United States Patent [19]

Williams

[11] **3,758,150**

[45] **Sept. 11, 1973**

[54] **COLLAPSIBLE WHEEL CHAIR**

[76] Inventor: **Patrick Yelverton Williams,** 2 Morotai Cres., Castlecrag, New South Wales, Australia

[22] Filed: **June 28, 1972**

[21] Appl. No.: **267,203**

[52] **U.S. Cl.**..... **297/45,** 297/433, 297/DIG. 4

[51] **Int. Cl.**..... **A61g 5/02,** A47c 5/10

[58] **Field of Search** 297/45, 44, 42, 433, 297/DIG. 4; 248/436, 423

[56] **References Cited**

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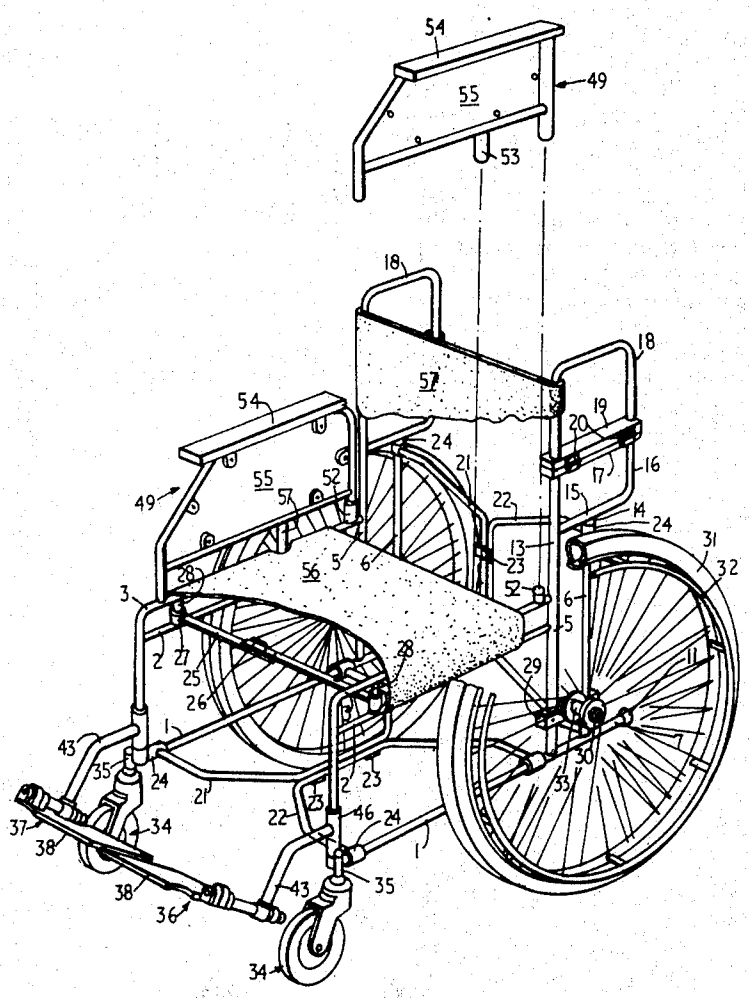
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Primary Examiner—Francis K. Zugel
Attorney—Dexter N. Shaw et al.

[57] **ABSTRACT**

A collapsible wheel chair the weight of which is of the order of 30 lbs and in its collapsed position its width is of the order of 7½ inches. The chair comprises two tubular side frames each formed of a bottom rail and two top rails joined by a single front post and the front member of two rear posts, said side frames being coupled together by two tubular toggle members and a brace, each said toggle member comprising two U members articulated at the base of the U's and having mounting sleeves on the ends of the U limbs, one said toggle member being mounted by said sleeves on the bottom rails between the front posts and the front members of the rear posts, the other said toggle member being mounted on the rear members of the rear posts, said brace being an articulated bar incorporating an off centre lock stop, a sleeve on each end of said brace, each sleeve mounted on a post between the respective top rails adjacent the front ends thereof; axle blocks one mounted on each pair of rear posts with an axle projecting outwardly therefrom, wheels each with a hand manoeuvering ring thereon and the hub offset outwardly mounted on the respective axles; castor wheels, a footrest, a seat and back rest are included.

3 Claims, 4 Drawing Figures



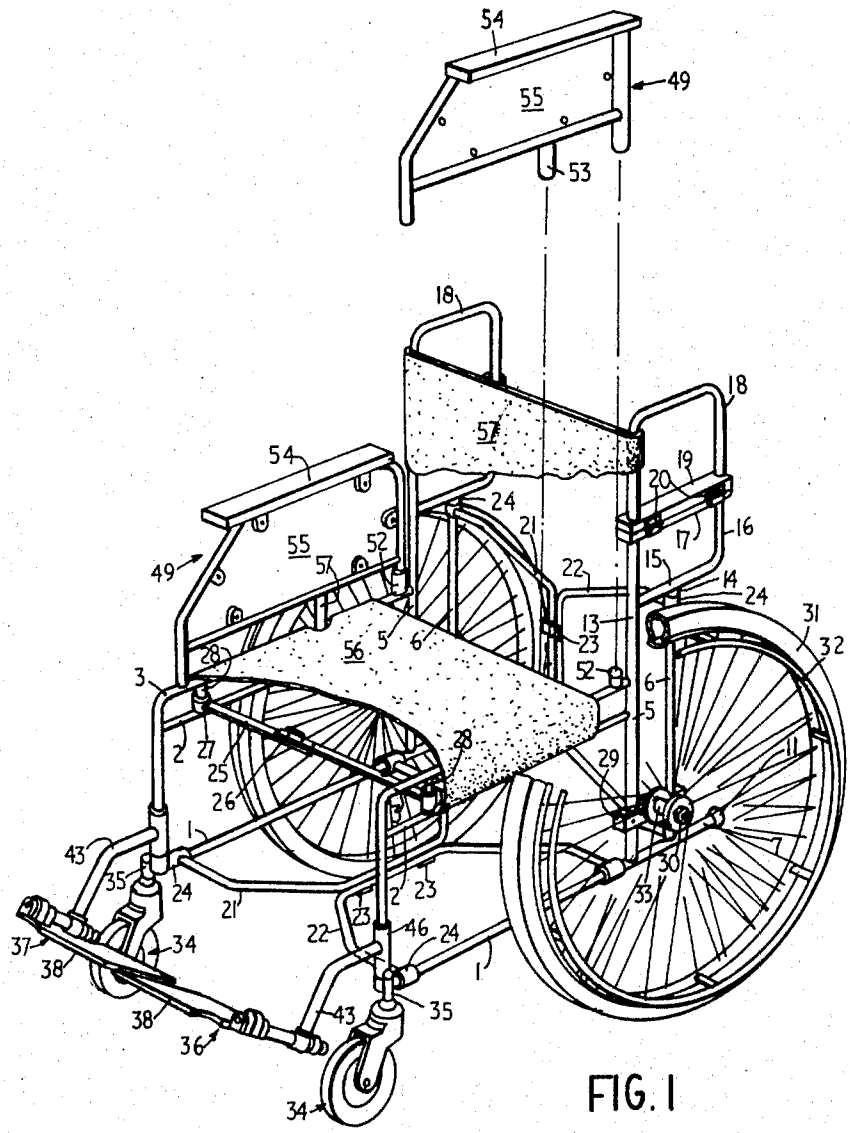

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FIG. 1

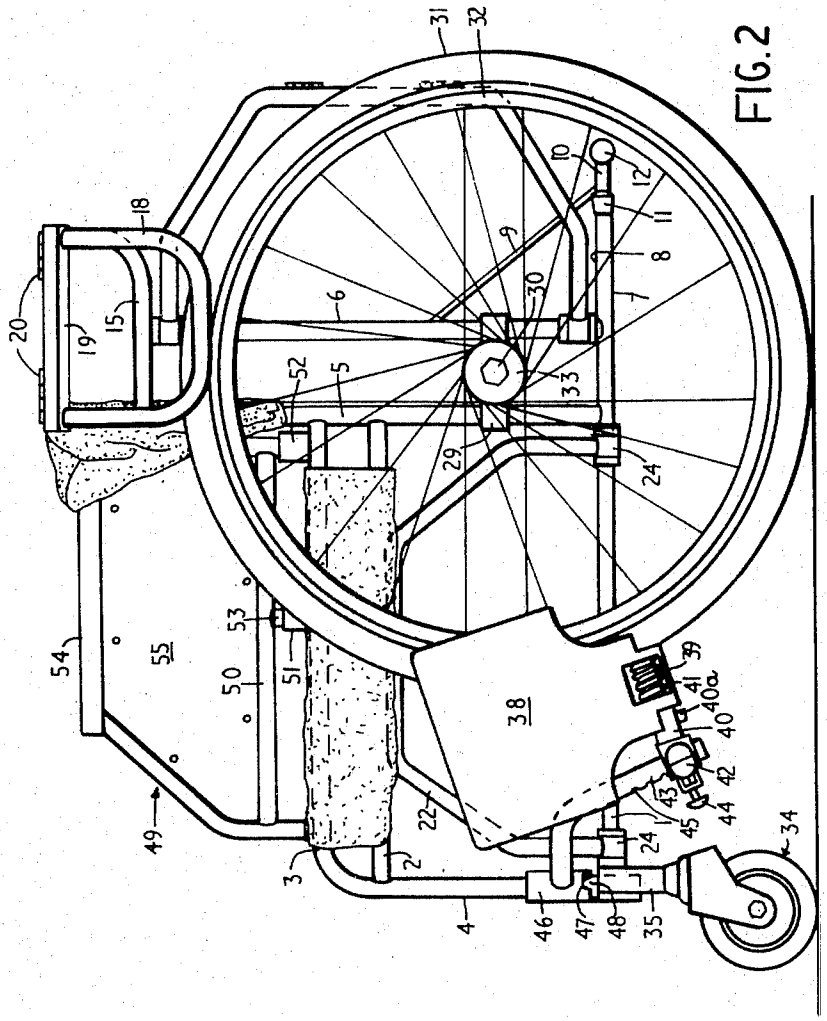

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FIG. 2

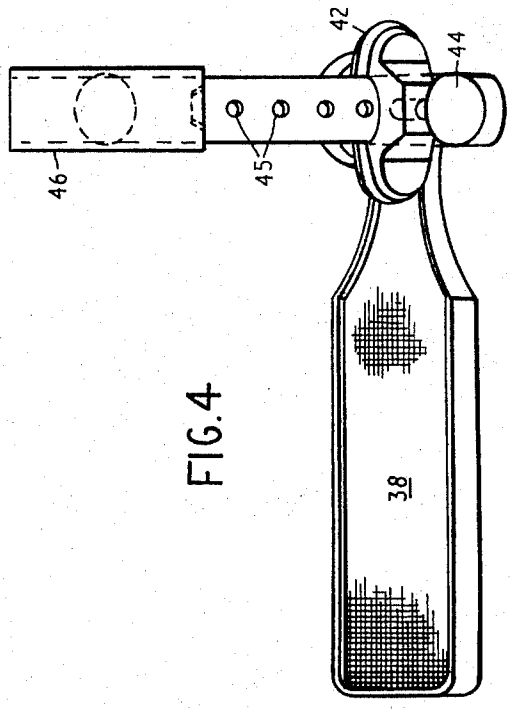


FIG. 4

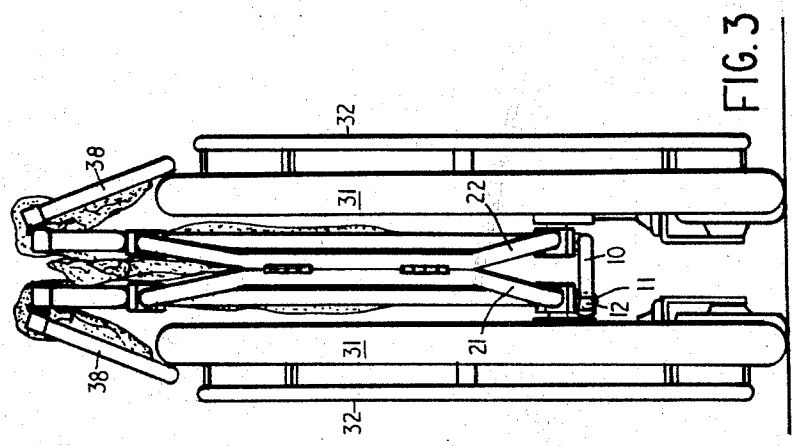


FIG. 3

COLLAPSIBLE WHEEL CHAIR

The present invention relates to a compact, light weight collapsible wheel chair of adequate strength to support a user and adapted for easy stowage by wheel chair users whose physical strength and freedom of movement are frequently diminished.

Collapsible wheel chairs are generally well known, but a review of sundry prior art indicated that they were of relatively massive construction, occupying a substantial space in their collapsed condition, i.e., of the order of 10 to 14 inches, and weighing 50 lbs or more. It would appear that conventional wheel chairs of the kind indicated have been constructed with the concept that a wheel chair user would be attended by some other person who could cope with the transfer of a handicapped person and his chair as from a vehicle.

The present medical philosophy in relation to the care of wheel chair users is directed to the encouragement of handicapped persons to achieve a high degree of self sufficiency and thereby sustain their personal independence. For example, many paraplegics now find themselves able to drive a car subject to accessory control elements being fitted and other physically handicapped persons achieve a measure of agility sufficient to transfer themselves from, say a car to an accessible wheel chair. However, many such individuals of limited mobility cannot manhandle conventional collapsible wheel chairs, into or out of a vehicle.

It is apparent that a light weight, collapsible wheel chair which collapses into a compact condition enabling easy stowage in the rear of small cars or in a luggage boot, fulfils a long felt need in respect of physically handicapped members of the community.

This invention has been devised to provide a collapsible wheel chair, effective for a users comfort, safety and (in many cases) handling by the user. The weight of the chair is of the order of 30 lbs and in its collapsed position its width is of the order of 7½ inches.

The collapsible wheel chair of the invention comprises two tubular side frames each formed of a bottom rail and two top rails joined by a single front post and the front member of two rear posts, said side frames being coupled together by two tubular toggle members and a brace, each said toggle member comprising two U members articulated at the base of the U's and having mounting sleeves on the ends of the U limbs, one said toggle member being mounted by said sleeves on the bottom rails between the front posts and the front members of the rear posts, the other said toggle member being mounted on the rear members of the rear posts, said brace being an articulated bar incorporating an off center lock stop, a sleeve on each end of said brace, each sleeve mounted on a post between the respective top rails adjacent the front ends thereof; axle blocks one mounted on each pair of rear posts with an axle projecting outwardly therefrom, wheels each with a hand manoeuvering ring thereon and the hub offset outwardly mounted on the respective axles; a castor wheel assembly mounted one on each front post; a footrest assembly mounted one on each of the front posts; an armrest assembly mounted one on each of the upper top rails; a seat fixed across the top rails and a back rest fixed to the back posts.

The invention is described in further detail with reference to the annexed drawings wherein;

FIG. 1 is a partly exploded perspective view of the wheel chair extended to seat a user,

FIG. 2 is a side elevation,

FIG. 3 is a plan of the wheel chair collapsed, and

FIG. 4 is a perspective view of one section of the footrests.

The main frame members are preferably made of ⅝ inch internal diameter tube. The two side frames are each formed of a bottom rail **1** and two top rails **2** and **3** joined by a single front post **4** and the front member of two rear posts **5** and **6.**

The bottom rails **1** extend beyond the post **6** as at **7** and **8** respectively. The extension **8** is longer than the extension **7** and is braced to its rear post **6** as at **9.** Its end is curved inwardly as at **10** to be in or about axial alignment with the end of the extension **7.** Both extensions have knobs **11–12** respectively thereon. The extensions are used to tilt the chair when required for manoeuvering. Each of the posts **5** and **6** project above the top rails **3** as at **13–14** respectively. An L-shaped tube has one limb **15** fixed to post projection **13** and to the top of the post projection **14.** The limb **16** extends to the same height as the projection **13** and is joined thereto by a bar **17.** A tube bent into a U **18** has the ends of its limbs joined by a bar **19** and one such U-tube is hinged to respective bars **18** as at **20.** These U-tubes function as handles to manoeuvre a chair and a part support for a back rest. They can be folded downwardly as shown in FIG. **2** when the chair is collapsed.

The side frames are coupled together by two tubular toggle members and a brace. Each toggle member comprises two U members **21—22** articulated by hinges **23** at the base of the U's and having mounting sleeves **24** on the ends of the U limbs. One toggle member is mounted by the sleeves **24** on the bottom rails **1** between the front posts **4** and the rear posts **5.** The other toggle member is mounted by its sleeves **24** on the rear posts **6.** The brace is an articulated bar **25** incorporating an off center lock stop **26.** There is a sleeve **27** on each end of the brace and the respective sleeves are each mounted on posts **28** fixed to and between the respective rails **2** and **3** adjacent the front ends thereof. When the chair is expanded to seating position the two parts of the respective toggle members are in locking planes and are assisted from refolding by the brace **25** which is also offset locked. The toggle members and the brace achieve a ten point interlock which imparts such rigidity and strength to the wheel chair that the members thereof can be made of tubes of approximately one-half the diameter of the tubular members of wheel chairs in current use.

Axle blocks **29,** are mounted one on each pair of rear posts **5—6** and have an axle **30** projecting outwardly therefrom. Wheels **31** on the respective axles **30** each has a hand manoeuvering ring **32** thereon. Each wheel has its hub **33** set outwardly so that its inner end is in or close to the plan of the inner edge of the wheel rim. This assists in reducing the overall width of the chair. Two castor wheel assemblies **34** each have a stem **35** whereby they are secured to the respective front posts **4.**

A footrest assembly is two units **36—37.** Each unit comprises a foot plate **38** part rotatably mounted on a spindle **39.** Stops **40—40*a*** limit the rotary movement and a spring **41** restrains the movement. Stop **40*a*** is on a spindle head which has a split bracket **42** whereby it is slidable mounted on a bent tube **43.** A spring plunger

44 in the bracket 42 is adapted for selective (height) engagement in one of a series of holes 45 in the tube 43. A sleeve 46 on the tube 43 is slidably and rotatably mounted on the front post 4. The sleeve 46 has a positioning groove 47 adapted to engage a stop 48 on the front post 4. This arrangement enables the footrest units to be selectively positioned for use on the front post 4 and to be turned onto the sides of the wheel chair when not required.

An armrest assembly for mounting on each of the top rails 3 comprises a U like frame 49 the limbs of which are joined by a rail 50 above the ends. Sockets 51–52 on the top rail 3 provide anchorages which take the rear limb of the frame 49 and a stub post 53 on the rail 50. The front limb of the frame 49 abuts the fore end of the top rail 3. A plate 54 is fixed on the top of the frame 49 and a panel 55 is fixed in the frame.

A fabric seat 56 is fixed across the top rails 3 and backrest 57 is fixed to the post extension 13.

I claim:

1. A collapsible wheel chair comprising two tubular side frames each formed of a bottom rail and two top rails joined by a single front post and the front member of two rear posts, said side frames being coupled together by two tubular toggle members and a brace, each said toggle member comprising two U members articulated at the base of the U's and having mounting sleeves on the ends of the U limbs, one said toggle member being mounted by said sleeves on the bottom rails between the front posts and the front members of the rear posts, the other said toggle member being mounted on the rear members of the rear posts, said brace being an articulated bar incorporating an off center lock stop, a sleeve on each end of said brace, each sleeve mounted on a post between the respective top rails adjacent the front ends thereof; axle blocks one mounted on each pair of rear posts with an axle projecting outwardly therefrom, wheels each with a hand manoeuvering ring thereon and the hub offset outwardly mounted on the respective axles; a castor wheel assembly mounted one on each front post; a footrest assembly mounted one on each of the front posts; an armrest assembly mounted one on each of the upper top rails; a seat fixed across the top rails and a back rest fixed to the back posts.

2. A collapsible wheel chair as claimed in claim 1 wherein each U toggle member has a straight base and the limbs bent partly outwardly obliquely from the base then parallel and two U toggle members are articulated by hinges positioned to restrict movement to a chair expanded and to a collapsed position.

3. A collapsible wheel chair as claimed in claim 1 wherein each footrest unit comprises a foot plate part rotatably mounted on a spindle, a bracket on said spindle slidably mounted on a bent tube and a spring plunger in the bracket adapted for selective (height) engagement in one of a series of holes in said tube, a sleeve on said tube slidably and rotatably mounted on the front post, a positioning groove on said sleeve adapted to engage a stop on said front post.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,758,150 Dated September 11, 1973

Inventor(s) Patrick Yelverton Williams

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

In the heading before [52] U.S. Cl., the following should be added:

[30] Foreign Application Priority Data

July 1, 1971 Australia.....5392/71

Signed and sealed this 19th day of March 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
★ U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.