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Long et al.

[11] **3,897,973**

[45] **Aug. 5, 1975**

[54] **BLOOD DRAWING CHAIR**

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[73] Assignee: **Amerco, Inc.**, Phoenix, Ariz.

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[21] Appl. No.: **367,262**

[52] **U.S. Cl.** **297/75**; 269/325; 269/328; 297/83; 297/90

[51] **Int. Cl.**[2] **A47C 1/035**

[58] **Field of Search** 297/83, 90, 330, 342, 75, 297/78, 84; 269/325, 328

[56] **References Cited**

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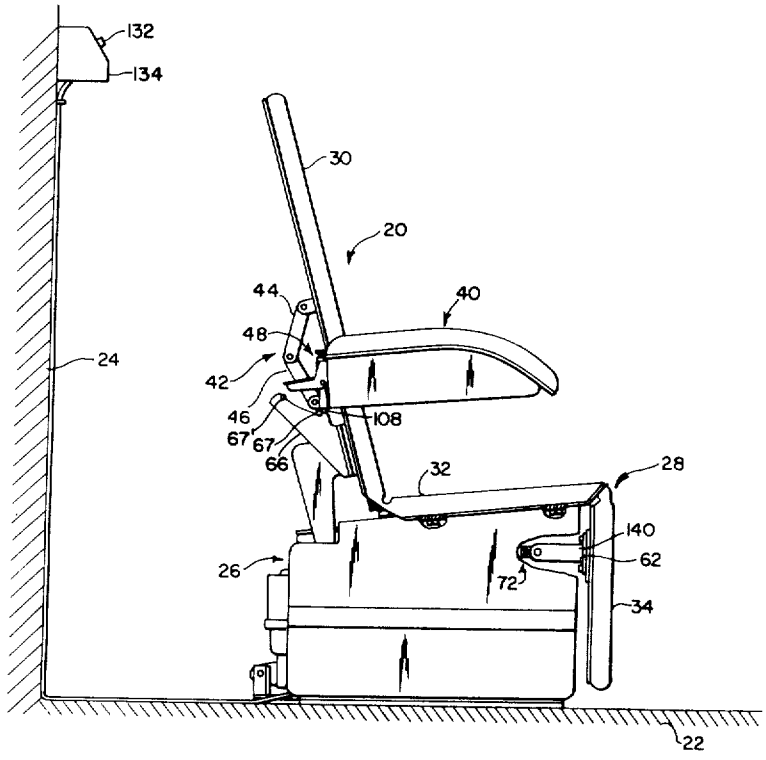
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Primary Examiner—Roy D. Frazier
Assistant Examiner—William E. Lyddane
Attorney, Agent, or Firm—David H. Semmes

[57] **ABSTRACT**

A chair for use in blood drawing permitting blood to be drawn from a patient in either a sitting or reclining position, as preferred by the patient or attending physician, paramedic, or other using personnel, and which ethically accommodates use to varied preferences of techniques and practices of individual technicians throughout the world. The chair is of a practical, safe and easy to use construction and accommodates to installation and operational requirements in different use locations and settings. The chair includes articulated back, seat and leg portions, and an arm assembly, all interconnected by a linkage system with means operable to erect the chair to a desired sitting position or lowered to a desired reclining position.

5 Claims, 16 Drawing Figures



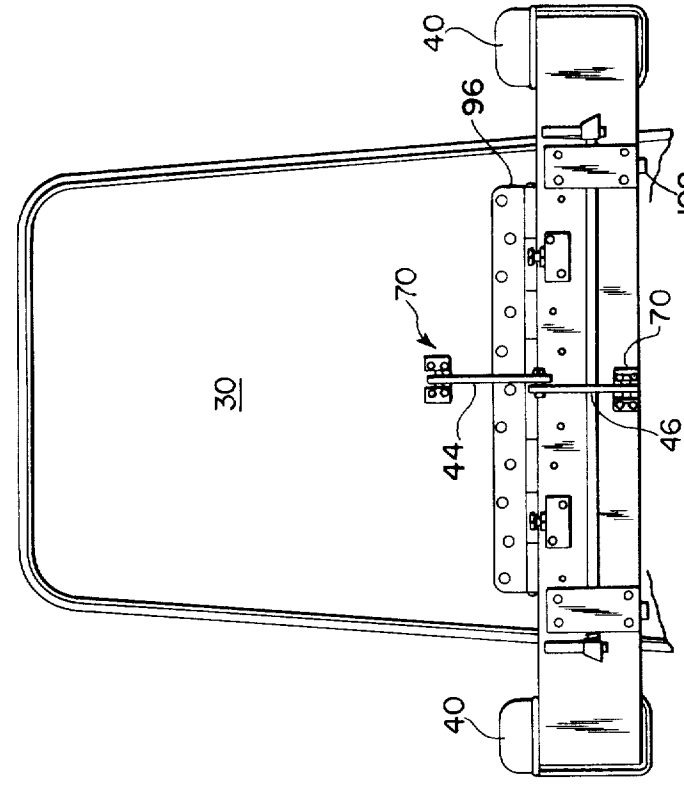

40
96
108
70
70
30
44
46
40

FIG. 2

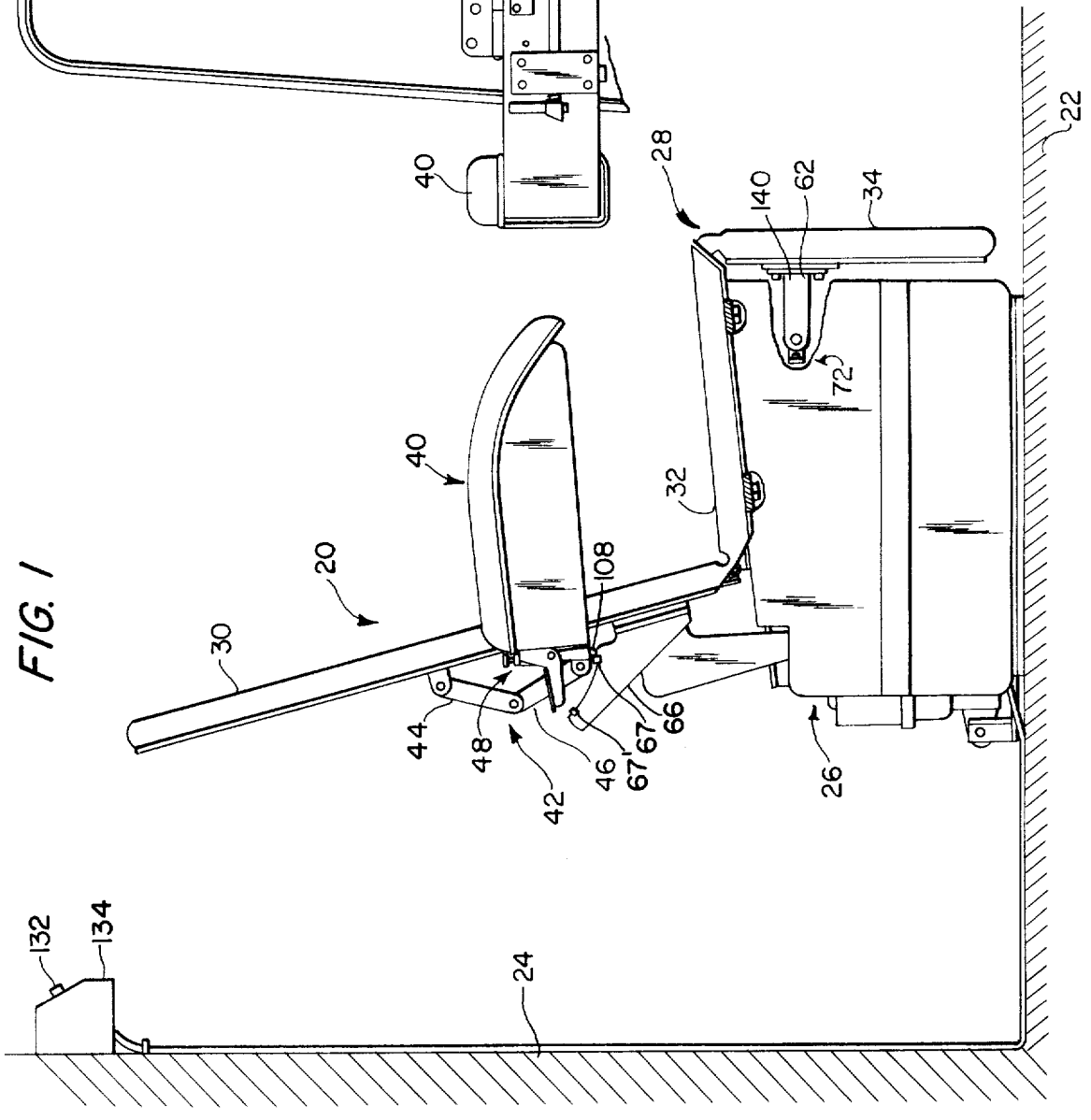

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140
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67'
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FIG. 1

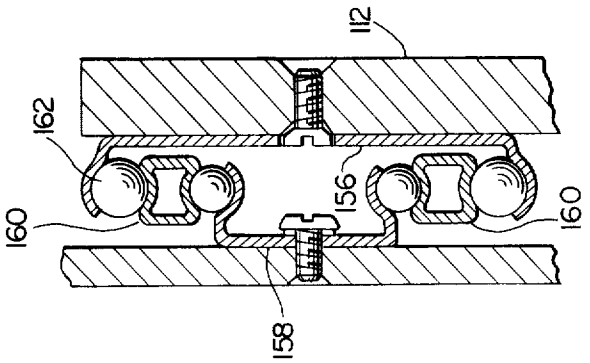


FIG. 10

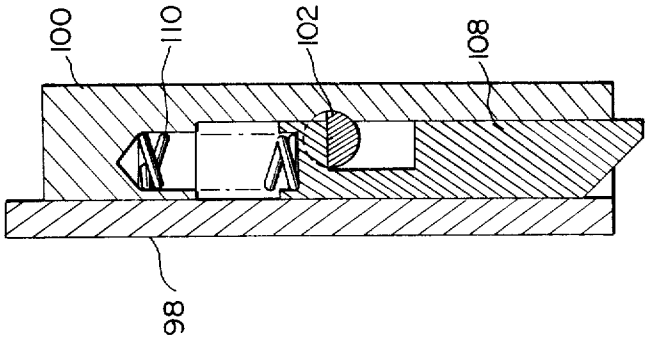


FIG. 16

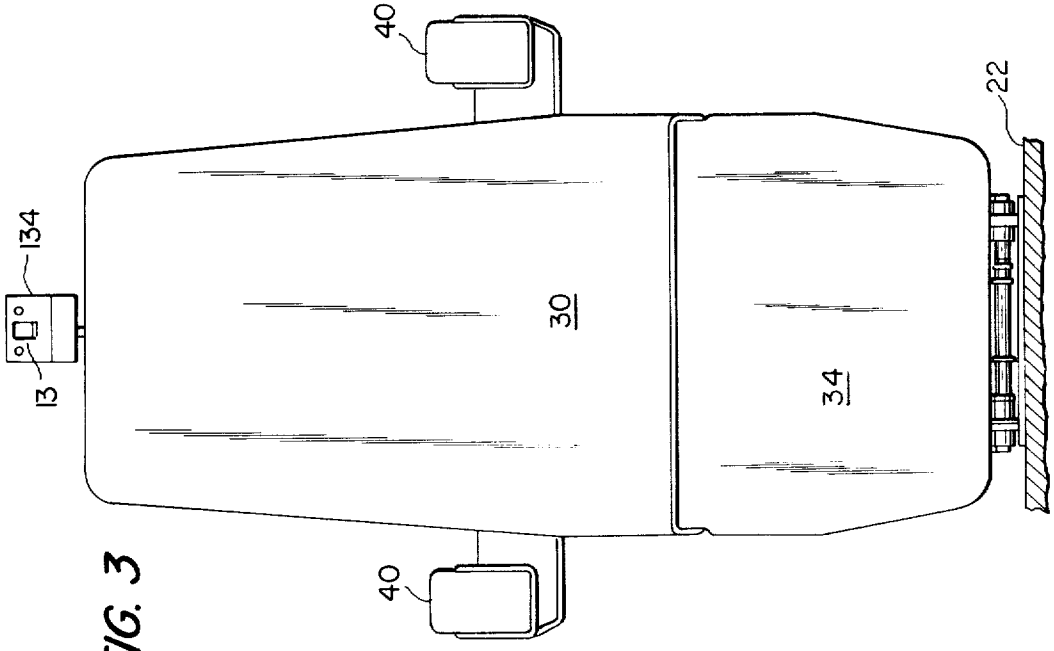


FIG. 3

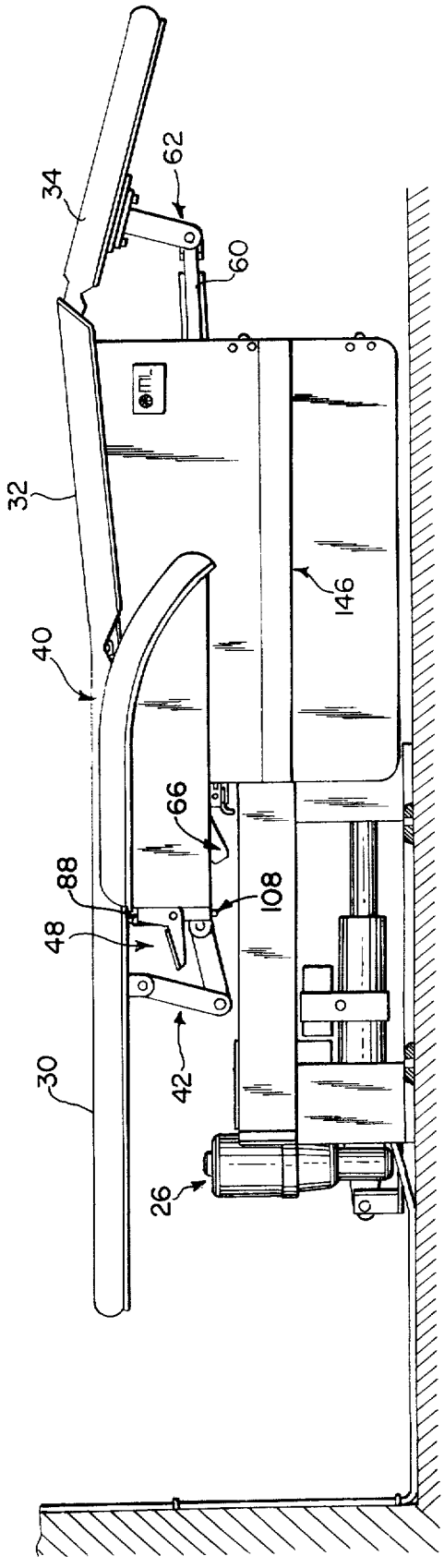


FIG. 4

FIG. 6

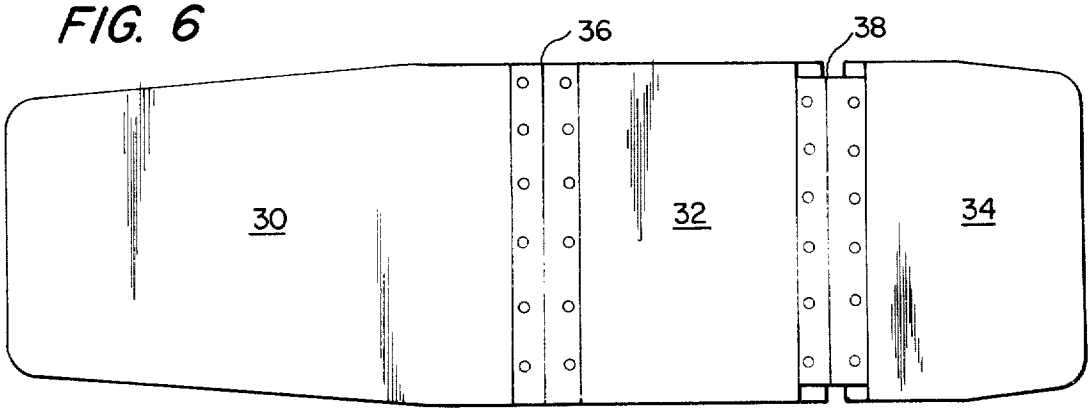


FIG. 5

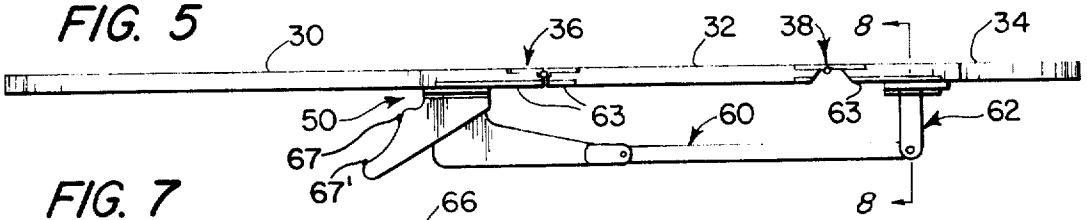


FIG. 7

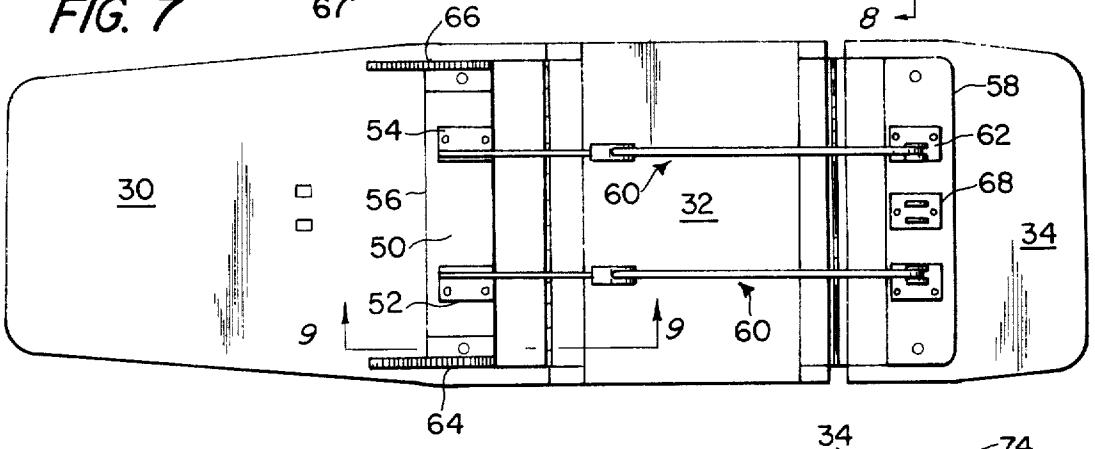


FIG. 8

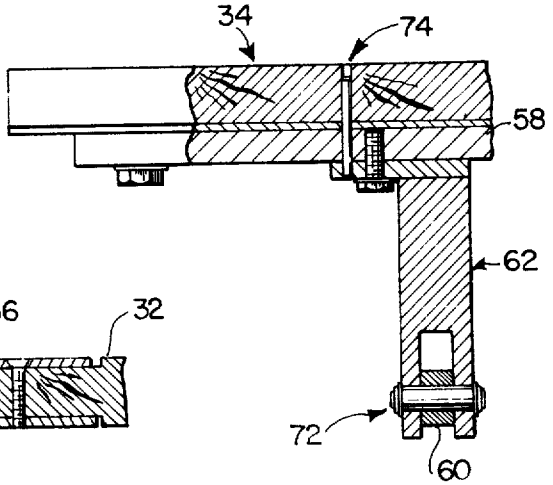


FIG. 9

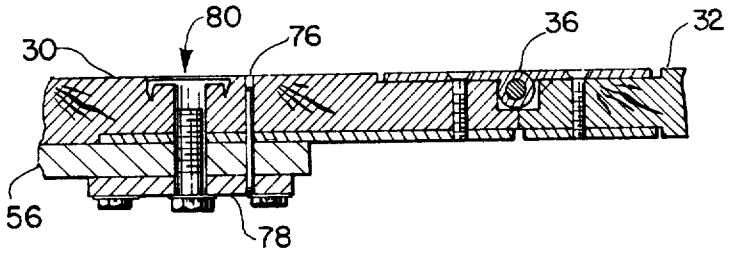


FIG. 11

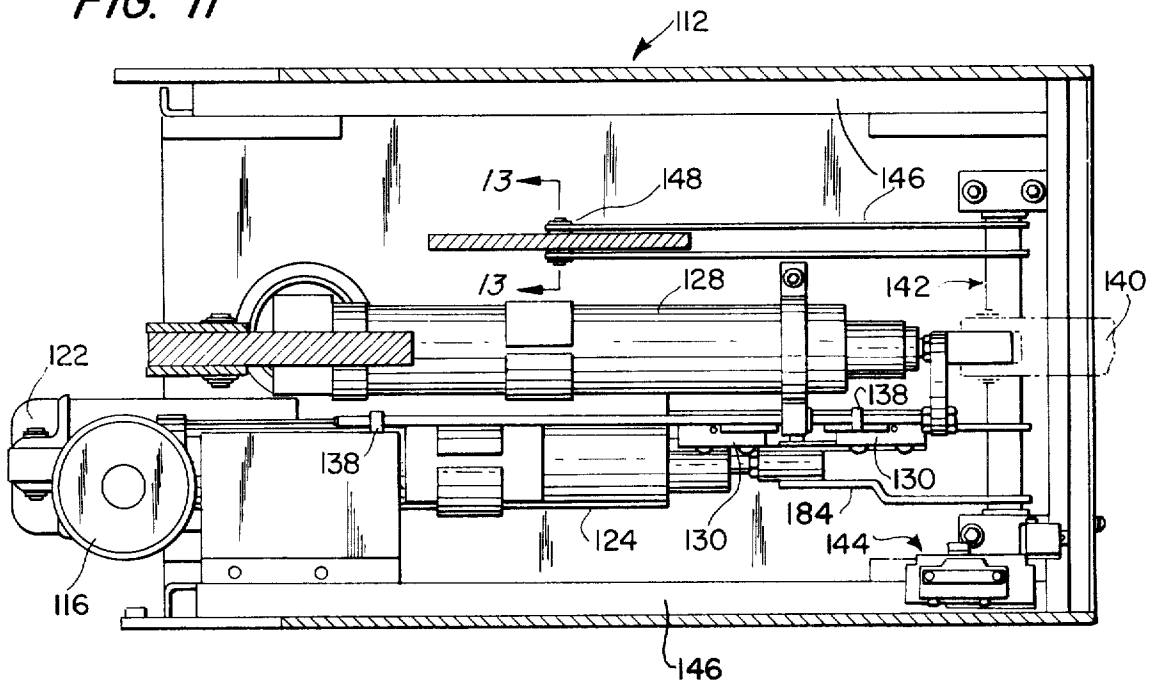
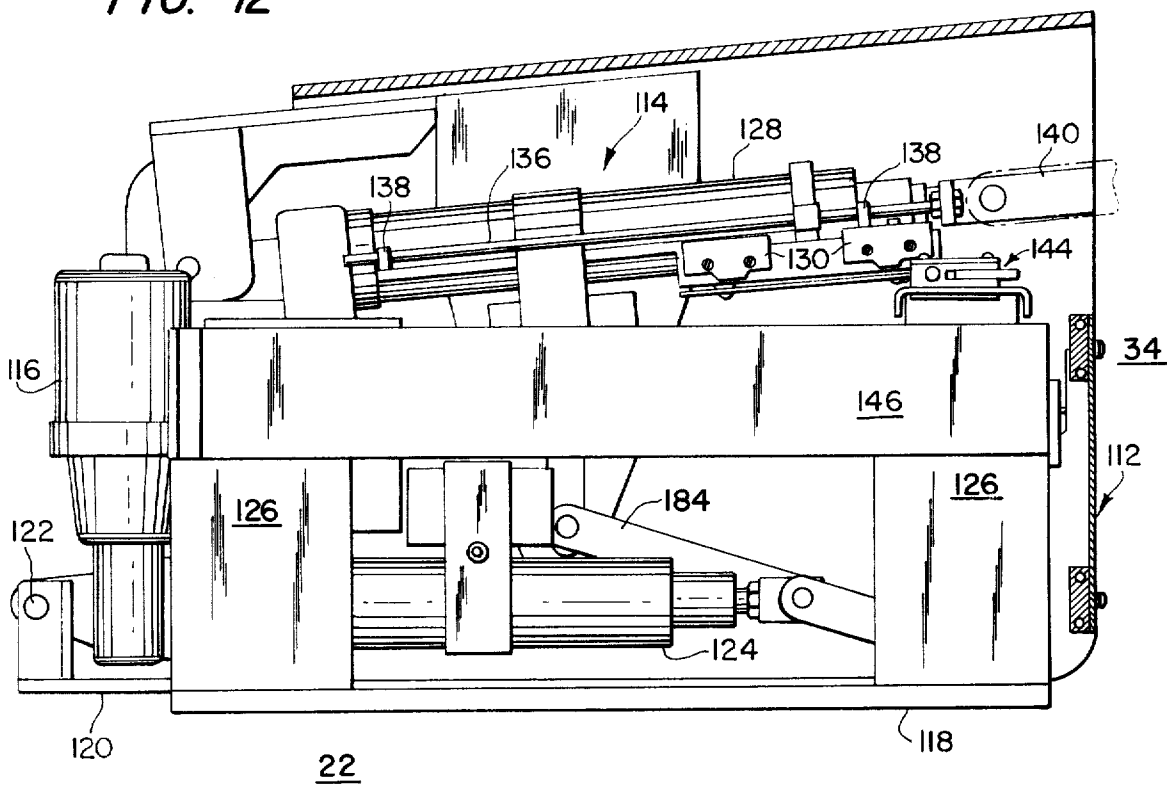

112
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FIG. 12


114
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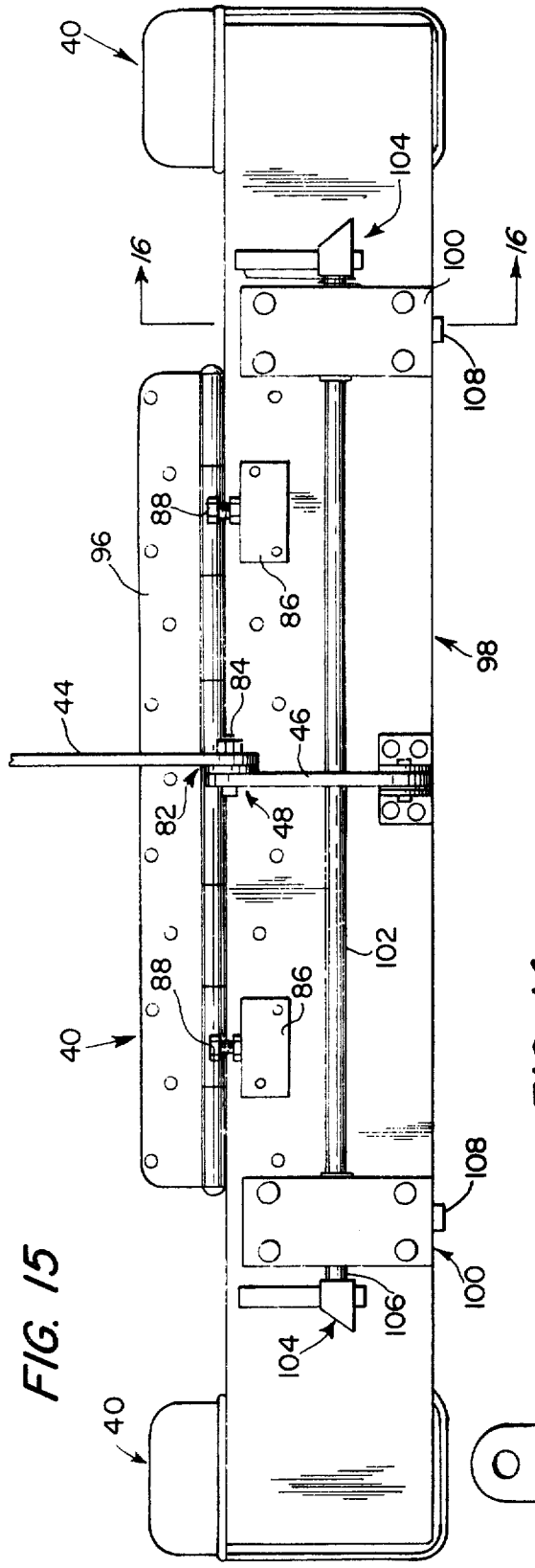


FIG. 15

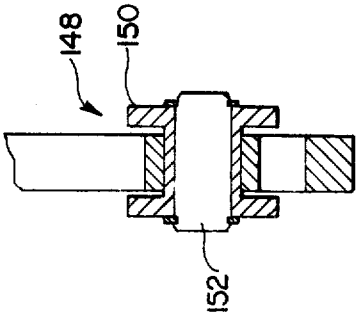


FIG. 13

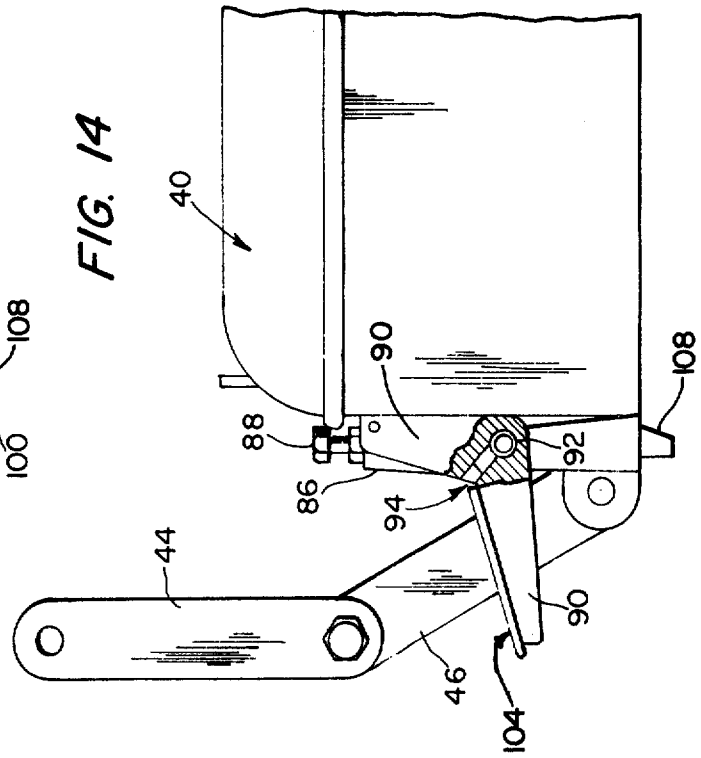


FIG. 14

BLOOD DRAWING CHAIR

BACKGROUND OF THE INVENTION

Blood drawing techniques utilized by different technical personnel and in different areas of the world differ in concept and techniques. There is additionally a growing tendency for paramedics or technical personnel other than physicians performing this function, and heretofore there has not been available a design of tables and chairs which would fulfill the desires and needs of these technical personnel, nor to appropriately satisfy the patient desires that blood be drawn in either a sitting or reclining position. In any known previous constructions, either the requirements and desires have not been adequately served or such equipment has been structurally unsatisfactory.

The present invention for a chair for use in blood drawing satisfies such requirements and preferences of the technical personnel using the same and the patients from which the blood is to be drawn.

SUMMARY OF THE INVENTION

According to the present invention, a blood drawing chair is provided which includes an articulated back, seat and leg portions, and an arm assembly, all of which are interconnected by a linkage system and having means operable to erect the chair to a desired sitting position or lowered to a desired reclining position. The structure has simplicity and is susceptible of ease of use and maintenance.

Additional objects, advantages and features of the invention will be more readily apparent from the following detailed description of an embodiment thereof when taken together with the accompanying drawings in which:

FIG. 1 is a side elevational view of the blood drawing chair in an erected position;

FIG. 2 is a rear elevational view of a portion of the chair of FIG. 1;

FIG. 3 is a front elevational view;

FIG. 4 is a side elevational view of the chair in extended or reclining position;

FIG. 5 is a side elevational view of the seat assembly in extended position;

FIG. 6 is a plan view from the top of the seat assembly of FIG. 5;

FIG. 7 is a bottom plan view of the seat assembly of FIGS. 5 and 6;

FIG. 8 is a fragmentary sectional view taken on line 8—8 of FIG. 5;

FIG. 9 is a fragmentary sectional view taken on line 9—9 of FIG. 7;

FIG. 10 is a fragmentary sectional view of the slide assembly according to the present invention;

FIG. 11 is a plan view of the base assembly mechanism of the chair;

FIG. 12 is a side elevational view of the base assembly;

FIG. 13 is a fragmentary sectional view taken on line 13—13 of FIG. 11;

FIG. 14 is a fragmentary side elevational view of the arm assembly mechanism of the chair;

FIG. 15 is an end elevational view of the arm assembly mechanism; and

FIG. 16 is a sectional view taken on line 16—16 of FIG. 15.

Referring now in greater detail to the drawings, the blood drawing chair generally designated 20 of the present invention is disclosed in a site of use mounted on a floor surface 22 in proximity to a vertical wall 24. The chair generally includes a base assembly mechanism 26 mounting thereon a seat assembly 28 which includes a back 30, a seat 32, a chair front or leg rest 34 depending upon whether the chair is erected to a sitting position as shown in FIG. 1 or to an extended or reclining position as shown in FIG. 4. The back and seat are interconnected for articulation by a continuous hinge 96 and the seat 32 and front or foot 34 are interconnected for articulation by a continuous hinge 38. An arm assembly 40 is mounted to the rear of back 30 and interconnected by a bracket assembly 42 which includes arm brake links 44 and 46 operatively interconnected to an arm brake assembly 48 operable to permit maintaining the arm assembly in the erected position as shown in FIG. 1, but being adjustable to the position shown in FIG. 4 in a non-obstructing arrangement with the chair in the extended or reclining position.

The back, seat and front or foot, as also the arms, can be appropriately covered, but for clarification some of the views merely disclose the panels and interconnecting construction.

The bracket assembly 50, as shown in FIGS. 5 and 7, further has interconnected left and right hand assemblies 52, 54, mounted on bar tie 56 on back 30. Through bar tie 58 on foot 34, bar links 60 interconnect between bracket assembly 50 and front bracket assembly 62 as shown in FIGS. 5 and 7 with appropriate plate backing 63 being used for strength. Index assemblies 64 and 66 are provided for the left and right hand arms. A bracket assembly front actuator 68 is provided on bar tie 58.

The link members 44 and 46 are connected at their ends by means of clevis pin and retainer assemblies 70. The front bracket assembly 62 is interconnected to bar links 30 by clevis pin and ring retainer assemblies 72. A pin spring mechanism 74 operatively engages with bracket assembly 62 and a like pin spring assembly 76 coacts with bracket assembly 50 on back 30. Back bar tie 56 is anchored by means of plate 78 and a bolt and T-pronged nut combination generally designated 80.

The brake assembly 48, which includes links 44 and 46, has an arm brake pad 82 (FIG. 15) interposed between the connected ends assembled by means of bolt 84 or the like with the pad consisting of a frictional material. Additionally, the structure includes stop arm blocks 86 which coact with adjustable bolts 88 to preset and limit movement of the relative parts. This assembly, further comprises stop arms 90 secured to shaft, 92, which, as can be seen from FIGS. 14–16, is an extension of shaft 102, with set screws 94 for securing stop arms 90 onto shaft 92. The arm assembly as shown in FIG. 15 further includes a hinge 96 connecting the back 30 with the arm assembly channel 98. With such an arrangement, back 30 can be traversed from a substantially vertical to a substantially horizontal position; a requirement extremely useful since the present invention is a blood drawing chair. Note that when back 30 is in a substantially vertical position as shown in FIG. 1, elements 98 and 96 are maintained in a single plane by the abutment of pawl 108 to stop 67, even as back 30 moves to a horizontal position as shown in FIG. 4. However, in any orientation of back 30 if pawl 108 is momentarily retracted (by a down-

ward pressure on handle **104**, as shown in FIG. **14**) bracket **98** maintains its substantially vertical position while bracket **96**, attached to back **30**, forms an angular relationship to bracket **98**. Pawl arm index mechanisms are positioned in housings **100** and through which pawl arm index shaft **102** extends and is operatively interconnected. Handle assemblies **104** are operatively engaged with the pawl mechanism and interposed therebetween on shaft **102** are helical portion springs **106**. Details are shown in FIG. **16** with the pawl **108** being slidably mounted in housing **100** as shown.

As can be most easily seen from an inspection of FIG. **1**, the left and right index assemblies, **64** and **66**, each have two stops, shown as **67**, **67'**, respectively. As shown in FIG. **1**, when pawl **108** engages stop **67** the arm **40** will remain in the erected position which as can be seen, is virtually perpendicular to seat back **30**, regardless of the relative position of the back **30** to seat **32** or foot **34**. If the individual physician or technician drawing blood prefers that the patient's arm be maintained erected from his body, while the patient is either in a sitting or supine position, this is accomplished by leaving the pawl **108** engaging the stop **67**. Consequently, the arm will always be maintained erected from the seat back and therefore erected from the patient's upper body.

If, on the other hand, the individual physician or technician prefers that the patient's arm be maintained parallel to the floor, while the patient is oriented in any position between sitting and supine, then pawl **108** is firstly selectively disengaged. This disengagement is accomplished by simply pressing on handle assembly **104**, FIG. **14**, which will rotate stop arm **90** slightly counterclockwise, momentarily retracting pawl **108**.

As a result of this disengagement, the articulation of the arm **40** then becomes dependent upon a resistance to relative movement between arm brake links **44** and **46** as supplied by arm brake pad **82**, FIG. **15**.

If desired the physician may limit this excursion of the erected arm by engaging another stop, designated **67'** in FIG. **1**. This allows the physician or technician to selectively limit the arm to another fixed orientation relative to the chair back.

As shown most clearly in FIG. **4**, there is a final stop position to the rotation of arm **40** through the provision of arm stop blocks **88**. If the individual physician or technician prefers that the patient's arm be maintained parallel to his back during a blood drawing, as is the custom in parts of the United States, the blocks **88** will contact the hinge **96** on back **30** and maintain an approximately parallel relationship between arm **40** and chair back **30**. When the blocks **88** so contact the chair back **30** the arm will then be maintained approximately parallel to the chair back regardless of the movement of the chair back relative to the ground. Consequently, it can be seen that the articulation of arm **40** can either be dependent on the resistance of the arm brake assembly, or selectively overriden, to meet the individual physician's preferences. Therefore, the arm can be selectively maintained either always erect to the chair back, or always parallel to the chair back, regardless of the relative position of the chair back to the ground.

The base assembly mechanism shown in detail in FIGS. **11** and **12** includes within housing **112** an actuator assembly generally designated **114** operatively interconnecting with an actuator assembly motor **116** or the like. The base assembly mechanism is fixedly mounted with respect to floor surface **22** by means of plate **118** fixed to the floor and the assembly unit includes a clevis assembly base **120** with clevis pin **122** interconnecting an extender mechanism **124** and actuator **116**. This mechanism is fixed as are vertical support plates **126**. The base housing and actuator **128**, together with associated switching mechanism generally indicated at **130** are movable with respect to the plate **118** and stationary members affixed thereto. Upon actuation of switch button **132** in switch box assembly **134** mounted on vertical wall **24**, the actuator motor **116**, through extender mechanism **124**, moves the seat assembly from the retracted position to the extended position and while so doing, through linkage **184**, forwardly moves actuator **128** and bar **136** therewith. As seen in FIGS. **11** and **12**, the bar has stops at **138** which co-act with switching mechanism **130** so that upon forward or return movement of the seat mechanism actuator **128**, such as a hydraulic cylinder or gearing mechanism and the like will elevate chair front or leg rest **34** through actuation of arm **140** in conjunction with the crank assembly generally designated **142**. Thus, basically, there are two major cylinders which act substantially simultaneously in order to move the chair from the position shown in FIG. **1** to that shown in FIG. **4** and vice versa. Upon actuation of motor **116**, major cylinder **124** moves the base housing parallel to floor **22** as shown in FIG. **4**. A second cylinder contacts stops **138** which co-act with switching mechanism **130** which thus moves the foot portion **34** in an upward direction while moving back **30** in a downward direction. Actuation is also controlled by means of a switch mechanism generally indicated at **144**. Sliding or forward and rearward movement is facilitated by means of slide assembly **146** which includes a roller assembly guide **148** shown in detail in FIG. **13** which includes roller **150** mounted on clevis pin **152**. The slide assembly as shown in detail in FIG. **10** includes a bracket **156** mounted to the interior of housing **112** and a bracket **158** mounted on the sliding base assembly portion. Interposed therebetween is sliding support bar **160** with the interposition therebetween and the brackets of roller bearings **162**.

The co-action between elements **30** and **34** can best be seen by viewing FIG. **7** which is a simplified bottom plan view of the seat assembly through the elimination of structural components shown in FIGS. **11** and **12**. Reference is respectfully made to FIGS. **5** and **7** in which the bracket assembly **50** has interconnected the left and right hand assemblies **52**, **54**, mounted on bar tie **56** on back **30**. Through bar tie **58** on foot **34**, bar links **60** interconnect between bracket assembly **50** and front bracket assemblies **62** with appropriate plate backing **63** being used for strength. Index assembly **64** and **66** are pivoted for the left and right hand arms. A bracket assembly front actuator **68** is provided on bar tie **58**. The link members **44** and **46** are connected at their ends by means of clevis pin and retainer assemblies **70**. The front bracket assembly **62** is interconnected to bar links **60** by clevis pin in ring retainer assembly **72**. A pin spring mechanism **74** operatively engages with bracket assembly **62** and a like pin spring assembly **76** co-acts with bracket assembly **50** in back **30**. Back bar tie **56** is anchored by means of plate **78** and a bolt and T-pronged nut combination generally designated as **80**.

From the foregoing description it will be apparent that as the chair is actuated from a seating position to a reclining position the seat assembly moves forward and simultaneously the back rotates downwardly and the front or leg rest portion swings upwardly. The arm mechanism is interconnected to assume the non-obstructing position shown in FIG. **4**. The reverse operation will then erect the chair to the sitting position shown in FIG. **1**.

Manifestly, minor changes in details can be effected in the structure without departing from the spirit and scope of the invention as defined in and limited solely by the appended claims.

We claim:

1. A blood drawing chair comprising:

A. a base assembly including:

i. a fixed base;

ii. a rectilinearly movable seat assembly mounted on said fixed base;

B. a back hingedly attached to the rear of said seat assembly;

C. a chair front leg rest hingedly attached to the front of said seat assembly;

D. an arm assembly articulated to said back operable to permit maintaining the arm assembly in an erected position said articulation comprising a bracket assembly interconnecting said arm assembly and said back, including pivotally interconnected link arms respectively attached at ends thereof to said back and said arm assembly, and arm brake pad means interconnected between said connected ends of said link arms, said link arms being operable to allow articulation of said arm assembly to raised or lowered positions and further including pawl indexing means, operable to selectively maintain said arm assembly in said erected position through contact with arm stop blocks fixedly positioned relative to said chair back, whereby said arm assembly can be selectively maintained in said erected position during said movement of said seat assembly,

E. actuating means for rectilinearly moving said seat assembly with respect to said fixed base; and

F. means operable upon said movement of said seat assembly forwardly or rearwardly to simultaneously pivot said chair front leg rest and said back with respect to said seat assembly to a patient reclining position or a patient sitting position respectively.

2. A blood drawing chair as claimed in claim **1**, said actuating means for rectilinearly moving said seat assembly including an extensible actuator having one end fixed to said fixed base and an extensible arm connected to said movable seat assembly, drive means for said actuator, actuation of said drive means serving to extend said extensible arm and slide said movable seat assembly with respect to said fixed base.

3. A blood drawing chair as claimed in claim **1**, a chair front actuator mounted for movement with said rectilinearly movable seat assembly and having an extensible arm interconnected with said chair front leg rest, said chair front actuator being automatically operable upon forward or rearward movement of said movable seat assembly to pivot said chair front to an elevated or lowered position.

4. A blood drawing chair as claimed in bar **1** including a bar link mechanism interconnecting said back and seat assembly operable upon movement of said seat assembly to raise and lower said back by pivoting with respect to said seat assembly.

5. A blood drawing chair as claimed in claim **3** including switch means operable upon rectilinear movement of said seat assembly to actuate said chair front actuator at predetermined positions of movement to raised or lowered position.

* * * * *