Jan. 2, 1951 N. C. OSTROFF 2,536,212

COMBINATION X-RAY AND EXAMINATION TABLE WITH UPRIGHT RADIOGRAPHY

Filed June 10, 1950 2 Sheets-Sheet 1

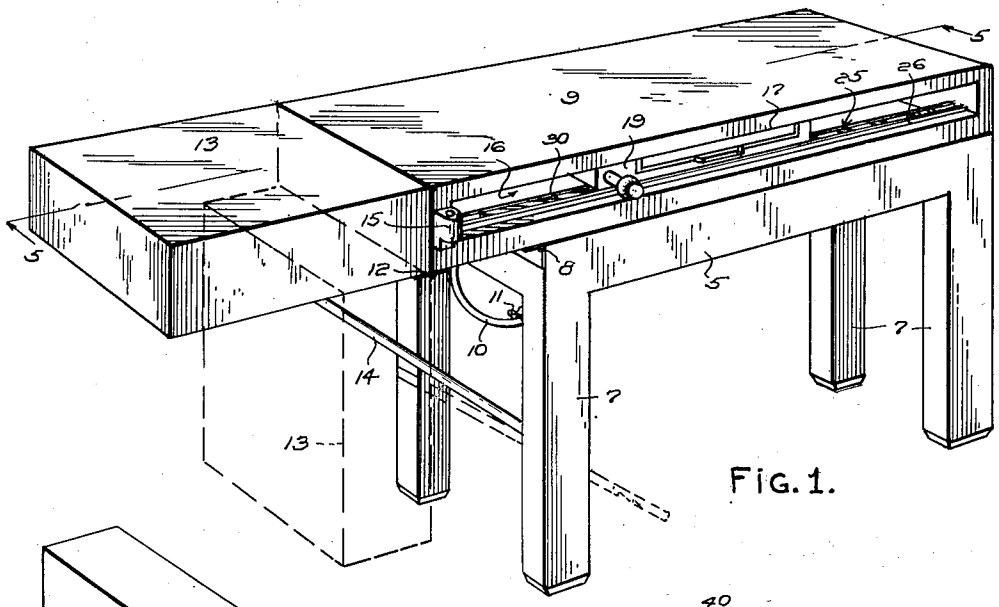


Fig. 1.

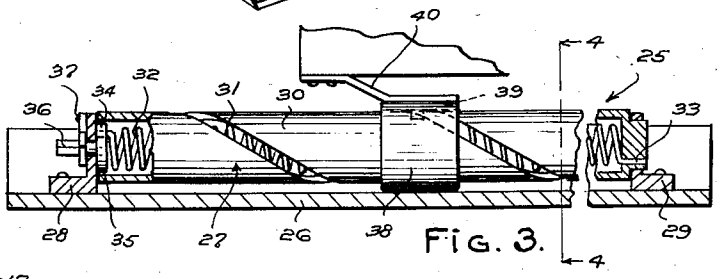


Fig. 3.

Fig. 2.

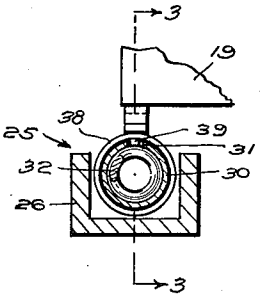


Fig. 4.

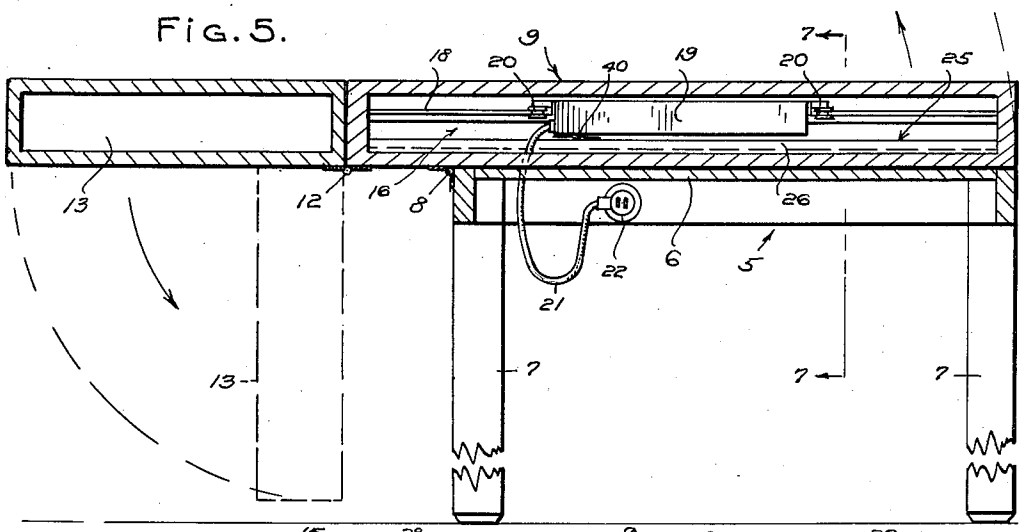
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Fig. 5.



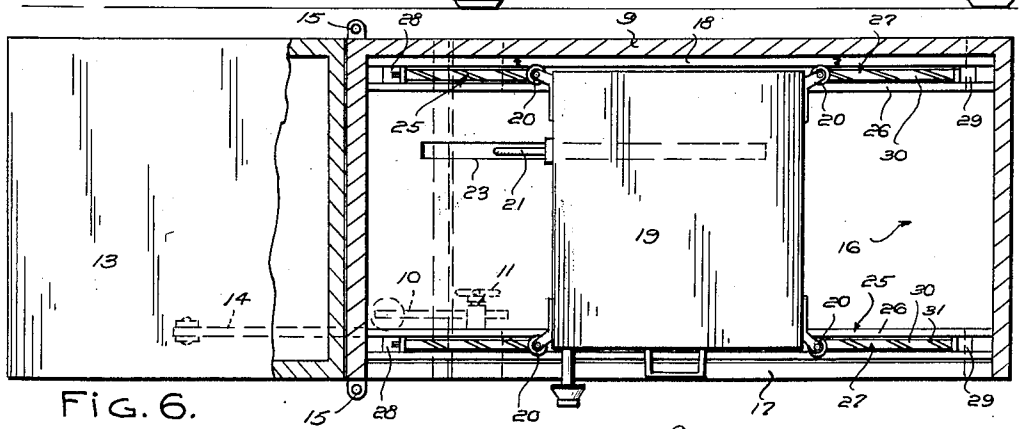


Fig. 6.

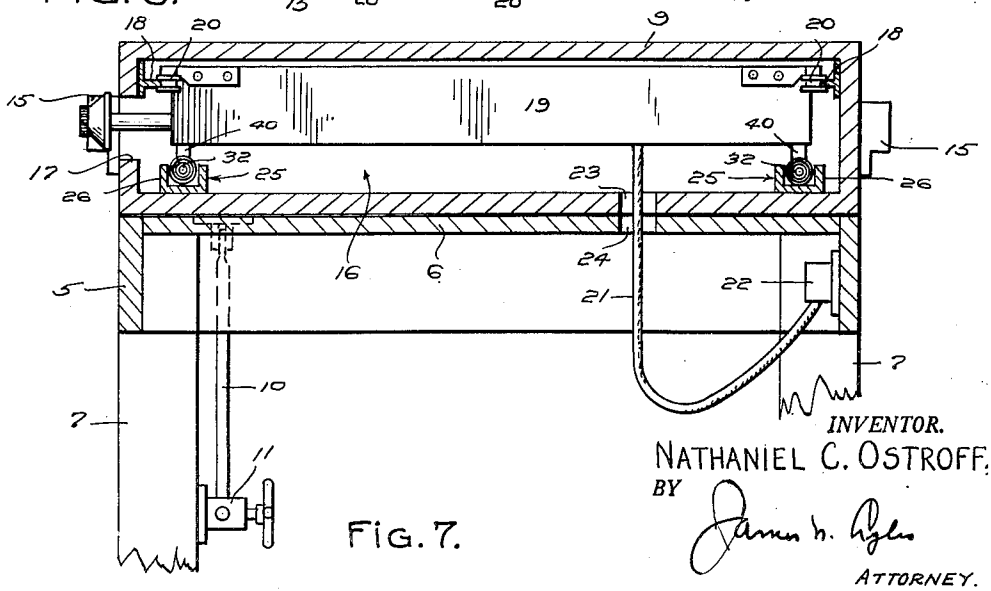


Fig. 7.

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COMBINATION X-RAY AND EXAMINATION TABLE WITH UPRIGHT RADIOGRAPHY

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Application June 10, 1950, Serial No. 167,370

5 Claims. (Cl. 250—58)

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This invention relates to improvements in a combined radiographic-fluoroscopic and examining table.

An object of the present invention resides in providing a table having a fixed base section and a table top that is hinged to swing in a vertical plane, with the table top having mounted therein for shiftable endwise movement, the conventional bucky, whereby the bucky maintains its relative position with respect to the table top regardless of whether the table top is in the horizontal or vertical position.

A further object of the invention resides in a novel construction of table having a hinged foot section that may be swung downwardly when the table is to be used for vaginal examinations, with the upper end of the depending foot section serving as a support for examination instruments or the like, with brace means to rigidly position the foot section in the upper or horizontal position.

Another object of the invention resides in the novel means whereby the bucky is mounted within the vertically shiftable table top to be adjusted to a desirable point within the top for proper positioning beneath a patient for X-ray pictures or for proper positioning as to height, when the table top is swung to a vertical position for use in fluoroscopic examinations, with novel means whereby the bucky is guided in its traverse of the table and suitably balanced to maintain its position of adjustment.

Other objects and advantages and novel features of construction and operation will be readily apparent during the course of the following description, reference being had to the accompanying drawings, wherein has been illustrated a preferred form of the invention and wherein like characters of reference denote like parts throughout the several figures.

In the drawings:

Figure 1 is a perspective view of a table constructed in accordance with the invention, shown in the horizontal position,

Figure 2 is a perspective view of the table with its top swung to the vertical position,

Figure 3 is a fragmentary longitudinal section of a traverse balancing means for the bucky, taken on line 3—3 of Figure 4,

Figure 4 is a transverse vertical section, taken on line 4—4 of Figure 3, with parts in elevation,

Figure 5 is a central vertical longitudinal section of the table, taken on line 5—5 of Figure 1,

Figure 6 is a horizontal section of the table top, parts in top plan view and,

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Figure 7 is a vertical transverse section, taken on line 7—7 of Figure 5.

Referring specifically to the drawings, the device comprises a fixed table 5, generally rectangular in top plan, having a cover 6 and corner supporting legs 7. The table may be of any suitable construction and the legs are of a length to support a table top at the proper height.

Hinged to the forward upper end of the table 5, as at 8, is a box-like table top 9, having a width equal to the width of the table 5. The top 9 is adapted to normally lie flat upon the table 5 with one end flush with the end of the table and its opposite end extended beyond the table and its point of hinging. The extended end of the top 9 is provided with an arcuate bracket 10 that slidably engages a clamp 11, fixed to one leg 7, through the medium of which the top 9 may be securely held against swinging movement, when adjusted to the vertical position, as shown in Figure 2. The normal weight of the top 9 will maintain the top in the horizontal position, as shown in Figure 1. Hinged to the extended end of the top 9, as at 12, is a box-like foot section 13, equal to the top 9, as to height and width. The foot section 13 is normally held in alignment with the top 9, by a brace rod 14, having shiftable notched engagement with a suitable bracket carried by the leg 7. The foot section 13 may be dropped down to the dotted line position shown in Figures 1 and 5, by disengaging the brace 14 and, when the foot section is in the lowered position, presents a flat, relatively wide end, that serves as a rest for various instruments employed during an examination. When the table top 9 is to be swung to the vertical position, as shown in Figure 2, the brace rod 14 is first disengaged, permitting the foot section to drop down, after which, the top 9 and associated elements, to be described, may be swung in a vertical plane to assume a perpendicular position, after which, the arcuate bracket is clamped in position. The tops of both the top 9 and foot section 13 are preferably smooth and free of any irregularities and it may be found desirable to place a pad or other cover over the surface as an aid to comfort. It is customary in examination tables, to provide stirrups, especially for vaginal examinations. Brackets 15 are secured to the forward ends of the top 9 for the detachable support of the stirrups, not shown.

The top 9, being of box form, provides an inner compartment 16, for housing a conventional bucky. The compartment extends for the major length and width of the top 9, and is formed open

along one side, as at 17. The opposite side and ends of the top are fully closed. Rigidly positioned along the sides of the top 9, adjacent the top cover, is a pair of parallel trackways 18, parallel with the top of the top 9. A conventional bucky 19, of well known construction, is provided with grooved rollers 20 at each of its upper corners for engagement with the tracks 18, through the medium of which, the bucky is easily shifted from end to end of the top 9. The bucky 19 remains parallel with the upper surface of the top 9 at all times. The open side 17 permits access to the bucky for insertion of sensitized plates and to permit clearance to control elements of the bucky. The bucky is connected by an electrical conductor 21, leading to a plug-in socket 22, fixed to the under side of the table 5, as shown, with the conductor freely passing through aligned slots 23 and 24, formed in the lower wall of the top 9 and the cover of the table 5, such an arrangement permitting the shifting movement of the bucky in any position of the top 9 without interrupting the flow of current. The plug-in socket 22 is detachably engaged by an electrical conductor from the conventional X-ray machine, not shown.

Since the bucky is freely shiftable upon the trackways 18, it follows, that means must be provided to counterbalance the weight thereof when the top 9 is swung to the vertical position, as in Figure 2. To accomplish this counterbalancing, a pair of identical balance devices, indicated as a whole by the numeral 25, are arranged within the compartment 16 adjacent each side wall and parallel thereto and with each other. Each balance device includes a channel member 26, fixed upon the lower wall of the compartment 16 and extending for the full length of the compartment. Each channel 26 houses a balance device 27, supported therein by end brackets 28 and 29. The balance devices include an elongated cylindrical tube 30, one end of which is reduced and is rotatably supported in the brackets 29. The tubes 30 are spirally slotted throughout their major length, as at 31. Housed within the tubes 30, are torsion springs 32, having one terminal end anchored to the reduced end of the tube, as at 33, while its opposite end is anchored at 34, to a winding head 35, rotatably supported within the bracket 28 and having an axial squared end 36 projecting therebeyond, as shown, through the medium of which adequate tension can be imparted to the spring 32 to compensate for the weight of the bucky. Any desirable ratchet 37 may be employed to maintain the spring in proper and predetermined tension. The free end of the tube 30 is rotatably supported upon the head 35.

Shiftably supported upon the tube 30, is a cylindrical ring 38, provided with an inwardly projecting key 39, that engages within the spiral slot 31. The rings 38 are welded or otherwise fixed upon a bracket 40, in turn fixed upon the bottom of the bucky at opposite sides. It will therefore be apparent, when the bucky is manually shifted upon the trackways 18, the rings 38 partake of longitudinal sliding movement over the tubes 30 and, since the rings cannot rotate, the keys 39 will traverse the spiral slots 31 in a straight line, causing the tubes 30 to rotate and increasing the tension upon the springs 32. Thus, the weight of the bucky can be balanced to a fine degree. While the balance devices will maintain the bucky against shifting, it may be found advantageous in some cases to provide a locking device between the bucky and the trackways. However,

this is a mechanical expedient and illustration thereof is not deemed critical.

In the use of the table, for examination purposes, the foot piece 13 is lowered to the dotted line position, after which a patient is placed upon the top 9, with or without a pad. If a vaginal examination is to be made, the conventional stirrups are engaged in the brackets 15, for the reception of the patient's feet. The physician then proceeds with his examination, using the flat end of the foot piece 13 as a rest for his instruments. If the table is to be used for horizontal fluoroscopy, the foot piece 13 is elevated and latched in fixed position by the brace rod 14 and, with the patient in the prone position, the bucky is shifted along its trackways to the desired point beneath the patient. Horizontal radiography is conducted in the same manner. After the bucky has been properly positioned, a sensitized plate is inserted therein and the conductor from the X-ray machine is plugged into the socket 22. The slots 23 and 24 permit freedom of movement for the conductor 21.

When the table is to be employed for vertical fluoroscopy, the foot piece 13 is first lowered by releasing the brace bar 14. The table top 9 is then bodily swung upward to a perpendicular position, as illustrated in Figure 2 and is then locked in such position by the bracket 10 and clamp 11. A patient is then placed in standing position against the vertical surface of the top 9 and the bucky shifted along its trackways 18 to the proper position, being counterbalanced and will remain in such adjusted position. The physician then proceeds with his fluoroscopic examination in the conventional manner.

It will be apparent from the foregoing, that a very novel and highly advantageous combination table has been provided. The novel arrangement of the bucky, whereby it maintains its same relative parallel position with respect to the top 9 regardless of the position of the top, is highly advantageous, since the bucky is always in accurate spaced relation to the body of a patient and requires no separate mounting and swinging supports to bring the bucky into position when the table is swung to perpendicular position. Buckys heretofore employed are usually mounted with the table and are not shiftable with the table top and obviously require a separate and costly mounting in order to control the shifting of the bucky when it is to be used in vertical fluoroscopy. The device of the present invention combines a vertically swinging table top with its housed bucky always ready for use. The novel balance means for the bucky is simple and highly effective and is easily adjusted as to tension. The table structure is simple, requires a minimum of floor space so important in the average physician's office, is strong, ornamental and highly effective for the purposes designed. Further, the structure presented is relatively cheap, as compared with corresponding devices now in use.

It is to be understood, that while a preferred example of the invention has been shown and described, various changes in the shape, size and arrangement of parts may be resorted to as will be determined by spirit of the invention or the scope of the subjoined claims.

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

1. In a combined X-ray and examination table that includes an elevated rigid base, a table top hinged adjacent one end to the base, the top extended beyond the base and the hinge at one end,

a foot extention hinged to the extended end of the top, the foot extension adapted to swing downwardly from the table top to provide a work surface at one end, brace means between the foot extension and the base, the table top provided with an inner compartment for its major width and length open at one side, trackways at both sides of the compartment parallel with each other and with the table top, a bucky diaphragm positioned in the compartment and provided with track rollers to traverse the trackways whereby the bucky diaphragm is shiftable from end to end of the compartment in parallel relation to the table top, torsion springs at both sides of the compartment, means carried by the bucky diaphragm for increasing or decreasing the torsion upon the springs as the bucky is shifted, the table top adapted to swing upwardly to a perpendicular position, with the bucky diaphragm maintaining its parallel relation to the top throughout the swinging movement and brace means between the table top and the base for maintaining the top in the perpendicular position against shifting.

2. A table of the character described comprising a rigid elevated base, a table top normally resting upon the base with one end extended therebeyond, hinge means between the base and the table top whereby the top is adapted to swing to a perpendicular position, a foot extension hinged to the top with its upper surface flush with the top, the foot extension adapted to swing downwardly to provide a work surface at one end, brace means for retaining the foot extension in the elevated and flush position, the table top provided with an interior compartment extending for the major length and width of the top and open at one side, trackways at both sides of the compartment parallel with each other and with the top, a bucky diaphragm positioned in the compartment and having rollers at each corner for traversing the trackways, the bucky diaphragm being parallel with the top throughout its traverse, balance means for the bucky diaphragm arranged at both sides of the compartment parallel with the trackways, the balance means including a torsion spring and a spirally slotted casing for the springs, the springs being anchored at one end to the casings and at the other end to brackets, brackets carried by the bucky diaphragm and means between the brackets and the casings adapted to slidably engage and rotate the casings as the bucky is shifted upon its tracks, the balance means adapted to balance the shifting movement of the bucky throughout the swinging movement of the table top to maintain the bucky in its parallel relation to the top at all times in any position of adjustment.

3. A combination table of the character described having a fixed elevated base and a table top hinged thereto and normally resting on the base, the table top extended at one end beyond the base and adapted to swing to a perpendicular position to be arranged entirely outwardly of the end of the base, a foot extension hinged to the extended end of the top and adapted to swing downwardly from the table top to expose a flat end as a work surface, brace means for retaining the foot extension in an upper flush position with the top, the table top provided with an interior compartment for its major width and length open at one side, parallel trackways in the compartment at both sides parallel with the top, a bucky diaphragm arranged in and adapted to traverse the compartment from end to end in

continuous parallel relation to the top, track rollers at each corner of the bucky that engage the tracks, torsion spring balance devices in the bottom of the compartment at both sides parallel with the trackways and with each other, spiral winding casings over the springs, brackets fixed to the bottom of the bucky, a carriage connected to each of the last named brackets for sliding movement over the spiral casings and means carried by each carriage for traversing the spirals of the casings, the movement of the carriages under the influence of the bucky serving to rotate the spiral casings for increasing or decreasing the torsion upon the springs, the bottom of the table top slotted and the top of the base slotted and an electrical conductor connected with the bucky and a plug-in device fixed upon the base with the conductor freely passing through the slots.

4. A combination table of the character described having a rigid base and a table top hinged thereto to swing to a perpendicular position, a foot extension hinged to the table top to swing downwardly to a perpendicular position, the table top being box-like and provided with an inner compartment for its major width height and length and open upon one side, a bucky diaphragm adapted to traverse the compartment from end to end, trackways in the compartment and rollers carried by the bucky for traversing the trackways, the bucky being parallel with the table top in all positions of traverse, balance means for the bucky throughout the various positions of the table top, the balance means including a tubular spirally slotted casing having a torsion spring therein anchored at one end to the casing, the opposite end of the spring being anchored at a fixed bracket, the casing adapted to rotate around the spring and rotatably supported at one end in a fixed bracket, brackets carried by the bucky, tubular carriages fixed to the last named brackets and adapted to have sliding movement over the casings under the influence of the shifting of the bucky, a key formed on each carriage to engage in and traverse the spiral slots, the shifting of the bucky causing the carriages to slide over the casings and rotate the casings through the medium of their key engagement in the slots for increasing or decreasing the torsion upon the springs, the bottom of the table top and the base provided with aligned slots, an electrical conductor connected with the bucky and with a fixed plug-in device upon the base, the conductor freely shiftable through the last named slots.

5. A combination X-ray and examination table that has a base and a table top hinged thereto and normally resting thereon in a horizontal manner, the table top adapted to swing vertically to a perpendicular position, a foot extension hinged to the table top at one end and adapted to swing downwardly to a perpendicular position, brace means for supporting the foot extension in the upper position, brace means for retaining the table top against swinging when in the perpendicular position, the table top provided with an inner compartment, a bucky diaphragm arranged in the compartment to be shifted from end to end thereof in continuous parallel relation to the table top in all positions of adjustment of the table top, rollers carried by the bucky and trackways in the compartment to be traversed by the rollers, balance means for the bucky in all degrees of angularity of the table top that consist of fixed channels along opposite sides of the compartment, brackets in the channels adjacent their

ends, a tubular spirally slotted casing in each channel that has one end rotatably supported in one of the brackets, torsion springs axially positioned in each casing with one end anchored to the casings and the opposite end adjustably connected to the other of the brackets, the casing rotatable around the springs to impart a torsional winding thereto, tubular carriages adapted to slidably traverse the casings, brackets connected with the carriages and with the bucky, each carriage provided with a key for engagement in and traverse of the spiral slots of the casings, the shifting of the bucky imparting a rotative movement to the casings under the influence of the carriages and their keys to increase or decrease the torsional stress upon the springs, the springs being torsionally adjusted at their adjustable connection with its respective bracket, the bottom of the table top and the base provided with aligned slots for the passage of an electrical conductor, the conductor connected with the bucky and with a plug-in device carried by the base.

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