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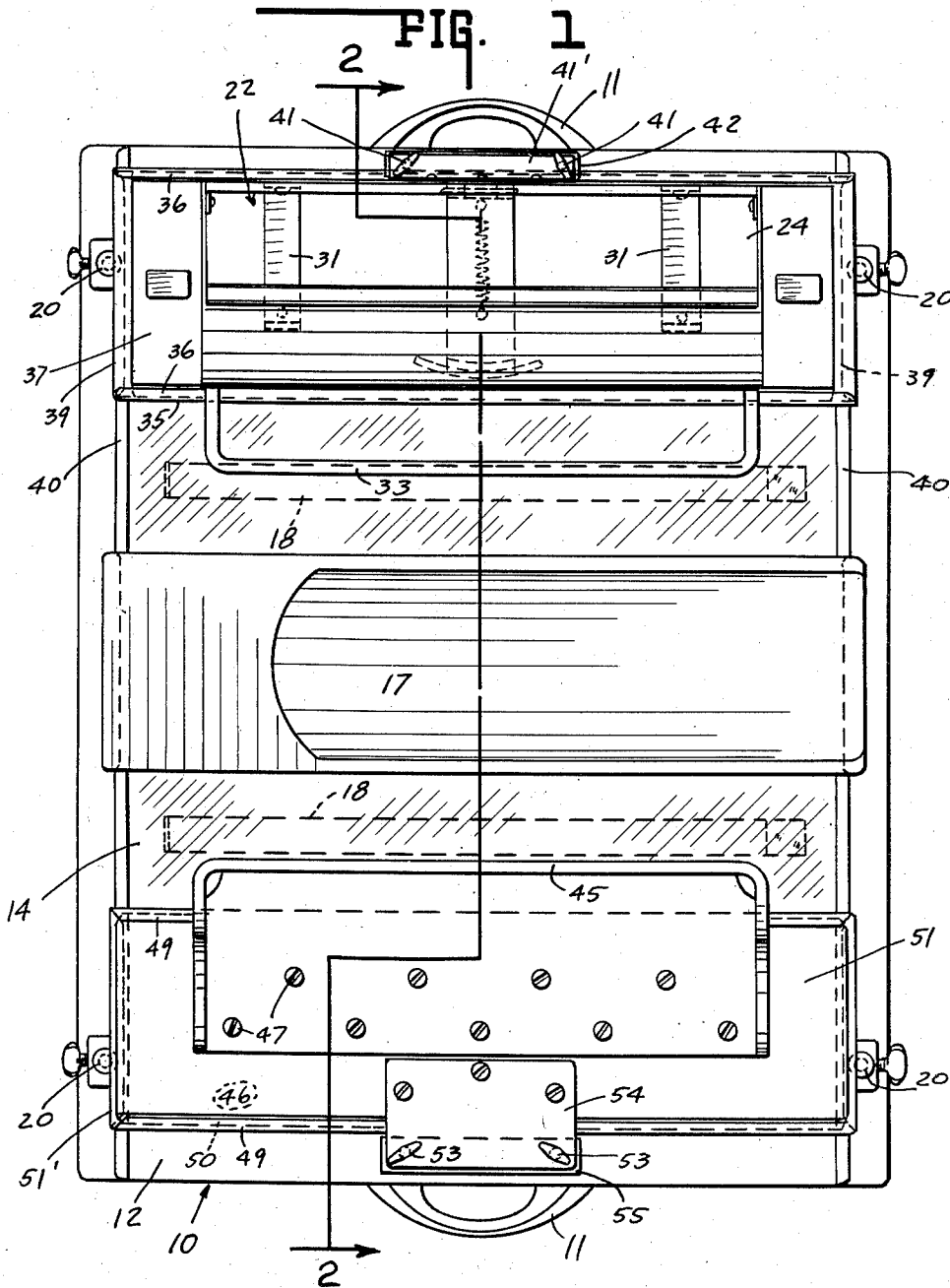
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CEREBRAL ANGIOGRAPHIC CASSETTE CHANGER

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2 Sheets-Sheet 1



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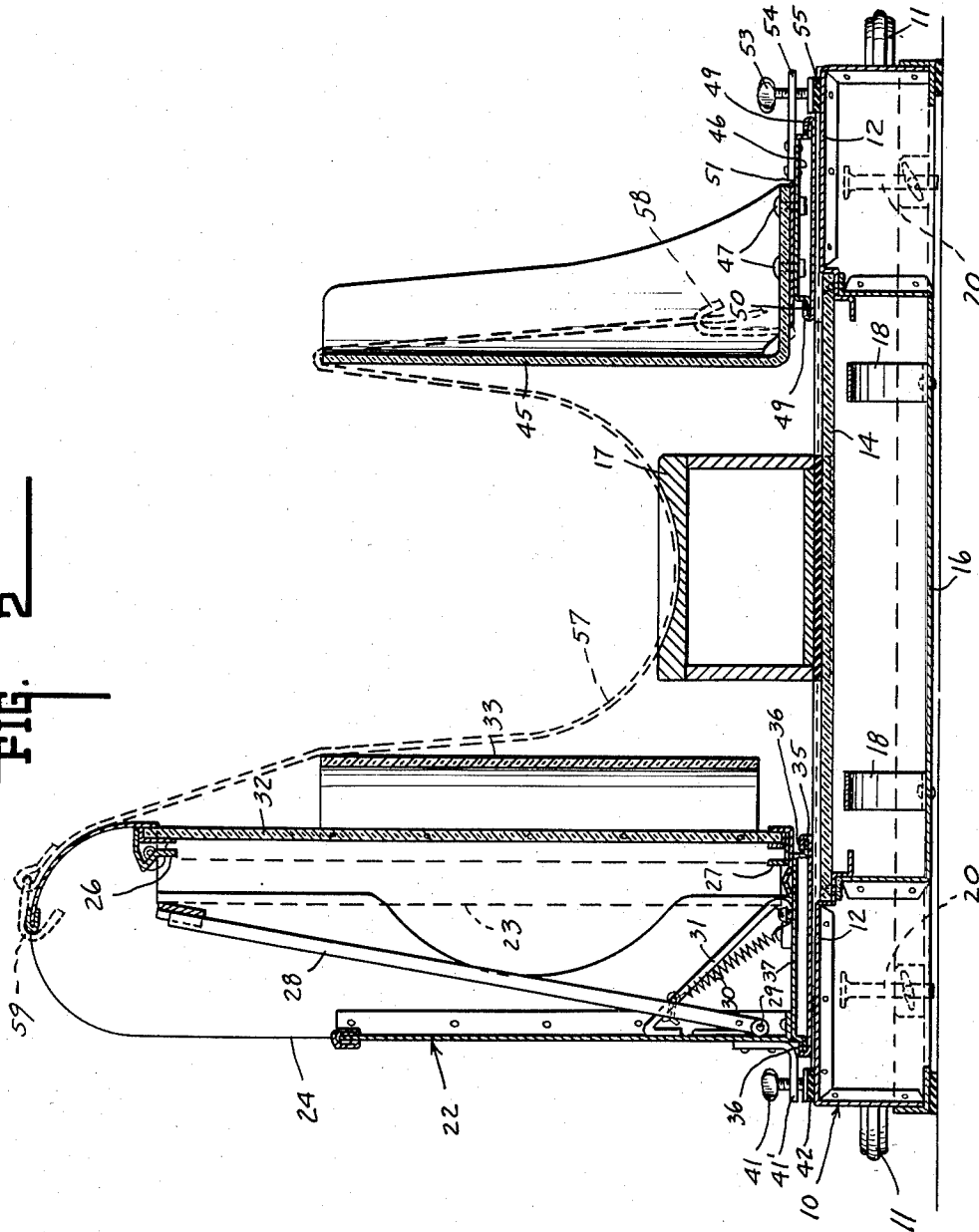
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FIG. 2



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CEREBRAL ANGIOGRAPHIC CASSETTE CHANGER

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4 Claims. (Cl. 250—58)

This invention relates generally to X-ray appliances and more particularly to cerebral angiographic cassette changers adapted to be used in connection with X-ray demonstration of the blood vessels in the human brain.

Cerebral angiography relates to the X-ray demonstration of the blood vessels in the human brain using a contrast medium. In order to obtain X-rays of this character, it is necessary that the patient be partially anesthetized so that an opaque contrast medium such as iodine solution may be injected into the carotid artery. This is done by passing a hypodermic needle through the tissues of the neck into this vessel from which the contrast medium may be conducted into the circulation of the brain. In carrying out this technique it is essential that the patient's head be carefully immobilized to prevent the needle from slipping out of the artery during the injection process. It is also necessary that serial X-ray photographs be made in quick succession from the front and side of the patient's head since the opaque contrast medium flows through the blood vessels of the brain in less than three seconds.

Accordingly, it is the principal object of this invention to provide adjustable apparatus for supporting film holders at right angles to one another for taking X-ray pictures of a patient's head without moving the patient from a comfortable and safe supine position.

Another object of this invention is to provide apparatus of the character described having multiple adjustments for allowing proper surgical access to the neck of the patient, adequate angulation of the head, and proper centering of the patient's head with respect to the X-ray film holders.

Still another object of this invention is to provide a cassette changing apparatus for making rapid serial X-ray films in the frontal and side projections with respect to the patient's head.

Another object of this invention is to provide a cassette changer having structure for immobilizing the patient's head, thereby to prevent injury to the patient and to provide accurate positioning of the patient's head with respect to the X-ray films.

In accordance with this invention there is provided a cerebral angiographic cassette changer adapted to hold a patient's head and a plurality of X-ray film holders in predetermined relation to one another comprising adjustable means for holding a plurality of X-ray films, a headrest and transparent clamping members adjustably mounted with respect to said head rest for immobilizing a patient's head with respect to said X-ray film holders.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 shows a top plan view of the cassette changer as provided by this invention.

Fig. 2 is a cross section taken on line 2—2 of Fig. 1. In accordance with this invention there is provided a cerebral angiographic cassette changer comprising a base member 10 having handle members 11 at each end thereof for facilitating handling of the device. Base member 10

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comprises a top panel 12 for supporting the plate 14 of "lucite," for example, which is transparent not only to ordinary light, but also to X-ray radiation. Beneath the plate 14 there is provided a cassette holder 16 in the form of a rectangular box dimensioned and portioned to accommodate two to four cassettes directly beneath the plate 14. By means of this arrangement it is possible to direct X-ray radiations from above plate 14 and through a patient's head, thereby to expose the X-ray films contained within the cassettes. Plate 14 is adapted to support a headrest 17 in the form of a recessed balsa-wood box or block on which a patient's head may be adjustably positioned directly over the X-ray films held in position by the cassette within holder 16. A pair of guide and clamp members 18 may be provided within holder 16 for accurately and removably positioning a number of cassettes.

For adjusting the relative height of the patient's head the base member 10 may be provided with a pair of elevation screws 20 at each end thereof. Thus before or after the patient's head is rested on the headrest 17, the cassette changer as a unit may be vertically adjusted to provide for the patient's comfort and for the angular relation of his head with respect to the cassette changer.

For supporting a number of cassettes in vertical position to one side of the patient's head there is provided a magazine 22 constructed and arranged to receive a number of cassettes 23 through a slot 24 whereby a number of cassettes may be placed in vertical position adjacent to one another as illustrated in Fig. 2. For holding the cassettes in vertical position there is provided a top guide member 26 and a bottom guide member 27, together with a pivoted arm 28 pivoted as at 29 to engage the rear of cassette 23 in forwardly biasing relation thereto, the bias being provided by a spring member 30. A pair of sloping guides 31 may be provided in the lower portion of magazine 22 for causing forward movement of the cassettes as the foremost cassette is removed. The side wall of the magazine 22 may comprise an X-ray radiation transparent "lucite" window 32 and a "lucite" head clamping member 33 arranged to project outwardly toward the patient's head for accurately positioning the head with respect to the X-ray films within cassette 23.

Magazine 22 is provided at the base thereof with flanges 35 nested within the turned over edge members 36 of a slide 37. The end portions of slide 37 include turned under flanges 39 which enfold an outwardly projecting track 40 on each side of the base 10. The flanges 35 and the turned under flanges 39 are adapted to fit loosely with respect to members 36 and 40 whereby magazine 22 may be moved laterally of slide 37 to provide lateral adjustment of the cassettes 23 with respect to the patient's head. Magazine 22 may also be moved longitudinally of the base 10 by adjusting the slide 37 longitudinally with respect to base 10.

For clamping the magazine 22 in an adjusted position there are provided a pair of clamping thumb screws 41 which are threaded into the bracket 41' mounted on the rear wall of magazine 22. Thumb screws 41 may be provided with friction pads 42 which may be moved forcibly into contact with the top panel 12 of the base 10, thereby to effect a clamping action for holding the magazine 22 in its adjusted position.

At the other end of the base 10 there is provided a slidably mounted head clamping member 45 which may consist of a plastic material such as "lucite," transparent to ordinary light and also to X-ray radiation. The clamping member 45 may be fixed to the base 46 by means of screws or rivets 47. For providing a slidable or adjustable mounting for clamping member 45, the base 46 includes a pair of flanges 49 which are adapted

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to slide within a slot formed by the turned over edges 50 of a slider 51. As in the case of slider 37, the end portions of slider 51 consist of turned under flanges 51' which slidably engage the outwardly projecting rails 40 which form a part of the base 10. The clamping member 45 may be adjusted laterally and longitudinally with respect to the base 10 and the patient's head in the same manner as described in connection with the magazine 22.

For clamping member 45 in its adjusted position, there is provided a pair of thumb screws 53 threaded within the plate 54 attached to the base 46 of clamping member 45. Thumb screw 53 may include a frictional pad 55 for engaging the top panel of base 10 and creating the clamping action to fix clamping member 45 in an adjusted position.

In operation a patient who is to be subjected to cerebral angiography can be placed in a supine position on a table, and the cassette changer as a unit may be placed beneath his head with the headrest 17 supporting his head in such a position that X-rays may be directed through his head onto the X-ray films supported in cassette holder 16. It may be desired to direct the X-ray radiation vertically downward through the patient's head or from an angle in vertical alignment with the patient's head, and thus the cassette changer may be adjusted longitudinally of the patient to insure that the X-ray radiation will impinge on the film in holder 16.

The magazine 22 may also be adjusted toward or away from the patient's head, but preferably in such a position that clamping member 33 will be in firm contact with the side of the patient's head, thereby to provide an immobilizing member which will prevent any movement of the patient's head toward or away from the X-ray film within cassette 23. Magazine 22 may also be adjusted longitudinally of the patient's head so that the film within cassette 23 will be in proper alignment with the patient's head or brain to receive X-ray radiation directed from the right hand side (Fig. 2). After the adjustments of magazine 22 are completed, thumb screws 41 may be adjusted to clamp magazine 22 in the desired position.

Clamping member 45 may likewise be adjusted into contact with the other side of the patient's head, whereby there can be no horizontal movement of the patient's head relative to the X-ray film. It should be noted that the patient's head is clamped both with respect to the film in cassette 23 and the film in holder 16.

From the foregoing description it will be apparent that there is provided in accordance with this invention a cerebral angiographic cassette changer which allows proper surgical access to the neck of the patient, adequate angulation of the head, and at the same time proper centering of the patient's head with respect to the X-ray film. It should be noted that holder 16 and magazine 22 are adapted to contain a plurality of cassettes, whereby one X-ray exposure after another may be made by quickly withdrawing a cassette after each exposure. Thus within a period of approximately three seconds, a series of rapidly successive X-ray films may be exposed without any danger of movement of the patient's head or withdrawal of the needle from his carotid artery.

While the invention has been disclosed as utilizing a head rest comprising a box or block, it is recognized that such a box or block may tend to cause a slight degree of shading in an X-ray photograph taken from above the patient's head. Such shading does not materially impair the usefulness of the X-ray photograph, but in order to eliminate such shading there may be provided a canvas or other cloth head suspending sling 57 as illustrated in dotted lines in Fig. 2 of the drawings. For supporting such a sling there may be provided the hooks 58 and 59 attached to the base of a clamp 45 and the casing of magazine 22, respectively. Thus sling 57 may be supported to hold a patient's head at a predetermined height with respect to the magazine 22 and the holder

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16. The specification and drawings also disclose certain specific forms of clamping mechanisms and elevating mechanisms, but it will be understood by those skilled in the art that various modifications of these devices may be substituted for those illustrated in the drawings. It will also be understood by those of ordinary skill in the art that the specific cassette holding or feeding mechanisms may also be modified as desired to produce the intended result.

10 The invention claimed is:

1. A cassette changer for cerebral angiography comprising a base member having spaced parallel track members; a vertical cassette holder mounted transversely of said members and including a base having track engaging members for providing movement of said holder on said track members longitudinally thereof, said holder base including spaced parallel track members extending transversely of said first track members, said holder including track engaging members movably engaging said transverse track for providing transverse movement of said holder, said holder comprising an X-ray pervious window and an X-ray pervious head clamp in front of said window, and clamping mechanism engaging said holder and said base member; an X-ray pervious head clamping member spaced from said head clamp and comprising a movable base slidably engaging said first mentioned track members and having spaced parallel tracks extending transversely thereof, and a secondary base member having track engaging members for engaging said clamp base transverse tracks and providing transverse movement of said head clamping member, and clamping mechanism engaging said head clamping member and said base member; and a horizontal cassette holding mechanism disposed beneath said first mentioned base between said head clamp and said head clamping member.

2. A cassette changer for cerebral angiography comprising a base member having spaced parallel track members; a vertical cassette holder mounted transversely of said members and including a base having track engaging members for providing movement of said holder on said track members longitudinally thereof, said holder base including spaced parallel track members extending transversely of said first track members, said holder including track engaging members movably engaging said transverse track for providing transverse movement of said holder, said holder comprising an X-ray pervious window and an X-ray pervious head clamp in front of said window; a head clamping member spaced from said head clamp and comprising a movable base slidably engaging said first mentioned track members and having spaced parallel tracks extending transversely thereof, and a secondary base member having track engaging members for engaging said clamp base transverse tracks, and providing transverse movement of said head clamping member; and a horizontal cassette holding mechanism disposed beneath said first mentioned base between said head clamp and said head clamping member.

3. A cassette changer for cerebral angiography comprising a base member having spaced parallel track members; a vertical cassette holder mounted transversely of said members and including a base having track engaging members for providing movement of said holder on said track members longitudinally thereof, said holder base including spaced parallel track members extending transversely of said first track members, said holder including track engaging members movably engaging said transverse track for providing transverse movement of said holder, said holder comprising an X-ray pervious head clamp; a head clamping member spaced from said head clamp and comprising a movable base slidably engaging said first mentioned track members and having spaced parallel tracks extending transversely thereof, and a secondary base member having track engaging mem-

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bers for engaging said clamp base transverse tracks, and providing transverse movement of said head clamping member; and a horizontal cassette holding mechanism disposed beneath said first mentioned base between said head clamp and said head clamping member.

4. A cassette changer for cerebral angiography comprising a supporting base, a cassette holder within said base inwardly of the ends thereof, a head rest overlying said cassette, a vertically disposed cassette mounted on said base to one side of said head rest and movable toward or away from the latter, said vertically disposed cassette also movable in a plane parallel with said head rest, means for maintaining said vertically disposed cassette holder in its adjusted positions, a head clamping member mounted on said base on the opposite side of said head rest, said clamping member movable toward

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or away from said head rest and also in a plane parallel therewith, and means for holding said head clamping member in its adjusted positions.

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