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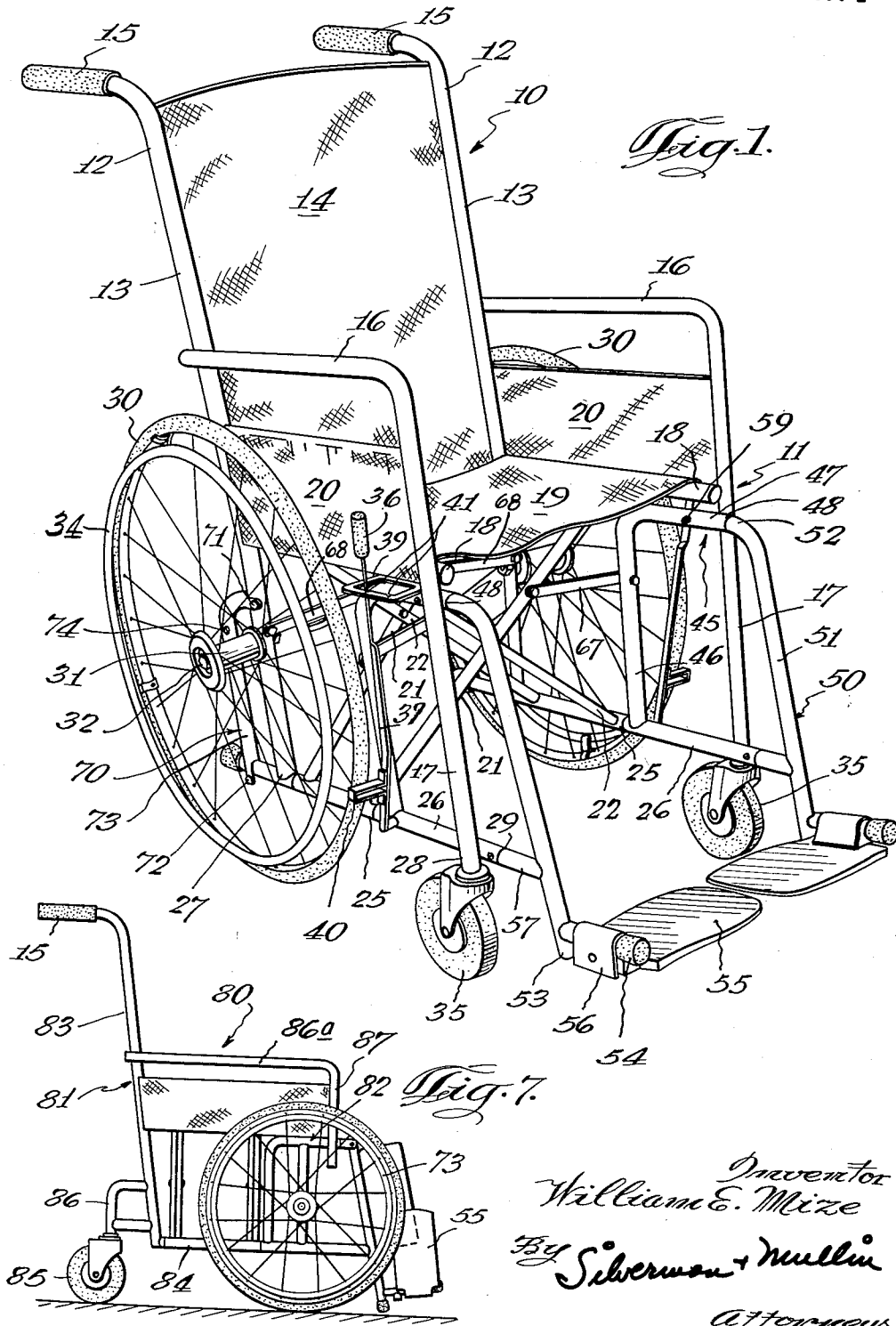
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FOLDABLE WHEEL CHAIR

Original Filed June 7, 1955

3 Sheets-Sheet 1



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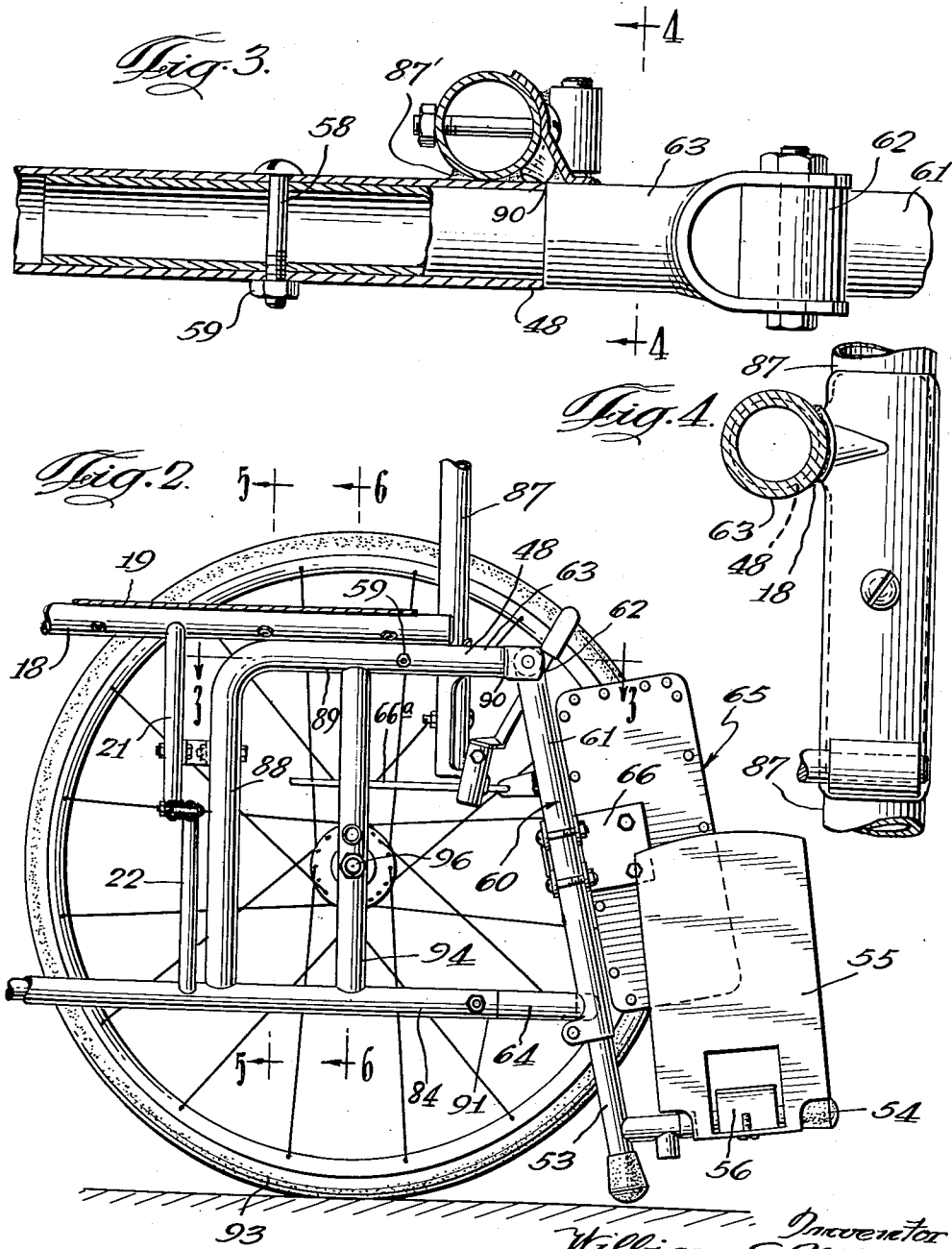
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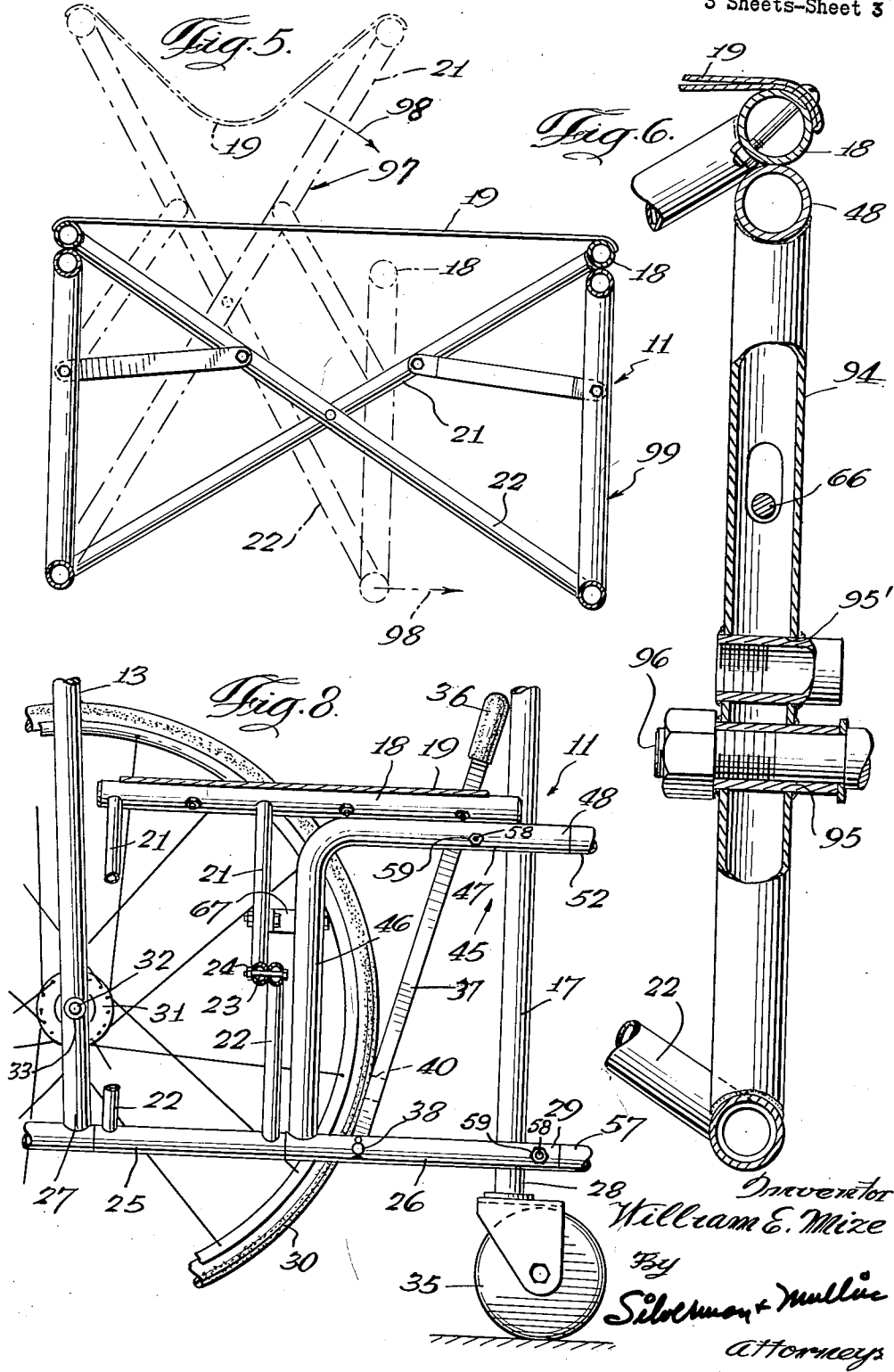
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FOLDABLE WHEEL CHAIR

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Continuation of application Ser. No. 513,840, June 7, 1955. This application Jan. 25, 1960, Ser. No. 4,562-7 Claims. (Cl. 297-433)

This invention relates generally to folding wheel chairs of the type useable by invalids in homes and hospitals and more particularly, relates to such a folding wheel chair having a novel framework which enables a greater versatility in construction and use of the chair and especially, enabling detachable mounting and adjustment of accessory parts.

The present application is a continuation of my co-pending application Serial No. 513,840, filed June 7, 1955, now abandoned.

Generally, folding wheel chairs of the type with which this invention is concerned are comprised of a pair of vertical side frames connected by a pivotal cross-brace linkage permitting the side frames to be moved laterally one toward the other for folding during storage or transporting of the chair. The side frames ordinarily are constructed from tubular metal rods to provide a pair of front and back vertical support posts which serve many purposes. For instance, the front pair provide supports for chair wheels and to which the front rest support posts are fixedly attached. The rear pair of vertical support posts carry the back rest member therebetween and in some instances provide supports for other wheels of the chair. The length of the wheelbase of the chair of such known construction is non-adjustable and interchanging of accessories such as footrests on such frames is a difficult if not impractical matter once the chair is fabricated. It has been found that folding chairs heretofore made have considerable limitations as to versatility and interchanging and adjustment of accessory parts by reason of the construction of the framework of the chair.

Accordingly, it is a principal object of the invention to provide a framework for a folding wheel chair of the character described which by reason of its novel features permits achievement of advantages in use and attachment of accessory parts to an extent heretofore not found possible or practicable with known structures.

Another important object of the invention is to provide a folding wheel chair of the character described in which the framework for the chair includes an auxiliary support frame which permits rapid and facile interchanging of footrest assemblies permitting the same basis framework to be employed in making a variety of different types of folding chairs.

Still another object of the invention is to provide a framework for a folding wheel chair which by reason of its construction enables adjustment in the length of the wheelbase of the chair as desired.

Another object of the invention is to provide a folding wheel chair of the character described in which the framework of the chair includes an auxiliary supporting frame associated with each side frame of the chair, said auxiliary supporting framework being formed as a part of each side frame of the chair and having portions thereof disposed

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to achieve additional support for the seat of the chair, provide socket means for detachably mounting footrest assemblies, and generally strengthening the framework of the chair without materially increasing the weight of the chair or adversely affecting compactness of structure.

A further object of the invention is to provide a novel framework for folding wheel chairs which is economical to manufacture, which employs a relatively small number of parts although contributing to a more versatile construction, which is very strong and durable.

These and other objects of the invention will become apparent as the description thereof proceeds, in connection with which several preferred embodiments have been described in detail in the specification and shown in the accompanying drawings to enable a full understanding of the principles of the invention. It is contemplated that minor variations in size, arrangement, proportion and construction of the parts thereof may be made without sacrificing any of the advantages or departing from the spirit of the invention.

In the drawings, where the same characters of reference have been employed to designate identical or similar parts of the invention throughout the several figures:

FIGURE 1 is a perspective view of one form of the folding wheel chair embodying the invention.

FIGURE 2 is a fragmentary median sectional view showing a portion of one of the side frames of a modified form of the chair.

FIGURE 3 is a sectional view taken through a said side frame along the line 3-3 of FIG. 2 and in the direction indicated.

FIGURE 4 is a sectional view taken along the line 4-4 of FIG. 3 and in the direction indicated.

FIGURE 5 is a sectional view taken through the chair along the line 5-5 of FIG. 2 and showing the folded condition of the chair in broken outline.

FIGURE 6 is a sectional view taken through a said side frame along the line 6-6 of FIG. 2 and in the indicated direction.

FIGURE 7 is a side elevational view of the modified form of chair shown in FIG. 2.

FIGURE 8 is a fragmentary side elevational view of the auxiliary support framework as constructed for use in connection with the chair of FIG. 1.

Referring to the drawings, one form of the chair embodying the invention has been designated generally by the reference character 10 in FIG. 1. The chair 10 is comprised of a pair of vertical side frames designated generally 11, 11 which are identical in construction so that a description of parts of one shall apply also to the other side frame of the pair. Each side frame preferably is formed from tubular metal rods which contribute great strength albeit, light weight construction. Each side frame includes a vertical support point 12 arranged at the rear of the chair to provide an intermediate straight section 13 to which is secured a flexible fabric back rest 14. The upper end of each support post 12 is bent outwardly to provide means for affixing a hand grip 15. Side frame 11 also has a front support member of generally L-shaped configuration, the leg 16 of which is horizontally disposed and secured at its free end to section 13 providing an arm rest for the chair. The other section or leg 17 integral with leg 16 is vertically ar-

ranged at the front of the chair generally parallel to the support post 12. A cross bar 18 extends between leg 17 and post 12 spaced above the bottom ends thereof respectively when the chair is open. Said cross bars 18, 18 provide floating supports for the flexible fabric seat 19 secured therebetween. Side panels 20 may be attached between post 12 and leg 17 on each side frame for additional comfort and safety of the occupant.

The side frames 11, 11 are connected one to the other by means of a diagonal cross-brace structure which consists of a pair of X-braces each formed by two diagonal rods 21 and 22. Rods 21 and 22 are connected together intermediate the ends thereof by means of a bolt 23 extended through aligned openings in each rod and nut 24 threaded on the end of the bolt such that the rods are pivotally held between said nut and the head of the bolt. The X-braces are spaced one behind the other, each X-brace being secured at the respective lower ends thereof to a sleeve 25. The respective upper ends of each X-brace are secured to cross member 18 as shown in FIG. 8 whereas the sleeve 25 is pivotally mounted on a horizontal runner 26. Each runner 26 is secured at one end thereof to the bottom end 27 of a post 12 and adjacent its opposite extremity is secured, as by welding, to the lower end 28 of a leg 17. The end 29 of each runner is open for purposes hereinafter described.

Propulsion of the chair is achieved by means of a pair of large drive wheels 30, each of which is carried on sleeve 31 rotatably mounted on shaft 32 journaled in a said post 12 spaced above the end 27 and held thereon by the nut 33. A conventional hand rim 34 for self-propulsion of the chair may be provided. As shown in FIG. 1, the drive wheels 30 are located at the rear of the chair and a pair of caster wheels 35, 35 are provided at the front of the chair each supported on the end 28 of a said leg 17. There is also provided the usual hand brake 36 for each wheel a said hand brake comprising an elongate lever 37 pivotally attached at one end thereof to a runner 26 as indicated at 38 in FIG. 8, the opposite end of the lever being received through the perforated guide plate 39 affixed on the auxiliary supporting frame designated generally 45. Adjacent the pivoted end 38 of said lever is affixed a braking shoe member 40 arranged to frictionally bear against the wheel 30 upon manipulation of the lever 37. Slots 41, 41 provided in a side edge of the perforation in plate 39 enables the lever 37 to be set to remain in braking or non-braking position, as desired.

Attention is now invited to the auxiliary support frame 45 which is provided on each side frame 11. Same is referred to as an auxiliary support frame not necessarily by way of characterization as to function since it is an integrated part of framework heretofore described, but rather for convenience of description. As shown in FIGS. 1 and 8, each comprises a generally L-shaped integral structure, vertically arranged, in which the vertical leg 46 thereof is rigidly secured at its end to the runner 26 spaced considerably inward of the open end 29 of said runner. The other leg 47 is generally horizontally arranged substantially parallel to and spaced a short distance below a cross bar 18. The length of leg 47 is such as to have its free end 48 extend a short distance past the front support post 17 of the adjacent side frame 11 and inwardly thereof. The support post 17 is secured to said leg 47 such as by means of a weld joint or other suitable fastening means contributing to increased rigidity of said side frames 11, 11 when the chair is unfolded. As will be noted, the free end 48 is open as is end 29 of the runner 26.

The auxiliary support frame 45 contributes to many desirable features for such a folding wheel chair. As shown in FIG. 1, the open end 48 of leg 47 and open end 29 of runner 26 lie in substantially the same vertical plane with each extending past the vertical post 17 substantially the same distance. The openings 48 and 29 cooperate to

provide socket means for telescopically receiving parts of a leg rest assembly such as designated 50 in FIG. 1 or 60 in FIG. 2. The leg rest 50 comprises a non-adjustable type unit including a vertical support post 51 bent at one end thereof to provide an outwardly extending short horizontal portion 52. Adjacent the second end 53 is mounted a footrest support rod 54 extending oppositely to portion 52 on which is pivotally mounted a footrest panel 55 by means of the strap clamp 56. Rigidly secured to post 17 spaced above the end 53 is a short rod 57 extending outwardly substantially parallel to the portion 52 and in the same direction. The diameter of portion 52 and rod 57 is such as to enable same respectively to be telescoped into the open ends 48 and 29. Portion 52 and rod 57 each have a lateral opening therethrough which can be aligned with a lateral opening in each of leg 47 and runner 26 for accommodating a fastening pin 58 therethrough as shown in FIG. 3 and secured by means of nut 59 threaded on the end of said pin.

The modified form of the invention illustrated in FIGS. 2-7 is substantially the same as the embodiment presented in FIGS. 1 and 8 except for the location and mounting of the wheels and for the structure of the leg rest assembly. Therefore, in describing the modified form of FIGS. 2 through 7, the same numerals will be used to identify parts identical to the elements already discussed with reference to FIGS. 1 and 8.

The leg rest unit 60 shown in FIGS. 2 and 6 is an adjustable unit seen to comprise a vertical support post 61 pivotally secured at its end 62 to a short rod 63 adapted to be telescoped into the opening 48 of leg 47. Likewise, there is attached a rod 64 extending parallel to and in the same direction as rod 63 which is adapted to be fitted into the opening 29. The leg rest designated 65 is adjustably mounted by support bracket 66, that is, it is movable vertically along the post 61 and capable of being set in various positions. Also, the angle of inclination of post 61 may be adjusted by means of lever assembly 66a seen in FIG. 2. It will thus be seen that the substantially C-shaped arrangement provided by runner 26 and legs 46 and 47 provide means for detachably mounting a variety of leg rest units which is very desirable because the same chair 10 may be fitted for patients having different immediate needs. Also, as can be noted in FIG. 1, the length of leg 47 permits the nut 59 and bolt 58 to be set back from the leading edge of the seat 19 a sufficient distance such that there can be no possible interference with the legs of the patient seated in the chair.

The auxiliary support frame 45 is very important in that same provides additional support for the seat 19 without contributing to materially increased weight or width of the chair. For instance, as shown in FIG. 1, the normal position of a bar 18 without a person seated in the chair may be spaced above the leg 47. When a person is seated in the chair, the weight of the person will bear down on the seat 19 sufficiently to spread the side frames 11, 11 so that bar 18 will drop a small amount and come to rest on leg 47 as shown in FIG. 8. The weight of the occupant will thus be additionally supported on the said auxiliary support frames 45, contributing to a more comfortable and less precarious position.

Because of the pivotal joints necessarily provided in the framework of the chairs, there is a tendency toward lateral shifting and canting of the side frames 11. This condition may be alleviated to some extent by means of the additional brace bars such as bar 67 pivotally connected at its respective ends between leg 46 and rod 21. Another such brace bar is shown at 68 pivotally connected between post 13 and rod 21 of the second X-brace. Such brace bars may be provided at advantageous locations to improve rigidity of the chair when unfolded.

As shown in FIG. 1, the wheel base of the chair 10 would ordinarily be fixed once the wheels 30 and 35 were mounted. However, some patients are forced to sit in a reclined position which upsets the balance of the chair

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subjecting same to a greater tendency to be upset when passing over uneven ground, for instance. Because of the construction of the framework, I have been able to provide a supplementary wheel post member 70. Said member 70 is an integral L-shaped bracket having each end thereof bifurcated. The member 70 is mounted at the rear of each side frame 11 in a vertical position with one end 71 secured to a post 13 and the other end 72 secured on the runner 26 adjacent the end thereof opposite end 29 by means of suitable fastening pins passed through the ears of the bifurcated ends and the adjacent side frame part and held by suitable nuts threaded on the ends of the pins. As shown in FIG. 1, bracket 70 includes a vertical portion 73 in which is provided a bearing opening 74. When desired, the shaft 32 upon which the drive wheel 30 is rotatable may be secured in the bearing opening 74 and the wheel 30 mounted to rotate on an axis spaced a greater distance from the caster wheels 35 thereby providing a larger wheel base for the chair if desired. The increased rigidity afforded by the frame 45 will permit such an increase in the wheel base of the chair without affecting the degree of support of the person seated in the chair because the bars always are adequately supported on legs 47 of said frames 45 under such conditions.

The chair 10 will be seen to be of the type where the drive wheels 30 are supported at the rear of the side frames 11. However, the principles of the invention may be applied equally to the chair such as designated generally 80 in FIG. 7 having the drive wheels at the front. The chair 80 includes a pair of side frames designated generally 81. The auxiliary support frame of this chair is designated generally 82.

Each side frame 81 comprises a vertical support post 83 terminating in outwardly bent ends affording the hand grips 15. The opposite end of the post is secured to a horizontal runner 84 similar to runner 26. Caster wheels 85 are supported on said post 83 by means of the generally C-shaped bracket 86 secured at its ends to said post 83 in a well known manner. The X-brace structure which inter-connects the side frames 81 is substantially similar to that described in connection with the chair 10.

The arm rest for the chair 80 is provided by means of the L-shaped rod 86a, secured at one end thereof to post 83 and having section 87 extending vertically to a position past the support frame 82 and secured thereto as by welding 87' shown in FIG. 3. However, the section 87 is foreshortened and does not extend as great a distance as leg 17 of chair 10. The chair 80 has chair seat support rods 18 for a fabric seat 19.

The auxiliary support frame 82 comprises a vertical leg 88 similar to leg 46 rigidly secured at its free end to runner 84 and a generally horizontal leg 89 similar to leg 47 integral with the leg 88 and provided with an open end 90 positioned ahead of the rod 87. The runner 84 likewise is open at its end 91 so that leg rest units such as 50 or 65 may be detachably mounted with portions telescoped into open ends 90 and 91. The frames 82 may be adapted to support the drive wheels 93 by means of the vertical standard 94 secured between runner 64 and leg 89. A bearing opening 95 provided intermediate the ends of standard 94 is suitable for mounting a wheel shaft 96 on which the wheel 93 is rotatable. A second bearing opening 95' may be provided in standard 94 for raising wheels 93, if desired.

Since the auxiliary support frames heretofore described are associated with the side frames of the chairs, there is no difficulty in folding the chair. As shown in FIG. 5, the chair in folded condition is shown in phantom outline at 97. To unfold, the side frames 11 are moved laterally one away from the other in the direction of arrows 98 to the unfolded or erected position indicated in solid outline at 99. To fold, the reverse procedure is followed.

It is believed that the invention has been described in sufficient detail to enable a complete understanding there-

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of. It should be understood that the horizontal leg, such as leg 66 or 89 of the auxiliary side frames described may normally be spaced from the brace bar 18 as shown in FIG. 1 or juxtaposed thereto as shown in FIG. 2. In either normal position, said leg part will support the chair seat support rods 18 when a person is seated in the chair. It is contemplated that various departures from the details of the construction may occur to the skilled artisan all within the principles of the invention and hence, it is intended the scope of the invention be interpreted as set forth in the claims appended hereto.

I claim:

1. A folding wheel chair comprising a pair of vertical side frames each having a bottom horizontal runner, a cross-brace structure including a pair of pivotally joined diagonal members having their lower ends pivotally secured to said runners, a pair of horizontal seat supporting members secured to said diagonal members adjacent the upper ends thereof, a flexible fabric seat secured to and extending between said seat supporting members, and a pair of auxiliary frames secured to said side frames, each of said auxiliary frames having an inverted L-shaped configuration and providing a depending rear leg and a forwardly extending upper leg, linkage means extending between and connecting said diagonal members and the depending leg of said auxiliary frames for maintaining said side frames in parallel relation, said upper legs of said auxiliary frames being disposed below and parallel with said seat supporting members for supporting the same when said seat is occupied, each of said side frames adjacent the lower portions thereof providing a forwardly-opening socket, each of said upper legs of said auxiliary frames also providing a forwardly-opening socket, the pair of sockets provided by each side frame and the auxiliary frame secured thereto being adapted to receive plug portions of a detachable footrest for rigidly supporting the same at the front of the chair.

2. The structure of claim 1 in which said wheel chair is provided with a pair of removable footrest units, each of said units having a pair of rearwardly projecting plugs telescopically received within the sockets of said side and auxiliary frames.

3. The structure of claim 1 in which the runner of each of said side frames and the auxiliary frame secured thereto lie along substantially the same vertical plane.

4. A folding wheel chair comprising a pair of vertical side frames each having a bottom horizontal runner for supporting between said frames a cross-linkage assembly having a pair of parallel seat supporting bars at the upper end thereof, and a pair of auxiliary frames secured to said side frames, each of said auxiliary frames having a forwardly extending horizontal member disposed above and parallel with said runner and being immovable with reference to said runner, each of said side frames adjacent the lower portions thereof providing a forwardly-opening socket, each of said forwardly extending horizontal members of said auxiliary frames also providing a forwardly-opening socket directly above the socket of the lower portion of each side frame, the paired vertically spaced sockets provided by said side frame and the auxiliary frames secured thereto being adapted to receive the vertically-spaced plug portions of a pair of detachable footrests for rigidly supporting the same at the front of the chair, said horizontal members of said side frames also being adapted to support said bars of a cross-linkage assembly when said chair is in use.

5. The structure of claim 4 in which said wheel chair is provided with a pair of removable footrest units, each of said units having a pair of rearwardly projecting plugs telescopically received within the sockets of said side and auxiliary frames.

6. The structure of claim 4 in which the runner of each of said side frames and the auxiliary frame secured thereto lie along substantially the same vertical plane.

7. A folding wheel chair comprising a pair of vertical

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side frames each having a bottom horizontal runner, a cross-brace structure including a pair of pivotally joined diagonal members having their lower ends pivotally secured to said runners, a pair of horizontal seat supporting members secured to said diagonal members adjacent the upper ends thereof, a flexible fabric seat secured to and extending between said seat supporting members, and a pair of auxiliary frames secured to said side frames, each of said auxiliary frames having an inverted L-shaped configuration and providing a depending rear leg and a forwardly extending upper leg, linkage means extending between and connecting said diagonal members and the depending leg of said auxiliary frames for maintaining

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said side frames in parallel relation, said upper legs of said auxiliary frames being disposed below and parallel with said seat supporting members for supporting the same when said seat is occupied.

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