OBSTETRICAL EXAMINING CHAIR AND EXAMINATION METHOD

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REFERENCES CITED
United States Patents
2,714,922 8/1955 McKibban et al. ................. 297/330
3,179,466 4/1965 Garrett ......................... 297/88
3,318,596 5/1967 Herzog .......................... 269/328

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ABSTRACT
An obstetrical examination body support structure is disclosed, being in the form of a comfortable upholstered, contoured, reclining chair and adjustable to a plurality of fixed, tilted positions to assure the patient's comfort and ease examination of the patient's chest and uro-genito-rectal area by the physician. The chair includes a unitarily movable back and head rest, centrally open buttocks support, and thigh, calf and foot rest supports, the leg support portion being outwardly spread as the chair approaches, a fully reclined attitude, to properly expose the uro-genito-rectal area for examination.

20 Claims, 8 Drawing Figures
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BACKGROUND OF THE INVENTION

Currently available obstetric examination tables are rudimentary in construction and uncomfortable for the patient. Usually, the table is merely a general purpose physician's table having a high, flat, hard body support surface, modified by the addition of a pair of metal stirrups on either side of the table top surface for receiving the patient's heels so that the pelvic region is exposed for examination.

Several problems occur in use of such a table. It is difficult for the patient to climb onto the table and assume a prone position, particularly if the patient is a woman in the later stages of pregnancy. The stirrups are uncomfortable, because they are made of metal which presses into the patient's heels, and very tiring, since no support is given to the patient’s thighs and calves. Frequently, positioning of the stirrups is incorrect, resulting in inadequate exposure of the pelvic region for examination. Once the examination is complete, the patient must possess the physical attributes of a gymnast to climb off the table. Again, this can be a substantial problem for a woman in the late stages of pregnancy.

Prior U.S. patents offer little in providing an acceptable solution, disclosing a wide variety of treatment, surgical and examination tables, but none being designed primarily for uro-genito-rectal examinations. U.S. Pat. No. 3,318,596 issued to Robert P. Herzog does disclose a table more satisfactory than other prior art devices, but the table is designed primarily for obstetrical deliveries. It includes a back rest and articulated leg supports which are movable in a 1 to 1 ratio, but a seat support remains stationary during movement of the remaining parts which move the patient to a Trendelenburg attitude. Additionally, the leg support sections may be spread for proper exposure of the perineum enabling obstetrical delivery. U.S. Pat. Nos. 3,227,439; 3,227,440 and 3,227,441 disclose medical tables primarily designed for use as operating tables, and including multiple movable body support members for portions of the torso and the extremities of the patient. U.S. Pat. No. 3,486,747 issued to Marc A. Cardoso discloses a dual purpose examining and operating table having movable body portion supports, and includes necessary accessories or accessory supports such as lights, equipment drawers and I. V. bottle stands, but articulation of the table to various positions still involves a stationary buttocks support 13 (compare FIGS. 1 and 2) which in many examinations is undesirable. Other operating tables having flat, movable body support sections although considered quite remote from the present are noted as being disclosed in U.S. Pat. No. 488,649; 3,635,461; and Design U.S. Pat. No. 222,192.

The prior art does not disclose an examining chair having unitarily movable head, back, buttocks, thigh, leg and foot support portions for properly exposing the perineum for medical examination with minimum discomfort to the patient and physician.

SUMMARY OF THE INVENTION

Accordingly, a primary object of this invention resides in provision of a medical examination chair designed primarily for chest examinations and examination of the perineum and attendant regions, comprising unitarily movable body support portions for rotating the patient from a seated position to a Trendelenburg attitude with a minimum of discomfort and strain on the part of both patient and physician.

It is another object of the invention to provide a medical examination chair rotatable to an infinite number of tilted positions for ease in positioning the supine patient for medical examination of the chest and perineum.

Yet another object of the invention is to provide a medical examination chair having thigh and calf supports automatically outwardly movable as the chair rotates to a fully reclined position to expose the perineum for examination.

A further object of the invention is to provide a reclining medical examination chair having simple electromechanical actuation means.

A still further object of the invention is to provide a reclining medical examination chair having a scissors linkage and cam follower and guide construction resulting in approximately full 90° rotation of the chair into a perineum examining position with a minimal number of operating parts and change in center of gravity of the chair.

Another object of the invention is to provide a reclining medical examination chair having foot rest portions resting flat on the floor for ease of ingress and egress by the patient, the foot rests being automatically rotatable to dispose the feet and ankles of the patient in a comfortable attitude during examination.

Yet another feature of the invention resides in a novel method of preparing a patient for perineum examination.

Further novel features and other objects of this invention will become apparent from the following detailed description, discussion and the appended claims taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

A preferred structural embodiment of this invention is disclosed in the accompanying drawings in which:

FIG. 1 is a perspective view showing the invention in an upright chair-formed disposition;
FIG. 2 is a perspective view similar to FIG. 1 but showing the chair in a fully reclined, perineum examination attitude; and drawn to a reduced scale;
FIG. 3 is a side view of the invention, partially in section, showing the invention in an upright, position in phantom lines, and a partially reclined position for chest examination, shown in solid lines;
FIG. 4 is a side view, partially in section, of the chair in a fully upright position.
FIG. 5 is an end view of the chair as shown in FIG. 4;
FIG. 6 is a top plan view of the chair with parts broken away to show interior detail;
FIG. 7 is a sectional view taken along lines 7—7 of FIG. 6 and drawn to an enlarged scale; and
FIG. 8 is another sectional view taken along lines 8—8 of FIG. 6 and also drawn to an enlarged scale.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the upright disposition illustrated in FIG. 1, a pre-
ferred embodiment has the structure and appearance of a comfortable easy chair, and for convenience will be designated as a chair. It has structural arm rest portions 10 and 12 with a unitary body support main chair section 14 including head and back rest area 16, buttocks, thigh and calf sections 18 and 20, and movable foot rests 22 and 24. In the center between leg sections 18 and 20 is a stationary seat center portion 26, fixed to the base framework, enlarged at 28 (FIG. 1) to provide proper support for a sitting patient when the chair is in its upright condition. However, when the chair is shifted to its fully reclined attitude (FIG. 2) the main section rises above the center portion 26, 28, upon the perineum is fully exposed for examination.

The base framework of the chair comprises front and rear cross-beams 30, 32 to which are secured side base channel beams 34, 36 providing a rigid, substantially rectangular base, the beams being made of sound structural material such as aluminum or steel. The main chair section 14 is supported on the side beams 34, 36 by a pair of scissors linkage assembly support braces 38, each including a short lever 40 and a long lever 42. Each short lever 40 is pivotally fixed to an associated channel beam 34 or 36 near the forward end of the base frame and to chair 14 at a point adjacent the lower end of back rest 16. Each long lever 42 is pivotally fixed medially to the associated short lever 40 and carries a freely rotating roller 44 at its lower end which rides in its associated channel beam 34 or 36. The upper end of each long lever carries a roller type cam follower 46 which rides in a cam slot 48 formed on the outer side of base 50 of a leg rest 18 or 20. A transverse axle rod 52 interconnects the two rollers 44. The axle also carries a jack block 54 which is fitted to a longitudinally mounted non-rotatable, screwjack actuator rod 56. The threaded rod 56 is reciprocated by an internally threaded hollow drive sleeve of a reversible power unit 58, mounted in the frame of the chair (FIGS. 2 and 3). Power unit 58 is operated in selected directions by conventional spring loaded push-buttons 60.

In a preferred embodiment, power unit 58 is a reversible electric motor with suitable electrical control circuits including limit switch safety controls for automatic motor cutoff at the end positions of the operating linkage.

With particular reference to FIGS. 3 and 4, the operation of those parts of the invention as thus far set forth will now be explained. When the chair is in a fully upright position, as illustrated in FIG. 1, by phantom lines in FIG. 3, and the partial view of FIG. 7, each side scissors assembly 38 is in a fully extended attitude. By operation of an appropriate one of the buttons 60, motor 58 will drive the actuator rod 56 to the right, as viewed in the drawing Figures, to draw the lower ends of both assemblies to a contracted disposition, via the connection of actuator rod 56 to jack block 54 and axle 52 which connects the lower ends of each long lever 42. During the scissors action, rollers 44 ride in channel tracks 34, 36. As the actuator rod 56 travels to the right, its outer and eventually protruding end may be covered by a housing 62 conveniently located between footrests 22, 24. An alternative drive could provide a trunion mounted nut on the cross axle 52 and the actuator rod could be an axially stationary, rotatable threaded shaft secured on the motor drive shaft. Other suitable reliable drive trains can be utilized.

An intermediate chair position is illustrated by solid lines in FIG. 3. It should be noted in this Figure that cam follower 46 has begun to travel rearwardly along its associated cam slot 48 in the side of the chair seat. The sinus configuration of the pair of side cam slots 48 is dictated by the geometry imposed by the movement of scissors assemblies 38, wherein the end pivots of short levers 40 are fixed at each end and the movable end pivots of long levers 42 are confined to the horizontal guide paths provided by channels 34, 36. In the intermediate position, the main chair body has been lifted approximately halfway between a normal chair seat height and the normal perineum examination height and the patient will be properly disposed for a chest examination. Due to the self-locking screw threaded jack type actuation of the chair, it will not move from any position except upon intentional operation of a selected one of push-buttons 60. As described hereinafter, each button 60 is preferable of the spring loaded variety, completing the circuit to actuate the motor 58 only when depressed against spring bias, the motor being inoperative when pressure on the button is released.

Subsequent or continued operation of the appropriate button 60 moves the chair to a fully reclined position, for pelvic examination, as illustrated in FIGS. 2 and 4. In this fully reclined condition, scissors assemblies are contracted and cam followers 46 are at the rearward (or bottom) end of cam slot guides 48. The chair 14 has also been fully tilted, about 90°, and fully raised to examination height so that the patient is laying comfortably supine. As just described, it will be appreciated from an inspection of FIGS. 3 and 4, that the entire chair 14 has been tilted or rotated without any interplay movement of relative body support members excepting for lateral swinging of the leg supports as will be described; thus the patient is moved to a pelvic examination position with maximum comfort. Moreover, the entire invention retains a remarkable degree of stability in that the center of gravity of the patient's body and the main chair section has been shifted only minimally, slightly to the right.

Depression of the other of the control buttons 60 will operate the motor in a reverse direction to rotate the chair 14 back to its initial upright position, shown in FIG. 1. As before noted, to prevent damage to motor 58 or other moving parts of the invention, the control circuit may include limit switches 64 (FIG. 3) at each end of one or both of cam guide slots 48, each limit switch being disposed for contact by cam follower 46 or a suitable switch operator, to stop motor 58 at each designed travel limit in the event the operator should hold a push-button 60 in depressed condition.

Another feature of the invention includes structure and mechanism enabling leg supports 18 and 20 to spread apart for exposure of the perineum as the chair approaches the fully reclined attitude. Turning to FIG. 5, a Y-linkage assembly includes a stem rod 66 pivotally mounted at one end on a jack block 54. The upper end and two branches of the stem rod 66 has a yoke to which are pivotally fastened two connecting rods 68 having their other ends respectively attached to leg rests 18 and 20 by ball joint connections 70. Leg rests 18 and 20 are each mounted beneath body support 14, for swinging movement laterally relative to the chair seat, on pivot mounts 72 (FIG. 5). As the chair 14 approaches a fully reclined attitude (FIG. 4), it has also
been raised to its upper level position and the linear distance between ball joints 70 and jack block 54 will necessarily increase, as an inspection of FIGS. 3 and 4 will reveal. Thus, branches 68 of the Y-linkage which were initially in a straight line (FIG. 6) across the upper end of the stem 66 will be pulled into a Y configuration (FIG. 5) causing leg rests 18 and 20 to pivot outwardly about their pivot mounts 70 gently spreading the patient's legs and exposing the perineum for examination. When the examination is completed and chair 14 is rotated back to an upright disposition (FIG. 1), leg sections 18 and 20 will gradually come together as the linear distance between ball joints 70 and jack block 54 is reduced.

Each foot rest 22, 24 is pivotally mounted at the base of its respective leg section 18 or 20. As illustrated in FIG. 8, a leaf spring 74 is fixed to each axle 76 mounting a foot rest, the free end of spring 74 being retained in pegs 78. When the chair is in the full upright position, footrests 22 and 24 as viewed in FIGS. 3 and 6, are forced counterclockwise by engagement of their floor portions with the floor, to lay flat on the floor, against the urging of spring 74 (FIG. 8) so that the patient may get into and out of the chair easily. As the chair 14 is rotated to an examining position, each spring 74 urges its associated foot rest counterclockwise about its pivot axis 76 to a comfortably inclined attitude to support the patient's feet without undue strain during examination.

Obviously, the actuating mechanism for rotating the chair to an examining position need not be the same as precisely set forth above. If, as previously described, jack block 54 were made as an internally threaded trunnion mounted nut to receive a threaded actuator rod 56 and rod 56 were constructed to be rotated to move block 54 therealong to rotate chair 14, the rod 56 would be mounted in bearing blocks at its distal ends and the housing 62 could be eliminated. In other embodiments, the actuating mechanism could be hydraulic, pneumatic, or electro-pneumatic.

Although the invention has been set forth in the environment of use as an obstetrical examination body support, it is designed for use by urologists, proctologists, and many other physicians who require access to the chest and/or urogenito-rectal area of the patient.

Depending on the physician's requirements, the invention may readily include needed accessory devices such as a sanitary tissue dispenser, which may conveniently be located in the rear of back rest 16, a heated instrument drawer or drawers which may be placed in the base of the invention adjacent the push-buttons 60, and/or a telescoping light fixture, located conveniently between leg supports 18, 20.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

We claim:
1. A support structure for medical examination purposes in the form of a reclining chair, comprising: a base having stationary arm rest devices fixed on either side thereof; a reclining chair body support including integral back and buttocks support portions, leg support means for movement unitarily with said integral back and buttocks support portions to and from a reclining attitude and a seat rest portion disposed between said buttocks support portions when said chair body support is in an upright, chair-like position; means connecting said chair body support to said base enabling relative unitary reclining movement thereof; said leg support portions comprising a pair of laterally swingable, integral thigh and calf support members adapted to be moved to properly expose a patient's perineum for medical examination thereof; and means for moving said reclining chair body support from said upright, chair-like position to a reclined, medical examination attitude, said seat rest portion being positioned other than between said buttocks support portions as said reclining chair body support is moved to said reclined, medical examination attitude to further expose a patient's perineum for medical examination.
2. The invention as recited in claim 1, wherein said reclining chair body support and said stationary arm rests are fully upholstered.
3. The invention as recited in claim 1, wherein said means for moving said chair body support to a reclined attitude also raises said chair body support to an examination level; and said seat rest portion includes an enlarged seat portion between said buttocks support portions when said reclining chair body support is in said upright, chair-like position for full perineum exposure when said reclining chair body support is in a reclined, raised medical examination attitude.
4. The invention as recited in claim 1, wherein said reclining chair body support is mounted in said base by a pair of scissors link assembly braces, one on each side of said chair, each scissors assembly brace including a first lever, pivotally fixed to said base and said reclining chair at distal ends thereof and a second lever, pivotally fixed mesially to a center portion of said first lever, and having distal ends slidably interconnected to said base and reclining chair respectively.
5. The invention as recited in claim 4, wherein said second lever further includes anti-friction guide at a lower end thereof interconnected with a channel beam portion of said base for slidable interconnection of said second lever and said base.
6. The invention as recited in claim 4, wherein said anti-friction means comprises a roller.
7. The invention as recited in claim 4, wherein said second lever further includes a cam follower at the upper end thereof, and said reclining chair further includes a cam track in which said cam follower is inter-fitted for slidable interconnection of said second lever and reclining chair.
8. The invention as recited in claim 7, wherein said cam track is sinuous in form.
9. The invention as recited in claim 4, wherein the lower distal ends of each second lever of said pair of scissors link braces are interconnected by an axle, said axle being connected to said means for moving said reclining chair body support from an upright chair-like position to a reclined, medical examination position.
10. The invention as recited in claim 9, wherein said means for moving said reclining chair body support comprise an elongate actuator rod secured to said axle mesially thereof, and power means for moving said actuator rod to close said scissors link braces and pivot
said reclining chair to a medical examination attitude.

11. The invention as recited in claim 10, wherein said power means comprises an electric motor.

12. The invention as recited in claim 11, wherein said actuator rod is externally threaded to be linearly driven by said electric motor, said electric motor including push-button control means for forward and reverse movement of said actuator rod, whereby said reclining chair body support may be tilted to an infinite number of intermediate examination positions between said upright and fully reclined positions.

13. The invention as recited in claim 12, wherein at least one of said pair of scissors link braces includes limit switch means to prevent overtravel of said reclining chair body support beyond said fully reclined and fully upright positions.

14. The invention as recited in claim 4, wherein said means for moving said chair body support to a reclined attitude also raises said chair body support to an examination level, and each of said laterally swingable thigh and calf support members is pivotally mounted beneath its buttoc support and is further connected to said axle by link means secured to said axle and to said swingable members adjacent said pivotal mounts, whereby upon rotation of and raising of said reclining chair to said medical examination attitude, the linear distance between said axle and said pivotal mounts is increased, causing said linkage to move said swingable members outwardly about their pivotal mounts.

15. The invention as recited in claim 14, wherein said link means comprise a first link pivotally mounted on said axle, and a pair of links pivotally mounted on the free end of said first link and connected to said swingable members by universal joint means, whereby said link means is in the form of a T when said reclining chair is in said full upright position and in the form of a Y when said reclining chair is in said reclined attitude.

16. The invention as recited in claim 1, wherein each said integral thigh and calf support member further comprises a foot support member pivotally mounted on the end of its calf support member whereby said foot support member lays flat on a support surface for said body support structure, to ease access to and from said reclining chair by a patient.

17. The invention as recited in claim 16, wherein each foot support member further comprises spring means urging said foot support slightly upwardly about its pivot mount to provide a comfortable foot rest for a patient in a reclined attitude on said reclining chair body support.

18. A method of perineum examination comprising the steps of: placing the patient in a reclining chair structure, wherein at least the patient's buttocks are fully supported across the width of the patient's buttocks, rotating the patient about a moving horizontal axis to a Trendelenburg attitude and simultaneously exposing the patient's perineum without changing the inter-relative attitudes of the patient's back, buttocks and legs, and swinging the patient's legs outwardly as the patient approaches said Trendelenburg attitude to more fully expose the perineum for medical examination.

19. The method of perineum examination as recited in claim 18, comprising the further step of: momentarily interrupting the rotation of the patient to a Trendelenburg attitude for the purposes of chest examination.

20. The method of perineum examination as recited in claim 18, comprising the further step of raising the lower half of the patient's body simultaneously with the step of rotating the patient and exposing the patient's perineum.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,845,945
Dated November 5, 1974

Inventor(s) Wraymon Randle Lawley & Tommy Joe Lawley

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, line 21, change "floor" to --heel--.
Claim 1, line 1 after "A" insert --body--.
Column 6, line 10, change "member" to --members--.

Signed and sealed this 7th day of January 1975.

(SEAL)
Attest:

McCoy M. Gibson Jr. C. Marshall Dann
Attesting Officer Commissioner of Patents