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S. DUCAVICH

2,354,949

FOLDING WHEEL CHAIR

Filed Dec. 23, 1940

2 Sheets-Sheet 1

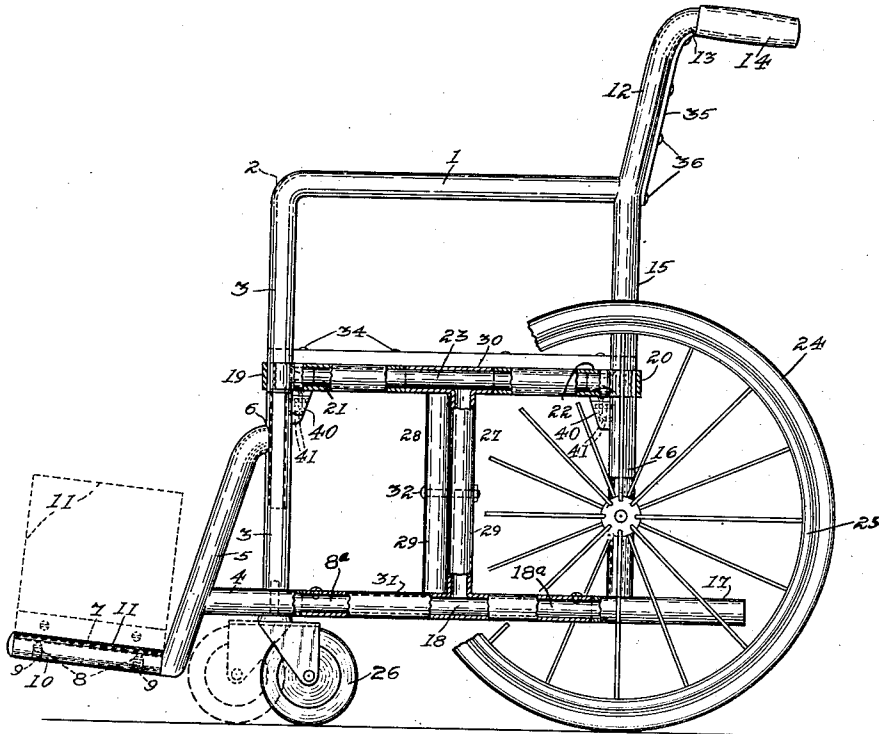


Fig. 1.

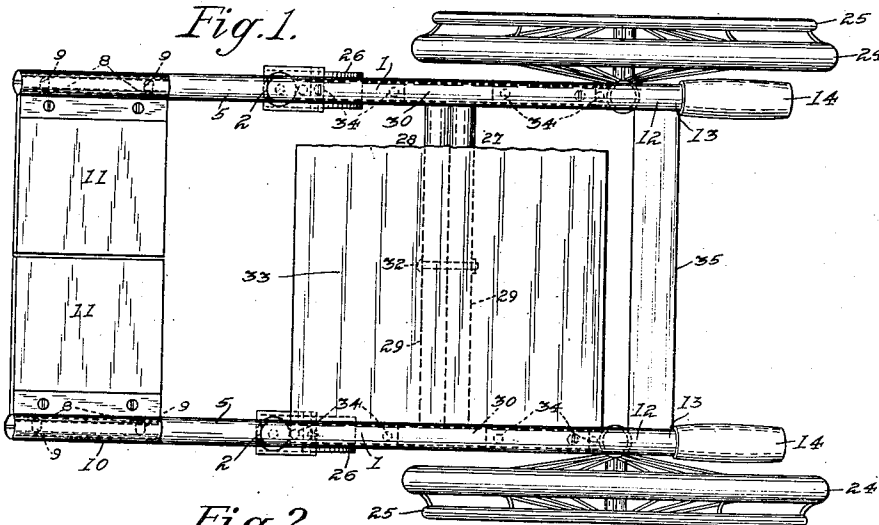


Fig. 2.

Inventor
S. D. Duvich
By H. J. Sanders
Atty.

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2 Sheets-Sheet 2

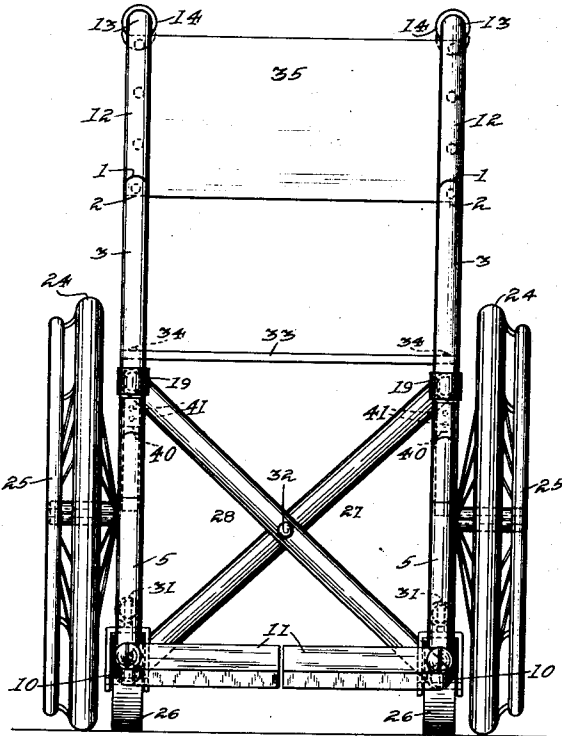


Fig. 3.

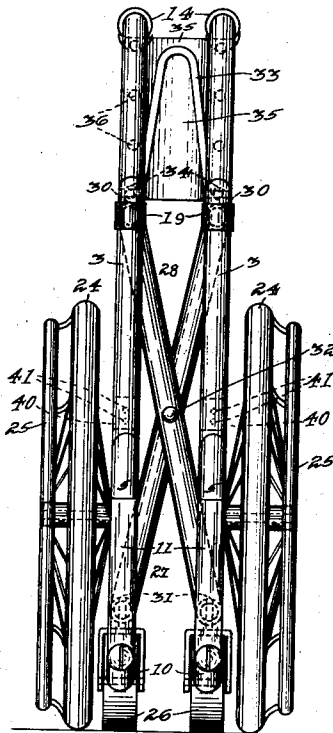


Fig. 4.

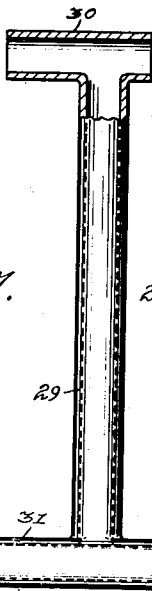


Fig. 5.

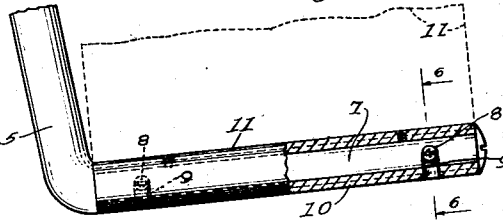


Fig. 6.

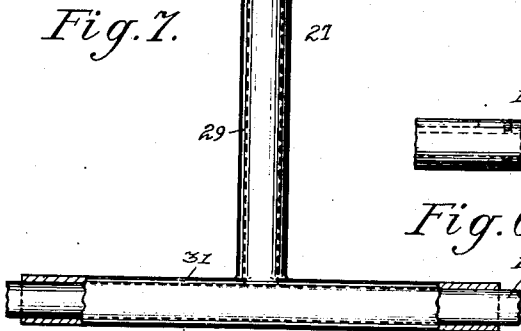


Fig. 7.

Inventor
S. Ducavich
By *H. J. Sanders*
Atty.

UNITED STATES PATENT OFFICE

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FOLDING WHEEL CHAIR

Sam Ducavich, Chicago, Ill.

Application December 23, 1940, Serial No. 371,361

2 Claims. (Cl. 155-140)

This invention relates to improvements in folding wheel chairs wherein the frame side members are adapted to be moved laterally toward each other to provide a narrow, compact folded chair or away from each other into normal operative position to provide a means of transportation. One of the principal objects of the invention is to provide a folding wheel chair having a framework of very simple construction, of few parts, sturdy and rugged and that is no manner weakened at its joints or connection points.

It is very essential that chairs of the folding or adjustable type designed for use by invalids and by those unable at all times to fully control all of their bodily movements and to fully maintain their bodily balance should be strong throughout as well as comfortable in use and with this end in view the present chair has been evolved.

A further object is to provide a folding wheel chair wherein the component parts operate in a substantially frictionless manner and practically as an unit. The construction and arrangement of the several parts of the chair are such that a weight borne by the chair is distributed quite evenly throughout the structure, that jolts and jars received through the operation of the chair over somewhat rough surfaces or slight obstructions are absorbed and mainly dissipated and not transmitted to the occupant.

A further object is to provide a folding wheel chair that is well balanced in construction, having a low center of gravity and that consequently is not easily overturned. A still further object is to provide a chair which while having the advantage of adjustability of parts and riding ease and comfort is of light weight, very easy to handle, compact in assembly, comparatively inexpensive to manufacture and durable, and consequently a chair of long life.

More specifically the chair includes a frame having tubular side members connected together by pivotally connected cross members of tubular construction, the cross members engaging with the frame side members throughout a considerable portion of their extent so that weak "points" of support are avoided at these junctions as well as at other vital junctures.

With the foregoing and other objects in view the invention consists in the combination and arrangement of parts to be hereinafter fully described, pointed out in the claims and illustrated in the accompanying drawings, in which—

Fig. 1 is a side view of a folding wheel chair, partly in section, constructed according to the

present invention, two positions of one element being shown and one wheel being partly broken away to provide a clearer illustration.

Fig. 2 is a top plan view of Fig. 1.

Fig. 3 is a view of the chair in front elevation.

Fig. 4 is a front view of the chair in folded position.

Fig. 5 is an enlarged fragmentary view of the foot rest employed.

Fig. 6 is a vertical cross sectional view taken on the line 6-6 of Fig. 5.

Fig. 7 is an enlarged fragmentary view, partly in section, of one of the cross members showing its engagement with one of the frame side members.

Like reference characters denote corresponding parts throughout the several views.

The frame of the present chair includes two side members of identical formation, each side member having a tubular arm rest 1 that at its front end 2 is bent downwardly substantially at right angles to form the sectional front leg 3 which at its lower end is welded to or formed integral with a short tubular member 4 disposed at right angles thereto, said tube 4 at its forward end being integral with or welded to an inclined tubular member 5 welded at its upper end 6 to said leg 3, the lower end of said tube 5 carrying a forwardly extending slightly upwardly inclined bar 7 disposed at right angles to said tube 5 and being provided with a pin or screw 8, the shank of said screw extending through a slot 9 formed in the tubular end 10 of a foot rest 11 carried by said bar 7. One or two pins or screws 8 may be carried by said bar 7, each being disposed in a transverse slot 9 in said tube 10.

The foot rest 11 is pivotally supported upon said bar 7 and adapted to be moved from substantially horizontal position, which is its operative position, to substantially vertical or inoperative position manually. The screw or screws 8 in the slot or slots 9 limit the extent of movement of said foot rest, the head of a screw being disposed at one end of a slot in one position of said foot rest and disposed at the opposite end of said slot in the opposite foot rest position, the foot rest being held in vertical position yieldingly by friction.

Referring again to the arm rest 1 the rear end thereof is welded to or formed integral with a tubular back member 12 inclined rearwardly slightly and terminating in a slightly downturned handle 13 provided with a hand grip 14. Below the arm rest 1 the tube 12 extends downwardly

at right angles to form a rear leg 15 of sectional formation, the sections thereof being telescopically connected, as are the front leg sections, the lower end of the upper section being shown at 16, the leg sections being preferably close fitting and secured together frictionally although susceptible of other fastening means if desired. The lower end of the lower rear leg section is welded to or integral with a bottom tube 17 disposed at right angles thereto and in line with the short front tubular member 4.

Connecting the front and rear bottom tubes 4, 17 and received telescopically therein is the main bottom tube 18 of slightly smaller diameter than said front and rear bottom tubes, the inner ends of tubes 4, 17 being denoted at 8a, 18a respectively. Slidably received upon the front and rear legs 3, 15 respectively are the eye-forming terminals 19, 20 of the seat bar stub tubes 21, 22 that telescopically receive the ends of the main seat bar tube 23 of slightly smaller diameter than said stub tubes, a very close frictional fit between said tubes being provided. The foregoing description is that of one side of the chair frame and as both sides are identical it is not necessary to describe but one.

Each side frame member is provided with a large rear wheel 24 having a hand rim 25 for self-propulsion and with a caster 26, swivel connected, two positions of a caster wheel being shown in Fig. 1.

The frame side members are connected together adjustably by a pair of twin tubular couplings 27, 28 each having a body portion 29, an integral tubular head portion 30 extending in opposite directions from said body portion and at right angles thereto, said head being of greater extent upon one side of said body portion than upon the opposite side thereof so that taken with said body portion said members form substantially an inverted L shape. The couplings each have a base integral tubular portion 31 at right angles to said body portion and extending outwardly from said body portion in opposite directions so that taken together with said body portion an inverted T-shaped portion is provided. The head 30 of one coupling telescopically receives a seat bar tube of one side of the frame while the base 31 of said coupling likewise receives the main bottom bar 18 of the opposite frame side and abuts the front and rear bottom tubes 4, 17, said coupling body portions being pivotally connected together in juxtaposed relation by a pin 32, said frame sides being thus adjustably secured together by said couplings. With the couplings positioned with their heads and bases the maximum distance apart the frame sides are the maximum distance apart and in operative position while with the couplings positioned with their heads and bases the minimum distance apart, illustrated in Fig. 4, the frame sides are the minimum distance apart and the chair is in folded or collapsed inoperative position.

The chair is provided with a flexible seat 33 of cloth fabric or the like secured along its lateral edges by fastening means 34 to the seat bar stub tubes, and with a back 35 secured by fastening means 36 to the tubular back members 12. To adjust the chair from extended operative position to collapsed folded position the seat fabric is manually lifted from its extended position to its approximately folded position shown in Fig. 4 thus moving the frame sides into closest

relationship. The frame sides may be readily spread apart manually to cause them to again assume operative position or the couplings may be manually spread apart. The chair may be wheeled about by means of its handles 14 or the occupant may operate it by manual manipulation of the hand rims 25 in a well known manner.

In their movement back and forth or up and down over the front and rear legs the seat bars move into and out of engagement with the cushioned supports 40 secured to the front and rear chair legs. Each support is secured by screws 41 to the chair legs and each includes a cushion head of rubber secured to the metal or wooden body portion by a countersunk screw passing downwardly from said head into the body of the support. In the lower or operative position of said seat bars they rest upon and may be partly supported by said cushioned stops or supports 40 and in the event that a considerable weight is suddenly disposed upon the seat this weight is in part transmitted to said supports and by them absorbed, the resilient rubber heads of said supports receiving and distributing the impact, said supports acting in a manner quite similar to that of shock absorbers upon automobiles. The eye-forming terminals of the seat bar stub tubes come in direct engagement with the supports. In travel over rough or irregular surfaces sudden jars and jolts are absorbed and dissipated by these supports instead of being transmitted to the occupant of the vehicle. These supports may be located at any point about the periphery of the front and rear legs and at such position that the seat bars contact them in normal position.

What is claimed is:

1. In a wheel chair, frame sides including front and rear legs, horizontal front and rear bottom tubes carried by said front and rear legs respectively and extending forwardly and rearwardly beyond said legs, inclined tubes connecting the forward ends of said front bottom tubes to said front legs, upwardly inclined bars secured to the lower ends of said inclined tubes, foot rests pivotally carried thereby, main bottom tubes connected to said front and rear bottom tubes, seat bar stub tubes slidably carried by said front and rear legs, main seat bar tubes connecting said seat bar stub tubes, a flexible seat carried by said seat bar stub tubes, and crossed pivotally connected coupling tubes swivel connected to said main seat bar tubes and to said main bottom tubes.

2. In a wheel chair, frame sides wholly of tubular formation and including front and rear legs, horizontal front and rear bottom tubes carried by said front and rear legs respectively and extending forwardly and rearwardly beyond said legs, inclined tubes connecting the forward ends of said front bottom tubes to said front legs, upwardly inclined tubes secured to the lower ends of said first mentioned inclined tubes, foot rests pivotally carried thereby, main bottom tubes connected to said front and rear bottom tubes, seat bar stub tubes slidably carried by said front and rear legs, main seat bar tubes connecting said seat bar stub tubes, a flexible seat carried by said seat bar tubes, and crossed pivotally connected coupling tubes formed with tubular head and base ends telescopically engaging said main seat bar tubes and said bottom tubes respectively and extending substantially thereof.

SAM DUCAVICH.