

Oct. 12, 1937.

H. A. EVEREST ET AL

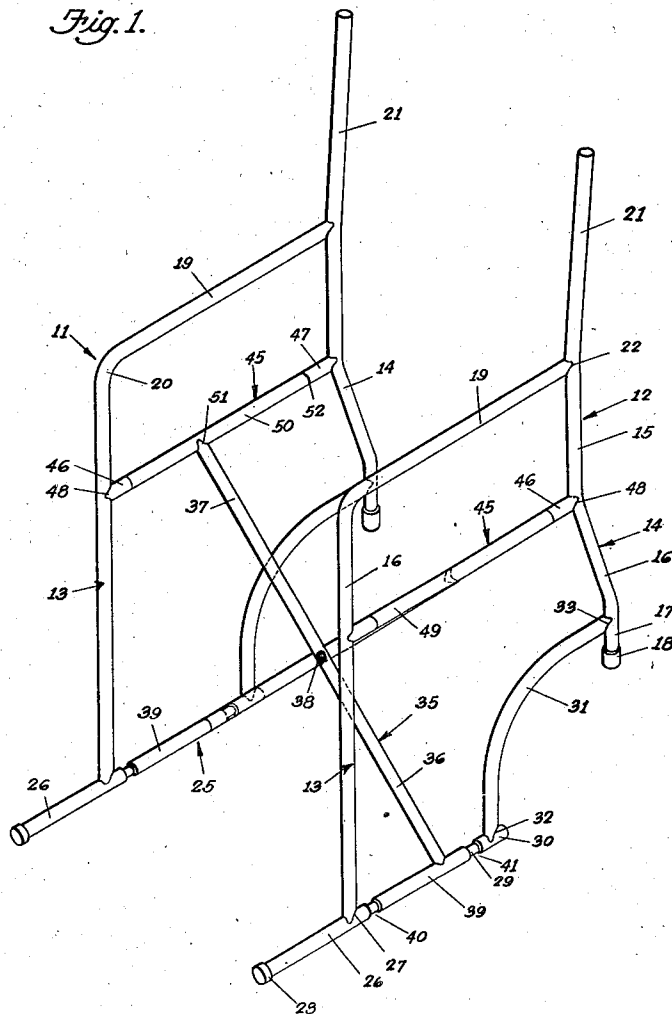
2,095,411

FOLDING WHEEL CHAIR

Filed Feb. 11, 1936

3 Sheets-Sheet 1

Fig. 1.



Inventors
H.A. Everest
H.C. Jennings.
by *Jazard and Miller*
Attorneys.

Oct. 12, 1937.

H. A. EVEREST ET AL

2,095,411

FOLDING WHEEL CHAIR

Filed Feb. 11, 1936

3 Sheets-Sheet 2

Fig. 2.

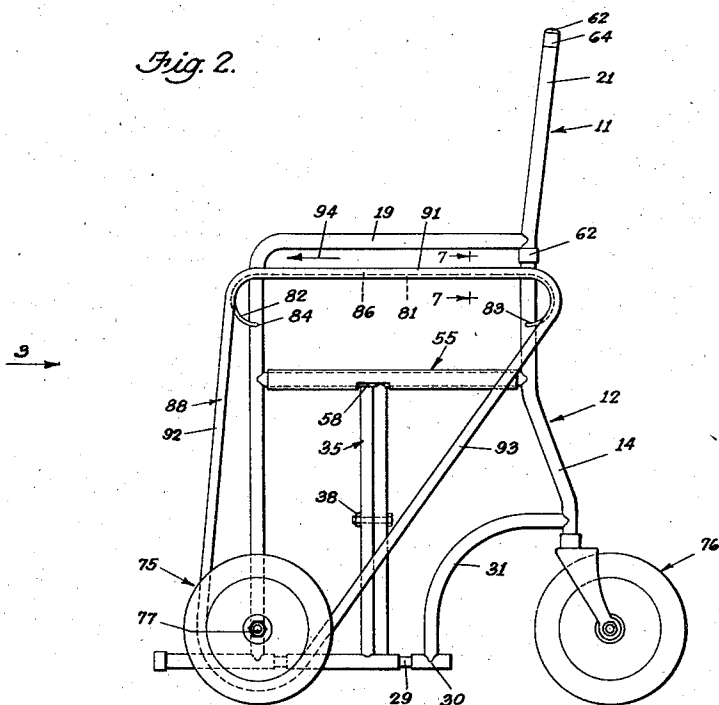


Fig. 3.

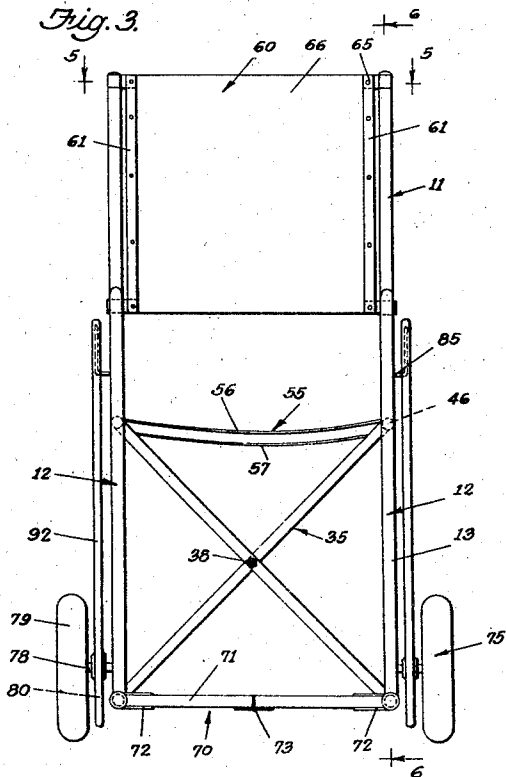
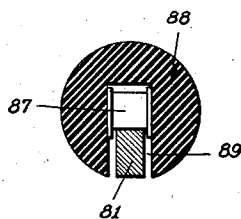


Fig. 7.



Inventors
H. A. Everest
H. C. Jennings
by Hazard & Miller
Attorneys.

Oct. 12, 1937.

H. A. EVEREST ET AL

2,095,411

FOLDING WHEEL CHAIR

Filed Feb. 11, 1936

3 Sheets-Sheet 3

Fig. 4.

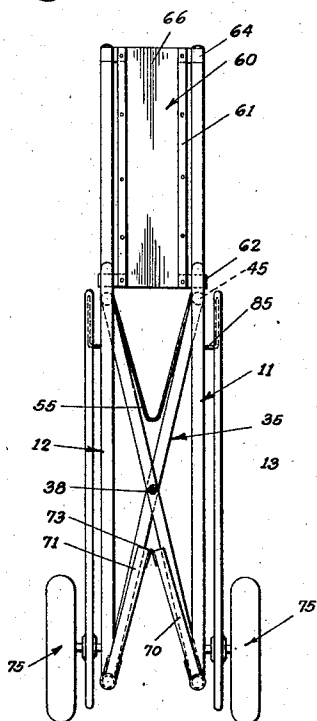


Fig. 5.

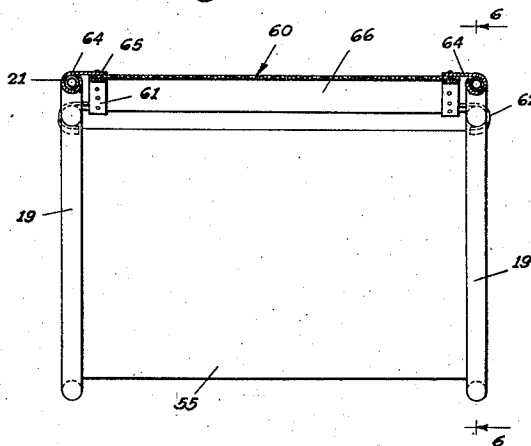
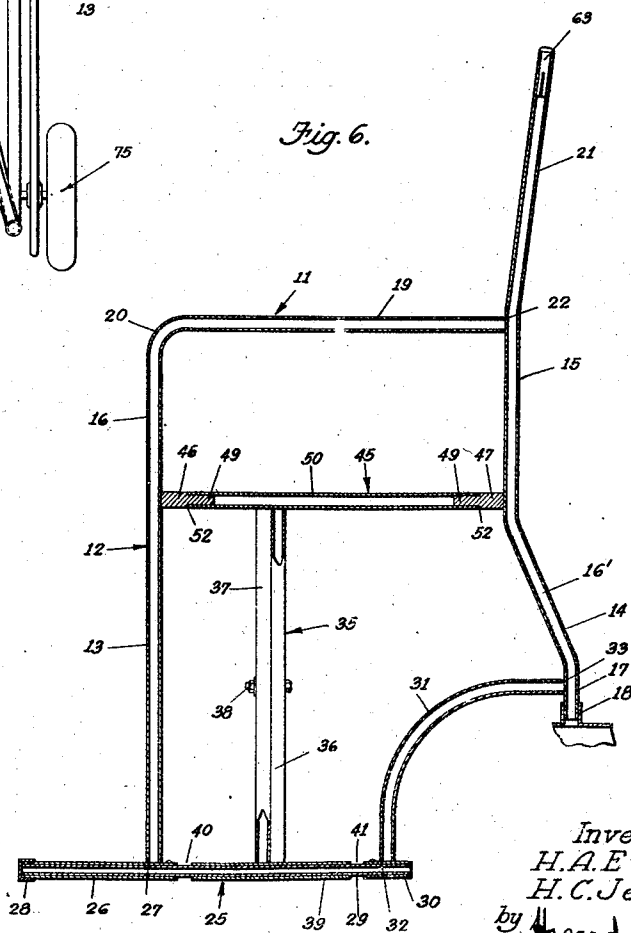


Fig. 6.



Inventors
H. A. Everest
H. C. Jennings.
by Hazard & Miller
Attorneys.

UNITED STATES PATENT OFFICE

2,095,411

FOLDING WHEEL CHAIR

Herbert A. Everest and Harry C. Jennings,
Los Angeles, Calif.

Application February 11, 1936, Serial No. 63,340

9 Claims. (Cl. 155—30)

Our invention relates to a folding wheel chair, this being of a type in which the leg framework carrying the wheels may be collapsed or folded inwardly to make a narrow and compact folded chair for either storage in a room or for carrying in an automobile.

In this type of chair, our invention comprehends as one of its main objects a simplification of the folding framework, using preferably metal rods and tubes. Hence, by our construction, one of the features of the frame is that it provides on each side of the chair a front and a rear leg. The front and rear leg on each side are connected by a pivoted or hinged member, from which diagonal intersecting braces extend upwardly to a sliding horizontal member, this being mounted to slide and be guided in the upper portion of the front and rear legs. With this construction the seat is formed of fabric looped between the vertically sliding members, such seat folding when the two side legs are shifted together, as also does a foot rest or step which is connected to the front to rear bottom member. A fabric back connected to an upward extension of the rear legs may also thus be extended or folded, thereby enabling the sides of the chair to be spread apart for use of the chair, or to be collapsed together.

Another object and feature of our invention is forming the frame with certain loose connections, especially at the bottom front to rear member, so that when the chair is provided with four wheels, that is, two propelling wheels at the front and two caster wheels at the back, this flexible connection allows a certain warping or twisting of the side members of the chair frame to accommodate the passage of wheels over bumps or depressions in a road or other surface on which the vehicle is used. One of the objects of this flexible construction is to maintain both driving wheels always in contact with the floor or ground and thus enable the occupant of the chair to propel it.

In wheel chairs of the type in which the occupant may propel the chair by actuating the driving wheels, it is an objectionable feature in most of the designs that there are large driving wheels. The periphery of such wheels extends so far forward of the front leg, and hence of the front of the chair, that it is difficult for an occupant to wheel the chair close to a table, a desk, a vehicle, or other chair or couch to which he may desire to move.

A further object and feature of our invention, therefore, is forming the driving wheels of the

chair of small diameter, preferably about the same size as the caster wheels.

The form of drive is by means of a flexible chain or belt operating over a sprocket or pulley directly connected to each driving wheel. The belt then operates over a horizontal guide located immediately below the arm rest of the chair, the guide having inturned ends so that the occupant of the chair may manipulate the belt along the guide frames on each side and thus transmit motion to the driving wheels for propelling the wheel chair.

A further detail feature of our invention relates to the construction of this driving belt, such being made of rubber with a fabric incorporated therein, and being channel shaped in cross-section to loop over the horizontal guides. This construction prevents the occupant of the chair from having the fingers caught between the belt and the guide. As an alternative construction the belt may be formed with a sprocket chain, generally incorporated therein.

Another detail feature of improvement is in having the back rest, which is formed of fabric, readily disconnectible from the back posts of the chair to enable a person to enter and leave the chair from the rear. That is, on entering the chair a person progresses foot first over the seat from a bed, couch, or the like, and in leaving the chair the occupant may move rearwardly from the seat through the open back of the chair, drawing his feet over the seat of the chair.

Our invention is illustrated in connection with the accompanying drawings in which,

Figure 1 is a perspective view of the metal frame of the chair when in its expanded position for use;

Figure 2 is a side elevation of a completed chair when expanded in position for use;

Figure 3 is a front elevation taken in the direction of the arrow 3 of Figure 2;

Figure 4 is a view similar to Figure 3 but showing the chair collapsed in its folded position;

Figure 5 is a horizontal section on the line 5—5 of Figure 3 in the direction of the arrow with parts omitted to show the attachment of the back;

Figure 6 is a vertical section on the line 6—6 of Figure 3 taken in the direction of the arrows through one of the side frames, to illustrate the details of construction of the side frames; and Figure 7 is a detail transverse section on the line 7—7 of Fig. 2 with parts omitted showing the upper guide or flexible wheel driving chain.

Referring first to the construction of the frame

of the chair, such frame being designated generally by the numeral 11: This frame is constructed of two similar side frames 12 and each side frame has a front leg 13, this being preferably 5 vertically. There is also a rear leg 14 having an upper section 15 parallel to the upper portion 16 of the front leg. Each rear leg has a rearwardly diverging lower portion 16' and a lower projecting vertical end 17 having a collar 18 at the bottom. These leg members are preferably 10 all made of metal tubing. There is an arm rest bar 19 on each side which is formed integral with the front leg, having a right angular bend 20 at the front. Rear chair posts 21 extend upwardly from the rear legs and preferably incline slightly rearwardly as shown in Figure 2. The rear end 22 of the arm rest has a curved end cut to partly encircle the tube forming the integral rear legs and the integral posts 21, the arm rests 20 being secured by welding, brazing or the like to the combined rear legs and posts. The bottom bar or rail construction 25 employs a tube 26 at the forward portion, such tube being rigidly secured by welding or the like to the lower end of 25 the front leg 13, this lower end being cut in a partial circle to encircle the tube 26, which tube is closed with a cap 28. A pintle rod 29 fits in tube 26 and also in a rear tube section 30. The rear bar assembly has a rear curved tube 31 connected at 32 to the short rear tube 30 and at 33 to the lower portion of the rear leg 14 preferably adjacent the junction point of the vertical section 17 and the rearwardly extending portion 16'. This tube 31 preferably forms a bend developing 35 a right angular turn that is for the purpose of accommodating the rear caster wheels of the chair, the assembly of which is described hereunder.

An improved feature of our chair is that we employ only two diagonal braces 35. Each of these 40 braces has a lower portion 36 and an upper portion 37 connected together by a longitudinal hinge pin or a bolt 38. These intersecting braces are preferably formed of tubes. The bottom of 45 the lower portion 36 of each brace is rigidly connected to a sleeve 39, such sleeve being fitted over the rod 29 connecting the tubes 26 and 30. This sleeve is shorter in length than the exposed portion of the rod 29, leaving a ring clearance indicated at 40 and 41. This allows a slight lengthwise movement of the sleeve 39 on the rod 29.

The seat bar 45 comprises two short end bars 46 and 47 each having a rounded cut-out end 48, such end being adapted to partly encircle the 55 upper portion 16 of the front leg 13 for the tube 46 and the upper portion 15 of the rear leg 14 for the short tube 47. Each of these short bars 46 and 47 has a pivot pin 49 and a swivel sleeve 50 is fitted over the pivot pins. Such swivel sleeve 60 is rigidly connected at 51 to the upper portion 37 of each cross bar. There is a snug fit at the joint 52 of the sleeve 50 and the short bars 46 and 47. This construction permits the side frames of the chair to be spread apart, as shown in Figure 1, or folded or collapsed as shown in Figure 4. In 65 this manipulation of the frame the lower sleeve 39 swivels on the rod 29 of the bottom rail 25. The sleeve 50 also has a swivel action on the pins 49, but causes an up and down movement of 70 the short bars 46 and 47, and thus of the seat bars 45, this sliding motion being on the parallel sections 16 of the front leg 13, and 15 of the rear leg 14.

The chair is provided with a fabric seat 55 75 which is preferably made with upper and lower

fabric sections 56 and 57 looped over the seat bars 45, and having a split 58 in the lower fold of the seat to accommodate the diagonal braces 35 at their connection with the seat bars. The fabric of the seat from the front to rear direction extends substantially between the portion 16 of 5 the front leg and the portion 15 of the rear leg. The bottom fabric of the seat is secured by a snap or similar fastener so that the seat fabric may be readily removed from the chair for cleaning or 10 the like.

The removable seat back 60 has two upright metal strips 61, and to each strip adjacent the bottom there is a hook 62, such hook engaging 15 the rear leg 14 at the upper section 15 preferably immediately below the connection point 22 of the arm rest 19 allowing a sufficient distance on the portion 15 for the upward movement of the seat bar 45 when folding the chair. A removable plug 63 is fitted in the upper end of each back post 21 20 of the chair. This plug fits through an eye 64, such eye being attached to the top of the metal strips 61 as indicated at 65. A fabric back 66 is secured to the metal strips and is thus stretched to a desired tension between the two posts of the 25 back when the chair is in its expanded position. When it is desired to remove the fabric seat back, the plug 63 may be removed, the eye 64 being disconnected from the plugs. This disconnects the upper portion of the fabric. The lower hooks 62 30 may be disconnected either by stretching the fabric 66 of the seat back, or slightly collapsing the chair. This allows entire removal of the fabric back of the seat, leaving the chair unobstructed between the posts and the arm rests so that a 35 person may move into the chair, for instance, from a couch or bed, by having the back of the chair wheeled adjacent said bed, the person moving into the chair feet foremost into the seat. The flexible seat back may then be reattached to 40 the post 21.

The foot rest or step 70 employs preferably two rigid boards 71, each having hinged straps 72 secured at the outer longitudinal edge. These 45 straps fit over the tube 26 in front of the front legs 13. These straps with the side edge of the boards 71 thus form in effect a pair of hinge eyes which may be inserted on the tube 26 after removal of the cap 28, which cap may then be replaced. The step boards are connected by a 50 center hinge 73 allowing the boards to occupy the horizontal position of Figure 3 with the chair extended, or to fold upwardly as shown in Figure 4 when the chair is collapsed.

The chair is mounted on wheels, in which the 55 front wheels 75 are the driving wheels and the rear wheels 76 the caster wheels. These latter are of the usual type and fitted in the vertical section 17 of the lower end of the rear legs 14. The wheels may swivel to occupy the position 60 shown in Figure 2 or to fit underneath the rear curved tubes 31.

The driving connection for the front wheels employs an axle 77 secured to the front legs 13 preferably slightly above the bottom rail or bar 65 25. The axle hub 78 is elongated and has a pneumatic tire wheel 79 on the outside and preferably a sprocket or pulley 80 on the inside, that is between the wheel and the side frame of the chair. A guide bar 81 has downwardly 70 curved ends 82 and 83, these ends being secured as indicated at 84 to the front leg 13 at the portion 15 and to the portion 15 of the rear leg 14. The point of attachment must be so located that the seat bars 45 may slide up and 75

down. The bar 81 is spaced from the side frame by horizontal portions 85 so that there is a horizontal section 86 of the bar located slightly below each arm rest 19 and on the outside of such bar.

5 A sprocket chain 87 is preferably of the roller type and is imbedded in a resilient rubberband 88, such band having a deep slot 89 sufficient to form an adequate cover for the sprocket chain and also to extend over the sides of the horizontal section 86 of the guide bar 81. The sprocket chain with the rubber covering band thus has a horizontal section 91, a downward lead 92, and an upward lead 93, the sprocket chain and the band engaging the sprocket wheel 10 80 and each of the driving wheels.

The manner of propelling the chair is by the occupant of the chair grasping the horizontal section 91 of the rubberband and thrusting this in the direction of the arrow 94. This rotates the driving wheels in the proper direction to move the wheel chair forward. The reverse movement is by pulling on the upper horizontal band section, which causes the chair to move rearwardly. The steering is accomplished by moving one of the propelling wheels faster than the other, or by moving one in a forward direction and the other in a rearward direction. It will be noted by this construction that the front driving wheels are quite small, and hence the chair may be moved close to a table, desk, couch or a bed.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

We claim:

1. A folding chair having two side frames, each frame having a bottom rod forming at least part of a connection between the front and rear ends of its frame, a sleeve rotatably mounted on each rod, a single diagonal brace extending upwardly from each sleeve, the said braces intersecting and being connected by a single hinge pin, the upper end of each diagonal brace being connected to a seat bar, each seat bar having a guiding connection at its ends with parallel portions of the upper part of each side frame, the point of connection of the upper part of each brace to the seat bar being substantially midway between the said parallel portions of the frame.

2. A folding chair as claimed in claim 1, a wheel connected to the forward portion of each frame, one or more wheels connected to the rear parts of the frames, means to confine each sleeve on the rod on which it is mounted whereby each sleeve independent of the other may have a slight sliding movement longitudinal of the rod to permit a slight twisting of one frame relative to the other to maintain both of the front wheels in contact with the ground.

3. A folding chair having two side frames each with a front and a rear leg, the upper portions of said legs being cylindrical and parallel, a bottom rod forming at least part of the connection between the front and rear legs of each frame, a single diagonal brace having a pivotal connection at its bottom to the said rod, said braces intersecting and being connected by a single hinge pin, each of said rods at its upper end being rigidly connected to a swivel tube, each end of the swivel tube being rotatably mounted in a short bar, each of the short bars having a cut-out end forming a jaw slidably engaging the cylindrical portion and parallel 75

portions of the front and rear legs, whereby on folding and extending the chair each sleeve connected to a brace rotates on the short bars and said bars have a vertical sliding movement on the front and rear legs of each frame.

4. A folding chair as claimed in claim 3, a front wheel connected to the front leg of each side frame, one or more wheels connected to the rear legs of the frames, the pivotal connection of the lower end of each brace to the bottom rod comprising a second sleeve rotatable on said rod, means to confine each second sleeve to a slight sliding motion on the rod, the said rod having a forward extension beyond the front legs of each frame, a foot rest hingedly connected to each extension, the foot rest being formed in two parts hinged together whereby when the chair is extended the portions of the foot rest operate to hold the side frames of the chair apart, and the sliding movement of the second sleeve connected to the lower part of each brace permits a slight twisting of the frame to maintain both of the front wheels in contact with the ground.

5. A wheel chair having two side frames, each with a front and a rear leg connected by an arm rest, each front leg being vertical, an axle attached to each front leg and having a wheel thereon, each rear leg having a rear wheel connected thereto, each side frame having a rod forming part of a connection between the front and rear legs, a sleeve rotatably and slidably movable on said rod, a cross brace extending upwardly from each sleeve, the cross braces being pivoted together, a seat bar slidably mounted on each frame, the upper end of each cross brace being connected to a seat bar, the said seat bars forming a support for the seat whereby the chair may be collapsed with the side frames movable towards each other, the sliding movement of the said sleeve on the said rod permitting a slight twisting of the frame to maintain both driving wheels on the ground when the chair is in its extended position.

6. A folding wheel chair having two side frames, each frame having a bottom assembly including a front straight portion and a rear upwardly curved portion, a sleeve rotatably mounted on a straight portion of each bottom assembly, a single diagonal brace extending upwardly from each sleeve, the said braces intersecting and being connected by a single hinge pin, the upper end of each diagonal brace being connected to a seat bar, each seat bar having a guide connection at its ends with parallel portions of the upper parts of each side frame, the point of connection of the upper part of each brace to the seat bar being substantially midway between the said parallel portions of the frame, a front wheel connected to the front portion of each side frame and a rear caster wheel connected to the rear portion of each side frame, the upwardly curved part of each bottom assembly being adapted to accommodate the swivelling of the caster wheel connected to its frame.

7. A folding wheel chair as claimed in claim 6, the single hinge pin forming a center relative to which the two side frames may twist as to each other whereby both of the front wheels may be retained on the ground if one of the four wheels engages an elevation or is over a depression in a road.

8. A folding wheel chair as claimed in claim 6, means to confine each sleeve on its lower frame assembly whereby each sleeve may have a slight 75

sliding movement longitudinally to permit a slight twisting of one frame relative to the other, the single hinge pin forming a center of twist of one frame relative to the other to maintain both of the front wheels in contact with the ground should the ground be irregular.

9. A wheeled chair having two side frames, each frame having a bottom assembly including a straight portion, a seat connecting the side frames, a spacing device securing said frames in spaced relation, said device having a sliding part thereof mounted on the straight portion of the bottom assembly of each side frame with

means providing for a limited longitudinal sliding movement thereof along the said straight portion, a pair of front wheels connected one to each of the side frames, one or more wheels connected to the rear portion of the side frames, the said sliding connection being adapted to provide for the two front wheels being always in contact with the ground should one of the wheels engage a slight elevation or be over a slight depression in the ground.

HERBERT A. EVEREST.
HARRY C. JENNINGS.