United States Patent

Bartos

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[45] **May 30, 1972**

[54] WHEEL CHAIR

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[52] **U.S. Cl.**.....**280/234,** 280/242 WC, 280/247, 297/DIG. 4, 297/45, 297/353

[51] **Int. Cl.**.....**B62m 1/12**

[58] **Field of Search**.....280/242, 244–250, 280/211, 42, 234; 297/16, 13, 377, 411, 373, 410, 433, 45, 353

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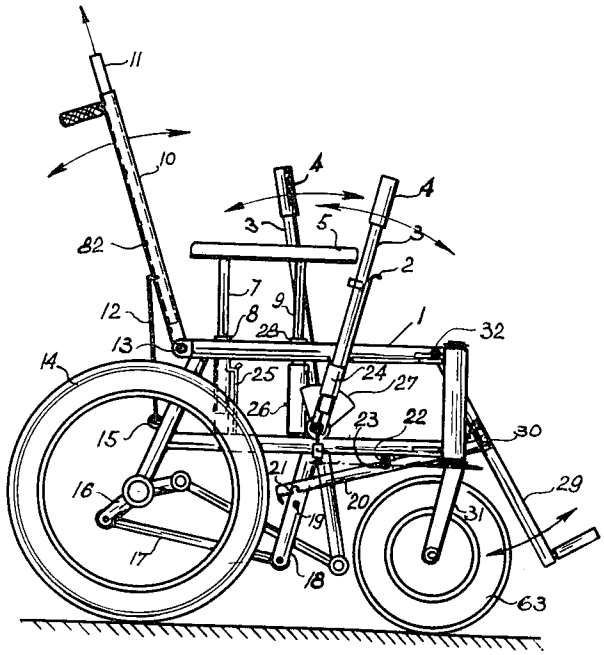
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[57] **ABSTRACT**

A foldable wheel chair with swingable chassis and leg rests driven by the occupant with the help of a lever mechanism is disclosed.

11 Claims, 9 Drawing Figures



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SHEET 1 OF 2

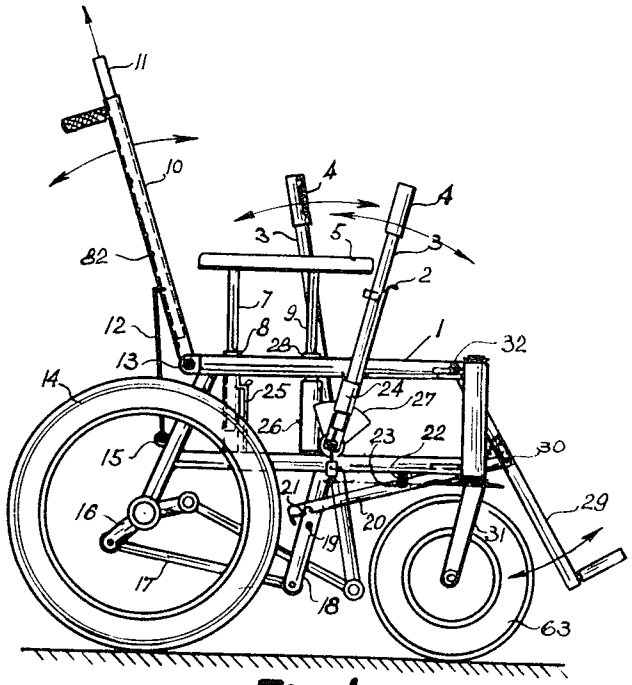


Fig. 1

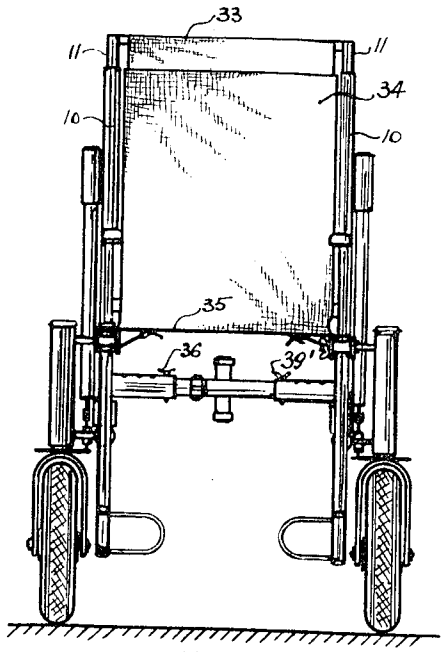


Fig. 2

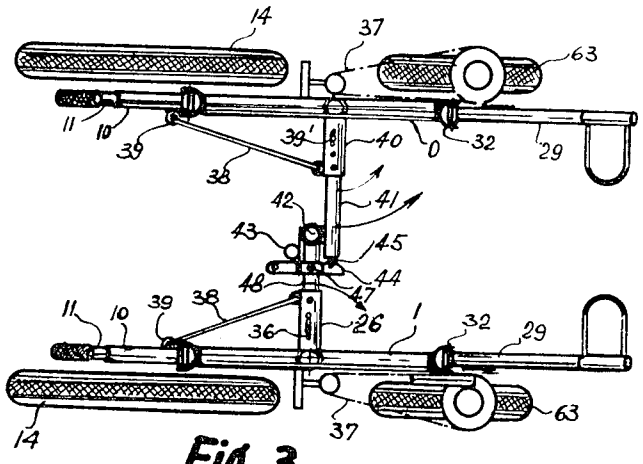


Fig. 3

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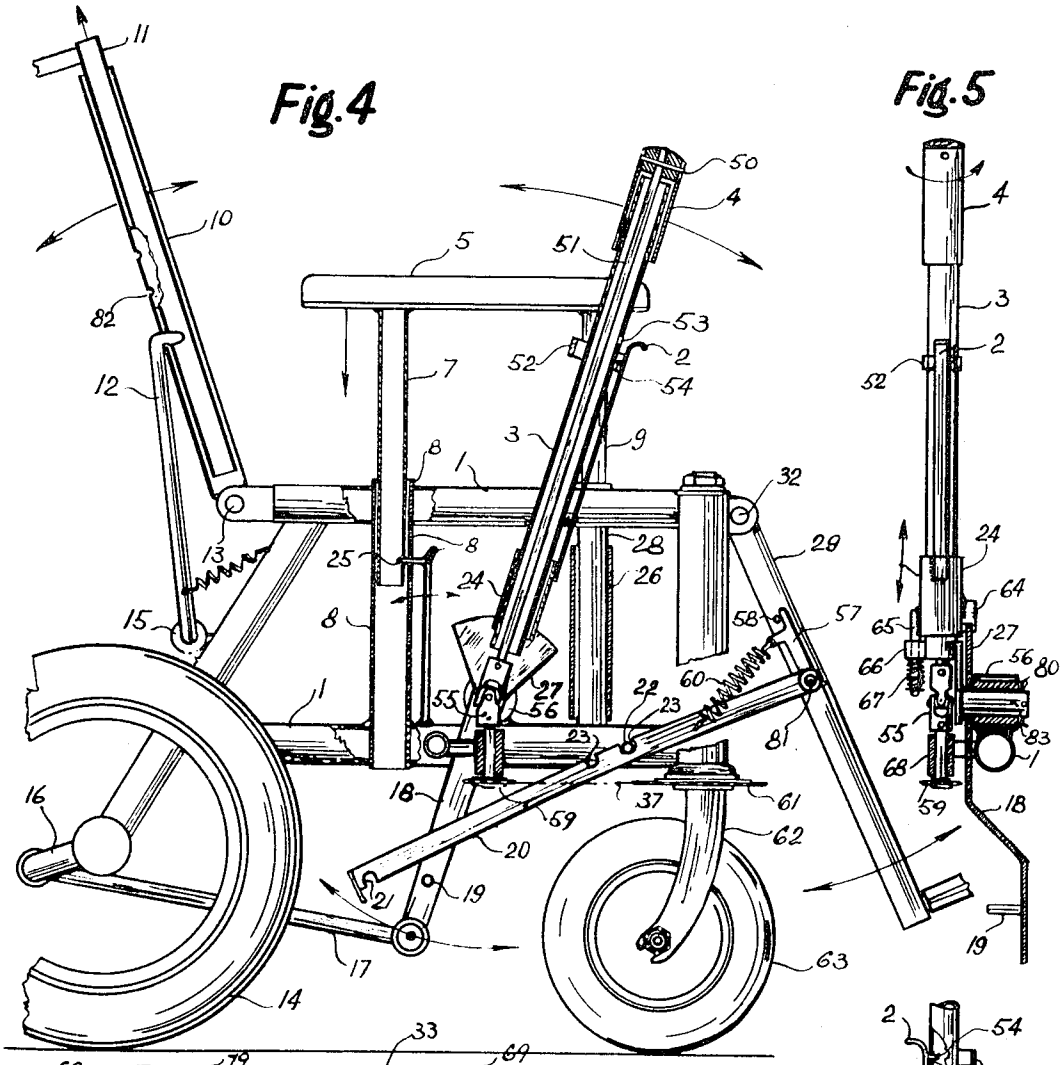


Fig. 4

Fig. 5

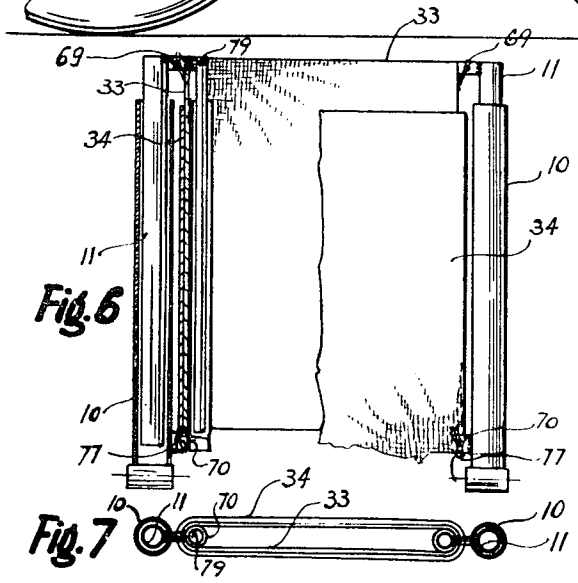


Fig. 6

Fig. 7

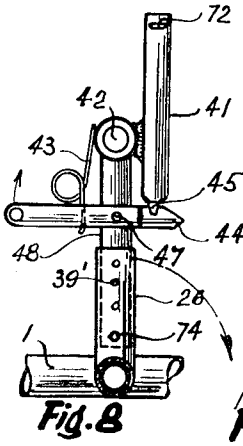


Fig. 8

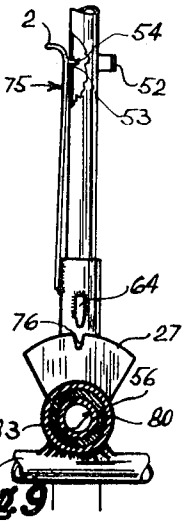


Fig. 9

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WHEEL CHAIR

The present invention relates to a wheel chair in which the occupant can move with the help of two levers without any assistance from another person.

Present day wheel chairs are unhygienic, because the occupant, while driving, must touch soiled wheels; are unstable, because their chasses are rigid, and can be transported only with difficulties, because even after they have been folded, they still require considerable space.

The wheel chair of this invention has the advantage that its occupant does not have to touch the wheels, but holds only clean levers with which he performs natural and healthy movements.

Another advantage is that the chassis of the chair is flexible, its wheels following exactly any, even uneven, terrains, as a result of which the chair is very stable.

Still another advantage is that the chair can be folded into small dimensions and can be taken easily into a car or a plane.

Still another advantage is that the back rest, the hand rests, and the leg rests can be adjusted to the size of the occupant, and the chair can be changed into a stretcher or a bed. The chair can be made wider or narrower according to the occupant's size.

Another advantage is that the chair can be driven and steered with one lever only.

Finally, another advantage is that the leg rests can perform a swingable movement forward and backward, and this movement can be stopped any time and the leg rests fixed in any desired position.

The above advantages can be seen from the following drawings, in which:

FIG. 1 is an elevational side view of the chair, showing its driving mechanism, the back rests, and hand and leg rests.

FIG. 2 is a front view of the chair, showing specifically the back rest, the seat and the folding mechanism.

FIG. 3 is a top view showing specifically the folding mechanism and the chaindrive of the steering.

FIG. 4 is an enlarged side view in elevation of the chair with portions broken away and in partial section to show details of the chair.

FIG. 5 is a partial front elevational view in section showing the driving and steering lever.

FIG. 6 is a partial front view of the back rest with portions in sections.

FIG. 7 is a top view of the back rest of FIG. 6.

FIG. 8 is a partial side elevational view showing the folding mechanism of the chassis.

FIG. 9 is a partial side elevational view in partial section of the gear clutch of the driving mechanism.

The chair consists of two independent chassis **0** and **1** with a driving wheel **14** and steering a wheel **63**. The chassis **0** and **1** are mutually connected with a cross yoke **26, 48, 41** and **40** whose parts **40** and **26** are turnable around the tubing **28** connected firmly with the frame. The parts **41** and **48** are telescopically sliding in the parts **40** and **26**, in which they are secured with pins **36** and **39'**. The part **41** has at one extremity a longitudinal slot **72** which makes possible a rotational movement of the part **41** in part **40**, and thus the chassis O to pivot in a horizontal plane relative to the chassis **1** according to the length of the slot **72**. In the driving position, the yokes **26, 48, 41**, and **40** are held firmly with a hook lock whose tooth **45** falls into the slot of the hook **44** swingable around the pivot **47** and pushed into the slot by the spring **43**.

The driving mechanism consists of two similar levers **3**, swingable about the pivot bearing **83** in the hollow pivot **80** of the driving arm **18** which is joined firmly with the segment **27** into which falls the tooth **64** of the clutch **24** which is held in the driving position by the spring **67** and the pin **65**. Pin **65** permits movement of tooth **64** on the lever **3**, but prevents its turning on this lever. The pin **65** passes, for this reason, through the body **66** joined firmly with the lever **3**. By pulling the bar **2** joined with the clutch **24**, the tooth **64** leaves the slot **76** of the segment **27**, the pin **54** falls into the hole **53**, and as a result the lever **3** is separated from the arm **18** and is free to

pivot. By pushing the ring **52**, the pin **54** leaves the hole **53**, the tooth **64** engages in slots **76** and the lever **3** is connected definitely with the arm **18**, and furthermore, because of the bar **17** with the crank **16** which drives the wheels **14**.

The steering mechanism consists of the turnable handle **4** which with the bar **51**, universal joint **55** and the chain drive **59, 37**, and **61** turns the steering wheel fixed in the turnable fork **62**. During driving, it is sufficient to steer one wheel only, since the other follows automatically.

The swingable leg rest consists of the arm **29** swinging in the suspension which includes a pivot **32**. To the arm **29**, there is connected the bar **20** together with the swingable segment **57** at the pivot **81**. The segment **57** is connected with the spring **60** by the bar **20** and leans against the pin **58** joined firmly with the arm **29**, by which it pulls constantly the bar **20** into engagement with the pin **22** with the help of the slot **23** on the frame **1**. By releasing the segment **57** from the pin **58**, the pull of the spring **60** is released, the bar **20** falls by its own weight down and is engaged by its slot **21** with the pin **19** on the arm **18**, and the arm **29** is connected firmly with the arm **18**, and starts to make a swinging movement. The interruption of the movement is done by switching the segment **57** behind the pin **58** so that the bar **29** is connected with the frame **1** in any desirable position.

The hand rests consist of the flats **5** with the tubing **9** and **7** which slide in the tubings **8** and **28**, the tubing **8,7** carrying a hole through which passes the flexibly mounted pin **25** which secures thus, the tubing **7** in any desirable position. For this reason, the tubing **7** has several holes.

The back rest consists of two tubings **10** to whose lower extremities are joined the tubings **70**. In the tubings **10** and **70** slide the tubings **11** and **79** which are firmly connected. Around the tubings **70**, there is attached the fabric **33** joined firmly to the tubings **11** in the point **69**. Around the fabric **33**, there is another fabric **34** joined firmly to the tubing **10** with the connecting member **77**. By pulling the tubings **11** from the tubings **10**, the fabric **33** is pulled from the fabric **34** so that the back rest can be adjusted to the position of the head. The tubings **10** are connected swingably with the chassis **0** and **1** at the pivot **13** and are provided on their back parts with the holes **82** into which fits the hook support **12** swingable in the pivot **15** on the chasses **0,1**. The slope of the back rest **10** can be selected by inserting the support **12** into the corresponding hole **82**.

The driving of the chair is attained by the back and forward movement of the levers **3**, which movement is transmitted by the gear clutch **24** to the arm **18**, and then to the bar **17**, the crank **16** and the wheels **14**.

The steering of the chair is done by turning either of the two handles **4** which turns the wheels **63**.

The folding of the chair is done by disconnecting the hook **38** from the rings **39** and by disconnecting the hook lock **44** from the tooth **45**, by which the parts **41** and **48** can be mutually turned in the point **42**, the parts **41** and **26** turned in the tubings **28**, as a result of which the chassis **0** and **1** can be pushed together. By disconnecting the hook support **12** from the tubings **10**, the back rest can be swung backward between the driving wheels **14**. By releasing the flexible pin **25**, the arm rest can be lowered and by disconnecting the arm **20** from the pin **19** or **22**, it is possible to push the leg rest arms **29** between the steering wheels **63**. By disconnecting the driving lever **3** from the segment **27**, the lever **3** can be tilted backward between the wheels **14**, and the chair is completely folded.

Having thus described a single embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. A wheel chair comprising, in combination,

a first chassis section having a drive wheel and a swingably mounted wheel;

a second chassis section having a drive wheel and a swingably mounted wheel;

means maintaining said chassis sections in spaced apart relation to each other;

a first drive lever pivotally connected to said first chassis section;

first drive means connecting said wheel of said first chassis section to said first level for rotation in response to oscillation of said first lever;

a second drive lever pivotally connected to said second chassis section;

second drive means connecting said drive wheel of said second chassis section to said second lever for rotation in response to oscillation of said second drive lever;

said first and second drive levers each including clutch means intermediate the ends thereof to permit selectively disconnecting at least an upper portion of said lever from a lower portion of said lever to permit oscillation of said lower portion without movement of said upper portion; and

means associated with the upper portion of at least one of said levers and including a flexible connection between said upper portion and one of said swingably mounted wheels to permit steering said swiveled wheel in response to rotation of said upper portion regardless of the relative position of said upper portion and lower portion of said lever.

2. A wheel chair according to claim **1** wherein

said means maintaining said chassis sections in spaced relation to each other includes

a first transverse element pivotally connected to said first chassis section,

a second transverse element pivotally connected to said second chassis section,

means pivotally connecting said first and second transverse elements to each other at a location between said chassis sections, and

latch means between said furst and second transverse elements to selectively latch said elements together.

3. A wheel chair according to claim **2** which further includes

first releasable means to prevent pivotal movement of said first transverse element relative to said first chassis section; and

second releasable means to prevent pivotal movement of said second transverse element relative to said second chassis section.

4. A wheel chair according to claim **1** wherein

said wheel chair further includes

a leg rest pivotally connected to one of said chassis sections for pivotal movement in a direction longitudinally of the chair;

means for selectively connecting said leg rest to one of said drive levers for oscillation therewith;

whereby, said leg rest oscillates with said one of said drive levers and can be manipulated by the leg of an occupant of the wheel chair to assist driving the chair.

5. A wheel chair according to claim **1** wherein

said wheel chair further includes

a first leg rest pivotally connected to said first chassis section,

a second leg rest pivotally connected to said second chassis section;

first connecting means for connecting said first leg rest and said first drive lever for oscillating said leg rest with said lever;

second connecting means for connecting said second leg rest and said second drive lever for oscillating said second leg rest with said second lever;

whereby said first and second leg rests can be oscillated by the occupant of the wheel chair to assist driving the wheel chair.

6. A wheel chair according to claim **5** wherein

said first connecting means is selectively connectable with said first drive lever;

said second connecting means is selectively connectable with said second drive lever;

whereby, said first and second connecting means can be disconnected to permit driving said wheel chair without oscillation of said first and second leg rests.

7. A wheel chair according to claim **1** wherein

said wheel chair further includes

first and second back rest support struts pivotally connected respectively to said first and second chassis sections,

flexible back support means connected between said first and second support struts,

a pair of support elements telescopically received within said first and second support elements, and

flexible head rest means extending between said pair of support elements and in adjacent relation to said first flexible means;

whereby, said head rest means can be raised and lowered independently of said back support.

8. A wheel chair comprising, in combination,

a frame having first and second drive wheels at opposite sides thereof and first and second additional wheels;

a first drive lever at one side of said frame and pivotally connected to the frame;

a second drive lever at the other side of said frame and pivotally connected to said frame;

first drive means interconnecting one of said drive wheels with said first lever, and second drive means interconnecting the other of said drive wheels to said second drive lever;

first and second leg rests each pivotally connected to said frame for fore and aft swinging movement;

selectively connectable drive means drivingly connecting said first leg rest to said first lever and said second leg rest to said second lever;

said selectively connectable drive means being manually operable to connect and disconnect said leg rests from said drive levers.

9. A wheel chair according to claim **8** wherein

said selectively connectable drive means includes

a first selectively connectable drive for selectively connecting said first leg rest to said first drive lever, and

a second selectively connectable drive for selectively connecting said second leg rest to said second drive lever.

10. A foldable wheel chair comprising in combination,

a first chassis section having a drive wheel and another wheel;

a second chassis section having a drive wheel and another wheel;

foldable brace means maintaining said chassis sections in spaced apart relation to each other;

seat support means on said first and second chassis sections;

a flexible seat extending between said seat support means;

first and second back rest support elements pivotally mounted respectively on said first and second chassis sections;

a flexible back rest extending between and supported by said back rest support elements;

head rest support elements mounted respectively on said back rest support elements for telescopic movement relative to said back rest support elements;

a flexible head rest extending between and supported by said head rest support elements;

a first tubular leg rest having a foot rest adjacent its lower end, said first leg rest being pivotally connected to said first chassis section;

a second tubular leg rest having a foot rest adjacent its lower end, said second leg rest being pivotally connected to said second chassis section;

back rest brace means for maintaining said back rest elements in a predetermined inclined position relative to said chassis sections, said brace means being releasable to permit pivoting said back rest sections to a horizontal position during folding of said wheel chair;

whereby, said chair in its folded condition presents a low, narrow profile for convenient transportation and storage.

11. A wheel chair according to claim 10 wherein

said wheel chair further includes

a first drive lever drivingly connected to said drive wheel of said first chassis section, and

a second drive lever drivingly connected to said drive wheel of said second chassis section;

said first and second drive levers each having upper portions and lower portions pivotally connected together;

selectively actuable clutch means for rigidly connecting said upper portions of said levers to said lower portions;

whereby, said upper portions of said levers can be pivoted relative to said lower portions to facilitate folding said wheel chair into a compact structure.

* * * * *