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X-RAY FIXATOR

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Fig. 1

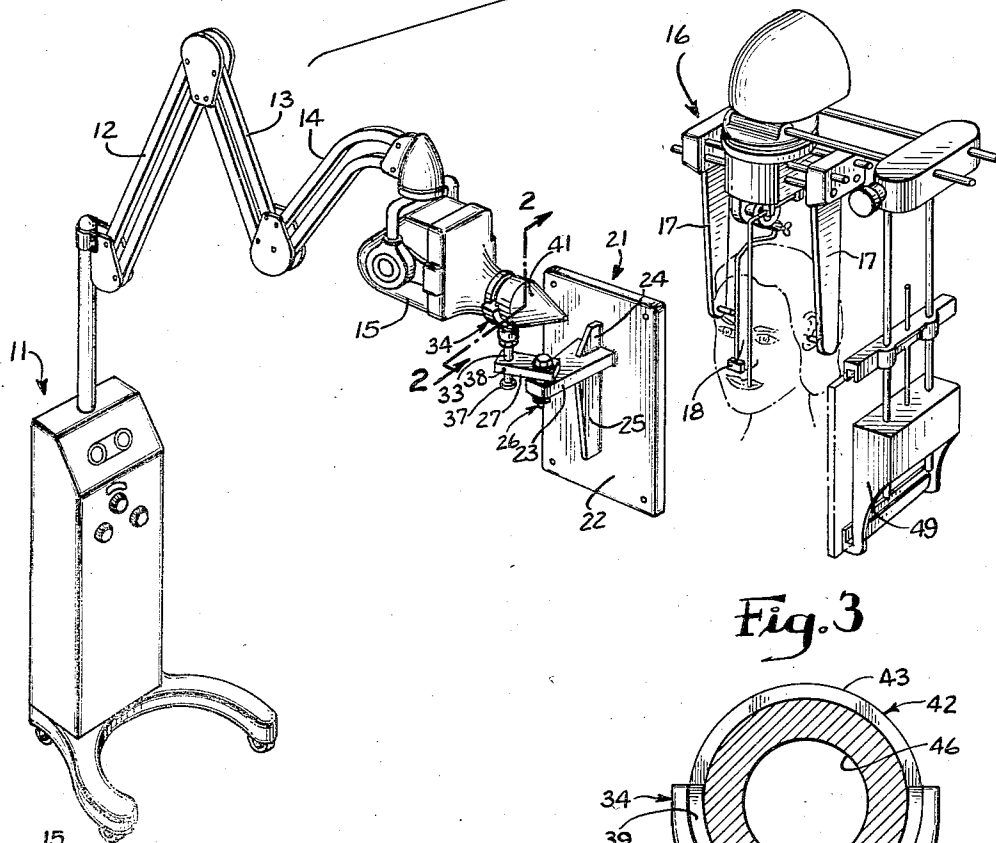


Fig. 3

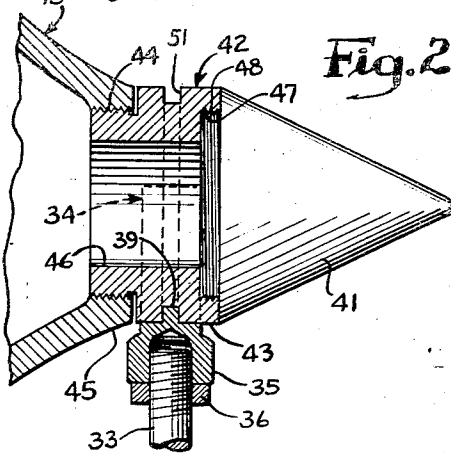
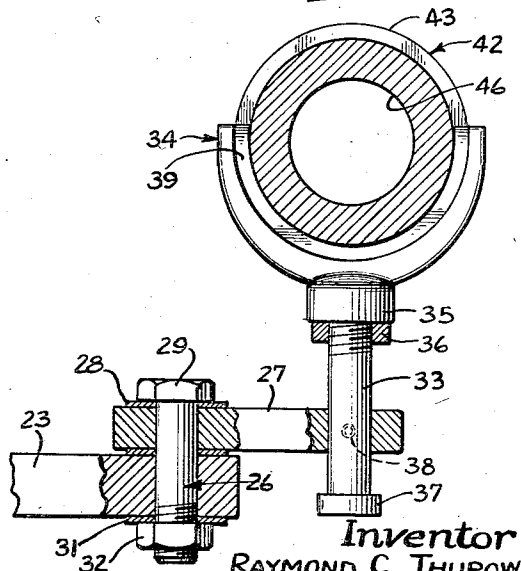


Fig. 2

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## X-RAY FIXATOR

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8 Claims. (Cl. 250—50)

This invention relates to improvements in X-ray apparatus and is more particularly concerned with the novel construction and arrangement of parts of a device to stabilize a movable X-ray tube head for cephalometrics.

Orthodontists and oral surgeons, as well as ear, nose and throat specialists, are particularly interested in being able to duplicate exposures of the areas being treated for the purpose of making X-ray studies of progress. For example, an orthodontist will wish to substantially duplicate a radiograph obtained some weeks or months earlier so that, upon comparison of the two, he can determine whether or not any progress has been attained during the intervening time. This duplication can be accomplished only if all of the conditions existing at the time of the taking of the earlier radiograph are present. In order to duplicate a radiograph it is necessary that the subject and the X-ray tube head be located in precisely the same relative positions with respect to each other as existed at the time the earlier radiograph was taken. Although an X-ray machine may be mounted on a wall and any one of many types of wall mounted cephalographs may be associated therewith, there has been no practical means available to stabilize the X-ray tube head so as to locate the penetrable cone thereon in a predetermined fixed relationship to the cephalograph. This situation is particularly aggravated in the instance of a portable type of X-ray machine which is more commonly in use because of its versatile utility. The present disclosure contemplates the provision of novel means, fixedly mounted relative to a cephalograph, to cooperate with the X-ray head carried on either a portable, stationary or wall mounted X-ray machine, for locating said X-ray tube head in a predetermined position with relation to the cephalograph.

It is therefore an object of the invention to provide novel means and apparatus to insure conformity in subsequent settings of the X-ray machine head relative to a cephalograph.

Another object of the invention is to provide a novel cone adapter collar for an X-ray machine.

Another object is to provide a novelly constructed universally adjustable bracket for supporting an X-ray tube head in a predetermined position.

Another object is to provide a structure of the character described, of improved construction, which insures the proper positioning of the X-ray tube head so as to obtain radiographs that are substantial duplicates of radiographs taken at an earlier date, differing therefrom in progression but otherwise being identical.

Another object is to provide a structure of the character described which is not expensive to manufacture, comprises few parts, is rugged in its construction, easy to install and very efficient and practical in its use.

With the foregoing and such other objects in view, which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being

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understood that various changes in form, proportion, size and minor details of the structure may be made without departing from the spirit of the invention.

Referring to the drawings in which the same characters of reference are employed to identify corresponding parts:

Figure 1 is a perspective view illustrating the relationship of the various apparatus used in taking radiographs, and showing the structure of the present invention in association therewith;

Figure 2 is a vertical sectional view taken on line 2—2 of Figure 1; and,

Figure 3 is a fragmentary elevational view of the adapter collar receiving bracket, showing the collar seated therein.

Referring now to the accompanying drawings, the X-ray machine 11 illustrated is a portable type as distinguished from one that is stationary or is mounted on a wall or other surface. The X-ray machine 11 illustrated is provided with a multiple of pivotally connected cantilever arms 12, 13 and 14, the latter carrying a conventional X-ray tube head 15. The X-ray machine 11 is shown associated with a cephalograph 16, including conventional ear posts 17 which are adapted to be fitted into the patient's ears, and a nasion rest 18. In use, the patient is positioned so that his head is located within the area of the cephalograph. The ear posts 17 are seated in the patient's ears and the nasion rest 18 is seated against the patient's nose.

In order to position the X-ray tube head 15 in a predetermined location relative to the cephalograph, and to maintain it against vibration, said X-ray tube head is supported firmly in a bracket structure generally indicated at 21 and to be described in detail presently. The orthodontist or other practitioner may record the position of the ear posts and nasion rest at the time of making the initial radiograph so that when the patient returns weeks or months later for another radiograph for the purpose of checking progress, the ear posts and nasion rest may be again set as previously. The X-ray tube head is then placed in the bracket 21, which is fixed in relation to the cephalograph, and because the X-ray tube head and the patient are in the same relative positions as when the previous radiograph was taken, the radiograph to be taken will correspond in area and intensity to the earlier radiograph, but will vary therefrom only insofar as progress is indicated.

To insure that the desired results are obtained, the bracket structure 21 is mounted firmly on a wall or other surface in fixed relation to the cephalograph. The bracket structure includes a mounting base 22 which may be attached to the wall in any suitable manner. The base 22 has an integral supporting arm 23 extending perpendicularly from its front face. Suitable reinforcing webs 24—25 may be formed integral with the base and arm to insure utmost rigidity to the arm. The free end of the supporting arm 23 has a vertical aperture therein through which a bearing bolt 26 extends for pivotally mounting one end of a bar 27 to said arm. The bolt has a washer 28 between its head 29 and the arm and a similar washer 31 between the bar and a nut 32 threaded onto the bolt 26.

The other or free end of the bar 27 has a vertical bearing bore to slideably and rotatably receive a supporting shaft or post 33 depending from a U-shaped yoke or cradle 34. The cradle preferably is connected to the shaft 33 by means of a tapped boss 35 which receives the threaded upper end of said shaft. A lock nut 36 mounted on said shaft adjacent to the boss 35 prevents unintended separation of the shaft from the cradle. The lower end of the shaft carries a collar 37 which prevents withdrawal of the shaft from the bearing bore in bar 27. This

structure permits vertical and rotatable adjustment of the cradle relative to the bar 27. When the cradle is placed in the desired position of adjustment it is held in such position by a set screw 38 that engages the shaft 33.

The cradle 34 is suitably machined or otherwise formed on its inside surface to provide an arcuate rib 39 co-extensive with its length for a purpose to become apparent presently.

It might be observed at this time that the bracket structure 21 just described is mounted in a fixed predetermined position with respect to the cephalograph and that the various adjustments are made initially in the bracket parts to meet the specific requirements of the X-ray equipment to be used in association therewith so that once it is set no further adjustment of the parts is required in order to obtain duplicate radiographs. However, in order to utilize the bracket structure 21, a minor modification must be made in the mounting of the X-ray penetrable cone 41 on the X-ray tube head 15. Referring now to Figure 2 in particular, an adapter collar 42 is interposed between the X-ray tube head 15 and the penetrable cone 41. This adapter collar preferably is a machined part including a large diameter body portion 43 having a reduced diameter 44 at one of its ends suitably threaded externally to be received in the internally threaded throat 45 on one end of the X-ray tube head 15. An axial bore 46 extends through the collar and the other end of said collar is recessed and internally threaded, as at 47, to receive the threaded mounting end 48 of the penetrable cone 41. In use, an X-ray beam passes out of the X-ray tube head 15 through the bore 46 in the collar 42 and the penetrable cone 41 and on through the registering portion of the patient and onto a negative film held in a cassette 49 on the cephalograph 16.

The body portion 43 of the collar 42 is formed with an external circumferential groove 51 of sufficient width and depth to receive freely, but without undue play, the arcuate rib 39 of the cradle when the collar is seated therein.

The structure is such that any portable X-ray machine as well as a stationary or wall mounted machine may be equipped with an adapter collar 42 so as to be useful for taking duplicate radiographs when used in association with the bracket structure 21 and a cephalograph 16 of any approved construction. The use of a U-shaped cradle or yoke 34 simplifies the positioning of the adapter collar in the bracket and further prevents horizontal and vertical rotation of the otherwise movable X-ray tube head while maintaining it in the precise position required.

Although an exemplary embodiment of the invention has been shown and described, it should be understood that the invention is capable of being embodied in a wide variety of modified structures and that it is not desired to limit the invention to the disclosure but to embrace such variations as will fall within the scope of the appended claims.

#### I claim:

1. In an apparatus for taking X-ray pictures, an X-ray tube head movably mounted on a portable machine cabinet for projecting an X-ray beam, said head having a threaded end coaxial with the X-ray beam emanating from said head, an adapter collar threaded at one end into the threaded end of the X-ray head, a penetrable cone threaded into the other end of said collar, and a firmly mounted bracket structure including means engageable with said collar for maintaining the X-ray head and cone in a fixed position.

2. A bracket for fixedly positioning a movably mounted X-ray head relative to a wall mounted cephalograph comprising, a wall mounted base plate fixedly located relative to the cephalograph, an arm integral with and

extending perpendicular from said plate, a bar carried by said arm, a yoke mounted on said arm for vertical adjustment relative thereto, means to secure said yoke adjusted, an adapter collar on said X-ray head, and co-acting means in said collar and on said yoke to secure the X-ray head fixedly.

3. A bracket for an X-ray tube head comprising a wall plate, an arm extending perpendicular from said plate, a bar pivotally mounted at one end to the free end of said arm, said pivotal mounting comprising a bolt and nut, a bearing in the other end of said bar, a post mounted in said bearing, means to secure the post against movement relative to said bar, a cradle carried by said post, and a guide rib on the inside face of and coextensive with the length of said cradle adapted to coact with complementary means on an X-ray tube head for holding the head in a predetermined fixed position.

4. A device to stabilize a movable X-ray tube head for cephalometrics comprising a bracket fixedly mounted relative to a cephalograph, said bracket comprising, a mounting plate, an arm extending outwardly from one surface of said mounting plate, a bar mounted on said arm for adjustment in a horizontal plane, a yoke carried by said bar, means securing the yoke in a position of adjustment, and an adapter collar on said X-ray head engageable with said yoke so as to be fixedly positioned relative to the cephalograph.

5. A device for fixedly positioning a movable X-ray tube head and its penetrable cone relative to a cephalograph comprising an adapter collar fitted between the head and cone, a bracket mounted in a fixed position relative to said cephalograph, a cradle carried by said bracket, and means on said cradle detachably engageable with means in the collar for supporting the head and cone.

6. A device for fixedly positioning a movable X-ray tube head and its penetrable cone relative to a cephalograph comprising an adapter collar fitted between the head and cone, a bracket mounted in a fixed position relative to said cephalograph, a cradle adjustably mounted on said bracket, means to secure the cradle adjusted, and means on said cradle detachably engageable with means in the collar for supporting the head and cone in a predetermined position.

7. A device for fixedly positioning a movable X-ray tube head and its penetrable cone relative to a cephalograph comprising an adapter collar having one end threaded into said X-ray tube head and the cone threaded into its other end, an external circumferential channel in said collar, a bracket fixedly mounted relative to a cephalograph, said bracket including a mounting plate and a rigid arm projecting therefrom, a bar adjustably mounted firmly in said arm, a post mounted in said bar, means securing said post against adjustment, and a yoke on said post including a rib to be received in said channel when the collar is seated therein so as to fixedly position the X-ray tube head and its cone.

8. A device for fixedly positioning a movable X-ray tube head and its penetrable cone relative to a cephalograph comprising a connector member removably securing said cone to the X-ray tube head, a bracket fixedly mounted relative to a cephalograph, and adjustable means carried by said bracket and removably connected to said connector member to fixedly position the X-ray tube head and connected cone as desired.

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