

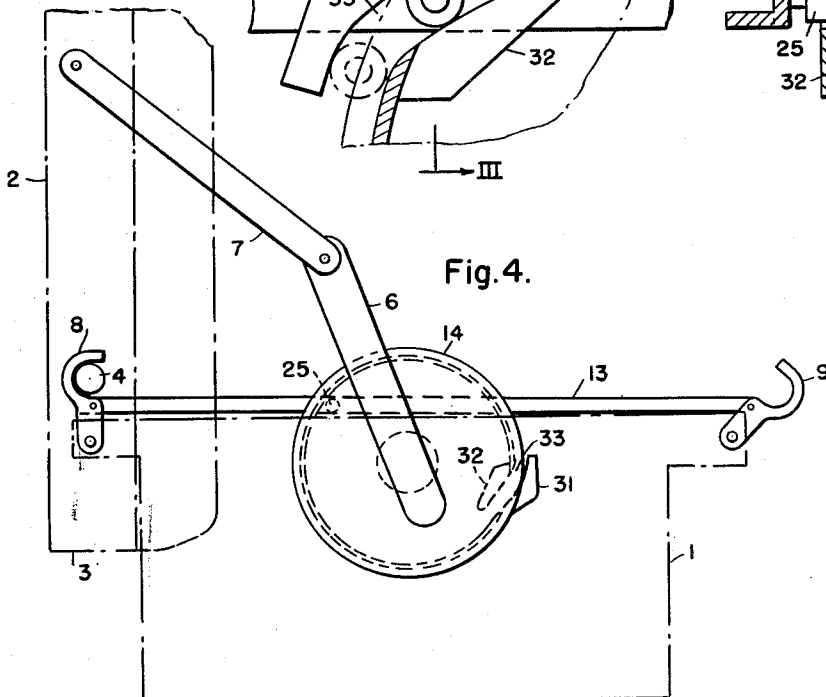
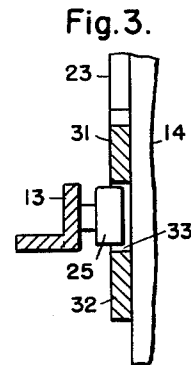
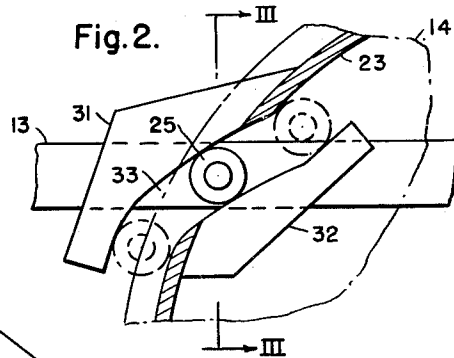
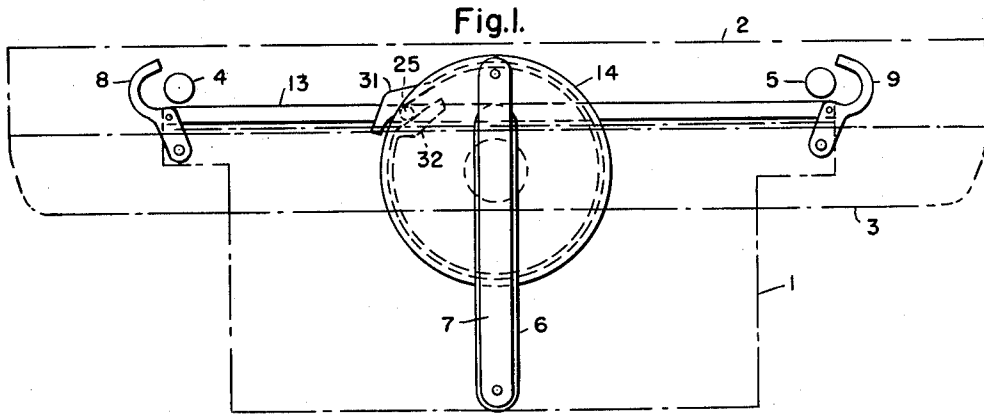
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2,693,399

PIVOT RELEASE FOR X-RAY TABLE

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PIVOT RELEASE FOR X-RAY TABLE

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6 Claims. (Cl. 311—6)

My invention relates to X-ray examination tables which may be tilted relative to the horizontal about a releasable fulcrum at either end as chosen by the operator, and it relates in particular to a safety lock which insures that the table cannot, while in a tilted position, be released from the fulcrum chosen. Certain subject matter here shown is also described and claimed in application Serial No. 323,650, filed December 2, 1952 of Koerner and Bantz for X-Ray Apparatus assigned to the assignee of this application.

Modern practice in medical X-ray examination requires a table on which the patient can recline and which can be tilted through 90 degrees relative to the horizontal in either direction, so that the patient's head may be higher than his feet when desired, and also so that, in what is known as the Trendelenberg position, his feet are above his head. It is also universal practice to attach the X-ray tube to the under side of this tiltable table so that its position relative to the patient is not disturbed when the table tilt is altered. An example of such a table is described in U. S. Patent 2,224,262 to W. H. Haupt.

It is self-evident that in any such arrangement disastrous results would follow if the pivot on which the table was resting could be released when the table was in a tilted position.

It is an object of the present invention to provide an improved form of tilting mechanism for an X-ray examination table which will simplify the operation of the tilt or pivot release and prevent the release of either fulcrum pivot except when the table is in substantially its horizontal position.

It is another object of the present invention to provide an improved mechanism for moving or actuating the pivot release for the respective ends of a tiltable examination table which shall insure by a very simple and economical device the release of either pivot when desired.

Other objects of my invention will become evident upon reading the following description taken in connection with the drawing, in which:

Figure 1 is a schematic side view of the mechanism for controlling the tilt of a typical X-ray examination table in accordance with our invention when the table is in its horizontal, or untilted, position.

Fig. 2 is an enlarged fragmentary view taken transverse to the rotational axis of bull sprocket 14, of the slot constituting part of my novel pivot-locking device as it stands when the table is in its untilted position.

Fig. 3 is a similar view taken on the section lines III—III in Fig. 2.

Fig. 4 is a schematic view similar to Fig. 1, showing the mechanism in its condition when the table is tilted through 90 degrees to the so-called "vertical" position in which the patient is in an erect position.

Referring in detail to the drawing, the X-ray examination table is shown in dot-dash outline and comprises a base 1 supporting in horizontal position the table top 2 on which the patient undergoing examination lies. The top 2 is supported by a box-like frame, or chassis 3, which may be tilted, at the will of the operator, about either of two releasable pivots fixed to the chassis 3 at points 4 and 5. The base 1 is hollow and contains a motor (not shown) and mechanical links 6, 7 by which an upward push can be exerted at the midpoint of chassis 3, thereby tilting the chassis 3 and table top 2 about the one of the two pivot-points 4, 5 which the operator has selected. The tilt may be made at any angle up to 90

degrees at either end, and its direction is dependent upon which of the pivots 4 or 5 is engaged by a releasable fulcrum member such as latch-hook 8 or 9, which respectively turn upon pivots fixed in base 1.

The X-ray tube (not shown) is supported within the chassis 3 and, as is conventional, is provided with means by which the operator may move it both crosswise and lengthwise of table 2 to irradiate any desired portion of the patient's body.

The latch-hooks 8 and 9 are interconnected by a latch-bar 13 pivoted to each. When the latch-bar 13 is moved to the right in Fig. 1, latch-hook 8 engages pivot 4 and latch-bar 9 is moved far enough away from pivot 5 so that the latter may move upward freely past the end of the hook. Conversely, when latch-bar 13 is moved to the left, hook 9 engages pivot 5 preventing it from moving upward and causing chassis 3 to pivot on 5 if its left end is raised.

Force to move chassis 3 to a tilted position is applied by a reversible electric motor (not shown) whose direction of rotation is under control of the operator. This motor is geared to turn a bull-sprocket 14 journaled on the base 1 and attached to the crank-arm 6 which is pivoted to link 7 which, in turn, is pivoted to the mid-point of chassis 3. In the untilted position of the table 2, the members 6 and 7 occupy the position shown in Fig. 1, in which the pivot connecting members 6 and 7 are vertically below the axis on which bull-sprocket 14 turns. Turning bull-sprocket 14 in either direction, therefore, exerts an upward force on the pivot connecting link 7 to chassis 3 and tends to tilt table 2 about the one of pivots 4 and 5 which is engaged by one of the hooks 8 or 9.

When the motor is energized to turn bull-sprocket 14 the latch-bar 13 is moved to its various positions by engagement of a pin 25, projecting laterally from it, with a curved slot in a rim on bull-sprocket 14. The pin 25 is made in the form of a roller to minimize friction. The curved slot which acts on pin 25 to move latch-bar 13 is shown more clearly in Fig. 2 where 23 is a portion of the rim of bull-sprocket 14 which is provided with an outwardly projecting plate 31 and an inwardly projecting plate 32. The plates 31, 32 and rim 23 are shaped to form a reversely-curved channel 33 in which the pin 25 slides in fitting engagement with both walls. The pin 25 stands at the mid-point of this channel when the table is at its horizontal position as shown in Fig. 1. When the bull-sprocket 14 is started in, let us say, a clockwise rotation in Fig. 2, the sides of channel 33 causes the pin 25 to move radially outward along the channel, thus as a glance at Fig. 1 will show, displacing pin 25 to the left and moving latch-hook 9 into engagement with pivot 5. As soon as the inner edge of pin 25 reaches the radially-outward face of rim 23 the inner edge of plate 31 stops further movement of pin 25 and latch-bar 13, and roller 25 thereafter rides the outer face of rim 23 holding latch-hook 9 in engagement with pivot 5. This engagement of latch-hook 9 continues until the operator decides to return table 2 to its horizontal position and energizes the motor to turn the bull-sprocket 14 and linkages 6, 7 to return the table 2 nearly to its horizontal position, at which time pin 25 reenters a slot 33 from its radially-outward end.

If bull-sprocket 14 starts to rotate counterclockwise from the position it assumes when the table 2 is horizontal, the pin 25 is displaced toward the radially-inward end of channel 33, thus displacing pin 25 to the right in Fig. 1 engaging latch-hook 8 with pivot 4. Engagement of pin 25 with the inner face of rim 23 holds the latch-hook in that position until reversed rotation of the bull-sprocket 14 returns the table 2 to its horizontal position and pivot 25 to the mid-point of channel 33 through its radially-inward end.

While I have shown my invention in only one form, it will be apparent to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

I claim as my invention:

1. In an X-ray examination table, a chassis provided with pivots spaced apart by its mid-section about which it may be tilted alternately to raise either end, a latch-hook

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for each pivot, said latch-hooks being joined by a link for moving them alternately into engagement with said pivots to permit said alternate tilting, a linkage embodying a crank and drive-means therefor for raising the mid-section of said chassis to tilt it about one of said pivots which is engaged by one of said latch-hooks, a projection on said link; an annular rim concentric with the pivot on which said crank turns, guide members at a point on said rim in the region occupied by said projection when said link is in its mid-position, and guide-faces in said guide members and said rim engaging said projection and blocking movement of said link to disengage said latch-hooks from said pivots except when said table is near its untilted position.

2. In an X-ray examination table, a chassis provided with pivots spaced apart by its mid-section about which it may be tilted alternately to raise either end, a latch-hook for each pivot, said latch-hooks being joined by a link for moving them alternately into engagement with said pivots to permit said alternate tilting, a linkage embodying a crank and drive-means therefor for raising the mid-section of said chassis to tilt it about one of said pivots which is engaged by one of said latch-hooks, a projection on said latch-bar, a sprocket turned by said crank and having a rim concentric with the pivot thereof, guide members at a point on said rim in the region occupied by said projection when said link is in its mid-position, and a reversed curved slot in said guide members and said rim engaging said projection and blocking movement of said link to disengage said latch-hooks from said pivots except when said table is near its untilted position.

3. In an X-ray examination table, said table including a chassis having a mid-section positioned between a pair of end sections, with the chassis being provided with a pair of pivots about which the chassis may be tilted, said

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chassis being tiltable about one of said pivots in a first direction to raise one of said end sections and about the other of said pivots in a second direction to raise the other of said end sections, the combination of a pair of latch hooks, with each of said latch hooks being operative to engage one of said pivots, a link member for inter-connecting said latch hooks and operative for moving each of said latch hooks relative to its respective pivot, a linkage operable about a pivot point for raising said mid-section of the chassis to thereby tilt said chassis, a projection on said link member, an annular rim concentric to said pivot point, and a guide mechanism positioned adjacent said annular rim and operative to engage said projection to thereby control the movement of said link.

4. The apparatus of claim 3, with said rim having first and second sides and having a slot, and said guide mechanism being positioned adjacent said slot and operative to move said projection between said first side and said second side of the rim.

5. The apparatus of claim 4, with said guide mechanism including a first member positioned on the first side of said rim and a second member positioned on the second side of said rim.

6. The apparatus of claim 4, with said slot and said guide mechanism providing a control channel, and said control channel being operative with said projection to control the movement of said link member.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,854,296	Emmert	Apr. 19, 1932
2,224,262	Haupt	Dec. 10, 1940
2,568,236	Kizaur	Sept. 18, 1951