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SURGICAL HEAD HOLDER

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Fig. 1.

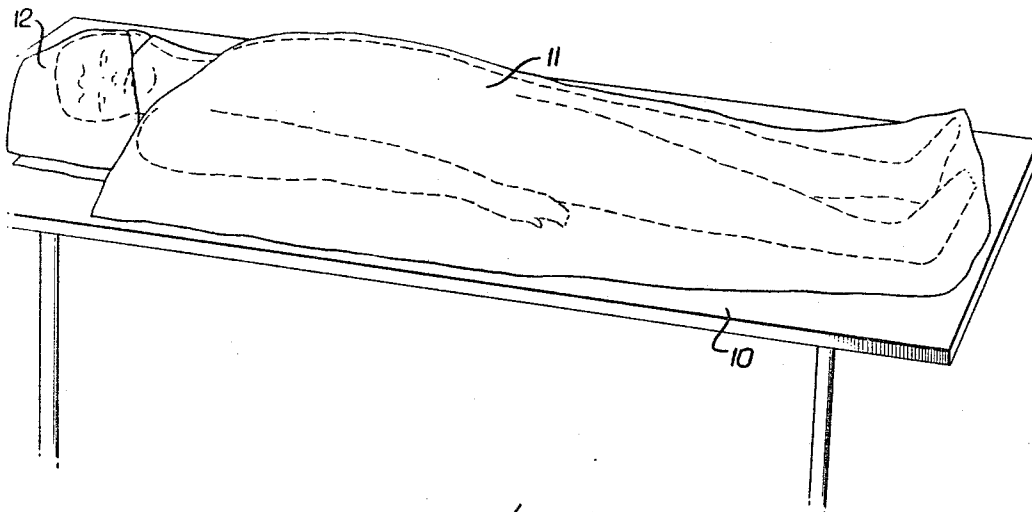
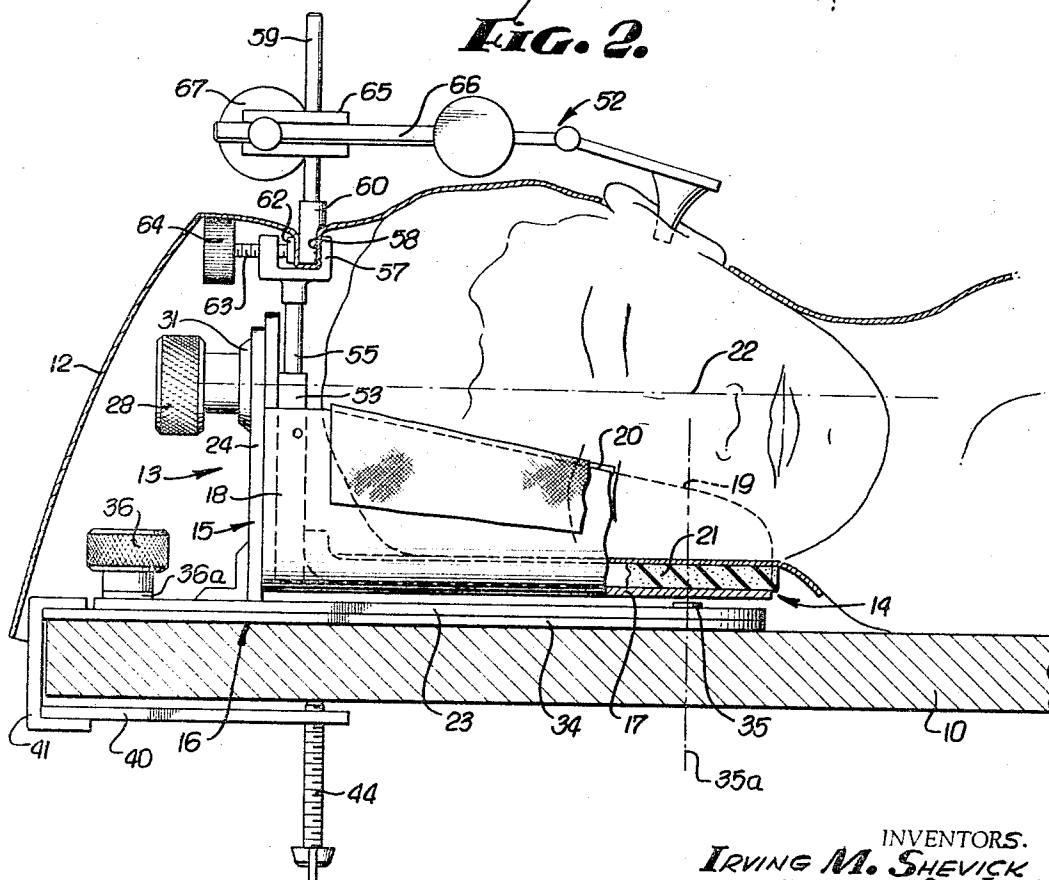


Fig. 2.



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SURGICAL HEAD HOLDER

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14 Claims. (Cl. 269—328)

This invention relates to surgical instruments, and particularly to apparatus for securing the patient's head for ear surgery. Such head holders must be capable of adjustment so that the position of the head can be fixed in a precise position most convenient to the surgeon.

One known head holder utilizes a ball type universal joint beneath the rest portion thereof, together with a clamp for securing the universal joint. This known device also uses a strap that extends across the patient's head. There are a number of disadvantages. The center of gravity of the patient's head is elevated relative to the universal joint. Thus when the joint is unclamped there is a large degree of instability, and it is difficult to position the patient's head exactly. Furthermore, the pivot point or center of the joint does not correspond to any natural axis of movement of the patient's head. The anatomy of the patient resists such unnatural adjustment. Even if his head is securely fastened to the head holder to prevent slippage, a substantial torque may yet be imposed on the ball joint, and unless it is tightened quite securely, it will move, with possibly serious consequences if surgery is in progress. If the clamp is secured, the patient may later suffer from the muscle strain. Moreover, the patient may later suffer from severe pressure imposed by the head strap. The clamp itself, since it must act upon a ball to resist movement in a number of directions, is not reliable.

The primary object of this invention is to provide an improved head holder free of the foregoing disadvantages, and which does not require any head strap. For this purpose, a head rest is pivotally mounted upon a bracket for movement about an axis extending longitudinally of the subject and passing close to, if not coincident with, the neck joint. The bracket, in turn, is pivotally mounted on a base for movement about a transverse axis also passing close to, if not coincident with, the neck joint. The base, in turn, is clamped to the operating table. Separate clamps operate between the rest and the bracket and the bracket and the base, and since each part has a simple pivotal movement rather than a compound movement, the clamp is entirely reliable. Since the axes of adjustment correspond to the neck axis, no undue strain is imposed upon the subject; adjustments are readily made; the suspension is relatively stable; and no head strap is required.

In a number of surgical procedures, certain fixtures may be required that must be held in a fixed position relative to the subject's head. Another object of this invention is to provide a fixture of this character as a part of the head rest whereby the position of the patient's head may be adjusted without disturbing the adjustment of the fixture itself.

Another object of this invention is to provide a head holder of this character that can be operated through sterile draping materials.

Another object of this invention is to provide companion fixture parts that can be conveniently coupled through the sterile draping material.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of one embodiment of the invention. For this purpose, there is shown a form in the drawings accompanying and forming a part of the present specification, and which drawings, unless as other-

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wise indicated, are true scale. This form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of this invention is best defined by the appended claims.

Referring to the drawings:

FIGURE 1 is a pictorial view of an operating table showing a patient prepared for surgery;

FIG. 2 is an enlarged side elevational view showing a head holder attached to the end of an operating table, a portion of the apparatus and the sterile draping material being shown in section;

FIG. 3 is a top plan view of a head holder;

FIG. 4 is an end elevational view taken along the plane corresponding to line 4—4 of FIG. 3;

FIG. 5 is a fragmentary top plan view similar to FIG. 3 but illustrating the intermediate bracket in a different position;

FIG. 6 is a longitudinal view of the apparatus and taken along a plane corresponding to line 6—6 of FIG. 3;

FIG. 7 is an end elevational view opposite FIG. 4, a portion of the apparatus being broken away, an alternate adjusted position of the head rest being shown in phantom lines; and

FIG. 8 is a transverse sectional view taken along the plane corresponding to line 8—8 of FIG. 5.

In FIG. 1 a patient is shown prepared for surgery upon an operating table 10. Sterile draping material 11 and 12 is provided that exposes in this instance the ear of the patient for operative procedures.

Beneath the drape 12 (FIG. 2) is a head holder generally designated by the reference character 13. The head holder 13 includes essentially three parts, a head rest 14, a right angle bracket 15 and a generally U-shaped base 16. The head rest 14 as shown most clearly in FIGS. 3 and 6, comprises a concave or substantially semi-cylindrical part 17 and an end plate 18 from which the part 17 is suspended. The semi-cylindrical part 17 tapers along opposite side edges 19 and 20 from the wide end at the end plate 18 to the narrow free end opposite the end plate.

In the present instance the left ear of the patient is to be subjected to the operative process and accordingly the right side of the patient's head (FIG. 2) rests on the part 17 with the top of his head close to the end plate. Arcuate cushions 21 are provided in the head rest. If the cushions do not sufficiently immobilize the head, extra padding may be provided or adhesive tape may join the head to the sides of the rest 14. Of course the patient's head could be oriented in other positions in the rest 17 with equal ease.

The end plate 18 is mounted upon the bracket 15 for movement about a longitudinal axis 22 (FIGS. 2, 4 and 6) that in this instance corresponds to the axis of the cylindrical part 17. The distance between the axis 22 and the head contacting surface of the rest 17 is designed to correspond to about half the diameter of an average adult head.

The bracket 15 includes a plate 23 and an upstanding wall 24 secured to the plate 23 by the aid of an angle 25. The wall 24 has an aperture 26 (FIG. 6) that receives a pivot plate 27 formed rearwardly of the head rest end plate 18 whereby the head rest 14 is supported for angular movement about the axis 22.

In order to secure the head rest in an adjusted position, a knurled knob 28 is provided. The knob 28 has a reduced threaded extension 29 cooperable with a correspondingly threaded aperture 30 in the pivot plate 27. The pivot plate 27 has a thickness less than the corresponding dimension of the aperture 26 whereby

it is at all times recessed within the aperture 26. When the knob 28 is rotated so as to advance in the pivot plate, a thrust washer 31 is urged to engage the edges of the aperture 26. The washer 31 surrounds the threaded extension 29 and is caught by the shoulder 32 that forms the extension 29. Thus by rotating the knob the parts are firmly clamped together to secure the rest 17 in an adjusted position. As shown in FIG. 8, the engaging surface of the wall 24 about the aperture 26 is provided with radial grooves as at 33 for increasing the frictional grip.

The axis 22 of head rest adjustment passes longitudinally through the head of the subject and falls close to the base of the neck about which the head normally swivels. Thus the body of the patient readily moves as the head rest is adjusted.

The bracket plate 23 (FIG. 6) underlies the head rest part 17 and is pivotally mounted upon the upper plate 34 of the base 15. This upper base plate 34 rests upon the upper surface of the operating table 10. The pivotal connection is achieved by a rivet 35 or other suitable means and it determines a vertical axis 35a of swinging movement of the entire head rest 13. This vertical axis also passes through the neck of the patient and thus corresponds to one of the points about which the head normally laterally tilts.

A knurled knob 36 (FIG. 6) serves as a means for clamping the bracket plate 23 against the upper base plate 34, thus to secure any adjustment of the bracket 14 and head rest 13. The knob 36 has a reduced threaded extension 37 that cooperates with the threaded aperture 38 located in that upper base plate 34 that projects beyond the head rest. The bracket plate 23 has an arcuate groove 39 (FIG. 3) centered upon the axis 36 so that the threaded aperture is continuously accessible to the knob extension 37. When the knob 36 is rotated in one direction a thrust washer 36a clamps the edges on opposite sides of the arcuate groove 39 to secure the parts in an adjusted position.

The base 16 includes, in addition to the upper plate 34, a lower plate 40 that extends partially along the under surface of the operating table 10. The upper and lower base plates 34 and 40 are connected together by a U-bracket 41 that extends across the top end of the table 10. The sides of the bracket 41 overlie the ends of the plates 34 and 40 and are fastened thereto (FIG. 3) by suitable fasteners 42 and 43. Clamp screws 44 and 44a (FIGS. 4, 6 and 7) secure the lower base plate 40 to the table 10.

The semi-cylindrical part 17 of the head rest extends beneath the longitudinal axis 22 and accordingly is substantially stable.

The knobs 28 and 36 (FIG. 2) may be manipulated through the draping material 12. However, since the side edges 19 and 20 taper to encompass a minimum amount of the head, these edges are not so accessible. For this purpose, a detachable handle extension 45 is provided. The handle 45 cooperates with the head rest adjacent the end plate 18. The handle has a bifurcated end 46 (FIG. 7) that fits over either edge 19 or 20 and it is secured in place by a simple pivoted latch 47. The latch 47 has a latching projection 48 selectively cooperable with aperture 49 or 50 at the edges 19 and 20 respectively. The latching projection 47 is normally projected by a spring thrust member 51 that engages beneath the end of the pivoted latch 47 remote from the latching projection 48.

The head rest 14 has provisions for securing a fixture, such as conventional speculum holder 52. For this purpose the head rest has an apertured post 53 (FIGS. 6 and 7) that falls along the inside of the end plate 18. Received in the aperture 54 of the post and beneath the draping material is a standard 55 (FIG. 2). This standard may be secured in position by a thumb screw 56 (FIG. 7). The upper end of the post 55 has a coupling

element 57 in the form of a generally rectangular channel whereby a sterilized extension 59 of the post can be installed from above the draping material. The inner surface of one side wall of the channel is grooved as at 58. The extension 59 carries a companion coupling element 60 that fits with substantial clearance in the lower coupling element 57. By urging the coupling element 60 to the right as viewed in FIG. 2 the parts are secured together so that the extension 59 is firmly anchored to the post 55 and thus to the head rest 14. For this purpose a clamping bar 62 is provided that is located in the channel element 57. This clamping bar is swivelled on the end of a screw 63 that projects through a correspondingly threaded aperture in the opposite side wall of the element 57. The screw 63 may be manipulated by a knob 64 accessible through the drapery material 12. By rotating the knob 64 in opposite directions the parts 60 and 57 are coupled and uncoupled. The rod 59 adjustably mounts a clamp 65. The clamp 65 in turn adjustably receives the rod portion 66 of the speculum holder 52. By manipulating a knob 67 the rod 66 is secured to the clamp 65 and the clamp in turn is secured to the post extension 59.

The inventors claim:

1. In a head holder: a base; a bracket; a head rest having head-supporting surfaces defining a seat to locate the head of the subject relative to the head rest with the top of the head at one end region of the head rest and the neck at the other end region of the head rest; means pivotally mounting the head rest on the bracket for movement about a first axis fixed with respect to the head rest and the bracket, said axis extending longitudinally of the head rest to pass longitudinally through the head and neck of the subject; and means pivotally mounting the bracket on the base for movement about a second axis fixed with respect to the bracket and the base, said second axis extending transverse to said first axis to extend transversely of the seat as well as transversely through the neck of the subject.

2. The combination as set forth in claim 1 together with: first releasable clamp means securing the head rest in an adjusted position with respect to the bracket; and second releasable clamp means securing the bracket in an adjusted position with respect to the base.

3. The combination as set forth in claim 1 together with: means for detachably securing the base to the end of an operating table.

4. In a head holder: a generally U-shaped base designed to fit over the end of an operating table or the like, and having a part adapted to extend along the top of the table; a bracket resting upon said base part and pivoted thereto for slidable movement along the surface of said base part about an axis substantially perpendicular to the base part, said bracket also having a wall extending upwardly from the bracket plate; said bracket plate having an arcuate slot centered on said axis; a first clamping knob having a threaded extension engaging the base part at a place spaced from said axis, and extending through said arcuate slot for releasably clamping said bracket to said base; a head rest having a substantially semicylindrical rest part having side edges, said head rest having an end plate at one end; said wall having a through annular aperture, the axis of which extends parallel to and above to said bracket plate in a direction longitudinally of the bracket; said head rest end plate having an annular portion extending into the aperture for pivotal connection therebetween and for angular movement of the head rest about the axis of said aperture; said annular portion locating said rest part above said bracket plate to clear the bracket plate upon angular movement of the head rest; and a second clamping knob having a reduced threaded extension extending through the aperture and engaging said head rest end plate to draw said end plate against said bracket wall.

5. In a head holder: a generally U-shaped base designed to fit over the end of an operating table or the like,

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and having a part adapted to extend along the top of the table; a bracket resting upon said base part and pivoted thereto for slidable movement along the surface of said base part about an axis substantially perpendicular to the base part, said bracket also having a wall extending upwardly from the bracket plate; said bracket plate having an arcuate slot centered on said axis; a first clamping knob having a threaded extension engaging the base part at a place spaced from said axis, and extending through said arcuate slot for releasably clamping said bracket to said base; a head rest having a substantially semicylindrical rest part having side edges, said head rest having an end plate at one end; said wall having a through annular aperture, the axis of which extends parallel to and above to said bracket plate in a direction longitudinally of the bracket; said head rest end plate having an annular portion extending into the aperture for pivotal connection therebetween and for angular movement of the head rest about the axis of said aperture; said annular portion locating said rest part above said bracket plate to clear the bracket plate upon angular movement of the head rest; a second clamping knob having a reduced threaded extension extending through the aperture and engaging said head rest end plate to draw said end plate against said bracket wall; a detachable handle extension having a bifurcated end adapted to fit the side edges of said head rest part along said head rest end plate; a latching arm pivotally mounted along the side of said handle and having a latching projection movable across said bifurcations; spring means normally operatively positioning said latching projection; said head rest part having latching recesses at both side edges for receiving said latching projection.

6. The combination as set forth in claim 1 in which said head rest has a substantially semicylindrical configuration; and a handle detachably secured to one of the side edges of the head rest.

7. The combination as set forth in claim 1 together with: a post member; and a clamp member; one of said members being carried at said one end region of the head rest; one of said members having a socket expandable for detachably receiving one end of the post member with substantial clearance and contractible for closing about the post member whereby the post member may be clamped with draping material interposed between the post member and said socket.

8. The combination as set forth in claim 1 together with: a two part post, one of said post parts having a socket at one end expandable for detachably receiving the end of the other part and contractible for clamping the parts together whereby the parts may be clamped together with draping material lining the socket; and means carried by the head rest for releasably securing one of said post parts.

9. In a head holder: a head rest; means adjustably supporting the head rest; a post member; and a clamp member; one of said members being carried at said one end region of the head rest; one of said members having a socket expandable for detachably receiving one end of the post member with substantial clearance and contractible for clamping about the post member whereby the parts may be clamped with draping material interposed between the post member and said socket.

10. In a head holder: a head rest; means adjustably supporting the head rest; a post; and means carried by the head rest for securing the post through draping material interposed between the post and the head rest, comprising companion coupling elements carried respectively by the post and the head rest, one of said elements being a socket and the other of said elements being a projection the end of which is loosely fitted and detachably re-

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ceived in the socket whereby draping material can be interposed between the elements, and a releasable locking device for urging the projection element against one wall of the socket.

11. In a head holder: a head rest; means adjustably supporting the head rest; a post; and means carried by the head rest for securing the post through draping material interposed between the post and the head rest, comprising companion coupling elements carried respectively by the post and the head rest, one of said elements being substantially U-shaped, and the other of said elements being a projection the end of which is fitted with substantial clearance in said one element and detachable therefrom for interposition of draping material between the elements, a clamping bar, a threaded post carrying the bar at one end of the post, said post being threadedly mounted on one side wall of said U-shaped element for movement of the clamping bar toward and away from the other side wall of said U-shaped element for clamping the projection against said other side wall, and means for manually rotating the threaded post.

12. In a head holder: a head rest; means adjustably supporting the head rest; a post; and means carried by the head rest for securing the post through draping material interposed between the post and the head rest, comprising companion coupling elements carried respectively by the post and the head rest, one of said elements being substantially U-shaped, and the other of said elements being a projection the end of which is fitted with substantial clearance in said one element and detachable therefrom for interposition of draping material between the elements, a clamping bar, a threaded post carrying the bar at one end of the post, said post being threadedly mounted on one side wall of said U-shaped element for movement of the clamping bar toward and away from the other side wall of said U-shaped element for clamping the projection against said other side wall, and means for manually rotating said threaded post, said elements having ribs substantially interlocking each other through the draping material.

13. In a surgical head holder: a base having means for affixing the base to one end of an operating table; a bracket; first pivot means confining the bracket for movement about a vertical axis fixed with respect to the base; a head rest having head-supporting surfaces defining a seat to locate the head of the subject relative to the head rest with the top of the head at one end region of the head rest and the neck at the other end region of the head rest; and second pivot means confining the head rest on the bracket for movement about a substantially horizontal axis fixed with respect to the bracket, and extending longitudinally through the said neck region of said head rest and longitudinally through the head of the subject supported by said head rest, said second pivot means being located to position the said other end region of the head rest substantially to be intersected by said vertical axis whereby the said head rest may be adjusted about said axes with said axes both passing through the said neck region of said head rest.

14. The combination as set forth in claim 13 together with: first releasable clamp means securing the head rest in an adjusted position with respect to the bracket; and second releasable clamp means securing the bracket in an adjusted position with respect to the base.

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