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 [21] Appl. No. **53,079**
 [22] Filed **July 8, 1970**
 [45] Patented **Jan. 4, 1972**

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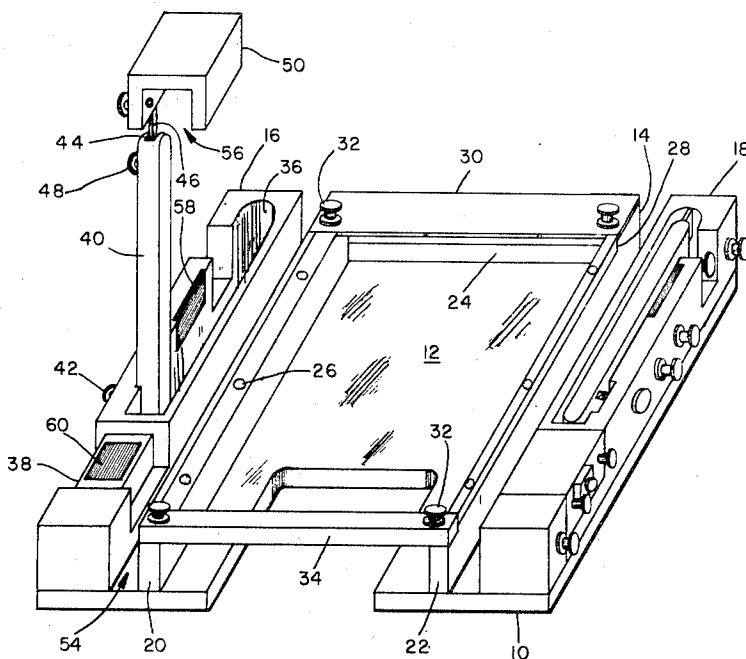
[54] MULTIPOSITIONABLE DEVICE FOR X-RAY FILM CASSETTE

11 Claims, 9 Drawing Figs.

[52] U.S. Cl. **250/50,**
 250/54, 250/58
 [51] Int. Cl. **G01n 21/00**
 [50] Field of Search 250/50, 54,
 58, 65 R

[56] **References Cited**
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ABSTRACT: In a device adapted for multiplane reception of an X-ray film plate so that X-rays may be taken in several views without repositioning a patient, a cover is captively held in spaced parallel relation to a base by a support and bars are captively held to the base in spaced parallel relation to opposite sides of the support. The cover, support and base define an open-ended enclosure which is adapted for reception of the X-ray film plate in a first plane. An arm, formed with cavity adapted for slidable reception of a finger, is articulated to each bar and a channel is removably mounted to one end of the finger. The bar, base, and support define a lower guideway and the channel defines an upper guideway, the lower and upper guideways being in spaced relation to each other and adapted for reception of the X-ray film plate in a second plane normal to the first plane. A head support and restraining devices are provided for securing the patient to the device.



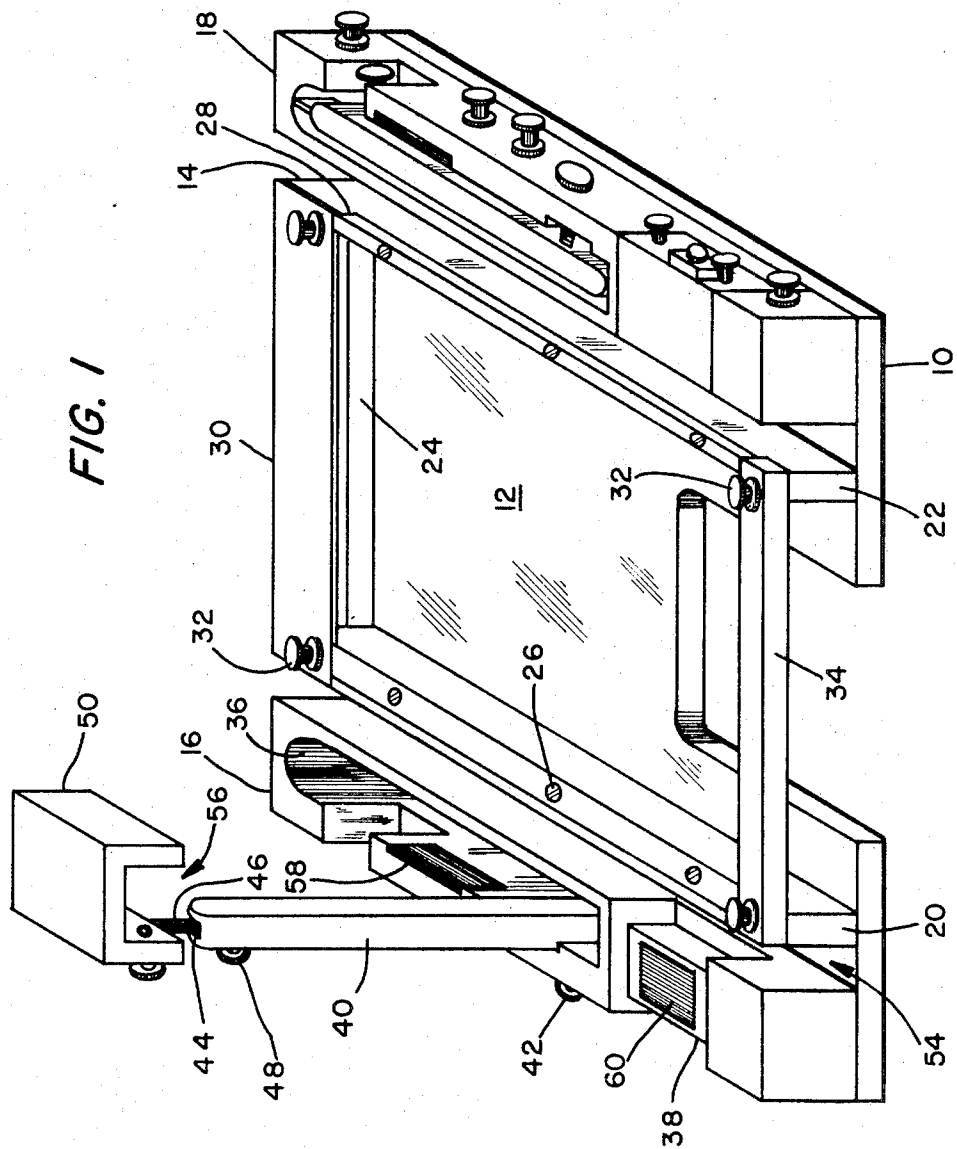


FIG. 1

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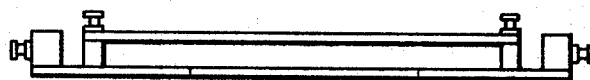


FIG. 3

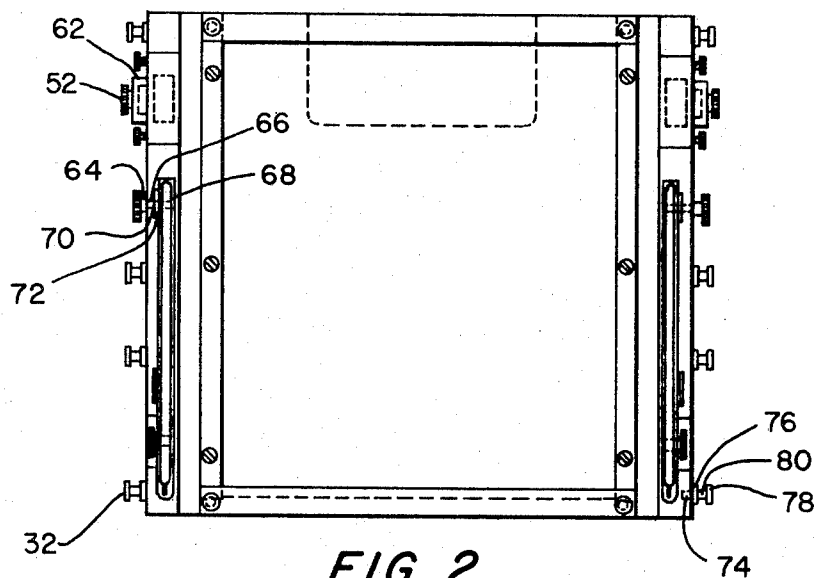


FIG. 2

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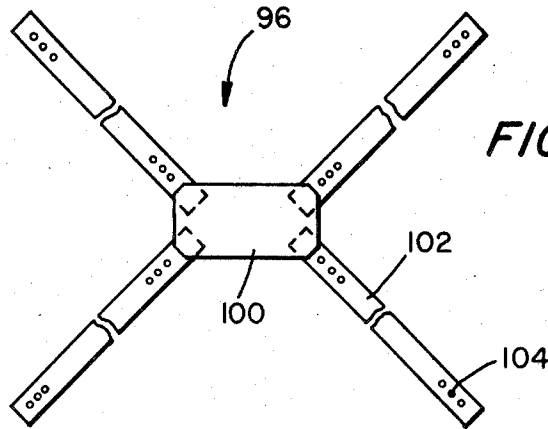


FIG. 6

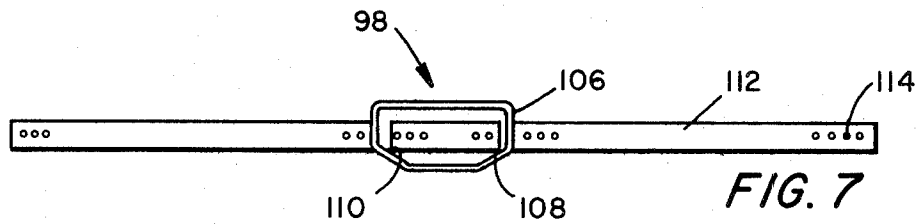


FIG. 7

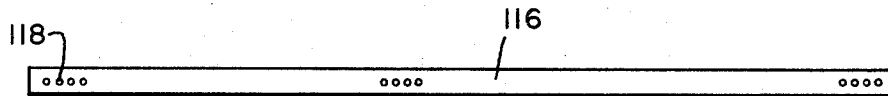


FIG. 8

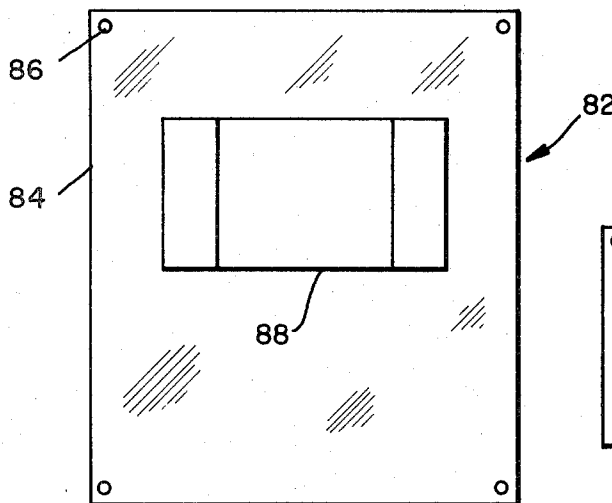


FIG. 4

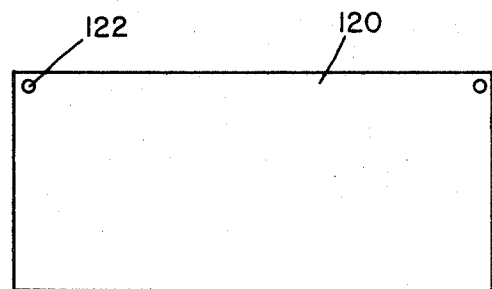


FIG. 9

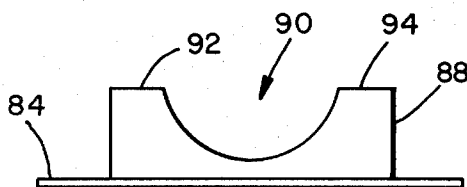


FIG. 5

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MULTIPOSITIONABLE DEVICE FOR X-RAY FILM CASSETTE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to devices for holding X-ray film plate cassettes and more particularly to a device for holding an X-ray film plate cassette for securing X-ray film plates in different planar orientation.

2. Description of the Prior Art

Generally, X-rays are recorded by the shadow picture, or radiograph, formed on a photographic film. As with ordinary photographs, darker regions on the negatives or lighter regions on the print means that more light has passed through the body at that particular location. In order to obtain an accurate pictorial description of the area under investigation, several X-rays are taken of the same area from various views by repositioning the patient on the X-ray table. Many patients have been subjected to unnecessary discomfort by this repositioning process.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a portable, multipositionable device for an X-ray film plate cassette which is characterized by a cover captively held in spaced parallel relation to a base by a support, bars captively held to the base in spaced parallel relation to the support, an arm articulated to each of the bars, a finger slidably mounted to each arm, and a channel removably mounted to each finger. The cover, base, and supports define an open-ended enclosure adapted for reception of an X-ray plate in a first plane; and the bars, base, support, and the channels define a guideway adapted for reception of an X-ray plate in a second plane normal to the first plane. The combination of cover, base, support, bars, arms, fingers, and channels is such as to provide a portable multipositionable device for an X-ray cassette which allows X-rays to be taken in several views without repositioning the patient.

The invention accordingly is comprised of the device possessing the construction, combination of elements, and arrangement of parts that are exemplified in the following detailed disclosure, the scope of which will be indicated in the appended claims.

BRIEF DESCRIPTION OF DRAWINGS

For a fuller understanding of the nature and objects of the present invention, reference should be had to the following detailed description taken in connection with the accompanying drawings wherein:

FIG. 1 is a perspective of a multipositionable device made according to the invention;

FIG. 2 is a top plan view of FIG. 1;

FIG. 3 is a front elevation of FIG. 2;

FIG. 4 is a top plan view of a head support made according to the invention;

FIG. 5 is a front elevation of FIG. 4;

FIG. 6 is a top plan view of a head restraint made according to the invention;

FIG. 7 is a top plan view of a chin support made according to the invention;

FIG. 8 is a top plan of a restraining strap made according to the invention; and

FIG. 9 is a top plan view of a shield made according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, it will be seen in FIGS. 1 and 2 that a multipositionable device made according to the invention is comprised generally of a base 10, a cover 12, a support 14, and bars 16 and 18. Support 14, substantially U-shaped in

profile and rectangular in cross section, includes sidewalls 20, 22 and a rear wall 24. Support 14 is mounted to base 10 by means of fasteners (not shown) and cover 12 is mounted to support 14 in spaced parallel relation thereto via a plurality of fasteners 26. Each sidewall of support 14 is cutaway at 28 so that cover 12 is flush with the upper face of rear wall 24, a face plate 30 being affixed to the rear wall of support 14 via fastening devices 32. A crossmember 34 is connected at the forward portion of cover 12 between the sidewalls of support 14 via fasteners 32. As shown in FIG. 1, base 10, cover 12, and support 14 define an open-ended enclosure adapted for reception of an X-ray film plate in the horizontal plane. In the preferred embodiment, by way of example, base 10 and cover 12 are plastic and support 14 is aluminum.

Each bar 16 and 18 is mounted to base 10 at opposite sides thereof in spaced parallel relation to the sidewalls 20 and 22, respectively. In the illustrated embodiment, bars 16 and 18 are mirror images of one another. Accordingly, like components of each bar will be denoted by like reference characters, the components of one bar being distinguishable from components of the other bar by a prime notation. Bar 16 is formed with an elongated rectangular slot 36, one end of which is rounded, and a substantially U-shaped recess 38. An arm 40, articulated to bar 16 within slot 36 via a fastener 42, is formed with a substantially rectangular aperture 44 along its longitudinal axis. Slot 36 is adapted for reception of arm 40 and recess 38 is adapted for reception of a channel 50. A finger 46 is reciprocally mounted within aperture 44 and is held at a fixed position therein by a locking device 48. Channel 50 is removably mounted to one end of finger 46 and held in fixed relation thereto by a locking device 52. As shown in FIG. 1, bar 16, base 10 and sidewall 20 define a lower guideway 54 and channel 50 defines an upper guideway 56, guideway 54 and 56 being in spatial relationship and adapted for reception of an X-ray film plate in a vertical plane. It will be readily appreciated that X-ray film plate inserted within the enclosure defined by base 10, cover 12, and support 14 is in a plane which is normal to the plane of an X-ray film plate inserted within guideways 54 and 56.

If the only plane of interest is that defined by base 10, cover 12, and support 14, then arm 40 and channel 50 are in the stored position as shown at the right of FIG. 1. Slot 36 and recess 38 is provided with ferromagnetic elements 58 and 60, respectively, channel 50 being secured within recess 38 by ferromagnetic element 60 and arm 40 being secured within slot 36 by ferromagnetic element 58.

As best shown in FIG. 2, channel 50 is provided with a substantially U-shaped bracket 62 which is adapted for reception of finger 46. Fastener 52, for example a screw having a knurled head, is threaded into bracket 62, the threaded shaft portion of screw 52 projects into the open portion of bracket 62 and the end of the threaded shaft engages finger 46. In the illustrated embodiment, fastener 42 is a knurled body screw having a side annular flange 64, a shank 66, and a threaded shaft 68. Shank 66 is rotatably received in an opening 70 of bar 16 and threaded shaft 68 is threaded into arm 40 for fixed engagement therewith. Bar 16 is cut away at 72, so that when arm 40 is in the extended or upright position and screw 42 is threaded into arm 40, arm 40 is received in cutaway 72 and is fixed against rotation with respect to bar 16.

In the illustrated embodiment, fastening devices 32 are provided at the four corners of cover 12, and on the outward wall of each of bar 16 and 18 at the extremities thereof. Each of fastening device 32 includes a threaded shaft 74, a flanges 76 and 78, and a shank 80, flanges 76 and 78 being held in spaced parallel by shank 80.

In order to accurately position the patient on the cassette for the taking of cranial X-rays a head support 82 is positioned over cover 12. Head support 82 includes a baseplate 84 and a headrest 88. Baseplate 84, the profile of which conforms to the profile of cover 12 is formed with an opening 86 at each of its corners. When baseplate 84 is positioned over cover plate 12, each opening 86 is in spaced relation to each fastening

device at the correlative corners of cover plate 12. Headrest 88, for example, polystyrene foam, is mounted to baseplate 84 toward one end thereof. Headrest 88, substantially rectangular in cross section, is formed with a hollowed center portion 90 which extends along the latitudinal axis thereof and is straddled by a pair of lip flanges 90, 94. Hollow 90 is adapted for reception of the patient's head. In order to secure the patient in headrest 82, a head restraint 96 and a chin support 98 are provided.

Head restraint 96 includes a substantially rectangular pad 100 having cutoff corners and a plurality of straps 102 attached to each of the corners of pad 100. Each strap 102 is formed with a plurality of openings 104 which are linearly disposed along the longitudinal axis thereof. Each opening 104 is adapted for engagement with each of fasteners 32 at the shank portion thereof. The linearly disposed openings 104 provide means for adjusting the tension of pad 100 against the patient.

Referring now to FIG. 7, chin support 98 includes a chin holder 106 formed with slits 108 and 110, and a strap 112. Strap 112 is formed with a plurality of openings 114 which are adapted for engagement with each fastener 32, whereby the tension of chin holder 106 against the patient is controlled by engagement of fasteners 32 with selective openings 114.

Referring to FIG. 8, there is shown an accessory strap 116 which is provided with a plurality of linearly disposed holds 118 which are adapted for engagement with fasteners 32 in similar manner as described with respect to straps 102 and 112.

When taking X-rays of a portion of the body, for example an arm, it is desirable to block that part of the X-ray plate which is not being used. Accordingly, a shield 120 is provided for blocking selected portions of the X-ray plate. Shield 120, for example a sandwich of rubber and lead, the outer surfaces being rubber and the inner stratum being lead, is formed with openings 122 adapted for engagement with fasteners 32.

In the preferred embodiment, by way of example, base 10 and cover 12 are composed of methyl methacrylate; support 14, bars 16 and 18 are composed of aluminum; arm 40, finger 46, and channel 50 are composed of steel; plate 84 is composed of an acrylic polymer; headrest 88 is composed of a polystyrene foam, pad 100 straps 102, 112, and 116 are composed of an elastomer; and chin holder 106 is composed of a polymer.

Since certain changes may be made in the foregoing disclosure without departing from the scope of the invention involved, it is intended that all matter contained in the above description and depicted in all accompanying drawings be construed in an illustrative and not in a limiting sense.

What is claimed is:

1. A multipositionable device for holding an X-ray film plate cassette, said device comprising:

- a. a base;
- b. a cover;
- c. means for supporting said cover in spaced parallel relationship to said base, said supporting means including first and second sidewalls and a rearward wall, said first and second sidewalls being in spaced parallel relationship to one another, said rearward wall in perpendicular relationship to said first and second sidewalls, said base, cover, and supporting means defining an open-ended enclosure adapted for reception of said cassette in a first plane;
- d. first bar means mounted to said base in spaced parallel relationship to said first sidewall, said first bar means, base, and first sidewall defining a first lower guideway;
- e. first channel means operatively connected to said first bar means in parallel-spaced relationship to said first lower guideway, said first channel means defining a first upper guideway in registration with said first lower guideways adapted for reception of said cassette in a second plane, said first and second planes being perpendicular to one another; and

f. first arm means articulated to said first bar means, said first arm means having first and second positions, said first position of said first arm means being in spaced parallel relationship to said base, said second position of said first arm means being in perpendicular relationship to said base;

g. said first bar means formed with a slot and a recess, said first bar means slot adapted for reception of said first arm means, one end of said first means articulated to said first bar means within said slot at one end thereof, said first arm means received within said first bar means slot when in said first position;

h. said first channel means removably mounted to said first arm means, said first bar means recess adapted for reception of said first channel means, said first channel means mounted to said first bar means within said recess when removed from said first arm means.

2. The multipositionable device as claimed in claim 1 including:

a. first ferromagnetic means mechanically associated with said first bar means and said first arm means for restraining said first arm means within said slot when said first position; and

b. second ferromagnetic means mechanically associated with said first bar means and said first channel means for restraining said first channel means within said recess.

3. The multipositionable device as claimed in claim 1 including:

a. first finger means;

b. said first arm means formed with an aperture at the other end thereof, said first arm means aperture adapted for slidable reception of said first finger means, the longitudinal axes of said first arm means and first finger means being coplanar when said first finger means is received within said first arm means aperture;

c. first locking means mounted to said first arm means, said first locking means adapted for engagement and disengagement with said first finger means within said first arm means aperture, said first finger means being fixed within said first arm means aperture when in engagement with said first locking means;

d. said first channel means removably mounted to a free end of said first finger means.

4. The multipositionable device as claimed in claim 3 including:

a. second bar means mounted to said base in spaced parallel relationship to said second sidewall, said second bar means, base, and second sidewall defining a second lower guideway; and

b. second channel means operatively connected to said second bar means in parallel-spaced relationship to said second lower guideway, said second channel means defining a second upper guideway in registration with said second lower guideway, said second upper and lower guideway adapted for reception of said cassette in a third plane, said first and third planes being perpendicular to one another, said second and third planes being parallel to one another; and

c. second arm means articulated to said second bar means, said second arm means having first and second positions, said first position of said second arm means being in spaced parallel relationship to said base, said second position of said second arm means being in perpendicular relationship to said base;

d. said second bar means formed with a slot and a recess, said second bar means slot adapted for reception of said second arm means, one end of said second arm means articulated to said second bar means within said slot at one end thereof, said second arm means received within said second bar means slot when in said first position;

e. said second channel means removably mounted to said second arm means, said second bar means recess adapted for reception of said second channel means, said second

channel means mounted to said second bar means within said recess when removed from said second arm means.

5. The multipositionable device as claimed in claim 4 including:

- a. second finger means;
- b. said second arm means formed with an aperture at the other end thereof, said second arm means aperture adapted for slidable reception of said second finger means, the longitudinal axis of said second arm means and second finger means being coplanar when said second finger means is received within said second arm means aperture;
- c. second locking means mounted to said second arm means and adapted for engagement and disengagement with said second finger means within said second arm means aperture, said second finger means being fixed within said second arm aperture means when in engagement with said second locking means;
- d. said second channel means removably mounted to a free end of said second finger means.

6. The multipositionable device as claimed in claim 5 including:

- a. first ferromagnetic means mechanically associated with said first bar means and said first arm means for restraining said first arm means within said first bar means slot when said first arm means is in said first position
- b. second ferromagnetic means mechanically associated with said first bar means and said first channel means for restraining said first channel means within said first bar means recess,
- c. third ferromagnetic means mechanically associated with said second bar means and said second arm means for restraining said second arm means within said second bar means slot when said second are means is in said first position; and
- d. fourth ferromagnetic means mechanically associated with said second bar means and said second channel means for restraining said second channel means within said second bar means recess.

7. The multipositionable device as claimed in claim 6 including a plurality of fastening means mounted to said first

and second bar means, said fastening means adapted for inter-connection with restraining means.

8. The multipositionable device as claimed in claim 7 including:

- a. a headrest; and
- a baseplate mounted to said cover, said headrest mounted to said baseplate conforming to the profile of said cover.

9. The multipositionable device as claimed in claim 8 in combination with head restraint means, said head restraint means including:

- a. a pad; and
- b. at least two straps affixed to said pad, each of said straps formed with a plurality of linearly disposed openings defining adjustment means, each of said openings being adapted for engagement and disengagement with each of said fastening means, said opening and fastening means being in engagement when said fastening means is inserted in said opening, a patient's head being restrained between said headrest and said pad when said straps and fastening means are in engagement.

10. The multipositionable device as claimed in claim 7 in combination with chin support means, said chin support means including:

- a. a chin holder formed with at least two slits; and
- b. strap means operatively connected to said chin holder, said slits adapted for reception of said strap means, said strap means formed with a plurality of linearly disposed openings defining adjustment means, each of said openings being adapted for engagement and disengagement with each of said fastening means, said opening and fastening means being in engagement when said fastening means is inserted in said opening

11. The multipositionable device as claimed in claim 7 in combination with at least one strap formed with a plurality of linearly disposed openings defining adjustment means, each of said openings being adapted for engagement and disengagement with each of said fastening means, said opening and fastening means being in engagement when said fastening means is inserted in said opening, a position of a patient's body being restrained by said strap when said strap openings and selected fastening means are in engagement.

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