

[54] DEVICE FOR USE WITH X-RAY MACHINES

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[51] Int. Cl.² **G03B 41/16**

[58] Field of Search **250/439, 444, 445, 451, 250/521, 523, 524, 525, 468, 491**

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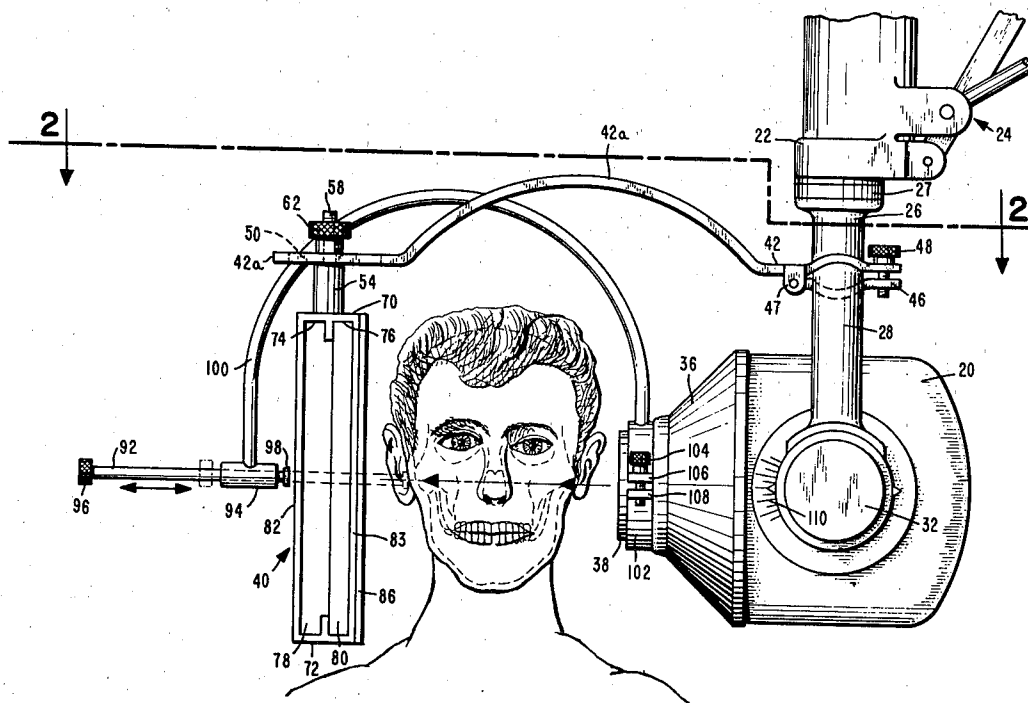
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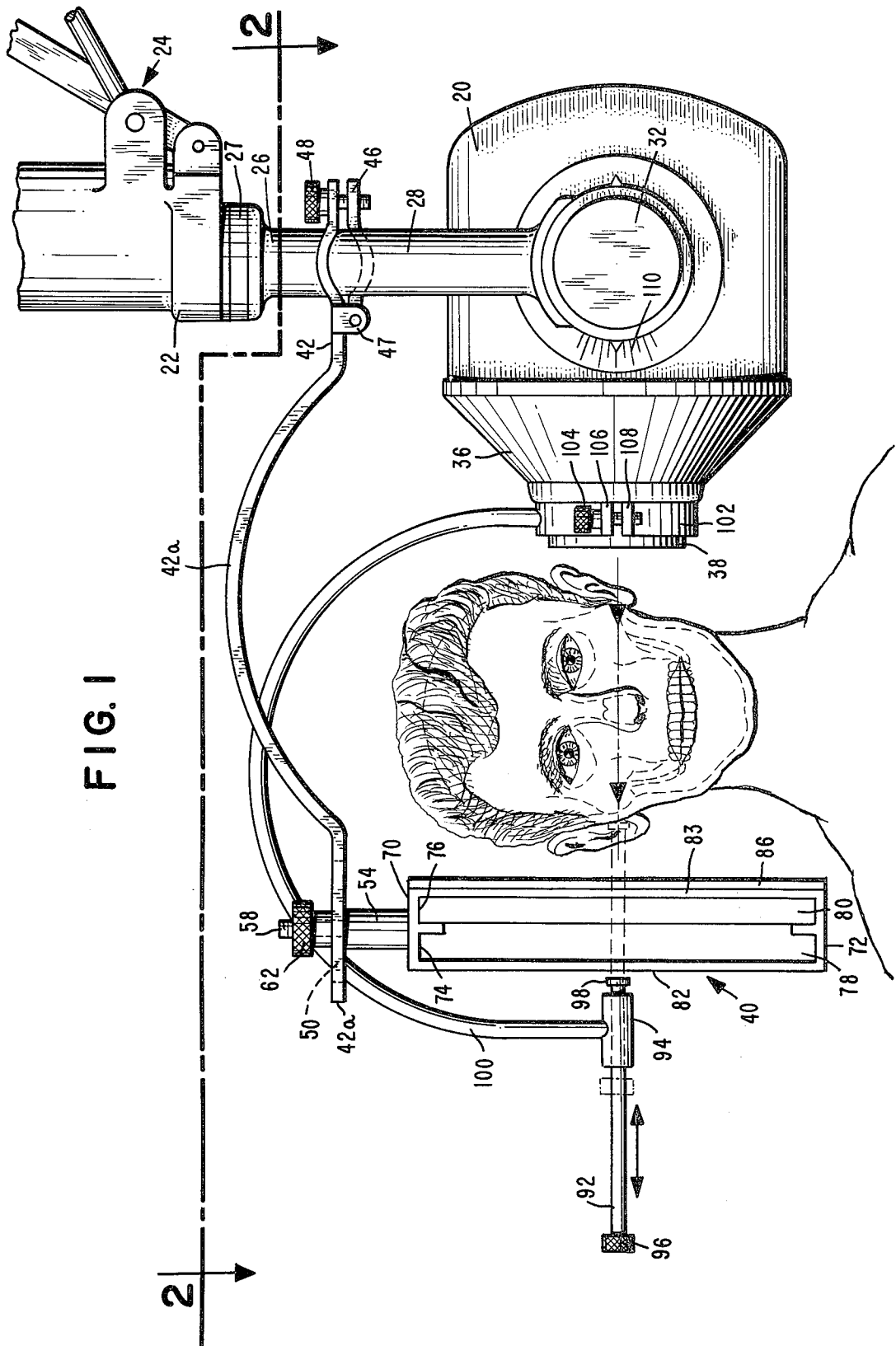
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[57] ABSTRACT

A device for attachment to X-ray machines of the type used in doctor's or dentist's offices. The device is used to locate the temporo-mandibular joint of a patient's head and to properly position it for obtaining X-rays thereof. The device includes a vertical cassette frame for film plates and a horizontal centering device both demountably attachable to a suitable part of the X-ray machine.

10 Claims, 4 Drawing Figures





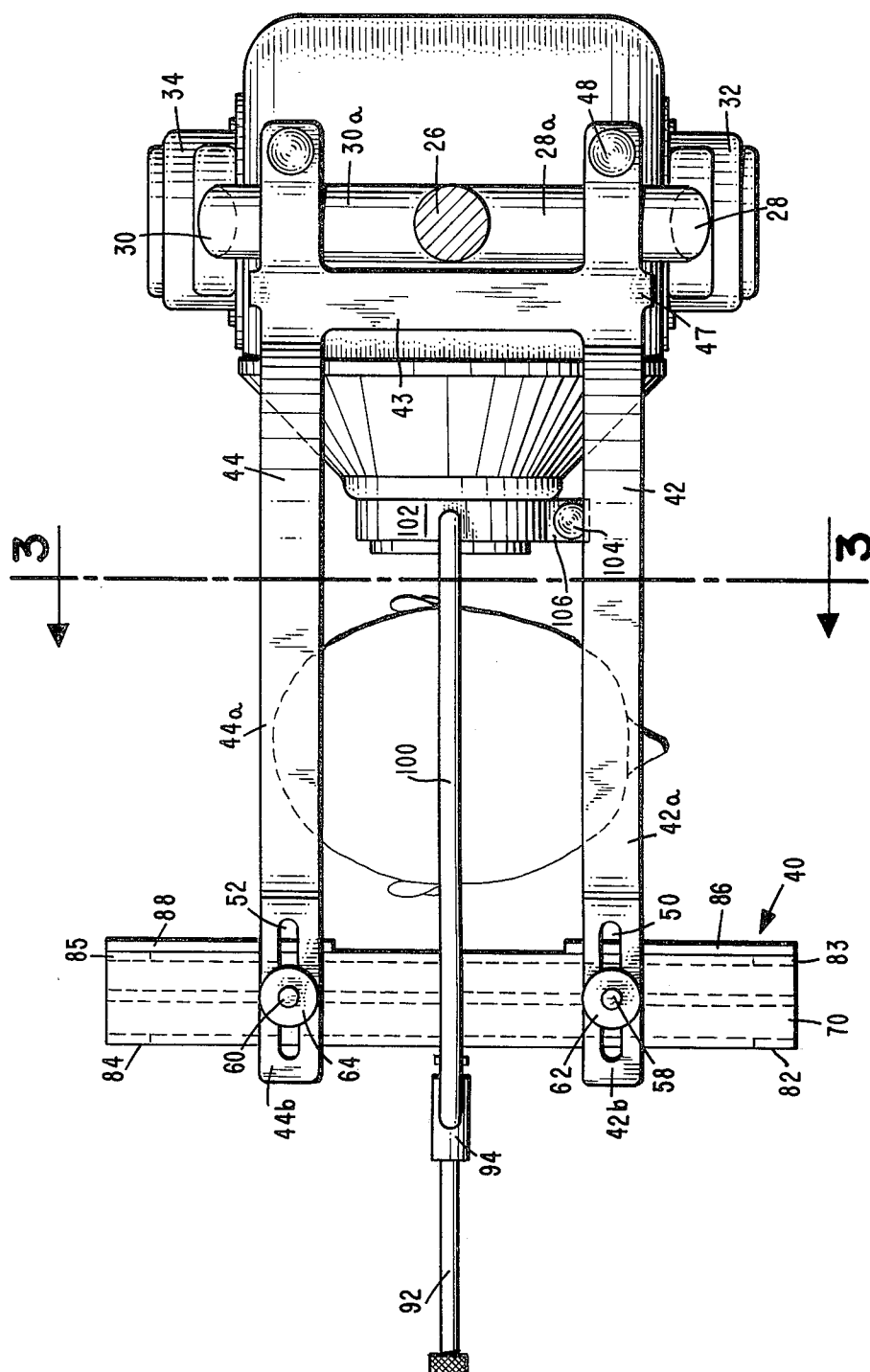
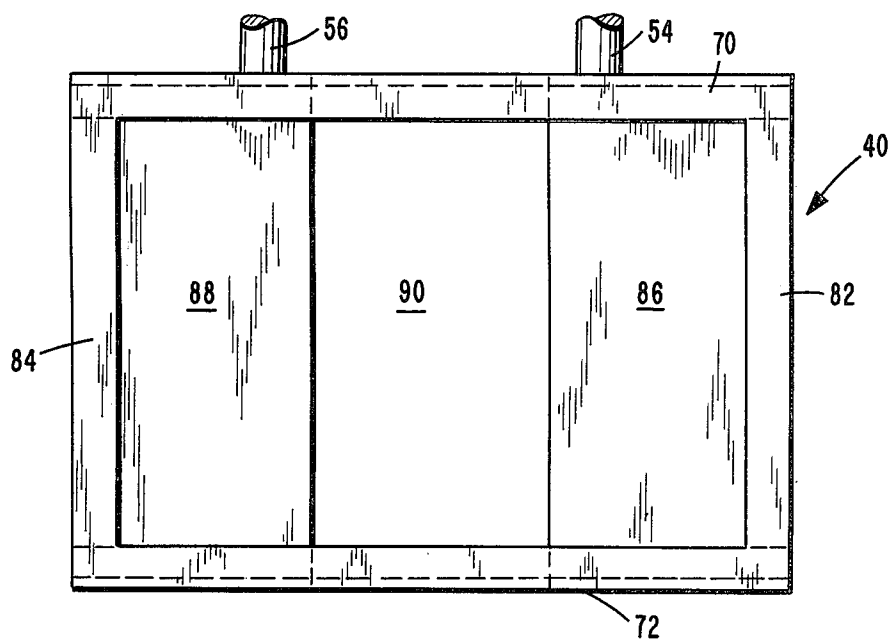
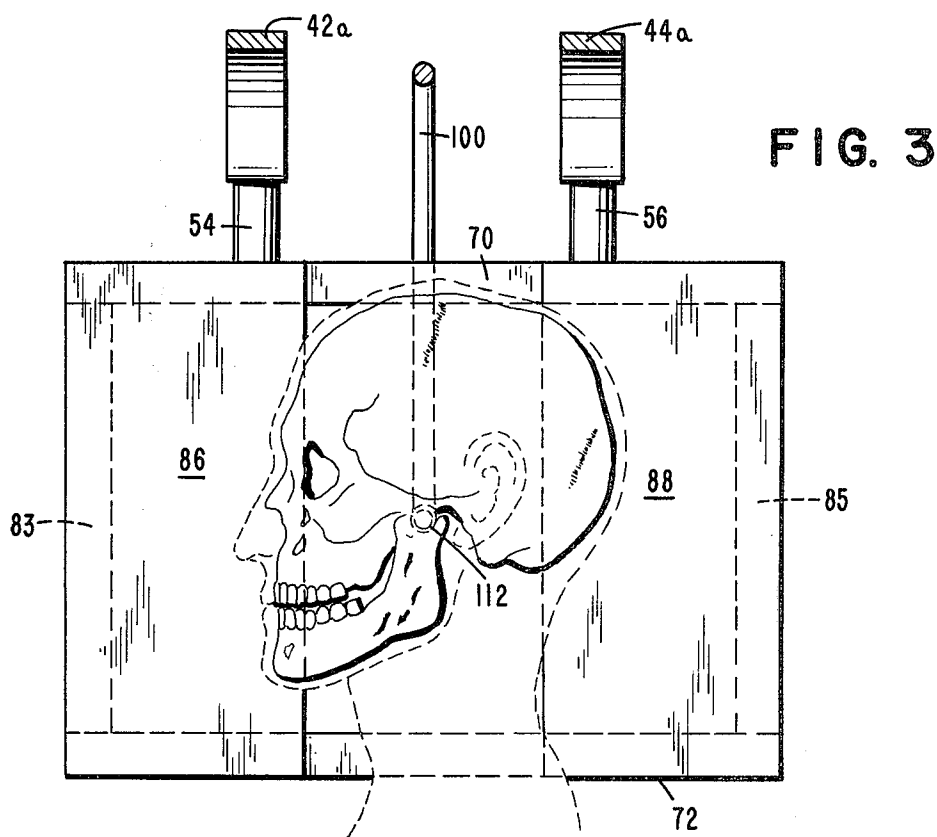


FIG. 2



DEVICE FOR USE WITH X-RAY MACHINES

BACKGROUND OF THE INVENTION

This invention relates to a device to be used with an X-ray machine, particularly for obtaining dental X-rays of the temporo-mandibular joint of a person.

The mandible or lower jaw is hinged to the temporal bone of the skull on both sides thereof just in front of the ears. This hinge is referred to as the temporo-mandibular articulation or joint. There are many important diagnostic reasons for requiring X-rays to be taken of this joint, such as diseases affecting the joint, e.g., arthritis, tumors, etc. as well as fractures thereof.

Presently, large and expensive X-ray machines are used, requiring skilled radiologists or doctors to operate the machines to correctly position the X-ray machine and to take proper X-rays of the temporo-mandibular joint. Furthermore, these machines required the use of considerable space and also have the disadvantage of using larger dosages (greater penetrating power) of X-rays for the relatively simple X-ray picture required. Smaller units used in doctors and dentists offices use lower dosages and would be desirable for use in X-raying the joint.

BRIEF DESCRIPTION OF THE INVENTION

The device of this invention can be used with conventional X-ray machines in offices of doctors and dentists, and with the aid of the device, suitable X-rays of the temporo-mandibular joint can be taken by relatively untrained persons or medical assistants.

The device is demountably attached to doctors and dentists X-ray machines and can be designed for movement into and out of position with respect to the X-ray machine. The device is inexpensive or minimal in cost when compared with the cost of large X-ray machines now required to be used for taking X-rays of the joint. The device produces X-rays with positive results in all cases and with less exposure to X-ray radiation by the patient, which is a desired safety factor. The X-ray results are easily reproducible for comparisons with later diagnoses to determine progress of an illness, etc.

Generally, the device comprises a pair of curved horizontal arms connected to the supports for the X-ray projector. At the extremities of the arms, an adjustable cassette frame is attached for horizontal movement permitting the frame to be movable towards and away from the X-ray projector. A horizontal centering rod is connected to an outer rim on the projector cone for the purpose of aligning with the temporo-mandibular joint of a patient. The patient's head is positioned sideways between the X-ray projector and the cassette frame, the centering rod is passed through the cassette frame and is centered in relationship with the joint, thereby adjusting the cassette frame for proper exposure against the patient's head. Thereafter, the rod is removed, a cassette film plate is placed and moved in the frame for the X-ray exposure. Two X-rays are taken on each film plate of the cassette, one with the mouth open and one with the mouth closed.

Accordingly, the invention provides a inexpensive device for demountable attachment to conventional X-ray machines in doctors or dentists offices which is easy to operate for taking X-rays of the temporo-mandibular joint of a patient.

The invention will be best understood from a consideration of the following detailed description of a spe-

cific embodiment thereof taken with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of an apparatus embodying the device of the invention showing a patient's head in position for using the device of the invention for taking an X-ray of the temporo-mandibular joint;

FIG. 2 is a section taken along line 2—2 of FIG. 1;

FIG. 3 is a section taken along line 3—3 of FIG. 2; and

FIG. 4 is an outer view of the cassette frame of the device as seen from the left side of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

In the drawings, the numeral 20 denotes a conventional X-ray projector of the type used in offices of a dentist or doctor, including a carriage 22 with members 24 (shown generally) for vertically raising or lowering the carriage. A boom 26 with a U-shaped yoke is pivotally mounted for horizontal rotation on the carriage 22 by means of rotatable member 27 on suitable shaft means (not shown). The yoke contains members 28 and 30 on which are mounted pivotable members 32 and 34 on each side of the projector 20. Members 32 and 34 are pivotally mounted to the side on the projector 20 by suitable shaft means (not shown), thereby providing vertical rotation to the projector. The projector cone 36 contains a rim 38 having means therein for directing the X-rays from the projector towards a particular desired direction.

A cassette frame 40 of the device for holding cassette film plates is adapted to be demountably attached to the horizontal portions 28a and 30a of members 28 and 30 of the yoke by means of arms 42 and 44. The arms are connected by cross member 43 and each arm is rigidly attached to the yoke by a bracket means 46 (FIG. 1) which is pivotally attached by member 47 to the arm 42. The arm and bracket are rigidly mounted to the yoke by bolt 48 passing through suitably threaded holes (not shown). Although, the arms are attached to the yoke by the above described bracket means, other suitable demountable securing means can be used. Furthermore, it is also contemplated that the arm means can be hinged for movement of the cassette frame out of position.

The arms 42 and 44 have arcuate portions 42a and 44a for accommodating the head of the patient. The horizontal ends of arms 42b and 44b are provided with longitudinal slots 50 and 52 respectively. Cassette frame 40 is vertically mounted from the ends of said arms by means of rods 54 and 56 which are secured to the frame. The upper ends 58 and 60 of the rods 54 and 56 are threaded and smaller in diameter, and are adapted to fit through slots 50 and 52 and be secured therein at a desired position by knurled nuts 62 and 64 respectively. The cassette frame is adjustable horizontally by movement of the rod ends 58 and 60 along the slot means.

The cassette frame 40 comprises an open-ended rectangular frame. The framework comprises a top member 70 comprising a pair of tracks 74 and 76, and a bottom member 72 comprising corresponding tracks 78 and 80. Between the members 70 and 72 are disposed braces 82 and 84 on the outward side, braces 83 and 85 and shields 86 and 88 on the inward side. The arrangement provides an open space 90 through the framework. The shields 86 and 88 and space 90 are of

the same width. Cassette film plates (not shown) can be placed on either or both tracks and the plate is adapted to be as wide as a combination of shield 86 and space 90 for reasons to be evident hereinafter.

A horizontal centering rod 92 is slidably mounted in sleeve 94 at the outer side of frame 40. The rod has a knurled knob 96 at one end and a stop member 98 at the opposite end. Sleeve 94 is secured to a rigid, curved brace 100 which is secured to bracket 102. The bracket is demountably attached to the periphery of rim 38 of the projector by means of knurled nut 104 passing through suitable threaded holes (not shown) in the end portions 106 and 108 of the bracket.

The brace 100 and bracket 102 are adjusted and positioned on rim 38 to enable the rod 92 to pass through the space 90 and be aligned with the center line of the projection cone 36. In this manner, rod 92 is movable horizontally in sleeve 94 and adjustable on the center line of projection cone 36.

The assembly of the cassette frame and the centering rod are movable together either pivotally horizontally and/or vertically by suitable movement of boom 26 as previously described. The X-ray projector as used herein is adjusted by means of the scale and pointer means 110 so that the center line of the projection cone 36 is horizontal.

In use, the device of the invention as described heretofore, is easily mounted on the X-ray machine by mounting the cassette frame in a vertical position and mounting the centering rod in a horizontal position. When it is desired to take an X-ray picture of the temporo-mandibular joint of a patient, the head is positioned sideways between the X-ray projector 20 and the cassette frame 40 and preferably closer to the projector. If necessary, the cassette frame can be adjusted inwardly or outwardly in slots 50 and 52 depending on the size of the patient's head. The centering rod 92 is passed through space 90 until stop member 98 engages the side of the head of the patient. The boom 26 is moved both vertically and pivotally horizontally, if necessary, whereby the operator of the device can move and locate the stop member 98 against the center of the temporo-mandibular joint 112 (FIG. 3) of the patient's head. Additionally, the head of the patient can be turned to enable centering of the joint. The rod 92 is then withdrawn. In this manner, the head and joint are properly positioned with respect to space 90 of the cassette frame for taking an X-ray picture of the joint.

A cassette film plate is carried on one set of tracks in the cassette frame. In the first position, one half of the film plate covers space 90 and the other half is masked by shield 86. An X-ray picture is then taken on one half of the film plate with the patient's mouth closed. The film plate is then moved on the tracks to a second position, whereby the second half (unexposed portion) is in space 90 and the exposed portion is masked by shield 88. An X-ray picture is then taken on the second half of the film plate with the patient's mouth open. Accordingly, the X-ray print will show two exposures of the temporo-mandibular joint, side by side, for convenient diagnosis of the joint both in the open and closed mouth position.

Similarly, the other side of the joint of the patients head can be X-rayed. Thus, the two pairs of tracks can be initially loaded with film cassettes for convenient, efficient and accurate use of the device. The inside tracks 76 and 80 can always be used for X-raying the left side of the head and the outside tracks 74 and 78

can always be used for X-raying the right side of the head.

From the foregoing description, one skilled in the art can easily ascertain the essential characteristics of this invention, and without departing from the spirit and scope thereof, can make various changes and modifications of the invention to adapt it to various usages and conditions.

What is claimed is:

1. A device for use in combination with a projector suspending means and projector cone of an x-ray machine for locating and taking an x-ray picture of a specific portion of a patient's head comprising:

a. an open-ended cassette frame adapted to be adjustably spaced on and vertically disposed in relation to the centerline of said projection cone of said projector, said frame adapted to be demountably attachable by arm means to said suspending means for said projector,

b. said frame comprising guide means for carrying at least one cassette film plate, an open space central section, and shield means adjacent said open space on the inward side of said frame,

c. centering and locating means disposed on the outward side of said frame and adapted to be aligned with and for movement along said centerline of said cone and through the center of said open space of said frame, said centering means adapted to be demountably attachable to said projector cone and movable with said cone,

whereby said frame and said centering means are movable both vertically and pivotally horizontally together with said projector, and whereby said centering means is movable through the center of said open space of said frame for location and alignment contact with said specific portion of said patient's head when the head is disposed between said frame and said projector, thereby centering and aligning said specific head portion for taking an x-ray picture thereof, upon removal of said centering means, on the portion of said cassette film plate positioned in said open space of said frame.

2. The device of claim 1 wherein said guide means of said frame means comprise upper and lower track means.

3. The device of claim 1 wherein the extremities of said arm means of said frame means comprise longitudinal slot means from which said frame is suspended and secured, and whereby said frame is adjustable in space relationship to said projector cone.

4. The device of claim 1 wherein said centering means is demountably attachable to a rim of said projector cone by arcuate brace means and bracket means.

5. The device of claim 1 wherein said centering means is a rod means which is disposed and movable through sleeve means attached to said brace means.

6. The device of claim 5 wherein said rod means comprises stop means adapted to locate and engage said specific portion of said patient's head.

7. The device of claim 1 wherein said guide means, shield means and open space are adapted for the taking of two juxtaposed x-ray pictures on one cassette film plate.

8. The device of claim 7 wherein shield means are disposed on each side of said open space.

9. The device of claim 1 wherein said guide means of said frame means comprise two sets of upper and lower track means.

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10. The device of claim 1 wherein said centering and locating means comprises rod and stop means adapted to locate the temporo-mandibular joint of a patient's head and said shield means are disposed on each side of said open space, whereby two juxtaposed x-ray pictures

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of said joint can be taken on one film plate, one with the patient's mouth open and one with the patient's mouth closed.

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