Feb. 18, 1969 H. D. HUNTER ET AL 3,428,307

ADJUSTABLE COUCHES

Filed Oct. 20, 1965 Sheet 1 of 3

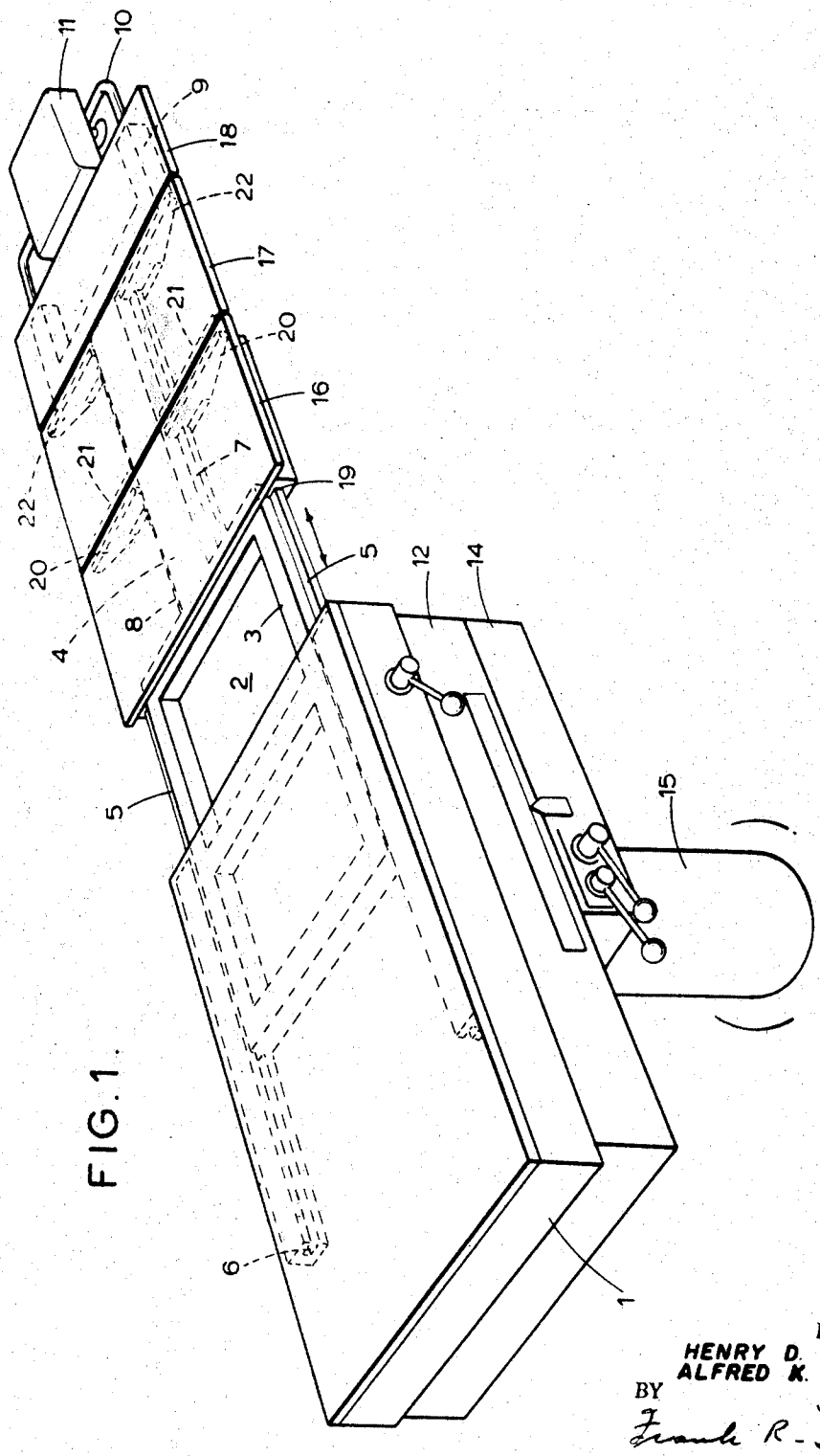

FIG. 1.

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FIG. 2.

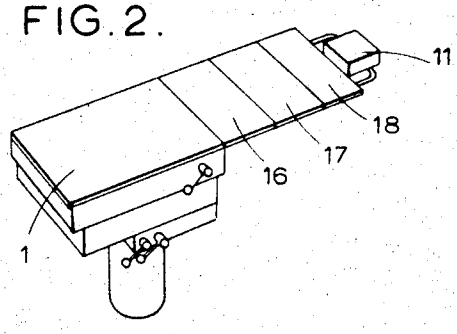


FIG. 3.

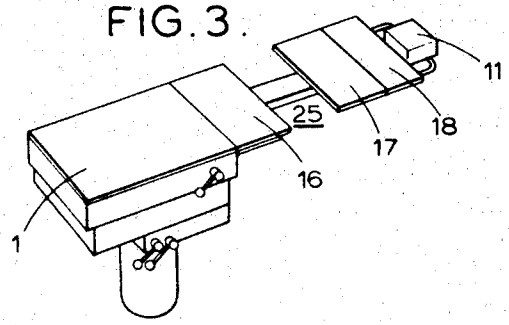
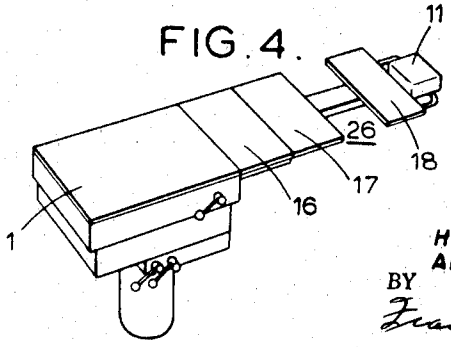


FIG. 4.



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ADJUSTABLE COUCHES

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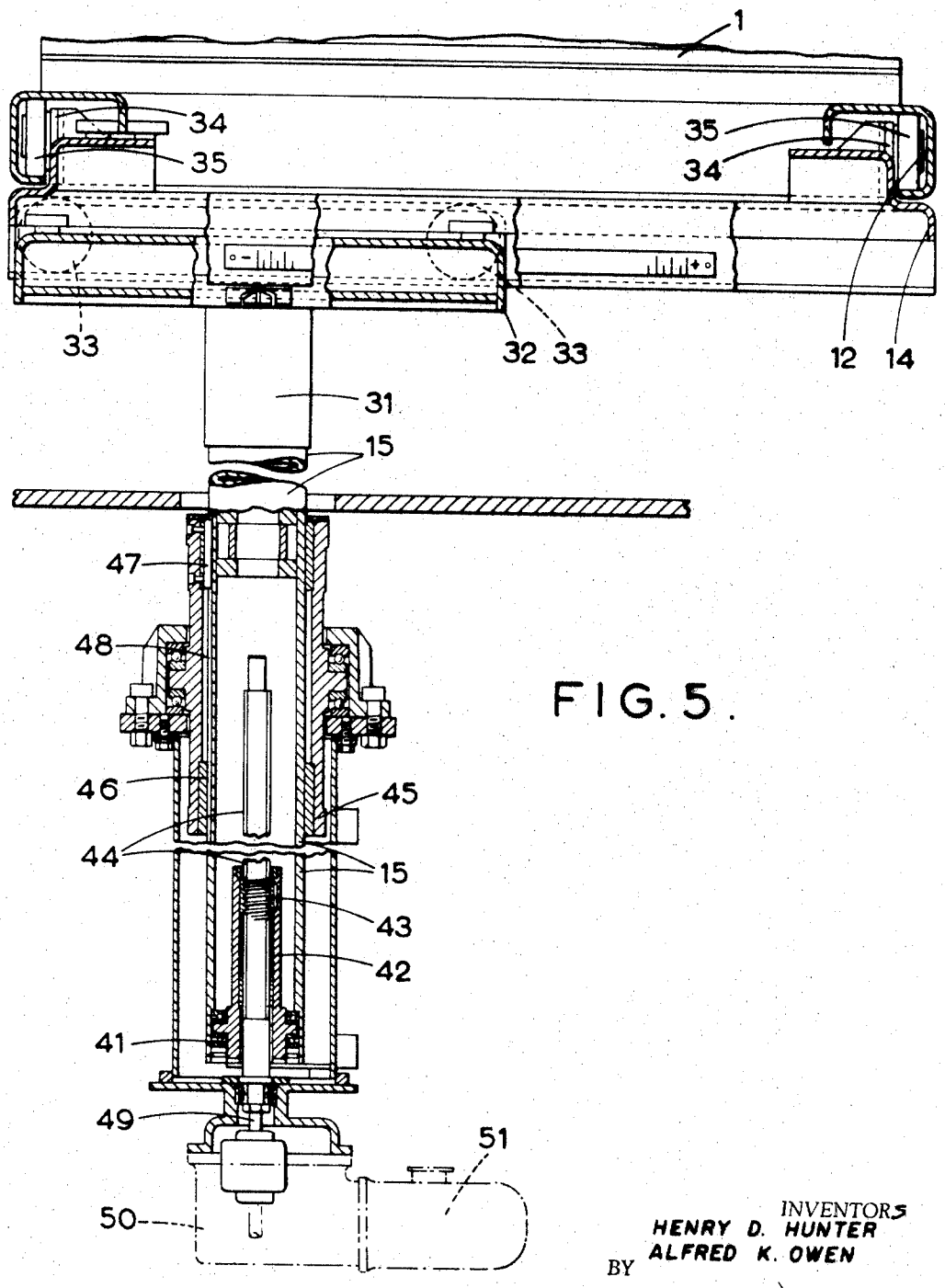

FIG. 5.

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ADJUSTABLE COUCHES

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U.S. Cl. 269—322 2 Claims
Int. Cl. A61g 13/00; A47b 11/00, 1/02

ABSTRACT OF THE DISCLOSURE

An adjustable couch particularly suitable for deep X-ray therapy comprising a base member, a support member connected to and movable relative to the base and adapted to carry a plurality of panels. The support member comprises two portions connected in tandem along the length of the couch, one portion is in the form of a central column and the other portion is in the form of a closed frame.

This invention relates to an adjustable couch for use, particularly, but not exclusively, as a medical couch for use for deep ray therapy apparatus.

In deep ray therapy it is necessary to be able to direct the rays from a suitable generator to any part of a patient's body and it may be necessary to treat a number of areas of a body while keeping the patient in one position. Thus it may be necessary to treat the patient both from the front and from the rear during one course of treatment. Previously, difficulty has been experienced in treating the underside of a patient lying on his back since part of the apparatus supporting him, forming the couch on which he is lying has at times obstructed the treatment ray. This problem has occurred often in the past particularly with regard to linear accelerators due to the fact that it has not been possible to rotate the X-ray head about the patient through a full 360°. By the use of a rotatable gantry having an X-ray head mounted on an arm connected to an annular member mounted for rotation through 360°, this problem has been eased. However, it has not been fully overcome and it is an object of the present invention to provide an adjustable couch suitable for use in deep ray therapy where the couch may be adjusted so that the patient to be treated is positioned on the couch so that no part of the couch structure impedes the ray's path when directed from below the patient.

According to the present invention there is provided an adjustable couch comprising a base member, a support member connected with the base member and a plurality of panels associated with the support member. The support member comprises two portions connected together in tandem along the length of the couch, one portion comprising a central column lying substantially on the longitudinal center line of the couch and the other portion comprising a closed frame defining a central area of the couch.

The support member may be arranged to be moved relative to the base member and the panels may also be movably connected to the support member. Alternatively the panels may be removed completely from the support member. The base member preferably includes an upper and a lower float table which are adjustably mounted so as to provide a longitudinal and lateral movement of the couch relative to a given datum and position. It is preferable that the couch is mounted on an adjustable raising and lowering means so that the height of the couch may be varied to suit the particular requirements of each case. In order that the invention may be readily understood a preferred embodiment thereof will now be described with reference to the five figures of the accompanying drawings in which FIGURE 1 shows an isometric view of the couch in an open position, FIGURE 2 shows the couch in a closed position, FIGURES 3 and 4 show alternative open positions for the couch and FIGURE 5 shows a part sectional view of the part of the couch and the moving mechanism therefor.

Referring to the drawings and particularly to FIGURE 1 thereof, the couch comprises a base member **1** having a support member **2** comprising two frame parts **3** and **4** mounted therein. The frame part **3** comprises two rectangular frames (one said frame being shown by broken lines within the member **1**) arranged in tandem and these frames have on each side runners **5** which engage in slots **6** in the interior of the base member **1** so that the support member **2** may slide relative to the base member **1** and in the plane of that member. The other frame part comprises a central spinal column **4** projecting in the general plane of the member **1** and attached to one end of the part **3**. The central spinal column **4** of this part has two runners **7**, **8** situated one on each side and at its end remote from the part **3** it carries a U-shaped member **9** to which is attached a supporting angle **10** carrying a head rest **11** for the patient.

The base member **1** is supported on an upper float table **12** and a lower float table **14** which are provided for allowing relative movement of the couch. The lower float table **14** is supported by a column **15** connected to mechanical lifting means (FIGURE 5).

Three panels **16**, **17**, **18** are removably connected to the support member **2**, two of which **16** and **17** are slidable. The panel **16** is provided on its underside with grooved members **19** which slide over the runners **5** so that the panel **16** is able to be moved along the frame part **3**. The panel **16** also carries on its underside at the end of the panel nearest the head rest **11** brackets **20** which engage with runners **7**, **8** attached to the column **4** so that the panel **16** is supported on the column **4** as well as on the frame part **3**. The panel **17** has 2 sets of brackets **21**, **22** respectively at each end which extend under the panel **17** in a manner similar to the brackets **20** to engage with runners **7** and **8**. These brackets enable the panel **17** to be moved along the length of the support column **4**. The third panel **18** is not slidably mounted but is fixed to the U-shaped member **9** in such a way that it can be detached if necessary.

When the couch is being used for treatment of a patient in which the X-ray apparatus is positioned above the couch, the couch can be in the closed position as in FIGURE 2. However, if it is desired to treat a central portion of a patient then the frame part **3** is slid out of the base member **1** to a position similar to that shown in FIGURE 1 so that the treatment can be given from below through the gap formed by the support frame **3** which projects out of the base member **1**. The patient is supported then at the base member **1** and on the panel **16**, **17** and **18**. The sides of the frame part **3** are sufficient comfortably to support the patient in this position without any part of the couch obstructing the central area of the patient which is to be treated.

FIGURE 3 shows the position of the panels of the couch when it is required to treat part of the patient's back other than the central area. In this position the frame part **3** has been withdrawn from the base member **1** so that one of the frames project from the base member (as in FIG. 1) and the panel **16** has been slid along the runners **5**, **7**, **8** to leave the gap **25**, between the panels **16** and **17**. If treatment is to be given at a higher level of the patient's back then the panel **17** is slid along the runners **7**, **8** so that it is in the position as shown in FIGURE 4 of the drawings so that treatment can be given through the gaps **26** between panels **17** and **18**.

If any area less than the maximum provided on the underside of the patient is to be treated, then the gap between the panels can be adjusted by varying the amount of the support member **2** which is slid out from the base member **1** thus giving maximum support to the patient's body. It is seen that the couch is provided with means by which any part of a patient is able to be treated without there being any obstruction to the treatment caused by any part of the couch itself.

In FIGURE 5 of the drawings a part sectional view of the column **15** and the float tables **12, 14** is shown to illustrate how these can be moved relatively to adjust the height of the base member and its longitudinal and lateral positions.

The column **15** is surmounted by a cap comprising a columnar part **31** which fits over the top of the column **15** and a horizontal support part **32**. The parts **31** and **32** are rotatable relative to the column **15** about the center line thereof by releasing a brake and manually moving the parts to the desired position. The brake is then reapplied to hold the cap in this position.

The support part **32** has four rollers **33** of which two are shown in the drawing, rotatably mounted on it. The float table **14** is of longitudinal channel structure as shown and the base of the channel rests on the rollers **33**. The float table **14** is able to be moved manually in its longitudinal direction on the rollers **33** to alter the position of a patient in the lateral direction of the couch. In FIGURE 5 the float table **14** is shown in one extreme position with one of the rollers **33** against the edge of the table. In order to hold the table **14** in a desired position a brake is incorporated in the assembly to clamp the table **14** relative to the cap.

The table **14** carries on its upper side mounting brackets **34** for rollers **35** which support the float table **12**. It will be noted that the rollers **35** are at right angles to the rollers **33** so that the movement of the table **12** will be at right angles to that of table **14** and in the longitudinal direction of the couch as shown in FIGURE 1. The float table **12** is movable manually with respect to the table **14** and is able to be held in its desired position by a releasable brake.

In order to raise and lower the couch the lifting column **15** is provided with a mechanical gear driven lifting mechanism set in the floor of the treatment chamber in which the apparatus is used. The lifting column is secured at its lower end through a bearing **41** to an internal column **42** having a nut member **43** engaging on a threaded drive

spindle **44** extending up inside the column **15**. The column **15** moves within a lined well the wall **45** of which has bearing pads **46** internally connected thereto for positioning the column. The wall **45** also carries a key member **47** engaging in a groove **48** of the column **15** to prevent any rotational movement of the column relative to the wall.

The lower end of the drive spindle **44** is connected to a drive shaft **49** of a gear box **50** driven by an electric motor **51**. To raise or lower the couch the motor **51** is switched on to rotate in the appropriate direction and causes through the gear box **50** and drive shaft **49** the drive spindle **44** to rotate. As the spindle rotates the nut member **43** engaging therewith is moved along the spindle causing a corresponding movement of the column **15**.

What we claim is:

1. An adjustable couch comprising a base member, a support member connected with the base member and a plurality of panels associated with the support member, said support member and said base member being movable relative to each other, and said panels being movable relative to said support member, said support member comprising two portions connected together in tandem along the length of the couch, one said portion comprising a central column lying substantially on the longitudinal center line of the couch and the other said portion comprising a closed frame member defining a central area of the couch.

2. An adjustable couch according to claim **1** in which said base member includes an upper float table relatively shiftable with respect to a lower float table, for longitudinal and lateral movement of said base member relative to a vertically movable support column.

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U.S. Cl. X.R.

108—83, 138; 250—54