United States Patent

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[45] Patented **Jan. 4, 1972**

[54] **CHAIR FOR THE HANDICAPPED**
14 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** **297/149,** 297/294, 297/397, 297/447, 297/457, 297/DIG. 4
[51] **Int. Cl.** **A47b 39/00,** A47c 1/10, A47c 7/02
[50] **Field of Search** ..... 297/71, 115, 196, 344, 345, 445, 357, DIG. 2, DIG. 4, 377, 194; 248/399, 401, 160, 161

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ABSTRACT: A unitary structure is molded from resinous impregnated fabric material to provide a back, seat and front leg portions with side flanges which together form a channel for containing parts of the body of a handicapped user. The unitary structure is supported on a stable base by the front leg portions which preferably provide a hingedlike effect due to the flexibility of the impregnated fabric material. The base may be a wheeled dolly with suitable braking means. Further support is provided by an adjustable length rear leg, extending between the base and the rear of the seat portion. The channel-shaped unitary structure preferably had additional oppositely directed reinforcement channels sharing in common the side flanges along each side. In addition to other reinforcement there are preferably provided a detachable headrest and adjustable and detachable tray and footrest members.

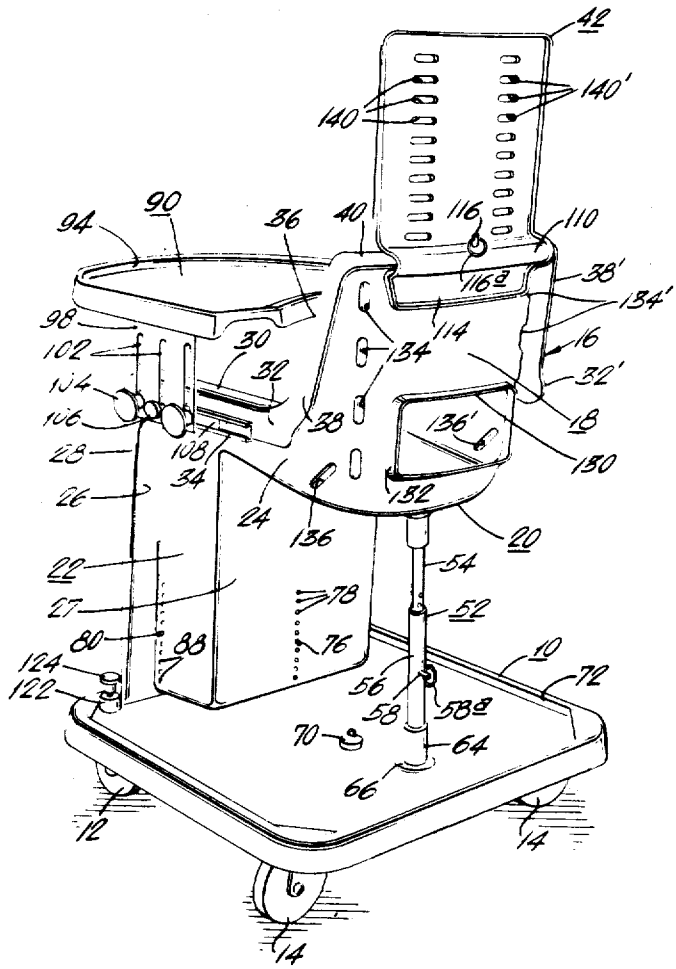


FIG. 1.

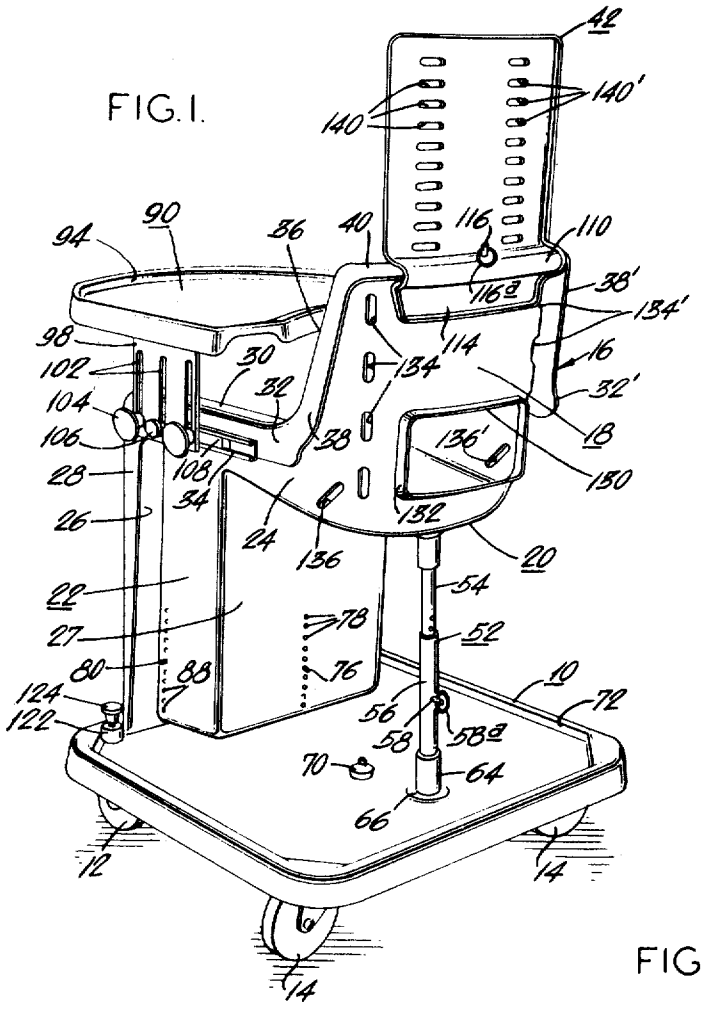


FIG. 5.

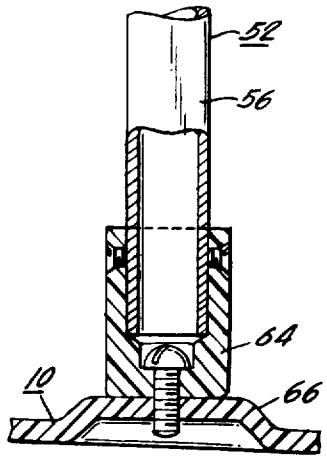


FIG. 9.

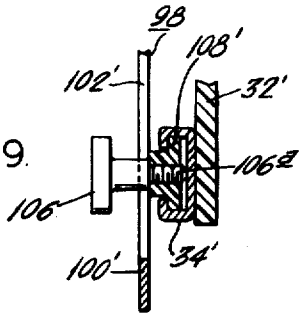


FIG. 8.

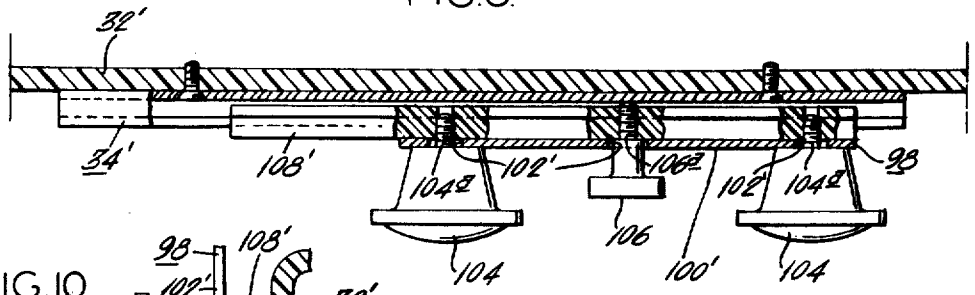
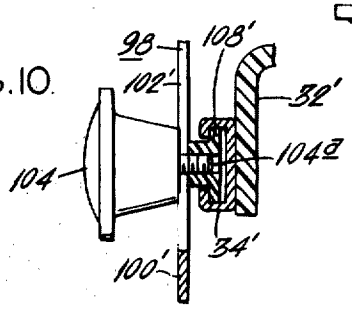


FIG. 10.



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FIG. 2.

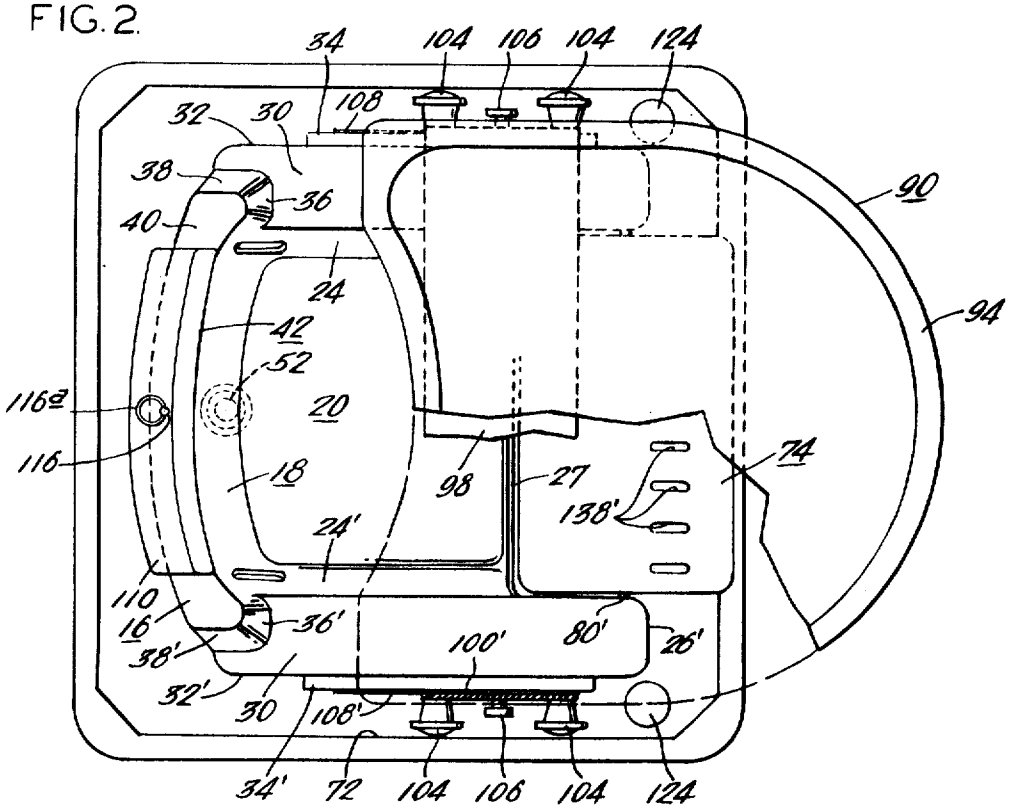
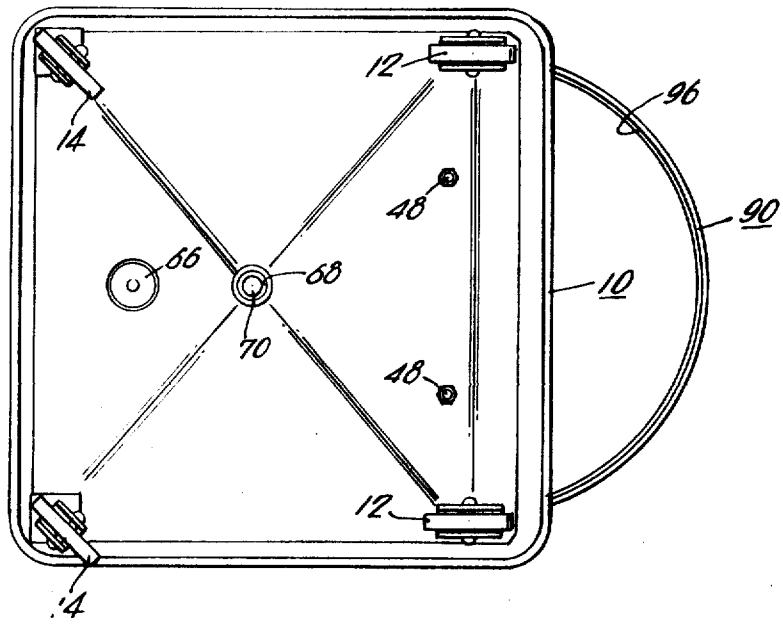


FIG. 3.



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FIG. 4

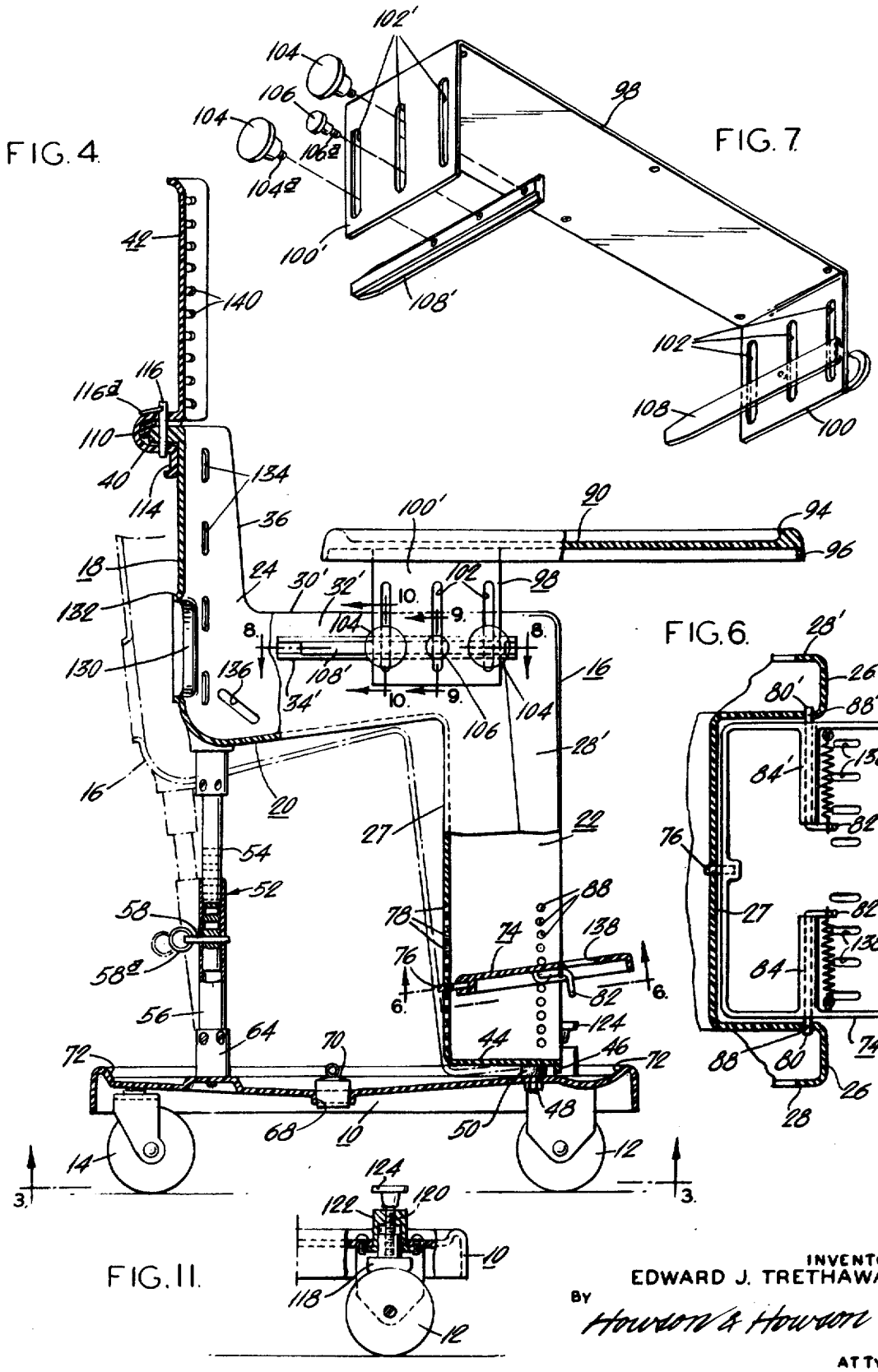


FIG. 7

FIG. 6

FIG. 11

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CHAIR FOR THE HANDICAPPED

The present invention relates to a chair for the handicapped. More specifically, the present invention relates to a chair which is adapted especially to the needs of a severely handicapped person who may be unable to support himself in a wheelchair.

In the prior art wheelchairs and other devices have been designed for the needs of persons who are normal in most respects but have to be moved without walking, for some specific reason. Such chairs do not meet the particular needs of the severely handicapped, such as persons who have not developed normally from childhood, either physically or mentally, so that they are not able to sit up without help. The present invention has for its principal object the fulfilling of the needs of such severely handicapped people, so that they may be able to assume a sitting position and perform simple tasks, which they may be unable to do as well in bed.

More specifically, the chair of the present invention contemplates providing a unitary structure on a stable support base. The unitary structure consists of a molded web of resinous impregnated fabric material having a back. a seat, and front leg portions, generally parallel side flanges at the opposite sides of these portions whereby the unitary structure provides a channel for containing seated body portions of the user.

The present invention also provides attachments to the unitary structure including a headrest, an adjustable tray and footrest portions and the chair itself is preferably adjustable to a slightly reclining position.

For a better understanding of the present invention reference is made to the accompanying drawings in which

FIG. 1 is a perspective view of the chair of the present invention from the rear;

FIG. 2 is a plan view of the chair above;

FIG. 3 is a plan view of the chair from below on a somewhat smaller scale;

FIG. 4 is a vertical sectional view of the chair partially in elevation in the region of the tray support;

FIG. 5 is a detail sectional view showing attachment of the rear leg means to the base;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 4, showing the footrest in plan from the bottom;

FIG. 7 is a perspective view of the tray support flange structure and its associated manual locking means, showing an exploded view of the said structure through a flange at one end;

FIG. 8 is sectional view taken along line 8—8 in FIG. 4 showing details of the tray support and locking structure;

FIG. 9 is a sectional view taken along line 9—9 of FIG. 4;

FIG. 10 is a sectional view taken along line 10—10 of FIG. 4;

FIG. 11 is a view of a front wheel showing a manually adjustable brake associated therewith.

Referring first to FIGS. 1, 2, 3 and 4, it will be seen that the chair is provided with a stable base generally designated 10, and preferably made of molded resinous impregnated fabric. The base is made mobile by four wheels which are rotatable relative to conventional support brackets on the base. The front wheels 12 are fixed and the back wheels 14 swivel, in order to provide movement of the chair.

The body-supporting portion of the chair is a unitary structure generally designated 16. The chair, like the base, is preferably made of resinous impregnated fabric material. In preferred embodiments the impregnated fabric is fiberglass. The resinous material employed and the overall thickness of the laminate are matters of judgment and subject to variation depending on the weight of persons to be supported and other factors. The material is molded to chair form avoiding sharp corners and rough edges in order to prevent injury to the handicapped user or institutional aides. The unitary molded structure includes a back 18, a seat 20 and front leg portion 22, all in a continuous web. The various dimensions may be varied as to size depending upon the size of the user but to avoid manufacturing too many sizes, padding may be employed. The unitary structure has side flanges to provide a channellike structure containing the seated body portions of the user. As seen best in FIGS. 1 and 4, the parallel side flanges 24 and 24' extend from the front leg portion 22 along the seat portion 20 and up along the back 18, diminishing in width toward the top of the back.

The flanges 24 and 24' are further extended from the side flanges at opposite edges of the chair in channels which are oppositely directed from the channel provided by the chair itself. The opposite direction of the channel can be seen in FIG. 6. The webs of the smaller reinforcing channels 26 and 26' are parallel to the web 27 forming the main web of the leg portion 22 and the outer flanges 28 and 28' are generally parallel to side flanges 24 and 24'. At the seat level, the web 30 of the reinforcing channel provides the arms of the chair spaced above the seat by the width of the side flange 24 in that region. As seen in FIG. 4, it will also be noted that the seat and the arm are designed to be at a slight angle to one another, with the seat being slanted downwardly at a small angle on the order of 8° from the horizontal toward the back and the arm being essentially horizontal in this position. The outer flanges 32 and 32' of the reinforcing channel at the arm also preferably provide support for the channel guides 34 and 34', which will be discussed below in connection with the tray. As best seen in FIG. 3, both the depth and the width of the reinforcing channels along the sides of the back taper as they approach the top. The webs 24 and 24' in this area, depart from the parallel and rather increase the sight curvature of the back more sharply at the edges before being terminated at the webs 36 and 36'. The outer flanges 38 and 38' are more enlarged. The whole structure is closed at the top in a flange 40 generally perpendicular to the back, to which a headrest 42 may be optionally attached.

The unitary structure, also preferably has a flange 44 extending between the side flanges 24 and 24' closing the end of the leg structure. A slight terminating flange 46 in the plane of webs 26 and 26' completes the bottom end of the unitary structure 16. The unitary structure is preferably connected to the base 10, using a pair of bolt and nut connectors 48, which are spaced apart as may be seen in FIG. 4 and connect the web 44 to the forward end of the base platform 10. The flexibility of the material of the web 48 and the unitary structure, plus the optional use of a slightly compressible washer material 50 permit a hinging effect, which lets the unitary structure 16 of the chair to be tilted back into the position shown in phantom lines in FIG. 4. Support at the front is obviously insufficient and additional support structure 52 is needed in the form of rear leg means of some sort, preferably a rear leg whose effective length can be adjusted to accommodate and effect the tilt of the chair. In this case a single rear leg in the form of a telescoping column, which permits length adjustment, extends between the base 10 and the rear portion of seat 20, spaced well behind the front leg portion of the chair and its attachment to the base 10. In this particular embodiment the telescoping rear leg column is made of a rod 54 and snugly and slidably engaged by tube 56 attached respectively to the seat and to the base. Rod 54 has a series of parallel diametrical holes through it which mate with the single diametrical hole through tube 56. As seen in FIG. 4, in the partially sectioned portion of the structure, a pin 58, having a suitable pull ring 58a, passes through a selected diametrical hole in rod 54, as well as the holes in tube 56, and holds the rear leg at a preselected length and the chair at a corresponding inclination. A practical range of adjustment is probably 15° or 16° at about 4° increments so that the number of holes shown for illustration are probably not useful in practice. The rod 54 is connected to the bottom of the seat of the chair by relatively massive bracket which provide a socket structure which rigidly accommodates rod 54. The tube 56 is attached, as shown in FIG. 8, through a socket structure 64, which is bolted to a boss portion 66 of the base 10 which provides increased flexibility.

Considering the base briefly again, it will be observed that it is made so that it has a slight concavity toward the center at

the low point of which is provided a drain opening **68**, accommodating a removable plug **70**. The base, therefore, serves to collect body fluids and spilled food and retain them by virtue of a dam molded into the structure by the inverted channel **72** around the outer periphery of the base. The wheels **12** and **14** are preferably standard caster structures, the rear wheels **14** being swivel casters.

Referring to FIGS. **4** and **6**, there is shown a suitable footrest **74**, which may also be made of molded resinous material, or, if preferred, of sheetmetal material. The top of the footrest may be coated with nonslip material or corrugated for the same purpose. The structure shown is provided with a rearwardly extending pin **76**, which may be cast into an enlarged portion of the footrest, and which is adapted to engage one of a plurality of holes **78** vertically aligned in the web **27**. Other means of interengagement of the parts could of course be substituted. The footrest also has a slidable L-shaped retractable pins **80** and **80'** at opposite ends about in the middle of the structure. The L-bends provide handles **82** and **82'**. The pins slide in guides provided by bosses **84** and **84'**, specifically provided for that purpose, and are urged outwardly toward the side flanges by spring attached between the footrest and the handles **82** and **82'**. In the illustrated embodiment the pins are urged outwardly and away from one another until the handles **82** and **82'** engage the ends of the bosses in order to engage in opposed holes in the opposed rows of holes **88'**and **88'** in the side flanges **24** and **24'**, respectively. To put the footrest in place a hole **78** is selected at an appropriate level for the user and pin **76** inserted while the pins **80** and **80'** are retracted. Pins **80** and **80'** then are preferably inserted into the next higher level of holes **88** and **88,'**, respectively. The pins **80** and **80'** are retracted by grasping the handles **82** and **82'** and squeezing them together until the pins are withdrawn to a position where the footrest can be slid into place and releasing the handles when the pins are in place.

Another attachment for the chair is the tray generally designated **90** seen in FIGS. **1**, **2**, **3** and **4**. The tray consists of a molded structure of resinous impregnating fiber glass, reinforced by a bead **94**, which forms a dam around the top surface and a downwardly extending flange **96**. Fixed beneath the tray is a bracket **98** extending the full length of the tray and reinforcing the tray. Bracket **98** as seen in FIG. **7** has downturned flanges **100** and **100'**, each having three parallel vertically oriented slots **102** and **102'**, which are therefore transverse to slide guides **34** and **34'**. As seen in FIG. **7**, these slots permit the passage of threaded shank portions of both vertical adjustment manual locking means **104** and horizontal adjustment manual locking means **106**, both of whose threaded shank portions **104***a* and **106***a*, respectively, engage a common slide bar **108** or **108'** of T-shaped cross section. As seen in FIGS. **8**, **9** and **10**, the slide bar **108** slides within the guide **34**, which is a channel guide with overlying flange portions to retain the slide, as can best be seen in FIGS. **9** and **10**. The guide is affixed to flange **32** by bolts, or other suitable means, as shown in FIG. **8**, and the slide bar **108** slid in place into the slide guide **34** from one end. The tray flanges **100** and **100'** are put in place, as seen in FIG. **8**, so that their slots **102** reveal the threaded holes in the slide bar and the threaded shanks **104***a* and **106***a* of manual adjustment means **104** and **106** can pass through the slots and engage their proper holes in the slide. As seen in FIGS. **8** and **10**, the knob portion **104***b* of manually adjusted vertical adjustment means has a large flat shoulder, which effectively clamps the flange **100** against the exposed flat bottom of the T-slide which projects above the guide when the manual adjustment knob **104***b* is tightened down into position. As seen in FIGS. **8** and **9**, horizontal adjustment member **106** passes through middle slot **102** out of contact with the flange **100**, but its threaded shank **102***a* extends through the slide bar **108** and, in its locking position, engages the bottom of the slide guide channel **34**, while urging the crosshead of the T-section of the slide **108** against the entrapping flanges of the slide, thus preventing the slide from moving relative to the channel and holding the tray in place horizontally.

It will be observed in passing that the slots **102** are made with greater clearance than required to pass the respective shanks. This clearance permits the tray to be tilted slightly as when the unitary structure is in the phantom position of FIG. **4** and the tray needs to be horizontal.

Finally, the optional headrest may be attached as seen in FIG. **4** by insertion of the flange **40** within the convolution channel **110**, molded into the headrest, which is merely an extension of the back **18**. A strip of resilient material within the bottom of the channel is compressed by the flange before the stop **114** at the bottom of the structure bottoms on the back of the chair's back. Thus compression of the resilient material tends to urge the headrest outward, but it is held snugly in place by a pin **116** placed through the aligned holes in the channel convolution **110** and flange **40**. Ring handle **116***a* enables the handling of the pin both in inserting and withdrawing and prevents the pin from passing through the hole completely and escaping from the bottom.

As seen in FIG. **11**, and in FIGS. **1**, **2** and **4**, simple means is provided for braking each of the front wheels **12**. This means is supported through the base and consists of a brake shoe **118** on the end of a threaded shaft **120** rotatable relative to the shoe but threaded through a boss **122** in base **10**. The threaded shaft **120** carries a knob **124** to rotate the shaft **120** to engage the brake shoe against the wheel and brake it, or to release the wheel.

It will be observed that an opening **130** is provided through the back **18** of the chair, said opening having reinforcing flanges **132** surrounding it to avoid loss of rigidity by this cutout. The opening provides room just above the seat to accommodate extra padding, diapers on the user, or other bulkiness of clothing or equipment which might add to the discomfort of the user, if not provided. Extending along the sides of the back at each side are a row of slots **134** and **134'**. These slots provide means for supporting belts, or belts or ties for supporting vests, or ties for holding padding or for supporting the user of the chair, if needed. Similarly, large diagonal slots **136** and **136'** may be used for a seat belt, as required, or for padding as needed. Similar slots may be provided elsewhere on the unitary structure. It should be noted in many cases adjustment of the tray into a position against the user will afford all the extra support for the upper body that is required.

It will be observed that slots **138** and **138'** are also provided on the footrest **74** to enable straps to be employed to hold the feet in position as required. Likewise, slots **140** and **140'** are provided through the headrest **42** to support pillows or padding or ties or for restraints to hold the user's head in place.

In some cases corresponding parts on opposite sides of the structure have been numbered with identical numbers, but with the numbers on one side primed and on the other side unprimed. In many cases both have been described but in others numbers appearing in the drawings may not appear in the specification but their significance will be understood from these remarks.

A preferred embodiment of the chair in accordance with the present invention has been described. It will be apparent to one skilled in the art that modifications of this chair can be made very readily. Modifications to the chair have been contemplated within the scope of the claims and all such modifications within the scope of the claims are intended to be within the scope of the present invention.

I claim:

1. A chair for the handicapped comprising

a stable support base,

a unitary structure mounted on said support base having back, seat and front leg portions molded from a web of resinous impregnated fiber material wherein rigidity is increased by continuing the molded web in essentially parallel continuous side flanges at the opposite sides of the seat, back and front leg portions, whereby the unitary structure provides a channel for containing seated body portions of the user, the front leg portion being attached

to the base and having a hinge region adjacent to the place of attachment to the base providing a hinge effect due to the inherent flexibility of the impregnated fiber material, in order to afford limited tilting or inclination of the chair,

a single rear leg beneath the seat and spaced back from the front leg portion, including telescoping pieces, one affixed beneath the seat and one affixed to the base, movement of which relative to one another changes the effective length of the rear leg to effect rotation of the unitary structure about the hinge region and latching means for securing in selected positions the telescoping pieces against movement relative to one another,

a removable footrest adjustably positionable within the side flanges of the molded channel in the front leg portion of the unitary structure and being supported in selected positions by said side flanges, and

associated tray and headrest attachments removably supported on said unitary structure, at least one of which is adjustable in position.

2. The chair of claim 1 in which the unitary structure includes a flange portion at the bottom of the front leg portion extending generally perpendicular to the side flanges and joining together the side flanges.

3. The chair of claim 2 in which the side flanges themselves are, in turn, provided with a further flange web increasing strength of the chair and providing arms on the chair at an appropriate level above the seat.

4. The chair of claim 3 in which the side flange structure is completed by further flanges directed away from the direction of opening of the chair so that each side flange structure all together provides a channel of opposite-facing direction from the channel provided by the chair itself and so that there is a channel extending along the length of each side of the chair to provide greater rigidity and whose edges are rounded to prevent the user from being injured on an edge of the web.

5. The chair of claim 4 in which the tray attachment is provided on the outer surface of the outermost flange at each side of the chair below the flanges supplying arms.

6. The chair of claim 5 in which the tray attachment is a metallic channel provided to entrap slide elements permitting adjustment of the tray toward and away from the back of the chair, the channel slide element being located beneath the arms of the chair and out of the way of the user.

7. The chair of claim 4 in which a flange is provided at the top of the back, extending away from the back in the direction away from the front leg portions, said flange also closing the ends of the flanged channel structures extending along each side of the unitary structure.

8. The chair of claim 7 in which the removable headrest effectively extends the back upwardly and is removably attached to the flange atop the back of the unitary structure, a convoluted portion conforming to and interfitting with the flange across the top of the back of the unitary structure so that attachment is made by a single removable attachment means extending through the convoluted portion and said flange.

9. The chair of claim 8 in which the headrest is provided with a series of spaced openings in order to accommodate straps and ties for pillow and head holding apparatus.

10. The footrest of claim 1 in which the footrest is provided with means alternatively engageable with a number of portions in the front leg web portion of the channel and retractable means engageable at different levels into alternative pairs of opposed openings in the opposed flanges.

11. The chair of claim 10 in which rows of holes are provided in the front leg web portion and each of the respective flanges at such levels to accommodate pins in the footrest such that the footrest may be either horizontal or tilted at angles which are multiples of 8° by rotating the footrest around the pins engaged by the flanges.

12. The chair of claim 5 in which the tray extends above and beyond the arms of the chair and is provided with downwardly extending support flanges through each of which extend at least two manual locking means attachable to slides in channel slide guides, each of said locking means being adjustable to lock and loosen structure in position in the guides.

13. The chair of claim 12 in which the support flanges for the tray are provided with slots transverse to the slide guide and permitting adjustment of the tray upwardly and downwardly, away from and toward the seat of the chair, and at least one of the manual locking means acts to lock the tray in vertical position by clamping the flange against the guide.

14. The chair of claim 1 in which the base is provided with wheels permitting it to be conveniently moved about and suitable brake means to hold the chair in a selected place.

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