United States Patent

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[54] **ORTHOPEDIC'S CAST CHAIR**
2 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **269/322,** 297/172, 128/83, 269/328
[51] **Int. Cl.** **A61g 15/00**
[50] **Field of Search** 269/322, 328; 128/83, 84, 94; 297/172, 174, 195, 345; 248/157, 399, 400

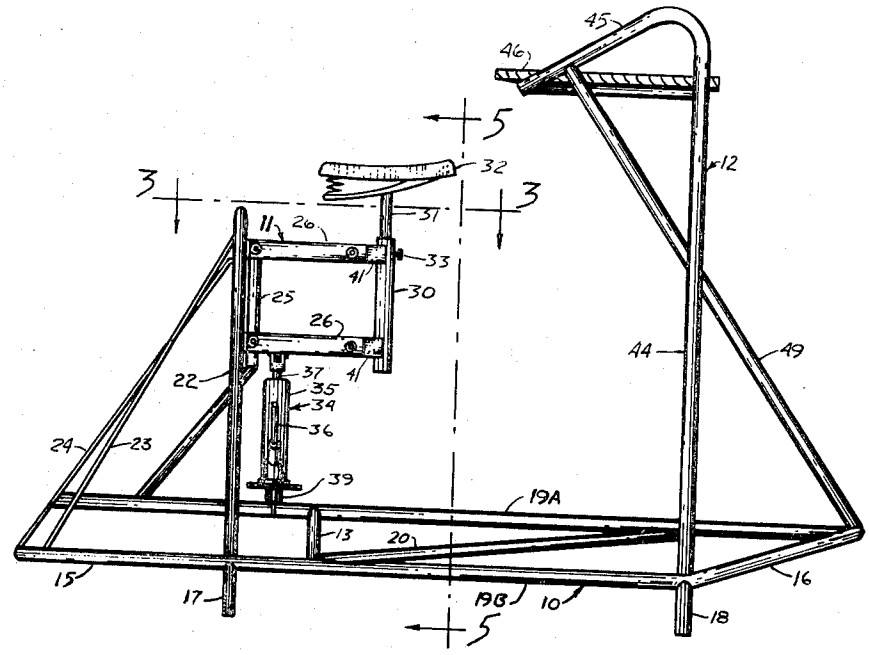
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ABSTRACT: An orthopedic support apparatus of an adjustable chair type to aid in maintaining a person in appropriate position to allow bandaging and casting of various parts of the body and particularly of the lower extremities and torso. A seat adjustably positionable on a supporting frame maintains the patient in a sitting position with legs suspended and trunk substantially upright and without support members adjacent the lower extremities so that they may be freely operated upon.



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SHEET 1 OF 2

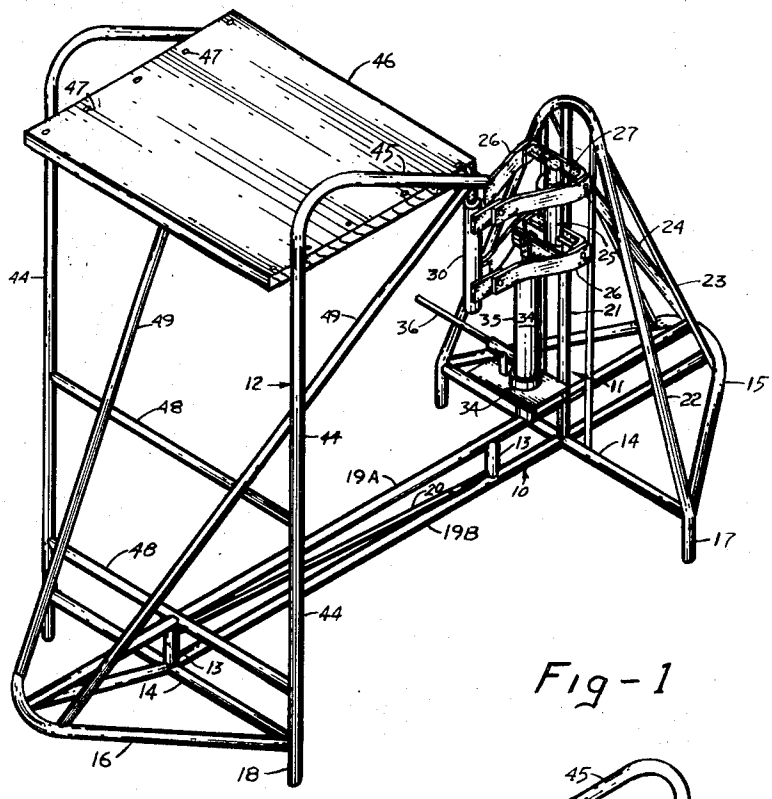


Fig - 1

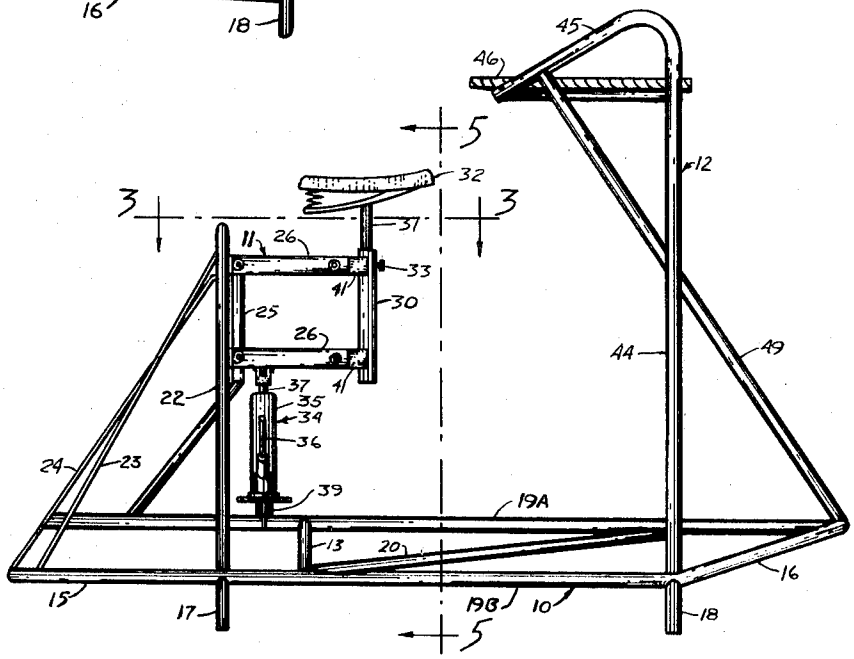


Fig - 2

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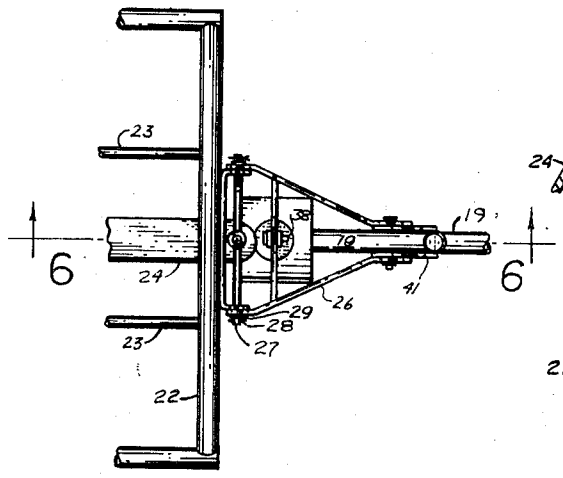


Fig - 3

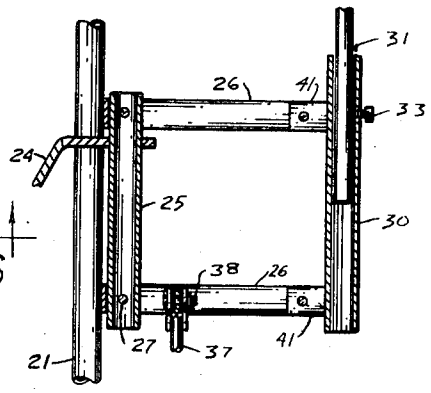


Fig - 6

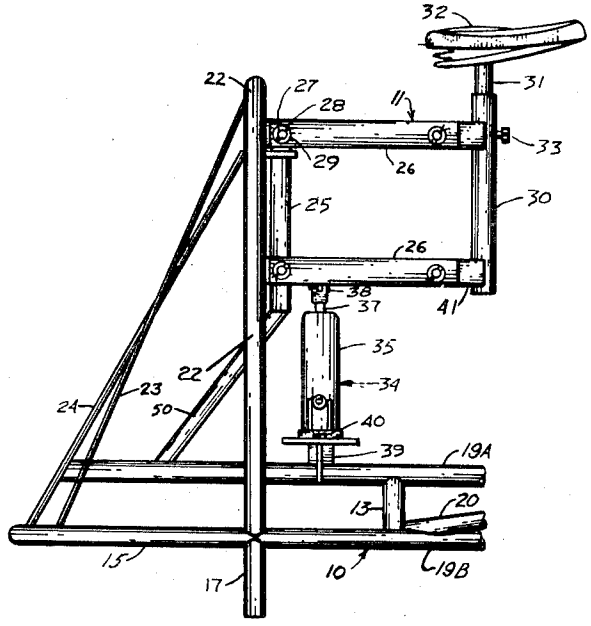


Fig - 4

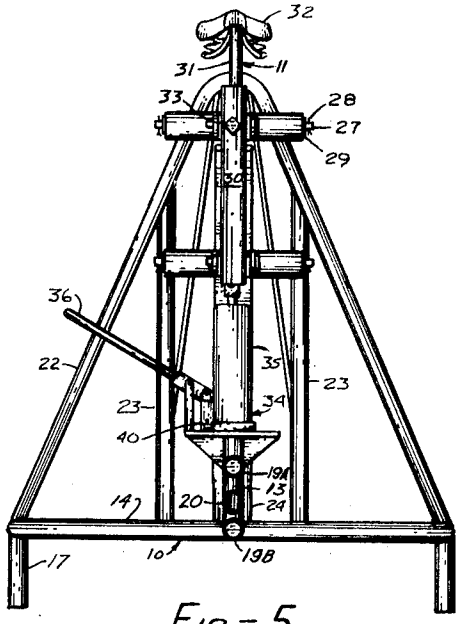


Fig - 5

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ORTHOPEDIC'S CAST CHAIR

FIELD OF THE INVENTION

This invention relates generally to the field of orthopedic support apparatus and more particularly to a chair-type device that aids in supporting the trunk and lower extremities of a patient to allow free access thereabout for placement of casts.

DESCRIPTION OF THE PRIOR ART

In the treatment of various bodily maladies and particularly in the case of fractures, it is common to bandage parts of the body including the torso and lower extremities. Especially in the case of fractures it is common to impregnate such bandaging with plaster or similar substance which may be placed in a plastic form, thereafter to harden to form a solid supporting structure that may be maintained in place to support the injured organ during its period of repair.

Commonly in orthopedic practice heretofore casts have been applied to a patient while resting upon a tablelike structure of one sort or another. In instances where a cast is placed upon a leg, the leg itself has remained supported by the table, at least in part, if it be supported at all during part of the casting process. This procedure has involved some difficulty in cast placement, as obviously during the operation the leg oftentimes must be moved, causing pain in the patient and sometimes improper positioning of the member for casting. With the body supported on a table it generally is not possible to effectively suspend the leg from the table because of the difficulty of necessary body position so to do.

To overcome these problems various auxiliary structures, to be used in conjunction with an ordinary surgical table, have heretofore become known to in some fashion support the member being cast away from the table during the casting operation. Some of these structures have completely supported the member against voluntary or gravity displacement and others have supported only a part of the member against gravity, generally by some mechanical coupling such as a clamp. These devices, however, generally support a substantial portion of the leg and by necessary physical interference make casting difficult and oftentimes by nature of their support cause pain or malpositioning of the member during casting.

With these thoughts in mind the instant invention was conceived to provide a chairlike device whereon the patient may be comfortably positioned in a substantially normal sitting posture with his trunk in normal vertical position and his legs extended downwardly therefrom, supported by their structure, to give relatively free access to operate about substantially all portions of trunk and all extremities in placement of a cast. The structure further provides adjustments to comfortably position the patient and to bring him into a working position as comfortable as possible for the person operating upon him.

SUMMARY OF THE INVENTION

The instant invention was conceived to provide an orthopedic supporting apparatus of chairlike nature that adjustably positions a patient in a sitting position so that he, and particularly his trunk and lower extremities, may be bandaged, especially with casting material, without substantial interference from supporting structures.

This function is accomplished by provision of a chairlike device having a rearward seat positioned for vertical motion upon a central beam-type frame with an armrest carried by the frame forwardly and above the seat to aid a patient in the maintenance of proper posture thereupon.

The base of the device provides a central frame with laterally extending legs supported at points defining a relatively large area to provide stability during use. The seat is supported above the rearward part of the base for adjustable motion, preferably by hydraulic means, in a vertical plane, the range of such motion being sufficient to accommodate the normal size range of potential users. The forward portion of the frame carries upwardly extending supports with a horizontal armrest of some areal surface therebetween, to allow for various supporting positions of the arms of a user.

The entire device is so fixed and positioned as to allow a user to sit upon the seat, rest his arms upon the forward armrest and maintain his lower extremities in a substantially suspended fashion, his entire weight being supported by the seat and armrest, to maintain the patient in a position of substantially normal sitting posture with relaxed muscles and extremities exposed for operation in a fashion unobstructed by supporting structures.

In providing such a structure it is:

A principal object of my invention to create a seatlike orthopedic support structure to maintain a patient in sitting position with weight supported so that the lower extremities are substantially freely depending without any supporting structures that might interfere with the normal casting operation immediately adjacent.

A further object to provide such apparatus that has relatively moveable elements to allow size adjustments to conform with a comfortable use by patients of varying sizes.

A still further object to provide such a device of a sturdy, stable and sanitary nature well adapted for use in orthopedic practice.

A still further object to provide such a device that maintains the body in a substantially normal sitting posture with relatively relaxed muscles so that the casting operation may be more simply and painlessly carried out, particularly on the lower extremities and trunk of a patient.

A still further object to provide such apparatus of the nature aforesaid that is of new and novel design, of rugged and durable nature, of simple and economic manufacture and otherwise well adapted to the users and purposes to which it is intended.

Other and further objects of my invention will appear from the following specification and accompanying drawings which form a part of this application. In carrying out the objects of my invention, however, it is to be understood that its essential features are susceptible of change in design and structural arrangement with only one preferred and practical embodiment being illustrated in the accompanying drawings, as required.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings, wherein like numbers of reference refer to similar parts throughout:

FIG. 1 is an isometric view of my invention showing its various parts, their configuration and relationship.

FIG. 2 is an orthographic side view of the invention of FIG. 1, showing details from this aspect.

FIG. 3 is an orthographic top view of the seat-supporting structure, taken on the line 3–3 of FIG. 1 in the direction indicated by the arrows, to show the details of construction.

FIG. 4 is a partial orthographic side view of the seat structure of FIG. 1, showing its construction in more detail.

FIG. 5 is a partial orthographic view, taken on the line 5–5 of FIG. 1 in the direction indicated by the arrows, to show this structure in greater detail from this aspect.

FIG. 6 is a partial cross-sectional view, taken on the line 6–6 of FIG. 3 in the direction indicated by the arrows, to show the seat-moving structure.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in more detail and particularly to that of FIG. 1, it will there be seen that my invention generally comprises base 10, supporting rearward seat structure 11 and forward armrest structure 12, both related in such fashion as to allow a patient to be seated on the seat structure with arms supported by the armrest and legs suspended in an externally unsupported fashion.

Base **10** includes a central boxlike structure formed by central beam elements **19** and cross elements **14**. Rearwardmost end portion **15** projects in a triangular fashion rearwardly from the end of the frame and forwardmost end portion **16** projects forwardly and upwardly from the forward end portion. Short rearward legs **17** and forward legs **18**, adjustable if desired, depend from the ends of the cross elements **14** to support the structure in a substantially level fashion upon a planar surface therebeneath.

Elongate longitudinal beam **19** in the form of a planar beam with upper chord **19A** and lower chord **19B** extends from the forwardmost end part **16** to the rearwardmost end part **15** of the frame. Diagonal brace **20** extends between these chords at their communication with vertical elements **13** to provide additional structural rigidity.

Preferably all of these frame elements are formed from relatively small, light, tubelike material, having appropriate structural rigidity to serve the required purposes and providing some simple and inexpensive means of end joinder of the frame elements. Such a material I have found admirably suited to the purpose is stainless steel tubing.

The seat structure is illustrated grossly in FIG. **1** and in detail in FIG. **3**, et seq. Seat-supporting upright **21** communicates with the medial portion of rearwardmost end element **14** and extends upwardly to structural communication with the medial portion of V-shaped upright support **27** structurally communicating in its lower part with the rear corners of the rectangular portion of base **10**, immediately above rear legs **17**. Paired rear seat supports **23** communicate from the upper portion of later support **22** rearwardly and downwardly to the rearwardmost end portion **15** of base **10** to provide further stability in a forward-rearward dimension. Medially positioned rear seat support **24** communicates from the upper portion of seat upright **21** downwardly and rearwardly to the medial portion of rearward element **15** of base **10** and support **50** similarly communicates from the lower portion of the seat upright to brace **19**, again to provide further rigidity.

Elongate seat support bracket **25** is positioned on the upper portion of upright **21** in structural communication therewith. Y-shaped seat support yokes **26** pivotably mount on bracket **25** by pins **27** communicating therebetween. The pins are maintained in appropriate lateral alignment by cotter keys **28** carried in the end parts thereof laterally outward from washers **29**.

Seat support yokes **26** communicate in their forward body extension with forwardmost pivotable element **41** which in turn structurally communicates with seat shaft collar **30** of a pipelike nature having a central chamber adapted to slidably receive shaft **31** of ordinary bicycle seat **32**. Setscrew **33** threadedly engages through seat shaft collar **30** so that the inner part of the screw may come into communication with ift **31** to adjustably vertically position the shaft relative col- r **30** to provide adjustment of seat elevation.

Hydraulic means, designated generally as **34**, and in this embodiment comprising an ordinary hydraulic jack having body **35**, pump handle **36** and extensible piston shaft **37** extends from longitudinal beam **19**, immediately forward of seat support upright **21** upwardly to pin **38** carried in lower seat-supporting yoke **26**. Pump body **35** is mounted on longitudinal beam **19** by appropriate bracket **39** structurally communicating therebetween. The pump is preferably of the ordinary single-acting variety of hydraulic jack to allow extension of shaft **37** upon operation by manual manipulation of handle **36**, and return of shaft **37** within body **35** by appropriate force of gravity or otherwise when hydraulic flow be changed by means of manual manipulation of reversing valve **40**.

This type of pump is well known in the mechanical arts and per se constitutes no part of my invention. Obviously, other means of adjustably vertically moving seat **32** might serve the purposes of my invention, but I prefer this hydraulic means because of its economic and simple operation.

With this structure then, as shaft **37** is moved upwardly, lower seat-supporting yoke **26** will move with its forwardmost portion describing an upwardly extending arc, but because of the pivotable parallelogram-type connection of the yoke supports, seat shaft **31** will remain in a vertical position and thusly the seat will remain in appropriate sitting position, but yet may be moved vertically upwardly or downwardly.

Armrest structure **12** includes armrest uprights **44** extending upwardly from structural communication with the rectangular portion of base **10** immediately above forward legs **18**. Uppermost portion **45** of these uprights is curved rearwardly and slightly downwardly, as illustrated especially in the drawing of FIG. **2**, to allow for simple support of armrest **46**. This armrest is a rectilinear, planar structure, preferably of wood or similar material, communicating between the paired opposed armrest uprights; the members are fastened at several points by screws **47** or similar fasteners to rigidly position the armrest to aid in supporting a patient.

Tubular crossmembers **48** are structurally positioned between uprights **44** and elongate angled braces **49** extend from rearward portion **45** of armrest supports **44** to the forward medial part of forward end portion **15** to provide further structural rigidity in the armrest structure.

Having thusly described the structure of my invention, its operation may now be understood.

An apparatus according to the foregoing specification is firstly created, with appropriate dimensioning to accommodate patients of average body size within the limits of adjustments of the device, and of appropriate rigidity to support such persons.

To use the device then, it is positioned upon a substantially planar supporting surface in an area where a patient may be operated upon and seat **32** adjusted to its lowermost position by appropriate manipulation of hydraulic means **34** so that a patient may by his own efforts or with appropriate aid seat himself upon the device in the normal sitting fashion, facing the forwardly positioned armrest **46**. With a patient in this position then, the operator manually manipulates hydraulic means **34** by way of pump handle **36** to raise seat **32** until the patient's lower extremities are suspended or very nearly suspended above the planar surface supporting the device. In this position then, the lower extremities will depend from the body in somewhat a laterally extended attitude and will not be supported except by their own anatomical communication with the body of the patient or the floor therebeneath.

The lower extremities then are in a substantially normal postural position with relatively relaxed muscles and no particular stresses or strains on those parts of the skeletal system. The patient is further aided in his balance and support by armrest **46**, and if necessary, the upper portion of his body may be attached thereto by straps or similar devices, especially if the patient be not physically able to appropriately support himself.

The casting operation may then proceed and after completion, the seat may again be lowered to its lowermost position to aid transfer of the patient from the casting device.

It is to be particularly noted that while the patient is supported by the device, his leg is in a relatively relaxed position free from substantial skeletal stresses and strains and is supported in such fashion that there is no communication with external supports which might cause such stresses or strains or hinder the free and complete access to the leg to perform the casting operation.

It is further to be noted that by reason of the nature of the base of the device, it has great stability and might not be easily tipped or upset, notwithstanding the positioning of the patient thereon nor his motions or changed centers of gravity during a casting operation.

It is further to be noted that if a patient be seated upon the device as aforesaid, the trunk portion of his body will also be supported in a reasonably normal sitting posture, free of any external supports, and may be quite readily operated upon to place a body cast in the traditional fashion.

The foregoing description of my invention is necessarily of a detailed nature so that a specific embodiment of it might be

set forth as required, but it is to be understood that various modifications of detail, rearrangement and multiplication of parts may be resorted to without departing from its spirit, essence or scope.

Having thus described my invention, what I desire to protect by Letters Patent, and

What I claim is:

1. An orthopedic support device of the nature aforesaid to maintain a patient in sitting position to allow application of cast material especially to the trunk and lower extremities, comprising, in combination:

a tubular base having an elongate central beam with spaced laterally extending crossmembers providing support on an underlying planar surface at plural spaced points to prevent tipping;

a seat structure carried by the base in the rearward part and at a spaced distance thereabove for adjustable vertical positioning including;

a seat support upright extending upwardly from the rearward medial portion of the base;

a seat bracket communicating with the upper portion of the seat support upright pivotably carrying paired spaced yokes extending forwardly therefrom, the yokes having pivotably mounted foreparts;

a seat support rigidly attached to the foreparts of the yokes having means for adjustably positioning the shaft of a seat therein;

a seat having a depending shaft adjustably slidably carried within the seat support; and

seat-moving means pivotably communicating at least with the lower yoke between the pivotal mount and forepart, to cause the upward motion in the forepart of the yoke, to adjustably vertically position the seat relative the frame;

an armrest structure carried by the base forwardly of the seat structure and vertically thereabove.

2. The invention of claim 2 wherein the mechanically extensible seat-moving means comprises an adjustable hydraulic cylinder extending from the base to the lower yoke.