

[54] **COUNTERBALANCED STAND FOR CAMERA**

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[58] Field of Search..... 248/123, 280, 292,
248/179, 180, 184, 181; 308/2 R

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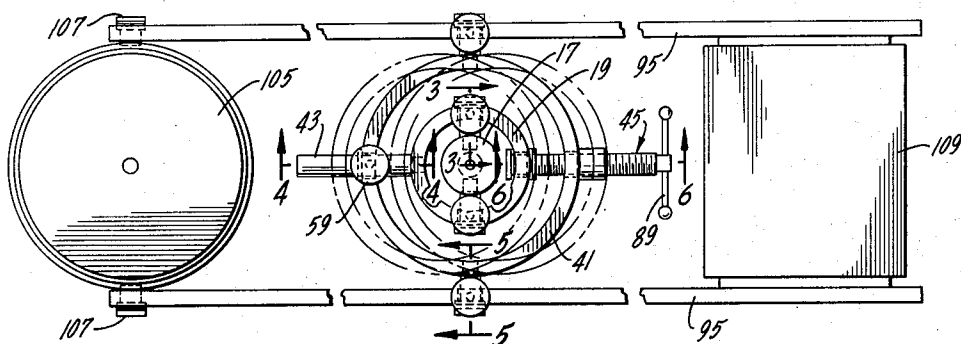
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ABSTRACT

A counterbalanced stand for a gamma camera. An elongated frame carries a gamma camera at one end and a counterbalance weight at the opposite end. The frame is mounted on a stanchion for universal movement relative thereto. In one form of the invention, the frame carries a socket which receives a socket support mounted on the stanchion. In another form, gimbals are mounted on the stanchion and are rotatable about the axis thereof. The outer ring of the gimbals and the frame are movable in a direction longitudinally of the frame to maintain the center of gravity of the assembly in a desired position relative to the stanchion.

4 Claims, 10 Drawing Figures



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SHEET 1 OF 3

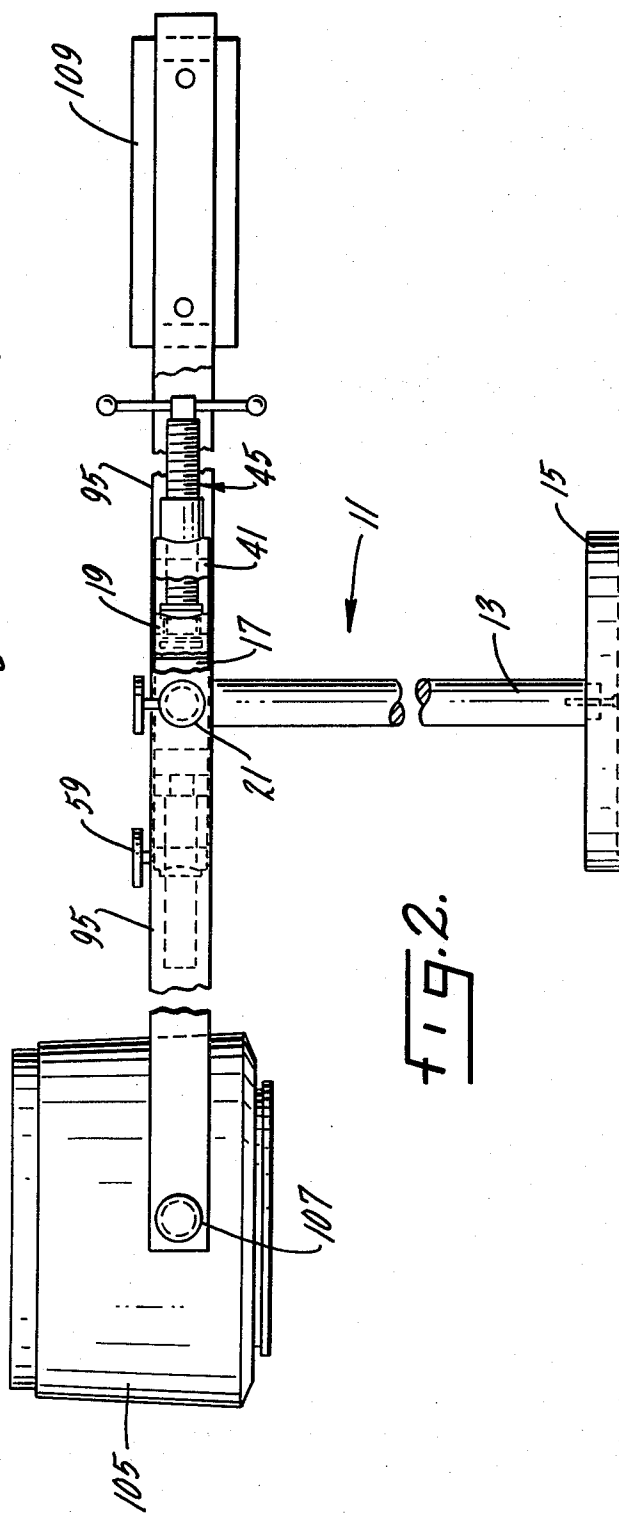
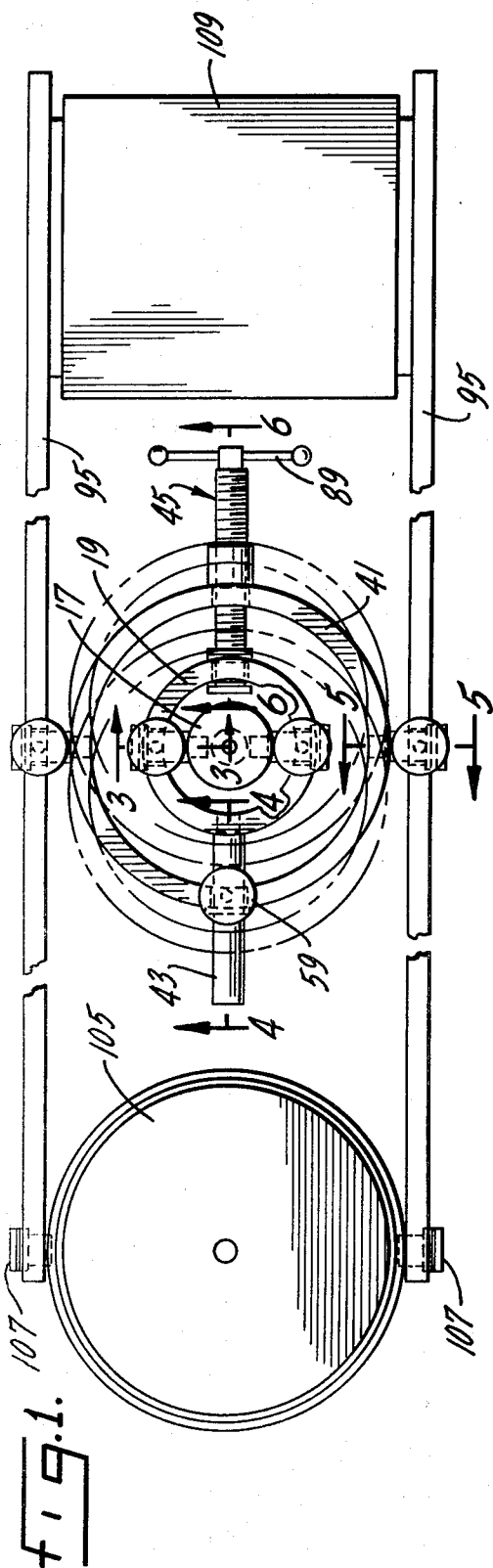


fig. 6.

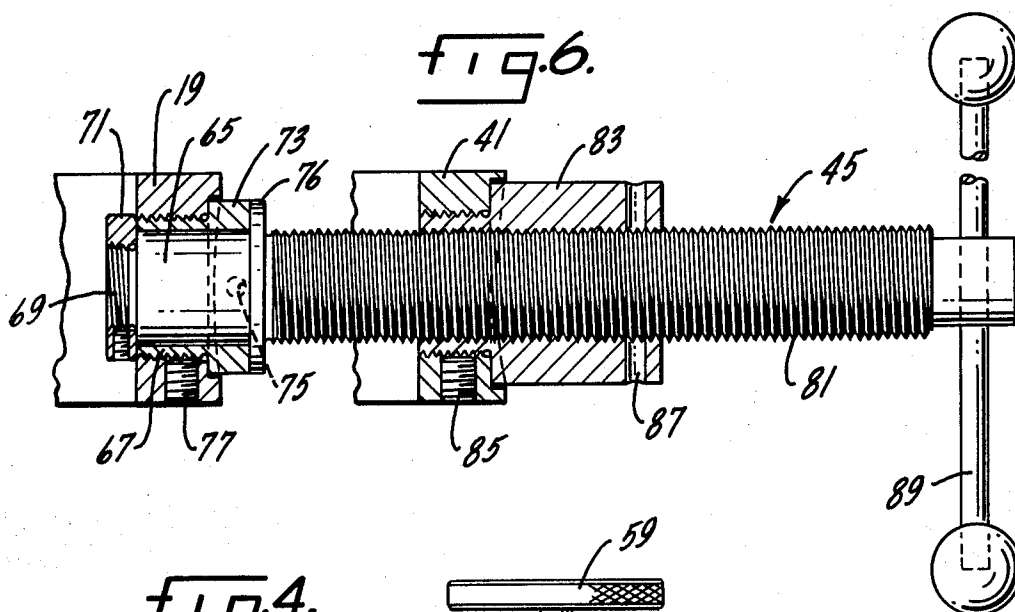


fig. 4.

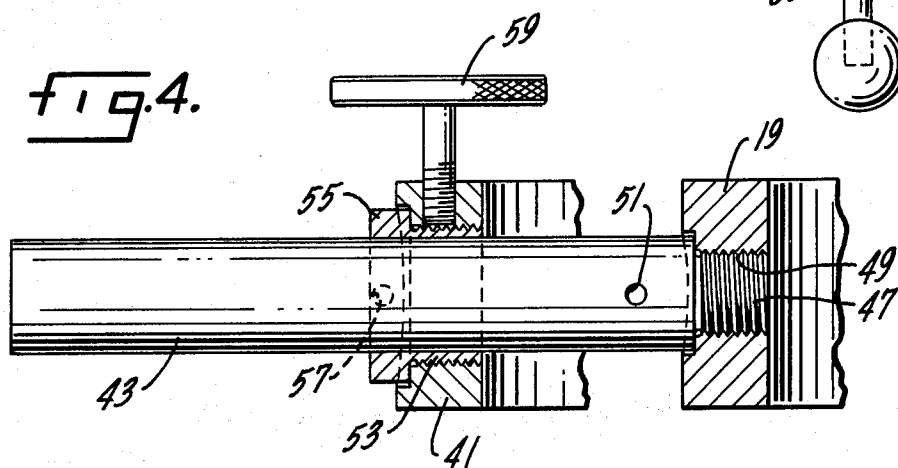


fig. 3.

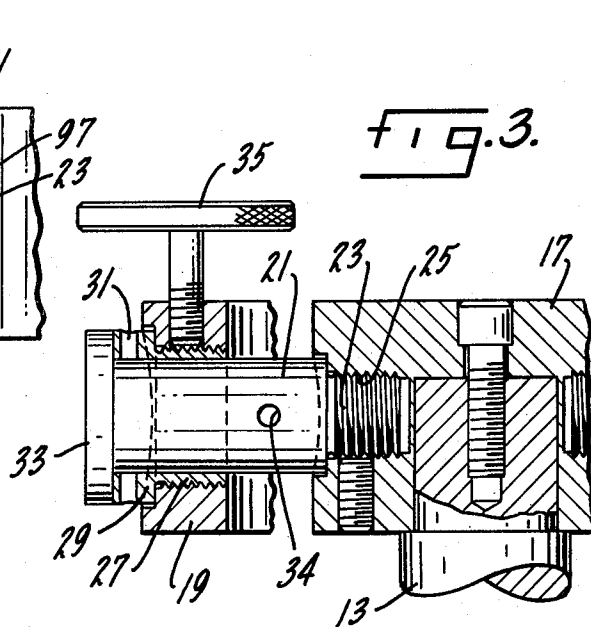
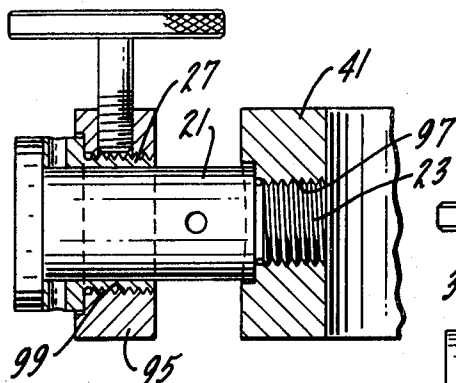
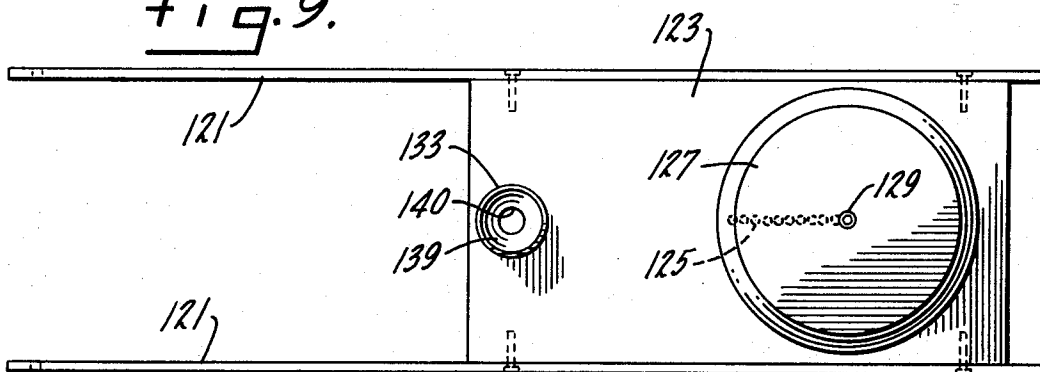
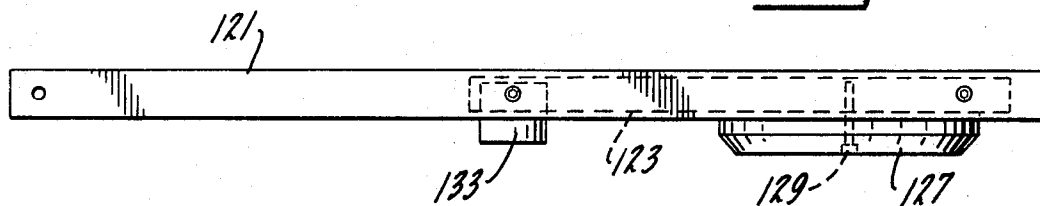
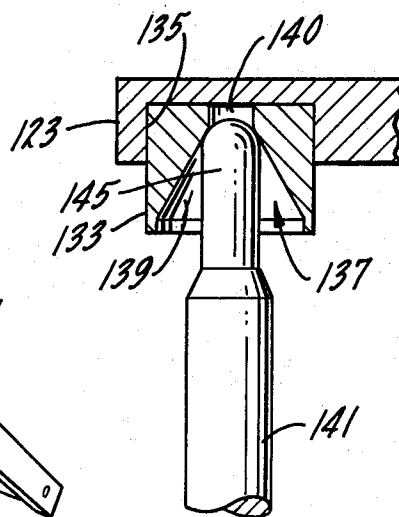
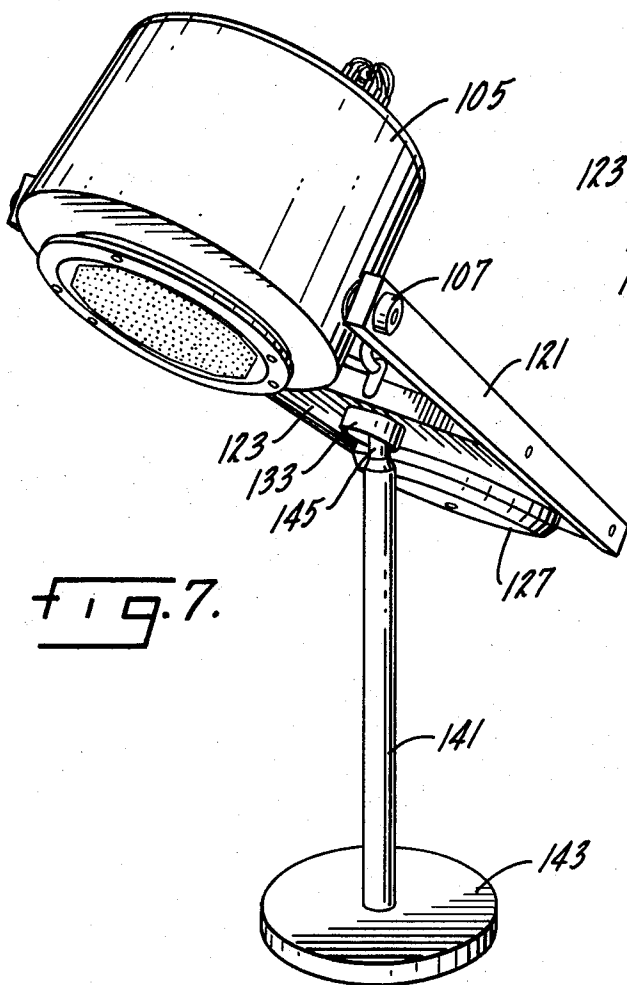


fig. 5.





COUNTERBALANCED STAND FOR CAMERA

SUMMARY OF THE INVENTION

This invention is directed to a counterbalanced stand for a gamma camera and more particularly with a counterbalanced stand in which the frame supporting the camera and counterweight is mounted on a stanchion for universal movement relative to the stanchion.

An object of this invention is a counterbalanced stand for a gamma camera which permits the camera to be positioned accurately relative to a patient and with minimum effort.

Another object is a counterbalanced stand for a gamma camera in which the frame supporting the camera is movable in a lengthwise direction relative to a support stanchion to maintain the center of gravity of the assembly in a desired location.

Other objects may be found in the following specification, claims and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated more or less diagrammatically in the following drawings wherein:

FIG. 1 is a partial top plan view of one form of a gamma camera stand showing the stand in several positions of adjustment;

FIG. 2 is a partial side elevational view of the camera stand of FIG. 1;

FIG. 3 is an enlarged cross-sectional view taken along line 3—3 of FIG. 1;

FIG. 4 is an enlarged cross-sectional view taken along line 4—4 of FIG. 1;

FIG. 5 is an enlarged cross-sectional view taken along line 5—5 of FIG. 1;

FIG. 6 is an enlarged cross-sectional view taken along line 6—6 of FIG. 1;

FIG. 7 is a perspective view of a second form of camera support stand;

FIG. 8 is a partial side elevational view of the support frame and counterweight of the camera of FIG. 7;

FIG. 9 is a bottom plan view of the structure of FIG. 8, and

FIG. 10 is an enlarged partial cross-sectional view of the frame, socket and socket support stanchion.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

One form of counterbalance stand for a gamma camera is shown in FIGS. 1 through 6 of the drawings. The stand 11 includes a stanchion 13 mounted on a base 15. A cap 17 is pivotally connected to the top of the stanchion 13. An inner gimbal ring 19 is pivotally connected to the cap 17 by trunnions 21. Each trunnion includes a threaded end portion 23 which fits into a threaded socket 25 in the cap 17. Each trunnion (FIG. 3) is journaled in a bearing 27 which threads into an opening in the inner gimbal ring 19. Each bearing 27 includes an integral flange 29 having holes 31 adapted to receive a wrench. Each trunnion has an integral head 33 which engages the flange of the bearing. Each trunnion is also provided with holes 34 adapted to receive a wrench. A binder screw 35 is provided to extend through the inner gimbal ring 19 and to engage the threads of the bearing to hold the bearing in position.

The outer gimbal ring 41 is pivotally supported on the inner gimbal ring 19 by means of a trunnion 43 and an adjustment screw 45. The trunnion 43 (FIG. 4) has

a threaded end 47 which fits into a threaded socket 49 in the inner gimbal ring 19. The trunnion is equipped with holes 51 near the threaded end 47 for receiving the ends of an adjustment wrench. The trunnion is journaled in a bearing 53 which is threaded into an opening in the outer gimbal ring 41. The bearing is equipped with an integral flange 5 in which are located holes 57 for receiving the ends of an adjustment wrench. A binder screw 59 extends through an opening in the outer gimbal ring to engage the threads of the bearing 53 to maintain the bearing in position.

The inner end of the adjustment screw 45 (FIG. 6) has a trunnion portion 65 which fits into a bearing 67 threaded into the inner gimbal ring 19. A smaller threaded stub 69 extends inwardly of the trunnion portion and receives a locking nut 71 which engages the inner gimbal ring 19. The bearing 67 has an integral flange 73 with adjustment wrench openings 75 located therein. The adjustment screw is equipped with an integral flange 76 which engages the flange 73 of the bearing 67. A set screw 77 is provided to extend through the gimbal ring 19 to engage the threads of the bearing 67 and lock it in position.

The adjustment screw 45 includes a threaded portion 81 which extends through an adjustment nut 83 in threaded engagement therewith. The adjustment nut is threaded into the outer ring 41 and is held there by a set screw 85. Adjustment wrench receiving holes 87 are provided in the adjustment nut. A handle 89 extends through the outer end of the adjustment screw 45.

The outer gimbal ring 41 is pivotally connected to the frame beams 95 (FIG. 5) by trunnions which are generally identical to the trunnions 21 which connect the inner gimbal ring to the stanchion cap 17. For example the threaded end portion 23 of the trunnion 21 fits into a threaded opening 97 in the outer gimbal ring 41 and the bearing 27 threads into a threaded opening 99 in the frame beam 95. A gamma camera 105 (FIGS. 1 and 2) is pivotally connected to one end of the frame beams 95 by adjustable friction brake trunnions 107 and a counterweight 109 is fastened to the opposite end of the frame beams 95.

A modified form of counterbalanced stand is shown in FIGS. 7 through 10 of the drawings. In this modification, the gamma camera 105 is pivotally connected to one end of frame beams 121 by adjustable friction brake trunnions 107. The frame beams 121 are connected by a plate 123 which extends between and is fastened to the beams. An aligned series of holes 125 are formed centrally in the plate near the end thereof opposite to the camera mounting. A counterweight 127 is attached to the plate 123 by means of a fastener 129 which may be inserted in one of the holes 125. Legs (not shown) may be provided to support the stand when the camera is removed.

As is best shown in FIG. 10, a bronze socket body 133 is located in a hole 135 formed in the plate 133. The socket body has a socket opening 137 which extends therethrough with the lower portion 139 of the socket opening being conical in shape and the upper portion 140 being cylindrical in shape.

A stanchion 141 which is supported on a base 142 has a rounded steel socket support 145 which is received in the socket opening 137. The socket support engages the portion of the socket body defining the conical opening and extends into the cylindrical open-

ing. A lubricant may be placed in the cylindrical opening.

The use, operation and function of this invention are as follows:

The gamma camera 105, whether mounted on the counterbalance stand shown in FIGS. 1 to 6 or in the modified stand shown in FIGS. 7 to 10, may be tilted and moved into position relative to the patient simply by moving the camera 105. Due to the universal mounting of the camera, the camera frame may be tilted longitudinally and laterally and may also be rotated relative to the stanchions 13 and 141. The counterbalanced design of the stand will maintain the camera in the desired position.

In the form of stand shown in FIGS. 1 to 6, the mechanism may be adjusted to compensate for cameras of different weights and sizes by turning the adjustment screw 45. Rotation of this screw will move the outer gimbal ring 41 and the attached frame beams 95 in a direction along the length of the frame beams. Thus, with a constant counterbalance weight 109, different types of cameras can be used and the stand can be adjusted for any variance in camera weight or center of gravity.

In the modified form of counterbalance stand shown in FIGS. 7 through 10 of the drawings, adjustment of the center of gravity for various types of cameras 105 or for cameras of varying centers of gravity may be made by moving the counterweight 127 longitudinally along the frame beams 121. This is accomplished by removing the countweight fastener 129 and positioning it in a selected one of the support holes 125.

Whereas, the preferred form of the invention has been described and shown, it should be understood that there are modifications, alterations and changes which may be made without departing from the teachings of the invention. Therefore, the scope of the invention should be only limited by the claims attached hereto.

I claim:

1. A counterbalanced stand for a gamma camera including a base, an upright stanchion mounted on said base, a generally rectangular frame formed of a pair of spaced parallel beams, means for pivotally mounting a gamma camera between said beams generally adjacent one end thereof,

a plate positioned between and fastened to said beams, means for mounting said frame and camera on said stanchion for universal movement of the

frame relative to the stanchion including a socket member positioned in said plate, an opening extending through said socket member and having a lower conical portion and an upper cylindrical portion, a cylindrical socket support positioned on the end of said stanchion and extending into said opening with the socket support engaging the portion of the opening defining the conical portion and extending into the cylindrical portion,

and a weight mounted to said plate generally adjacent the opposite end of said beams from the camera, and means for adjusting the position of the weight relative to said socket member.

2. The structure of claim 1 further characterized in that the means for adjusting the position of the weight include a plurality of aligned holes in the plate and a pin extending through the weight and into the holes for adjustably positioning the weight relative to the plate.

3. A counterbalanced stand for a gamma camera including a base, an upright stanchion mounted on said base, a generally rectangular frame formed of a pair of spaced parallel beams, means for pivotally mounting a gamma camera between said beams generally adjacent one end thereof,

a weight mounted to said spaced beams generally adjacent the opposite end thereof,

a cap at the upper end of said stanchion, an inner gimbal ring pivotally attached to said cap to permit movement of said ring about an axis generally perpendicular to said beams, an outer gimbal ring pivotally attached to said inner ring to permit movement of said outer ring about an axis generally parallel with said beams, and means for pivotally attaching said beams to opposed portions of said outer ring,

the means for pivotally attaching the outer gimbal ring to the inner gimbal ring including means for moving the outer ring relative to the inner ring along the pivotal axis of the outer ring.

4. The structure of claim 3 further characterized in that the means for pivotally attaching the outer ring to the inner ring include a trunnion and an adjustment screw, generally parallel with each other and aligned along the axis of pivotal movement of the outer ring, rotation of said adjustment screw moving the outer ring relative to the trunnion.

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