May 25, 1954 H. E. KOERNER ET AL 2,679,442

SERIALOGRAPHIC ATTACHMENT FOR X-RAY EXAMINATION TABLES

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Fig. 2.

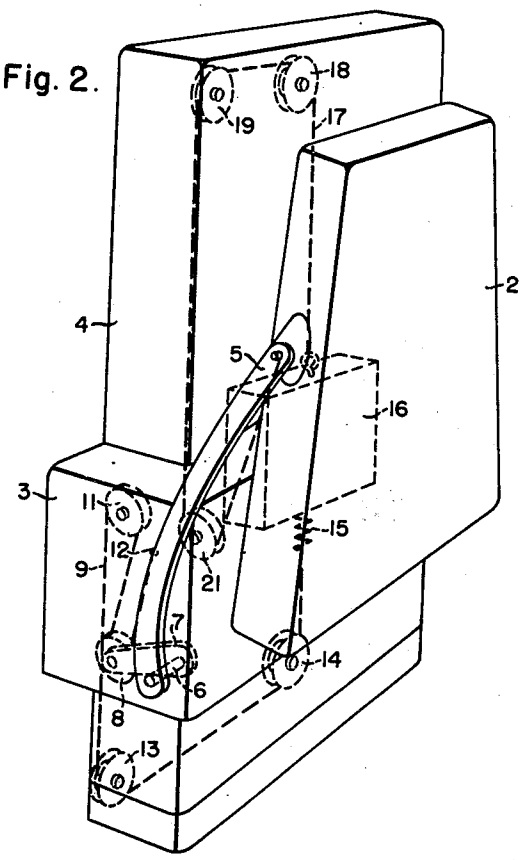
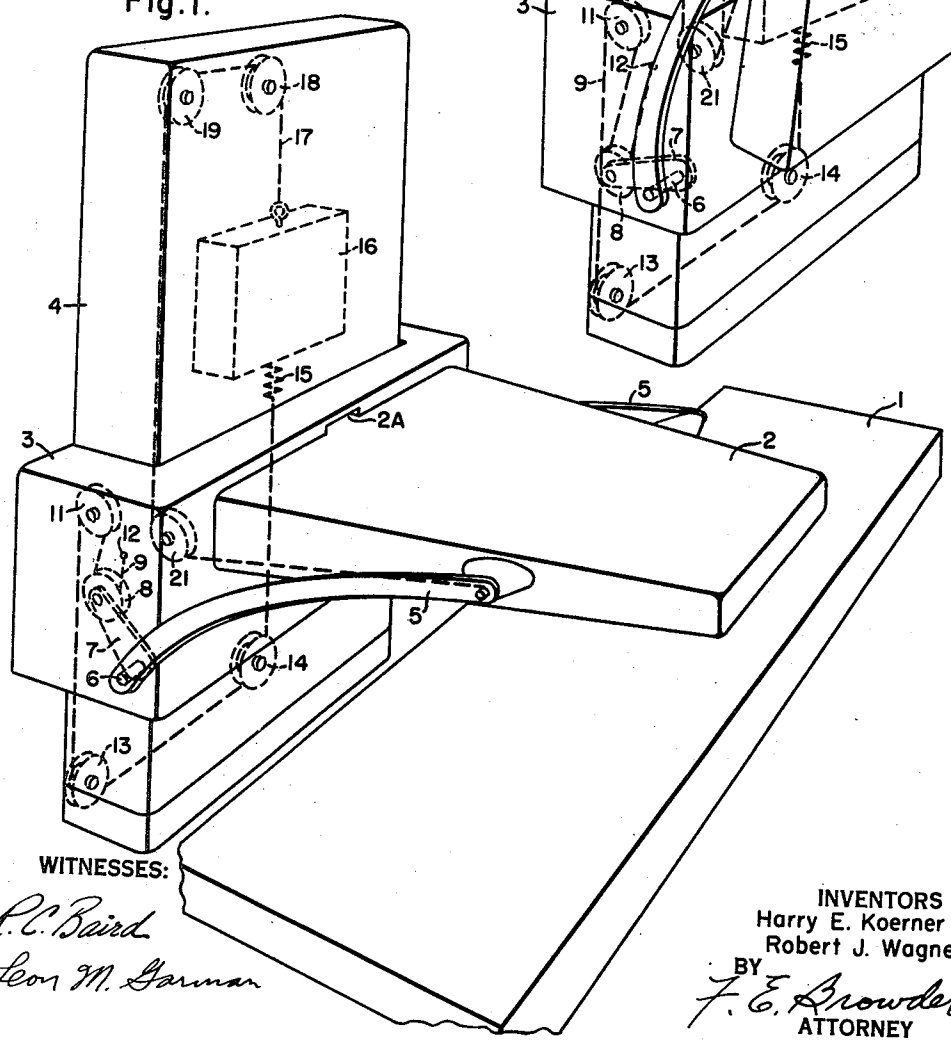


Fig. 1.



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SERIALOGRAPHIC ATTACHMENT FOR X-RAY EXAMINATION TABLES

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2 Claims. (Cl. 311—2)

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Our invention relates to X-ray examination tables and in particular relates to a pivoted support by which a fluorescent screen or spot-film may be moved in and out of position above the table top when it is desired to change from radiographic to fluoroscopic or other uses of the table.

In current practice in X-ray examinations, the patient is usually supported on a table, which is usually tiltable through a wide range of angles relative to the horizontal, and is equipped to make fluoroscopic or spot-film examinations, and also to make radiographic pictures. In the former, a screen on which the image appears is positioned parallel to and above the table, while in the latter case the X-ray tube is positioned in the space above the table. It is accordingly necessary to provide a frame for holding the fluoroscopic screen and spot-film device above the table in the former case, but which may be moved out of the way of the X-ray tube when radiographs are to be taken.

One object of our invention is accordingly to provide a novel and improved type of movable frame for X-ray apparatus which is connected to the X-ray table by a linkage which permits it to be easily moved into position above the table to support a fluorescent or spot-film screen parallel thereto and which moves it to a convenient out-of-the-way position while radiographs are being made.

Another object of our invention is to provide a mechanism for positioning a screen-holding frame in X-ray apparatus of the type in which the distance of the X-ray tube or view-screen from the X-ray table is adjustable by the operator, such mechanism operating to hold the screen parallel to the table and then to move it out-of-the-way when radiographs are to be taken, without interference from such adjustments by the operator.

Another object is to provide a mechanism capable of performing the above-mentioned functions in which the weights of the moving parts are counterbalanced so that all changes may be carried out by the operator without substantial exertion.

Another object is to provide a mechanism capable of effecting the above-mentioned purposes at any of the positions relative to the horizontal which the X-ray table is required to assume.

Still another object is to provide a new and improved type of medical X-ray apparatus.

Other objects of our invention will become apparent upon reading the following description taken in connection with the drawings, in which:

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Figure 1 is a view in perspective of the mechanism of our invention with the screen-support frame positioned parallel to the X-ray table in position for a fluoroscopic examination,

Fig. 2 is a similar view with the frame parked in its out-of-the-way position while a radiography is in progress.

Referring to the drawings in detail, the X-ray table 1 is supported in conventional fashion on a base (not shown) on which it may be tilted through angles up to 90 degrees to the horizontal. The U. S. Patent 2,504,687 to O. C. Hollstein may be referred to if more detailed information as to such an X-ray table support is desired. The patient lies on the table 1 and, when fluoroscopic observation is carried out, a fluorescent screen is supported parallel to table 1 by a frame 2 which is supported in turn from a carriage 3 which slides up and down on a tower 4 which stands always perpendicular to table 1. The tower 4 is well known in X-ray table practice and its connections to table 1 will accordingly not be described here other than to note that it may be moved lengthwise or crosswise of table 1 to any desired position within travel limits. The operator may thus, in accordance with present X-ray practice, adjust the position of tower 4 along or across table 1 and adjust the position of carriage 3 in the directions perpendicular thereto.

The frame 2 is pivotally supported by two yoke arms 5 at its opposite edges, the arms 5 being supported in turn on axle 6 which passes through journals in the end-walls of carriage 3. The inner end of frame 2 is held by a lock 2A to the front side of carriage 3 when the arms 5 are turned to the Fig. 1 position in which frame 2 is parallel to table 1, and when unlocked can slide downward in contact with said front side.

An arm 7 is attached to the end of arm 5 inside the carriage 3 and carries a pulley 8 having a grooved rim on which a cable or chain 9 may run. A grooved idler-pulley 11 is supported on a bearing on the end-walls of carriage 3. The cable 9 having one end fastened at 12 to the wall of carriage 3 runs under idler 8, over idler 11, down through the bottom of carriage 3, under a grooved idler pulley 13 supported on bearings from the side wall of tower 4, through that side wall around another grooved idler-pulley 14 and vertically upward to a spring 15 attached to counterweight 16. A second cable 17 attached to the top of counterweight 16 passes over idler pulleys 18 and 19 at the top of tower 4, then downward around a pulley 21 having bearings

affixed to carriage 3, and out through the wall of the latter to a collar on the pivot which interconnects frame 2 to support arm 5.

When the operator adjusts the height of the fluorescent screen in frame 2 above the table 1, the carriage 3 slides on tower 4 but the cables 9 and 17 move the counterweight 16 in the opposite direction, and its weight is of such value as to approximately balance that of carriage 3 and the parts attached to it, so that only a slight force need be exerted in making this adjustment.

When the operator wishes to have the frame 2 removed to its out-of-the-way position as shown in Fig. 2, he releases the lock 2A and the tension exerted by counterweight 16 through cable 17 moves the outer ends of arms 5 upward folding the frame 2 back against the face of carriage 3 into a perpendicular position to table 1 as shown in Fig. 2. The idler 8 on arm 7 is moved when arm 5 turns, to take up the slack in cable 9 which results from the slight lowering of counterweight 16 incident to this change in the position of frame 2. Spring 15 helps to maintain a constant tension on the cables 9 and 17 to insure that they never slip out of the grooves in the pulleys over which they run. The lock portion at 2A slides downward in a groove in the face of carriage 3.

In the following claims the term "horizontal" merely means parallel to the table face which lies against the patient's body, and "up," "down" and such words merely mean directions perpendicular to that face.

We claim as our invention:

1. In combination with an X-ray examination table, a tower supported perpendicular to said table at one side thereof, a carriage movable up and down said tower, a pair of yoke-arms journalled on a first horizontal axis in the walls of said carriage, a frame pivoted to said yoke-arms on a second horizontal axis which is higher than said first horizontal axis, means to releasably lock the end of said frame to hold it horizontal, a counterweight within said tower free to move up and down, a first cable fastened at one end to said counterweight passing over a first idler-pulley journalled near the upper end of said tower, then passing over a second idler-pulley journalled on said carriage closer to a horizontal plane passing through said second horizontal axis than is said first horizontal axis, said cable having its other end journalled about one of the pivots at said second horizontal axis, and a second cable fastened to said counterweight and passing over a third idler-pulley journalled to said tower near its lower end, then over a fourth idler-pulley journalled to said carriage, then over a fifth idler-pulley journalled on one of said yoke-arms, the end of said cable being fastened to said carriage.

2. In combination with an X-ray examination table, a tower supported perpendicular to said table at one side thereof, a carriage movable along said tower, a pair of yoke-arms journalled on a first horizontal axis to the walls of said carriage, a frame pivoted to said yoke-arms on a second horizontal axis which is higher than said first horizontal axis, means to releasably lock the end of said frame to hold it horizontal, a counterweight within said tower free to move longitudinally with respect to said tower, a first cable fixed at one end to said counterweight and passing over a first idler pulley journalled to said tower near the center of the upper end, then passing over a second idler pulley journalled to said tower near an edge of the upper end, then passing over a third idler pulley journalled on said carriage closer to a horizontal plane passing through said second horizontal axis than is said first horizontal axis, said cable having its other end journalled about one of the pivots at said second horizontal axis, and a second cable fastened to said counterweight and passing over a fourth idler pulley journalled to said tower near the center of the lower end, then over a fifth idler pulley journalled to said tower near an edge of the lower end, then over a sixth idler pulley journalled to said carriage, then over a seventh idler pulley journalled on one of said yoke-arms, the end of said second cable being fastened to said carriage.

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