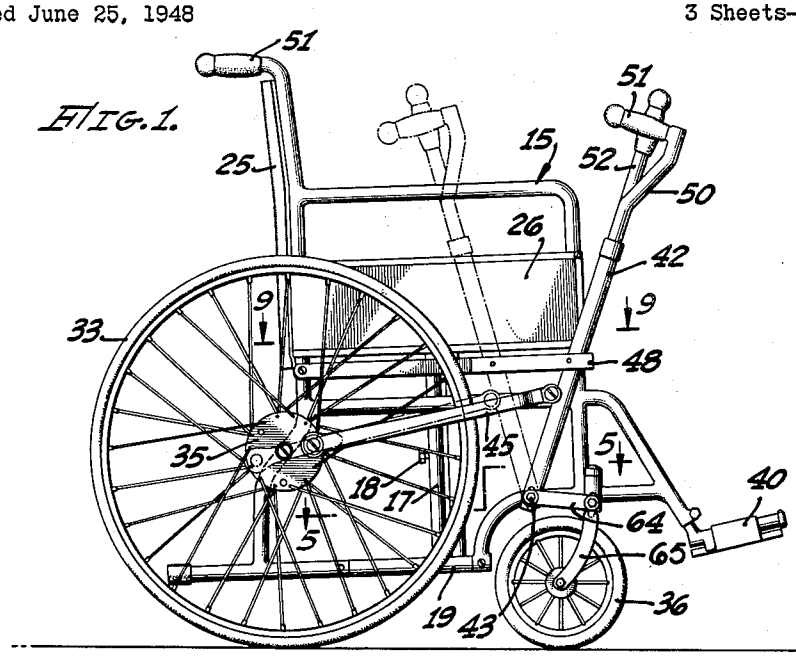
June 30, 1953 H. A. EVEREST ET AL 2,643,898

SELF-PROPELLED WHEEL CHAIR

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FIG. 1.



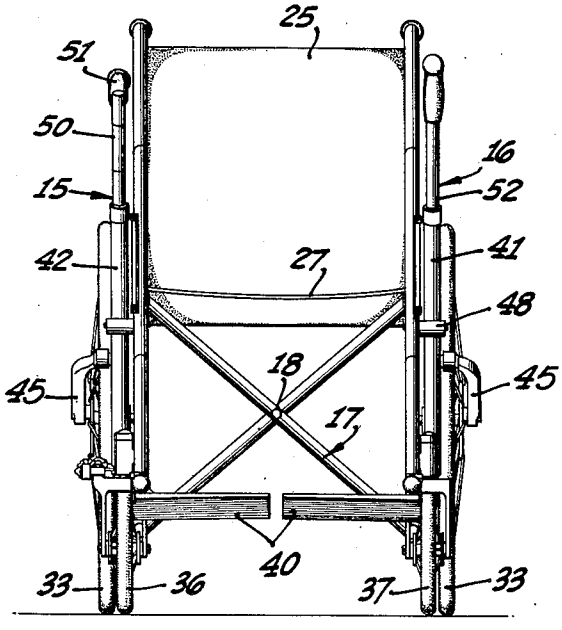
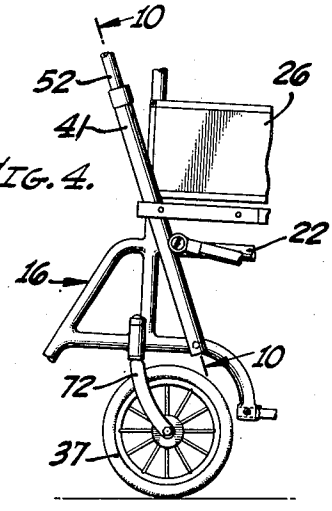


FIG. 2.

FIG. 4.



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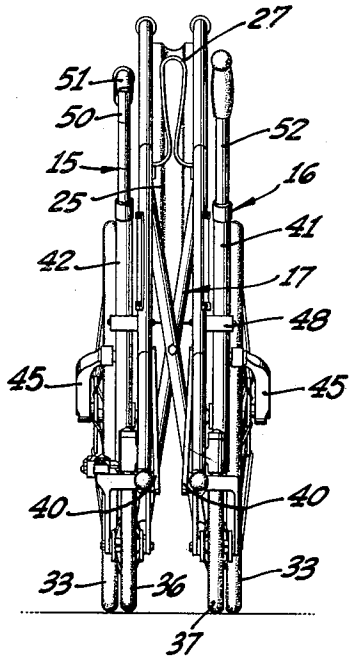


FIG. 3.

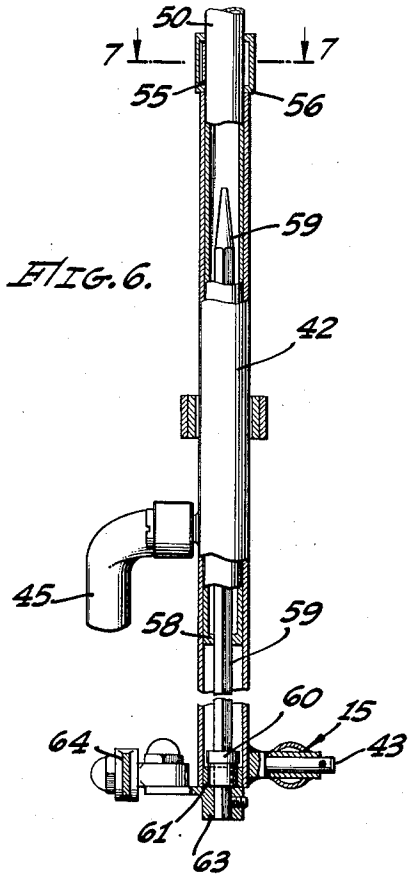


FIG. 6.

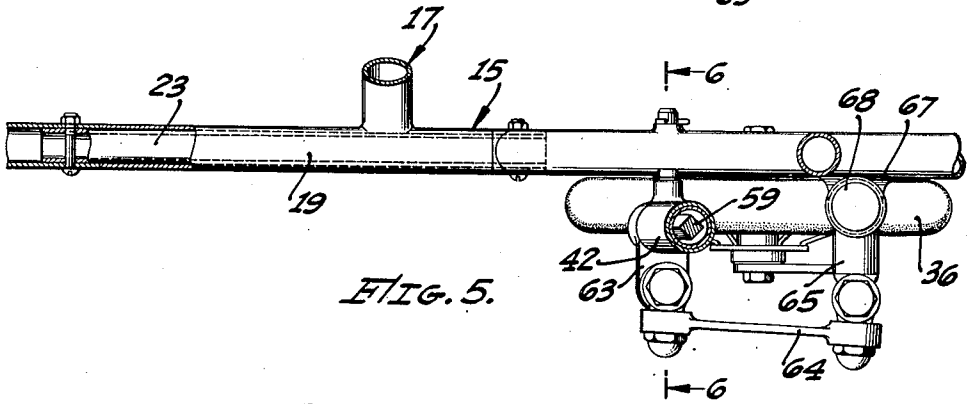


FIG. 5.

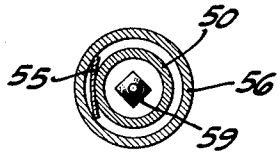


FIG. 7.

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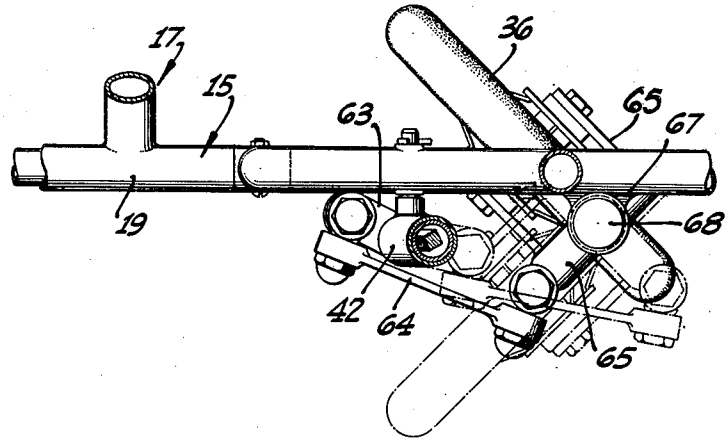
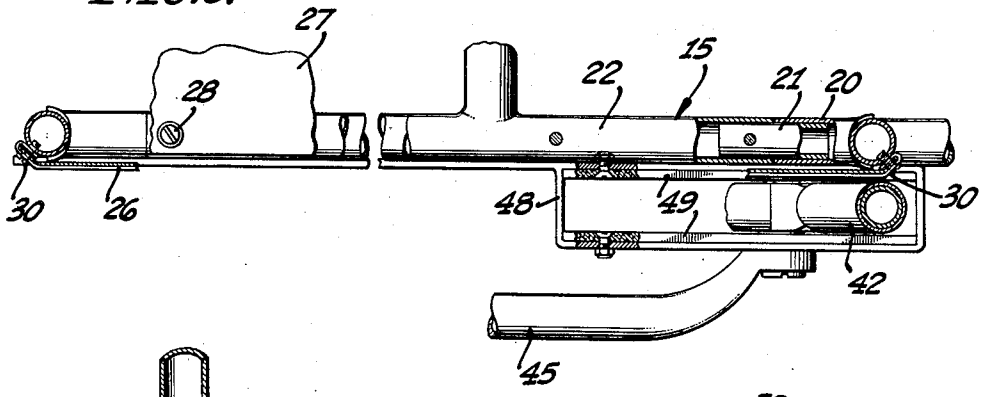


FIG. 8.

FIG. 9.



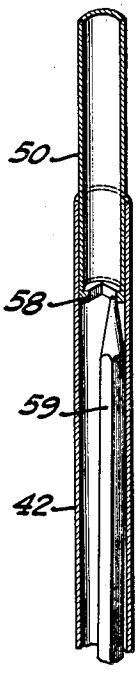


FIG. 11.

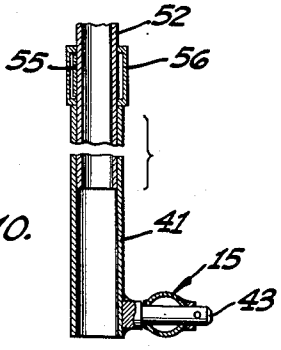


FIG. 10.

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UNITED STATES PATENT OFFICE

2,643,898

SELF-PROPELLED WHEEL CHAIR

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

Application June 25, 1948, Serial No. 35,198

5 Claims. (Cl. 280—240)

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This invention relates to wheel chairs and in particular to self-propelled wheel chairs.

An object of this invention is to provide a wheel chair having means so constructed and arranged on the wheel chair as to enable the occupant to propel the wheel chair by manipulation of the means.

Another object of this invention is to provide a wheel chair so constructed and designed that the occupant thereof can steer the wheel chair.

Another object of this invention is to provide a collapsible wheel chair which can be self-propelled and steered by the occupant thereof.

Another object of this invention is to provide a wheel chair having a pair of oscillatively mounted arms having the upper portions of the arms removable so that when it is desired to have someone push the wheel chair that only the lower portions of the arms are oscillated back and forth and therefore the upper portions since they are removed will not interfere with the freedom of action of the occupant.

Another object of this invention is to provide a wheel chair having a hollow arm mounted thereon with a removable telescopic extension on the upper portion thereof and means within the hollow arm fitting within the extension, the means being connectible to a swingably mounted front wheel so that by manipulation of the extension the front wheel is swung to steer the wheel chair and the means within the hollow arm are so constructed that the extension is freely removable and when replaced will be easily guided back into keying relationship with the means.

Another object of this invention is to provide a wheel chair with oscillatively mounted arms so connected to the rear wheels and, at least one front wheel of the wheel chair, so as to permit the operator to propel himself and to steer the vehicle and to provide extensions on the arms to allow the arms to be adjusted to a height suitable to the occupant.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 discloses a side elevation view of a wheel chair embodying the present invention;

Fig. 2 discloses a front elevation view of a wheel chair disclosed in Fig. 1;

Fig. 3 discloses a front elevation view of the wheel chair embodying the present invention in its collapsed condition;

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Fig. 4 discloses a partial side elevation view of the front of the wheel chair disclosed in Fig. 1 looking in a direction opposite from the view disclosed in Fig. 1;

Fig. 5 is a sectional view along lines 5—5 of Fig. 1 showing the construction of the front wheel linkage system;

Fig. 6 is a sectional view along lines 6—6 of Fig. 5 with parts thereof broken away to better show the insides of the hollow arm and extension;

Fig. 7 is a sectional view along lines 7—7 of Fig. 6;

Fig. 8 is a view similar to the view shown in Fig. 5 with the front wheel shown in full lines in one extreme position and in dot-dash lines in another extreme position;

Fig. 9 is an enlarged sectional view along lines 9—9 of Fig. 1; and

Fig. 10 is a sectional view along lines 10—10 of Fig. 4.

Fig. 11 is an enlarged sectional view of certain details of the structure shown in Fig. 6.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the wheel chair comprises two side frames generally indicated at 15 and 16 in Fig. 2, said side frames being collapsibly connected together by an X brace generally entitled 17 which is pivoted at 18 and connected to the lower portions of the side frames by knuckles 19, see Fig. 1, and slidably engages the upper portions of the side frames by means of slide tips 20 which are supported by pivot tubes 21. Pivot tubes 21 are telescoped and fastened within knuckles 22 which form the upper ends of the X brace 17. Knuckles 19 pivot on pivot tubes 23, see Fig. 5, which tubes are provided in side frames 15 and 16 and fastened to the side frames as shown in Fig. 5.

A flexible back 25, flexible sides 26 and a flexible seat 27 are provided for the wheel chair, the seat being fastened to knuckles 22 by screws 28 or like means and sides 26 are fastened to the vertical portions of side frames 15 and 16 by screws 30 or like means, see Fig. 9.

Each of the side frames 15 and 16 has a traction wheel 33 rotatably mounted thereon, and each of said traction wheels being provided with a crank disk 35, see Fig. 1, for purposes to be described. Each of the side frames 15 and 16 also is provided with a swingably mounted front wheel, front wheel 36 being provided on side frame 15 and front wheel 37 provided on side frame 16.

Foldable foot rests 40 are provided on the front

of the wheel chair and are foldable upwardly into the position shown in Fig. 3, the construction of these foldable foot rests being set out more specifically in our application filed March 1, 1948, Serial No. 12,316, and since issued as Patent Number 2,591,246.

Side frames 16 and 15 have hollow arms 41 and 42 pivoted thereto by means of trunnions 43, see Figs. 6 and 10. Each of the hollow arms 41 and 42 has a connecting rod 45 pivoted thereto above the trunnions 43, as shown in Fig. 1, and the connecting rods are pivoted to the crank discs 35, as shown in Fig. 1. Therefore, when the arms 41 and 42 are oscillated back and forth there will be a driving connection to the rear wheels through the connecting rods 45. Since the wheels are independent with respect to one another the hollow arms 41 and 42 will be out of phase in every position except one so that normally there will be no dead center at which the wheel chair will be stuck so that the occupant will be able to propel the vehicle with a minimum amount of effort.

Each of the hollow arms 41 and 42 has a guide 48, see Figs. 1 and 9, which guides are fixedly attached to side frames 15 and 16 and are preferably provided with wooden inserts 49 between which the hollow arms are sandwiched and slide back and forth.

Hollow arms 41 and 42 have extensions 52 and 50 respectively telescoped down therein. Extension 50 is provided with a handle 51, and extension 52 is preferably straight and is provided with a grip. These hollow extensions 52 and 50 frictionally slide into hollow arms 41 and 42, friction being provided by resilient leaf springs 55, see Fig. 7, which are positioned within adapters 56. The lower portion 58 of extension 50 is formed or provided to receive a non-circular spline 59, the end of the spline 59 being reduced as shown in Fig. 11 so that whenever the telescopic extension 50 is withdrawn and is to be replaced, that the reduced end will easily enter the lower portion 58 of the telescopic extension, as shown in Fig. 11, and guide the remaining portions of spline 59 into the extension 50. The lower portion 58 of the extension 50 and the spline 59 form a sliding keyway fit so that whenever the extension 50 is rotated the spline 59 will be rotated.

Spline 59 is rotatably mounted in hollow arm 42 by any suitable means which may take the form of a collar 60 which is fixedly fastened to spline 59 and which rests on an insert 61 which is fixedly fastened to hollow arm 42, see Fig. 6.

A linkage system is provided for carrying motion from spline 59 to the front wheel 36 for purposes of swinging the front wheel in order to steer the wheel chair and this linkage system comprises a crank 63 fixed to spline 59, said crank being pivoted to a connecting rod 64, compare Figs. 5 and 6, said connecting rod being pivoted to a forked member 65 which in turn is pivoted to frame 15, frame 15 being formed with a lug 67 on which forked member 65 is pivoted at 68, see Fig. 5.

The forked member 65 has two downwardly, backwardly sweeping arms, as can be seen by comparing Figs. 1 and 5, and front wheel 36 is pivoted between two arms of forked member 65.

Front wheel 37 is pivoted by a forked member 72, see Fig. 4, from frame 16.

The various movements of the front wheel 36 upon rotation of extension 50 can be seen in Fig. 8 in which the full line position depicts the front wheel being swung to one extreme position in which position the crank 63 is moved back adjacent to frame 15 and in the dot-dash position, the front wheel is in the other extreme position in which crank 63 is forward of the hollow arm 42, as can be seen in Fig. 8.

The operation of the device is as follows. In Fig. 1, the extensions 50 and 52 are shown in their forwardmost position and as Fig. 1 is depicted this is the only position of the traction wheels 33 in which both of the extensions will be in the same position, a movement of the traction wheel 33 by lifting the wheel chair will move the hollow arm 42 with its extension 50 and leave hollow arm 41 with its extension 52 in position. Upon oscillation of arms 41 and 42 the connecting rods 45 will cause crank wheels 35 to rotate thereby rotating traction wheels 33 and propelling the wheel chair. The hollow arm 42 is oscillated through handle 51 which handle is so shaped as to permit easy oscillation of arm 42 while at the same time permitting easy rotation of extension 50. Upon rotation of extension 50 the spline 59 is rotated and the linkage system causes the front wheel to be swung so that the vehicle may be easily steered.

Since each mechanism for propelling the traction wheels 33 and the mechanism for steering the front wheel 36 are mounted on side frames 15 or 16 there is no difficulty in collapsing the wheel chair so that a wheel chair is provided which is self-propelled and steerable and which may be readily collapsed.

Since the extensions 50 and 52 are adjustable within hollow arms 42 and 41, an occupant of the wheel chair may readily adjust them to the height which he finds most convenient for his use and since the extensions are frictionally telescoped within hollow arms 41 and 42 once they are adjusted they will maintain their position until readjusted.

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

We claim:

1. A device of the class described having rear wheels and swingably mounted front wheels, means including an oscillatably mounted hollow arm for driving at least one of the rear wheels, a hollow extension for the hollow arm telescoping into the top portion of the hollow arm and equipped with a handle, a keying member rotatably mounted in the lower portion of the hollow arm and extending upwardly into the hollow extension, said hollow extension being formed to receive the keying member so as to be keyed thereto in a manner such as to permit the extension to be freely withdrawn from the hollow arm, a linkage system connecting the keying member to at least one of the front wheels whereby the device may be steered by rotating the extension and the extension can be freely removed when desired.

2. A wheel chair having rear wheels and at least one swingably mounted front wheel, a hollow arm mounted on the wheel chair, a removable hollow extension for the hollow arm partially telescoped therewithin, a noncircular member extending upwardly into the hollow arm and into the extension when the extension is telescoped within the hollow arm, said hollow extension having a part of the inner portion thereof formed in a noncircular manner to correspond to the irregularities of the upwardly

extending member, whereby a sliding keyed fit is provided, means connecting said noncircular member to the front wheel so that the front wheel is swung when said extension is rotated, said noncircular member being reduced at its upper end whereby whenever the extension is telescoped down to the hollow arm, the noncircular member will be guided by the reduced end of the noncircular member into the extension.

3. In a wheel chair, a traction wheel rotatably mounted upon a side frame of the chair, a caster wheel mounted upon said side frame, a propelling arm mounted for oscillation upon the side frame, means providing a driving connection between the propelling arm and the traction wheel whereby the traction wheel may be rotated by oscillating the propelling arm, a spline mounted for rotation within the propelling arm and oscillatable therewith, means connecting the spline to the caster wheel whereby upon rotation of the spline the caster wheel may be rotated to steer the wheel chair, and an extension telescopically connected to the propelling arm having a sliding but non-rotatable fit with the spline.

4. In a wheel chair, a traction wheel rotatably mounted upon a side frame of the chair, a caster wheel mounted upon said side frame, a propelling arm mounted for oscillation upon the side frame, means providing a driving connection between the propelling arm and the traction wheel whereby the traction wheel may be rotated by oscillating the propelling arm, a spline mounted for rotation within the propelling arm and oscillatable therewith, means connecting the spline to the caster wheel whereby upon rotation of the spline the caster wheel may be rotated to steer the wheel chair, an extension telescopically connected to the propelling arm having a sliding but nonrotatable fit with the spline, and friction means for holding the extension in adjusted position on the propelling arm.

5. In a wheel chair, a traction wheel rotatably mounted upon a side frame of the chair, a caster wheel mounted upon said side frame, a propelling arm mounted for oscillation upon the side frame, means providing a driving connection between the propelling arm and the traction wheel whereby the traction wheel may be rotated by oscillating the propelling arm, a spline mounted for rotation within the propelling arm and oscillatable therewith, means connecting the spline to the caster wheel whereby upon rotation of the spline the caster wheel may be rotated to steer the wheel chair, and an extension telescopically connected to the propelling arm having a sliding but non-rotatable fit with the spline, friction means for holding the extension in adjusted position on the propelling means, said friction means permitting the extension to be completely withdrawn from the propelling arm and the spline having a tapered upper end for centering itself within the extension upon application of the extension to the propelling arm.

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