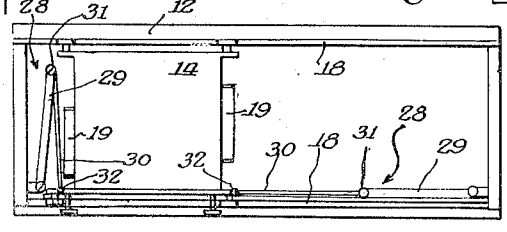


Fig. 6



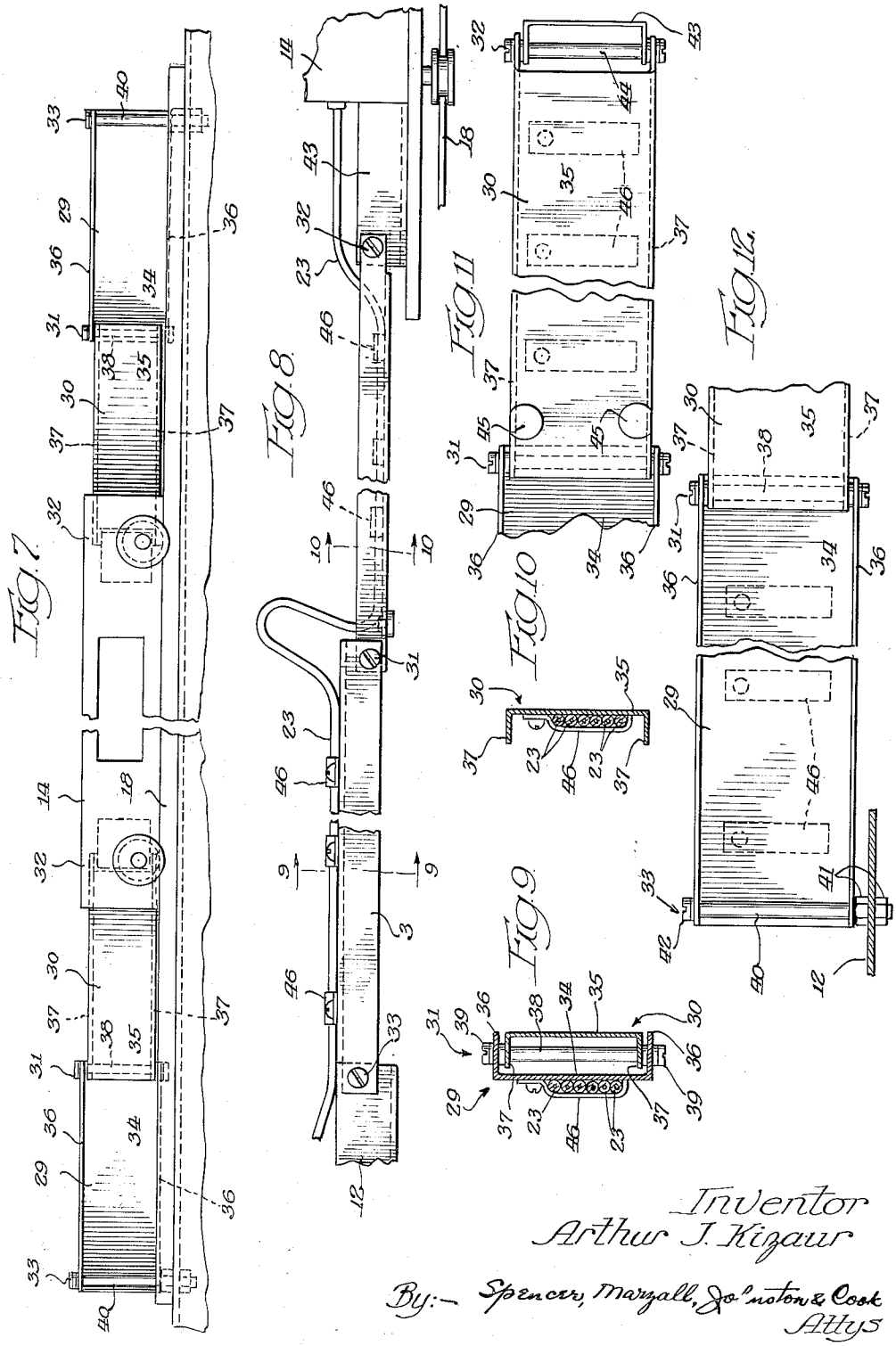
Inventor
Arthur J. Kizaur

By: Spencer, Marzall, Johnston & Cook
Attys

Sept. 11, 1951 A. J. KIZAUR 2,567,566

X-RAY APPARATUS

Filed July 15, 1949 2 Sheets-Sheet 2



Inventor
Arthur J. Kizaur

By:— Spencer, Marzall, Johnston & Cook
Attys

Patented Sept. 11, 1951

2,567,566

UNITED STATES PATENT OFFICE

2,567,566

X-RAY APPARATUS

Arthur J. Kizaur, Wauwatosa, Wis., assignor to General Electric Company, a corporation of New York

Application July 15, 1949, Serial No. 104,903

6 Claims. (Cl. 250—58)

1

The present invention relates in general to X-ray apparatus, and has more particular reference to an improved table structure for the support of an object, such as a human being, for X-ray examination and photography.

A structure of the sort in which the present improvement may be embodied to advantage is illustrated and described in U. S. Letters Patent No. 2,315,786, issued April 6, 1943, on the invention of Julius J. Grobe, such structure comprising a frame providing a support for a panel forming a table top on which an object to be examined may be disposed, the frame and panel being preferably, though not necessarily, supported for tilting movement, so that an object thereon may be presented at will either horizontally or in tilted position for examination.

X-ray examination may be accomplished by means of a suitable X-ray source mounted in position above the panel to emit an X-ray beam downwardly through the panel and the object disposed thereon for examination, to thereby photograph an X-ray picture of the object on X-ray sensitive material supported beneath the panel. Examination may also be accomplished by means of a suitable X-ray source mounted in position beneath the panel and the object disposed thereon for examination, for X-ray photography or fluoroscopy on suitable X-ray sensitive material disposed above the object being examined.

For examination convenience and flexibility, the structure is preferably arranged to allow for examination at will by either of the aforesaid methods, and to this end the structure may include suitable X-ray source means disposable at will above or below the panel or top of the table; or separate X-ray sources, one disposed above and the other below the panel, may be provided. In order that examination may be accomplished in any zone or area within the confines of the table top, it is desirable that the X-ray source or sources be adjustable longitudinally as well as laterally of the table top within the area thereof; it being likewise desirable to provide carriage means allowing for the lateral and longitudinal adjustment of the sensitive material at all times in registration or fixed relation with respect to the cooperating source of X-rays.

To this end, the structure may include carrying frame means, preferably supported on the table frame and adjustable longitudinally with respect to the table top. The sensitive material and cooperating X-ray source means may be supported on such carrying frame means or may be separately supported. Such carrying frame means

2

may include separate carriage, one of which may be mounted on the table frame for movement longitudinally thereof beneath the table top panel, for the purpose of supporting X-ray sensitive material, as in a light-tight cassette, in position beneath the table top to cooperate with an X-ray source disposed above the table. Such a carriage may include a Bucky type diaphragm in position to rectify X-rays prior to impingement thereof upon the sensitive material disposed in the carriage beneath the diaphragm; and the carriage may also contain diaphragm shifting and other electrically operated mechanism. Such carriage, for convenience, may be referred to as an under panel cassette carriage, and may be mounted for movement on suitable rails on the table frame. It may be shifted and locked in adjusted position, and otherwise controlled by means of handles extending outwardly of and beneath a side edge of the table top panel, through a suitable elongated slot or opening between the edge of the panel and its underlying support frame, such operating and control handles being thus conveniently located at approximately table top height in position readily accessible to an operator of the apparatus standing beside the table structure.

A separate, longitudinally movable frame structure may be provided for carrying sensitive material above the table top panel. Such frame, for convenience, may be referred to as an over panel support structure, but it preferably also includes portions extending beneath the top panel for the mounting of an X-ray source beneath the panel in position registering with the sensitive material disposed above the panel.

It will be apparent that, in order to avoid operational interference, the separate carriage structures should be movable from one end of the table structure to the other, independently the one with respect to the other; and it will be apparent, also, that when one of the structures is in position for examination, the other should be in relatively offset position to avoid interference by one carriage structure with an examination being conducted by the other. Accordingly, when, for example, an examination is being conducted by means of the over panel support structure, the under panel cassette carriage should be offset at either of the ends of the table structure, thereby allowing examination with the over panel support structure to take place at the central portions of the table, or at the end thereof remote from the under panel cassette carriage, and vice versa.

It will be noted that when the over panel support structure is in operation, an X-ray source will be activated in position beneath the panel to direct X-rays upwardly upon sensitive material mounted above the table. This sensitive material may be either a fluorescent screen upon which to visually observe X-ray shadow pictures, or light sensitive material for X-ray photography purposes may be employed. In either event, and particularly where visual examination is made with a fluoroscopic screen, the operator or examiner must necessarily stand alongside of the table in position to view the screen, or operate controls required in X-ray photography. When so standing alongside of the table, the operator's mid section is likely to be disposed at the slot provided for the accommodation of the operating handles of the under top carriage, in position exposed to stray X-ray radiation through said slot from the source located beneath the table top panel.

Since it is desirable to protect the operator, as much as possible, from exposure to X-rays, the present invention has for its important object the provision of simple and inexpensive means for screening the aforeaid slot against passage therethrough of X-rays whenever the over table carriage structure is in operation in conjunction with an X-ray source disposed beneath the table top.

Another important object is to arrange such slot screening means to automatically assume screening position when the over table carriage structure is in use, without requiring the operator to take any special steps to mount the screen in screening position, thereby eliminating the danger of failure to provide the screening effect through the operator's negligence.

Another important object is to provide screening means of the character mentioned, which will automatically be positioned in slot screening position as the result of moving the under panel cassette carriage to either end of the table in order to allow the over panel carriage structure to be placed in operation.

Another object is to provide screen means comprising a pair of folding, panel-like legs of material relatively impervious to X-rays, between the under panel carriage and each end of the table, so that one or other of said pairs of folding legs may be disposed in screening position across the slot in response to disposition of the under panel carriage in offset position at one end or the other of the table.

Another important object is to utilize one or both of said relatively foldable leg pairs for the purpose of supporting electrical conductor means for energizing electrical apparatus carried on the under panel carriage, and for electrically controlling the operation of the same.

The foregoing and numerous other important objects, advantages, and inherent functions of the invention will become apparent as the same is more fully understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment of the invention.

Referring to the drawings:

Fig. 1 is a perspective view of a structure comprising a support table embodying the present invention;

Fig. 2 is a sectional view taken substantially along the line 2—2 in Fig. 1;

Fig. 3 is a perspective view of the structure as seen from the under side of the table;

Figs. 4, 5, and 6 are sectional views of somewhat diagrammatic character, taken substantially along the line 4—4 in Fig. 1, to illustrate structure embodying the present invention in several relatively shifted positions;

Fig. 7 is an enlarged sectional view taken substantially along the line 7—7 in Fig. 5;

Fig. 8 is an enlarged sectional view taken substantially along the line 8—8 in Fig. 7;

Figs. 9 and 10 are enlarged sectional views taken substantially along the lines 9—9 and 10—10 in Fig. 8; and

Figs. 11 and 12 are enlarged views of portions of the structure shown in Fig. 7.

To illustrate the invention, the drawings show a compact apparatus adapted for fluoroscopic examination and radiographic purposes, the same comprising a table-like support structure 11, including a table frame 12 and a top panel 13, on which an object to be examined may be disposed. While the frame 12 may be of any preferred construction to provide adequate rigidity, it preferably consists of hollow, box-like members, including longitudinally extending side members and transverse members interconnecting the side members at the opposite ends of the frame. The transverse and side members are preferably formed of heavy gauge sheet metal, such as steel, which is relatively impervious to X-rays. If desired, the frame members may be lined with lead sheets for X-ray screening purposes. One of the side members of the frame also preferably carries a skirt 12′ comprising a dependent plate, as of steel, which may be lined with lead for X-ray screening purposes hereinafter more fully explained. The structure also includes associated facilities for radiographic purposes, that is to say, the making of X-ray photographs of an object thereon by means of a source of X-rays (not shown) disposed above the table, in conjunction with means for supporting X-ray sensitive material beneath the top panel of the table, such means comprising an under panel carriage 14.

The associated equipment may also include apparatus for the fluoroscopic examination as well as X-ray photography, or radiography, of an object, supported on the table, by means of an X-ray source, S, disposed beneath the top panel in position to emit a beam of X-rays in a direction upwardly through the panel and an object thereon, such means including an over panel carriage structure 15 adapted to support, as at 16, an X-ray sensitive fluoroscopic screen above the table, in position for fluoroscopic examination of an object on the table. The over table carriage structure may also be formed to support X-ray sensitive material in position for radiographic purposes above the table.

While the illustrated apparatus has many convenient features, the present invention is not necessarily restricted to the particular form or arrangement of parts which are shown merely for the purpose of illustrating the operation of the present invention, which comprises protective screening means in conjunction with the table structure and associated equipment, as hereinafter more fully described. In this connection, it will be obvious that the X-ray source, used above the table, in conjunction with sensitive material in the under panel carriage 14, may, as shown in the previously mentioned Grobe Patent No. 2,315,786, be mounted on the over panel carriage structure 15. It will be obvious, also, that facilities may be provided for utilizing such X-ray source in position selectively above and below the panel 13, in the manner taught in said Grobe

patent aforesaid. Such X-ray source obviously, when positioned above the panel, may cooperate with light sensitive material carried in the under panel carriage 14 for radiographic purposes; and when disposed beneath the panel, may be employed in conjunction with a fluorescent screen or X-ray sensitive material carried above the panel, as at 16, in the carriage structure 15 for fluoroscopic examination or radiographic purposes.

The apparatus herein illustrated contemplates the support of the X-ray source on a support structure separate from the over panel structure 15. To this end, the X-ray source may be separately supported in the manner illustrated and described in a co-pending application for U. S. Letters Patent on X-Ray Apparatus, Serial No. 95,752, filed May 27, 1949. An X-ray source supported in such separate fashion may, at will, be adjusted in position above the panel 13 for emission of X-rays downwardly for radiographic purposes on sensitive material supported on the under panel carriage 14, and in position beneath the panel to project X-rays upwardly therethrough upon a fluorescent screen or light sensitive material supported, as at 16, in the over panel carriage.

The illustrated apparatus comprises a pedestal or base 17, on which the table frame 12 may be tiltably mounted to support the object under examination in either horizontal or in any relatively tilted position. As will be apparent, however, the present invention is not necessarily limited to a relatively tiltable table structure, but may be embodied to advantage in a stationary table, if desired. Where a tilting table is employed, however, the same may, and preferably does, comprise a structure of the character illustrated in the copending application for U. S. Letters Patent for X-Ray Apparatus, Serial No. 95,752, filed May 27, 1949. In such structure the frame 12 may be provided with tracks 18 along the opposite sides of and beneath the top panel 13 for guiding and supporting the under panel carriage 14 for longitudinal movement immediately beneath the top panel, the carriage being preferably provided with suitable wheels or rollers having engagement with the tracks; and the carriage may be provided with rollers 19 at the opposite ends of the carriage in position to bear upon the under side of the table top 13. If desired, the carriage may be connected with counterbalancing means, through suitable cords operating on pulleys or sheaves on the table frame, to counterbalance the weight of the carriage and facilitate movement thereof along the tracks, regardless of the tilted position of the table structure on its pedestal or base 17.

A handle 20 may be provided on the carriage in position projecting through an elongated slot or opening 21 in the frame 14, immediately beneath a longitudinal side edge of the top panel 13, such handle 20 being provided for shifting the under panel carriage longitudinally from end to end of the table structure. Said handle, if desired, may be arranged for manual operation to clamp or lock the carriage 14 in any position of longitudinal adjustment on the table frame; or a separate clamping or locking handle may be provided in position extending through the slot 21.

The carriage 14 comprises frame means providing support for receiving a case or cassette containing a sheet or film of X-ray sensitive material. Such cassette may be loaded into or mounted in the carriage 14 by insertion of the cassette edgewise through the slot 21. Said carriage may, and preferably does, embody a Bucky diaphragm structure, B, mounted therein in position extending between the cassette support and the table top. The carriage 14 preferably also includes motive means, M, for shifting the Bucky diaphragm, in the manner taught, for example, in U. S. Letters Patent No. 2,062,562, issued December 1, 1936, on the invention of Roy F. Dent. Such Bucky shifting mechanism may be adjusted, and the operation thereof controlled, by suitable handle means 22 extending from the carriage 14 through the slot-like opening 21. Power for the operation and control of the Bucky shifting mechanism may be delivered through suitable conductors 23.

The table frame 12 may also be provided with tracks 24, beneath the tracks 18, for mounting the over panel carriage structure 15 for movement longitudinally of the table frame. To this end, the structure 15 may comprise a carriage frame 25, formed with rollers adapted to ride the tracks 24 between the opposite ends of the table frame 12. This carriage frame, if desired, may be counterbalanced, and manually operable means may be provided for anchoring it in any desired position of adjustment longitudinally of the table frame. Supported on the frame 25, for sliding movement in a direction transversely of the table, is a sub-frame 26 having portions extending outwardly of and beneath the side of the table frame 12, preferably opposite from the slot 21, said sub-frame 26 carrying the over panel support structure 15 thereon. The sub-frame 26, if desired, may be supported directly on the carriage frame 25, as by means of suitable rollers. Preferably, however, the sub-frame is slidably supported by suitable rollers on an intermediate frame, which in turn, by suitable roller means, is carried slidably on the carriage frame 25. Manually operable means may be provided for securing the sub-frame 26 in any relatively adjusted position with respect to the carriage frame 25 in a direction transversely of the table structure.

A suitable structure 27, such as the mechanism illustrated and described in an application for U. S. Letters Patent on the invention of Mueller and Burgeson, shortly to be filed, may be mounted on the over panel carriage structure 15 for the purpose of supporting a fluorescent screen above the panel 13 in position for fluoroscopic examination of an object on the table, in conjunction with a light source disposed beneath the panel 13, as on the sub-frame 26, such structure 27 preferably embodying support means for positioning X-ray sensitive material, in a suitable cassette, at will, in position, as at 16, for radiographic purposes, such mechanism allowing an X-ray photograph to be made of an object viewed fluoroscopically, substantially instantaneously, by appropriate action of the observer.

The X-ray source in position beneath the table, for cooperation with the mechanism 27, if desired may be permanently mounted on the sub-frame 26 at a suitable source seat formed in said sub-frame. So mounted, the X-ray source will be permanently positioned in alined registration with the fluorescent screen at 16 and with the position occupied by a film cassette when projected into position for X-ray photography purposes. Alternately, as heretofore suggested, the sub-frame 26 may be formed with source seating means adapted detachably to receive a suitable X-ray source in operative position thereon, whereby such source may be selectively employed in position on the sub-frame 26 be-

neath the table top panel, and in position above the table top to cooperate with sensitive material in the under panel carriage 14.

When the structure 27 is in operation for fluoroscopic examination or radiography in conjunction with a light source mounted on the sub-frame 26, it will be apparent that the under panel carriage 14 will necessarily be disposed in position either at one end of the table, as shown in Fig. 4, or at the opposite end of the table, as shown in Fig. 6, thus leaving the remaining portions of the table unobstructed for fluoroscopy or radiography by means of the mechanism 27. It will be seen, also, that during fluoroscopy or radiography by means of the mechanism 27, the operator or observer must necessarily stand alongside of the table opposite the viewing screen location at 16. In such position, the observer's mid-section will necessarily be disposed opposite the slot 21 in substantial registration with the operating X-ray source on the sub-frame 26, thus being in danger of exposing the operator's mid-section to undesirable X-ray radiation as the result of penetration of stray X-rays from the source through the unguarded opening 21.

The frame 12 and its skirt 12', as heretofore pointed out, tend to screen the operator against undue X-ray exposure. The edge of the top panel 13 may also be enclosed in a metal binding having some X-ray screening effect. The opening 21, however, is necessarily of substantial width, of the order of 3–4 inches, and is necessarily unobstructed to allow adjustment of the carriage 14 freely to any position between the opposite ends of the table frame, and to permit a cassette loaded with sensitive material to be mounted in the carriage 14 in any adjusted position thereof lengthwise of the table structure.

It is an important object of the present invention to provide automatic means for screening the opening 21 against such penetration of X-rays therethrough when the over panel apparatus 27 is in operation. To this end, automatically operating screen means 28 is provided, which not only disposes an adequate screen across the slot 21 whenever the over panel apparatus 27 is in operation, but also allows free and unobstructed movement of the under panel carriage 14 longitudinally of the table at all times. The screen means 28, also, is of exceedingly simple and inexpensive character and may be provided without materially increasing the cost of the apparatus.

The protection screen mechanism 28 comprises a set or pair of relatively foldable leg panels 29 and 30 at each end of the under panel carriage 14, each leg pair 29 and 30 being pivotally connected together, as at 31, at the meeting ends of the legs. The end of the leg 30, remote from the medial pivot 31, is pivoted, as at 32, on the carriage 14, at a corner thereof adjacent the slot 21. The other leg 29, at the end thereof remote from the medial pivot 31, is pivoted, as at 33, on the main table frame 12 opposite an end of the slot 21. A folding screen, comprising a leg 29 and a leg 30, is thus connected between each end of the carriage 14 and the corresponding end of the frame 12, the folding screens being sized and mounted so that, when the carriage 14 is in position at either end of the table, one of the screens will be in snugly folded position between the carriage 14 and said end of the frame 12, while the other of them will be straightened out in position occupying a flat plane and covering the slot 21 between the carriage 14 and the opposite end of the frame 12.

The two folding screens may comprise leg parts of identical configuration, said parts preferably comprising metal stampings, as of steel, carrying, if desired, sheets of lead for additional X-ray protection. As shown, the screen legs 29 and 30 comprise sheet metal channel members 34 and 35, having upper and lower marginal flanges 36 on the members 29 and 37 on the members 30, such flanges being formed for interfitting or nested relationship at the meeting ends of the legs, whereby the pivots 31 may comprise simple stems 38 extending through perforations in the flanges 36 and 37 to relatively hinge the legs 29 and 30, suitable nuts 39, fastened on the opposite ends of the pivot pins 38, being provided to secure the legs on the pivot pins. The legs 29 may be pivotally secured on the frame 12 by means of pivot pins 40, mounted on the frame 12 as by means of nuts 41 threaded on the pins 40, said pins 40 extending through suitable openings formed in the flanges 36 and secured in place, as by means of nuts 42. The pivot remote ends of the leg members 30 may be pivotally secured to the carriage 14 by means of sheet metal panel members forming brackets 43 on the carriage, and pivot pins 44 pivotally interconnecting the ends of the flanges 37 with the flanges of the brackets 43.

If desired, one or other or both of the legs 29 and 30 of each folding screen may be provided with resilient buffer members 45, as of rubber-like material, mounted to minimize noise of engagement of the leg members when relatively folded together. The legs 29 and 30 forming one or both of the screens may be provided at intervals with conductor clips 46 for the purpose of securing the conductors 23 to the legs, said conductors being preferably looped opposite the pivots 31. The conductors 23, which connect with electrical mechanism in the carriage 14 and with electrical equipment on or outwardly of the table frame 12, may thus be supported in neat, orderly fashion and prevented from hanging loosely and from becoming entangled with the several relatively movable elements of the structure. To facilitate electrical connections, the conductors 23 may be connected at their opposite ends on connection terminal panels 47 and 48, respectively mounted on the frame 12, near the pivoted end of a screen member 29, and on the carriage 14, near the pivoted end of a screen member 30, in position for electrical connection with the Bucky operating aparatus, M.

It is thought that the invention and its numerous attendant advantages will be fully understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the form herein disclosed being a preferred embodiment for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. In an X-ray apparatus comprising a support table structure including a frame and a panel forming a top on which to support an object for X-ray exposure, an under panel carriage for X-ray sensitive material movable on said frame, longitudinally of and beneath said panel, between the opposite ends of said table structure, in position to cooperate with an X-ray source supported above the panel, and means for supporting X-ray sensitive material in position, above the panel, to cooperate with an X-ray

source disposed beneath the panel, wherein the table structure is formed with an elongated opening beneath the panel affording access to said under panel carriage, in any longitudinally adjusted position thereof in the table structure, the combination, with said frame and carriage, of X-ray opaque screen means comprising relatively hinged plates at least one of which is pivotally connected with the carriage and another of which is supported by the frame, said plates being movable, in response to movement of said carriage toward one end of said frame, into position to screen the said opening, between said carriage and the opposite end of the frame.

2. In an X-ray apparatus comprising a support table structure including a frame and a panel forming a top on which to support an object for X-ray exposure, an under panel carriage for X-ray sensitive material movable on said frame, longitudinally of and beneath said panel, between the opposite ends of said table structure, in position to cooperate with an X-ray source supported above the panel, and means for supporting X-ray sensitive material in position, above the panel, to cooperate with an X-ray source disposed beneath the panel, wherein the table structure is formed with an elongated opening beneath the panel affording access to said under panel carriage, in any longitudinally adjusted position thereof in the table structure, the combination with said frame and carriage, of X-ray opaque screen means for said opening, comprising a pair of plates of X-ray opaque material relatively pivoted at their adjacent ends and having remote ends respectively pivoted on said carriage and on said frame, adjacent an end thereof.

3. In an X-ray apparatus comprising a support table structure including a frame and a panel forming a top on which to support an object for X-ray exposure, an under panel carriage for X-ray sensitive material movable on said frame, longitudinally of and beneath said panel, between the opposite ends of said table structure, in position to cooperate with an X-ray source supported above the panel, and means for supporting X-ray sensitive material in position, above the panel, to cooperate with an X-ray source disposed beneath the panel, wherein the table structure is formed with an elongated opening beneath the panel affording access to said under panel carriage, in any longitudinally adjusted position thereof in the table structure, the combination, with said frame and carriage, of X-ray opaque screen means for said opening, comprising a pair of elongated plates of material relatively impervious to X-rays, having pivotally interconnected ends and remote ends respectively pivoted on said carriage, adjacent said opening, and on said frame, adjacent an end thereof and inwardly of said opening, in position to extend in substantially co-planar relation in said opening when said carriage is moved toward one end of said frame, and to fold one plate against the other when said carriage is moved toward the opposite end of said frame.

4. In an X-ray apparatus comprising a support table structure including a frame and a panel forming a top on which to support an object for X-ray exposure, an under panel carriage for X-ray sensitive material movable on said frame, longitudinally of and beneath said panel, between the opposite ends of said table structure, in position to cooperate with an X-ray source supported above the panel, and means for supporting X-ray sensitive material in position, above the panel, to cooperate with an X-ray source disposed beneath the panel, wherein the table structure is formed with an elongated opening beneath the panel affording access to said under panel carriage, in any longitudinally adjusted position thereof in the table structure, including electrically operable equipment supported on said carriage, the combination, with said frame and carriage, of X-ray opaque screen means for said opening, comprising a pair of plates relatively pivoted at their adjacent ends and having remote ends respectively pivoted on said carriage and on said frame adjacent an end thereof, and conductors electrically connected with said operable equipment and extending thence from the carriage to said frame in position successively supported on said relatively pivoted plates.

5. In an X-ray apparatus comprising a support table structure including a frame and a panel forming a top on which to support an object for X-ray exposure, an under panel carriage for X-ray sensitive material movable on said frame, longitudinally of and beneath said panel, between the opposite ends of said table structure, in position to cooperate with an X-ray source supported above the panel, and means for supporting X-ray sensitive material in position, above the panel, to cooperate with an X-ray source disposed beneath the panel, wherein the table structure is formed with an elongated opening beneath the panel affording access to said under panel carriage, in any longitudinally adjusted position thereof in the table structure, the combination, with said frame and carriage, of X-ray opaque protective screen means comprising a folding screen connected on and between each of the opposite ends of said carriage and the corresponding ends of the frame, each of said folding screens embodying a pair of plates relatively pivoted at their adjacent ends and having remote ends respectively pivoted on said carriage and on said frame, adjacent an end thereof, in position to fold together between the carriage and the end of the frame when the carriage is moved on the frame toward said end.

6. In an X-ray apparatus comprising a support table structure including a frame and a panel forming a top on which to support an object for X-ray exposure, an under panel carriage for X-ray sensitive material movable on said frame, longitudinally of and beneath said panel, between the opposite ends of said table structure, in position to cooperate with an X-ray source supported above the panel, and means for supporting X-ray sensitive material in position, above the panel, to cooperate with an X-ray source disposed beneath the panel, wherein the table structure is formed with an elongated opening beneath the panel affording access to said under panel carriage, in any longitudinally adjusted position thereof in the table structure, the combination, with said frame and carriage, of X-ray opaque screen means for said opening, comprising a pair of elongated plates of material relatively impervious to X-rays having pivotally interconnected ends and remote ends respectively pivoted on said carriage, adjacent said opening, and on said frame, adjacent an end thereof and inwardly of said opening, in position to extend in substantially co-planar relation in said opening when said carriage is moved toward one end of said frame, and to fold one plate against

the other and between the carriage and the opposite end of the frame when said carriage is moved toward the said opposite end of the frame.

ARTHUR J. KIZAUR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
422,379	Clark	Mar. 4, 1890
1,907,523	Egressi et al.	May 9, 1933
2,179,859	Page	Nov. 14, 1939
2,315,786	Grobe	Apr. 6, 1943
2,423,636	Boyd	July 8, 1947
2,426,502	Haupt	Aug. 26, 1947