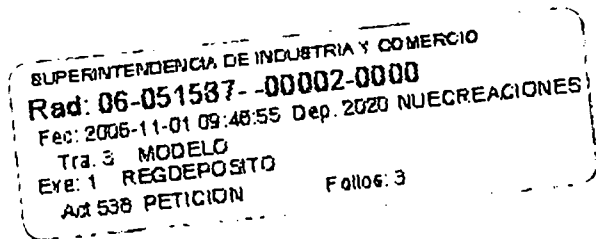


23

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 000176009-2

RECIBO OFICIAL DE CAJA : 06 - 84.324
 FECHA : NOVIEMBRE 1 DE 2006



***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	Nº. PAGO	FECHA PGO	Vr. PAGO
GUILLERMO ORTIZ	CONSIGNACION	BANCO POPULAR	050-00110-6	56010514	01/11/2006	64.750.00

***** C O N C E P T O *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01	SOLICITUDES	*** 25% EXAMEN DE PATENTABILIDAD DE M
			TOTAL : \$ 64.750.00

SON: SESENTA Y CUATRO MIL SETECIENTOS CINCUENTA PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE Nº.

24

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No 06-51587

EXTRACTO DE LA PRESENTE SOLICITUD DE **MODELO DE UTILIDAD**

NUMERO FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No

569 DE FECHA **31 DE OCTUBRE DE 2006** EL TERMINO HABIL SEÑALADO

POR LA LEY EXPIRA EL **18 DE DICIEMBRE DE 2006**.

NOTA: Dentro del plazo de los tres (3) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 y en concordancia con el artículo 85 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____

NO _____X_____

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISION DE NUEVAS CREACIONES

2020
Bogotá, D.C.

Señores
Jorge I. Díaz Ortiz y José G. Ortiz Pérez
(Solicitantes)

ASUNTO	Radicación	06 – 51 587
	Trámite	003
	Evento	001
	Actuación	430
	Oficio	Nº 5 8 3 2
	Folios	028

Patente de Invención ☐ Patente de Modelo de Utilidad ☒

Como resultado del examen de fondo, realizado con fundamento en el artículo 85 en concordancia con el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. De los documentos estudiados

Descripción: Folios 3 y 4 como se radicó inicialmente
Reivindicaciones: Folios 4 y 5 como se radicó inicialmente
Dibujos: Folios 6 a 8 como se radicó inicialmente

2. Del objeto de la solicitud

- Título de la solicitud: *Silla de ruedas con dispositivo manual para darle una mejor movilidad*, folio 1
- El objeto de la presente solicitud de patente de modelo de utilidad consiste en suministrar un dispositivo que permite la propulsión manual de una silla de ruedas. El dispositivo tiene un mecanismo de trinquete, en coordinación con una palanca y unas guayas, que engranan con el eje de las ruedas mayores de una silla de ruedas.

El problema planteado en esta solicitud es facilitar la independencia del usuario de una silla de ruedas, permitiéndole moverse a voluntad.

Para solucionar este problema técnico la solicitud en estudio proporciona un dispositivo que comprende una palanca, unas guayas, unas ruedas dentadas dispuestas sobre el eje principal de la silla y un mecanismo de trinquete que permite engranar una de las ruedas o la otra o ninguna. Este dispositivo le

permite al usuario de la silla avanzar, retroceder o permanecer en un mismo sitio.

Clasificación Internacional de Patentes (IPC): A61G 5/02, 5/10, A61F 4/00, B62B 11/00

3. De la solicitud de Patente de Modelo de Utilidad

Antes de entrar en detalles específicos, se le dan al solicitante algunas indicaciones generales, algunas de las cuales son aplicables a la solicitud tal como se presentó; pero, todas son aplicables a las eventuales modificaciones que se presenten en adelante:

En Colombia, la máxima autoridad en cuestiones del lenguaje es la Academia Colombiana de la Lengua. En caso de duda sobre el significado de las palabras, se debe acoger la definición que trae el Diccionario de la Real Academia Española (DRAE).

En Colombia, es de uso obligatorio el Sistema Internacional de unidades. Esto implica, también, que la coma decimal es de uso obligatorio. Cuando aparezca algún valor con unidades diferentes a las exigidas, deberá incluirse su correspondiente conversión al Sistema Internacional.

El título o nombre de la invención debe concordar con lo que se reclama en el capítulo reivindicatorio. Esto es, si en las reivindicaciones se reclama un producto, tal producto debe ser mencionado en el título, y si en las reivindicaciones se reclama un procedimiento o un sistema o un método, también debe ser mencionado allí.

La parte técnica de la solicitud se divide en tres secciones, debidamente separadas, preferiblemente en este orden: Capítulo descriptivo, capítulo reivindicatorio y dibujos o figuras. Ninguna de estas secciones podrá llevar membretes (encabezamientos o pies de página) ajenos al contenido técnico de la solicitud.

Por lo menos el capítulo descriptivo debe estar debidamente paginado, con el fin de facilitar la referencia a los apartados del texto.

La terminología empleada en la descripción y en las reivindicaciones debe ser igual para designar las diferentes partes, piezas, elementos, detalles o aspectos de lo que se mencione en ellas.

Dentro del texto de la descripción y las reivindicaciones se aconseja encerrar entre paréntesis el número o signo de referencia cada vez que se mencione, con el fin de distinguirlo de otros tipos de números o signos que eventualmente aparezcan allí.

Las reivindicaciones deben estar numeradas individual y consecutivamente (1, 2, ... 5, 6, etc.) El capítulo reivindicatorio no debe tener subtítulos.

En las reivindicaciones se deben definir los alcances de la protección que desea el solicitante. En consecuencia, las reivindicaciones forman un cuerpo aparte de la descripción y como tal debe ser redactado: la primera vez que se mencione un nombre dentro de las reivindicaciones debería estar acompañado de un artículo indeterminado; y, la inclusión -entre paréntesis- de un número de referencia no sustituye la definición del elemento o aspecto al que se refiere, simplemente sirve de información complementaria. Se debe entender que la descripción sirve para interpretar las reivindicaciones y, en consecuencia, si en una reivindicación se reclama un aparato, por ejemplo, no se deberían mencionar aspectos del funcionamiento del aparato dentro de ella, limitándose a definir únicamente los elementos que constituyen el aparato.

Cada una de las figuras debe estar debidamente identificada, preferiblemente con un número consecutivo: Figura 1, figura 2, ...

Las figuras deben ser realizadas siguiendo las reglas del dibujo técnico.

Se prefiere que dentro de las figuras no se incluya ningún texto. Cada uno de los detalles ilustrados en las figuras deberá estar señalado con un número o signo de referencia, el cual será el mismo en todas las figuras en donde se encuentre el detalle en cuestión.

La patente de **modelo de utilidad** no puede incluir los procedimientos, por definición. Si alguna de las reivindicaciones de una solicitud de patente de modelo de utilidad reclama un procedimiento, debe ser suprimida.

De la descripción (artículo 28 D. 486)

Durante el análisis del texto de la descripción y de las ilustraciones anexadas, se observaron los siguientes defectos:

(1) Tanto el título o nombre de la solicitud como la descripción y las reivindicaciones se refieren a una silla de ruedas con un dispositivo, pero lo que se divulga realmente dentro de la solicitud es el dispositivo, no la silla. El solicitante debe hacer los ajustes en cada una de estas secciones para que coincida lo que se anuncia con lo que realmente se enseña en la solicitud.

(2) En la página 1, folio 3, aparece la expresión *platina de Fe* que, se supone, se refiere a una platina de hierro. El solicitante debe sustituir el término *Fe* por *hierro*, u otra expresión que se ajuste mejor a lo que el solicitante quiere decir, dado que, en este contexto, no está justificado emplear el símbolo químico del elemento metálico.

(3) En la misma página 1 aparece la expresión *tubo metálico de 22 mn de diámetro* en la cual se debe corregir el símbolo de las unidades (deben ser unidades del Sistema Internacional).

(4) En la página 2, folio 4, aparece la expresión *con la figura 2 donde...* encabezando el tercer párrafo, lo que carece de sentido.

(5) Las figuras, folios 6 a 8, no fueron realizadas siguiendo las reglas del dibujo técnico y, además, se omite la ilustración del mecanismo de funcionamiento del dispositivo objeto de la solicitud. Por ejemplo: ¿dónde van los resortes que se mencionan en la reivindicación 3, folio 3? ¿cómo actúan tales resortes? ¿cómo es la manzana que se menciona en la solicitud? ¿cómo se asegura el dispositivo al eje de las ruedas principales de la silla? ¿cómo va anclado el dispositivo a la silla? Todas estas cuestiones deben ser resueltas dentro del texto de la descripción, ayudándose de una o más ilustraciones que aclaren tales aspectos.

- La descripción no cumple con los requisitos de claridad y de completitud que exige el Art. 28 de la Decisión 486.

De las Reivindicaciones (artículo 30 D 486)

Durante el análisis del texto de las reivindicaciones se observaron los siguientes defectos:

1) Todas las reivindicaciones, folios 4 y 5, reclaman una *silla de ruedas* pero ninguna de ellas la define. Lo que sí definen -o intentan definir- es el dispositivo de propulsión manual para una silla de ruedas. El solicitante debe hacer los ajustes del caso, para que lo que se reclame coincida con lo que se define dentro de las reivindicaciones. Por lo demás, tampoco en la descripción se ha definido específicamente una silla de ruedas, por lo que lo que se reclama en las reivindicaciones, además, carece de soporte.

2) En la reivindicación 1 se reclama una *silla de ruedas con un dispositivo manual para darle mayor movilidad **caracterizada** por dos discos dentados ensamblados a la manzana exterior a cada lado de la rueda de la silla*. En primer lugar, como ya se dijo, no se define la silla; en segundo lugar, ni siquiera se define el dispositivo que se menciona en la reivindicación; en tercer lugar, el dispositivo divulgado en la solicitud no siempre sirve *para darle mayor movilidad* a la silla; en cuarto lugar, según la descripción y las figuras anexadas, los discos dentados no se encuentran *a cada lado de la rueda de la silla* sino que se encuentran *en la parte exterior de la manzana de las ruedas* como se afirma en la página 1, folio 3; y, en quinto lugar, la silla no tiene una

- única rueda, por lo que la expresión *la rueda de la silla* carece de significado según el contexto.
- 3) En las reivindicaciones 2 a 5, folios 4 y 5, se debe suprimir el símbolo # porque es superfluo y afecta negativamente la concisión de las reivindicaciones.
- 4) Se debe revisar la redacción de la reivindicación 2, folio 4, porque es muy confusa.
- 5) En la reivindicación 3, folio 5, se reclama una *silla de ruedas... de acuerdo a la reivindicación 1 y 2, **caracterizada** por guayas y resortes... situada en la parte superior de la palanca* pero, en la reivindicación 1 no se menciona ninguna *palanca*, por lo que esta reivindicación carece de sentido.
- 6) Se debe revisar la redacción de la reivindicación 4, folio 5, porque es confusa.
- 7) Aparentemente, lo reclamado en la reivindicación 5, folio 5, es muy similar a lo que se reclama en la reivindicación 4, folio 5, por lo que podría resultar redundante, pero en todo caso, también es confusa.

Las reivindicaciones que dependen de una reivindicación objetada también se objetan por las mismas causas.

Las reivindicaciones no cumplen con los requisitos de claridad, de concisión y de sustento por la descripción que exige el Art. 30 de la Decisión 486.

Se deben presentar, entonces, un nuevo título así como nuevos capítulos descriptivo y reivindicatorio, ambos completos, junto con un nuevo juego de dibujos, donde se hayan corregido todas las objeciones que se han hecho arriba. Esto con el fin de evitar -cuando solo se presentan algunas páginas sueltas corregidas- que el lector tenga que desplazarse desde un sitio a otro de la solicitud y luego regresar a donde estaba antes sin perder la ilación de la lectura, porque esto produce confusión y afecta negativamente la claridad de dichos capítulos.

4. De la determinación del estado de la técnica

- La fecha que se ha tenido en cuenta para determinar el Estado de la Técnica es la

Fecha de presentación de la solicitud nacional 2006-05-30

Durante la búsqueda de anterioridades se encontró el siguiente documento, que forma parte de la familia de patentes de la presente solicitud: Publicación WO 2007/138417 A1 del 2007-12-06. Se anexa la copia de la primera página de este documento junto con la copia del Informe de Búsqueda Internacional, en su versión en inglés. También se encontraron los siguientes documentos que forman parte del estado de la técnica más cercano al objeto de la solicitud:

n.º	Documento	Título	Fecha de publicación
D1	Patente US 3 104 112, cuyo inventor es Jesse W. Crail	«Stair climbing wheel chair»(Una silla de ruedas que puede subir escaleras)	1963-09-17
D2	Patente US 4 274 650, cuyo inventor es Hans Gilles	«Hand drive assembly for a wheelchair»(Un montaje de propulsión manual para una silla de ruedas)	1981-06-23

n.º	Documento	Título	Fecha de publicación
D3	Patente US 4 453 729, cuyo inventor es Wesley O. Lucken	«Occupant propellable wheelchair»(Una silla de ruedas que puede ser impulsada por el usuario)	1984-06-12
D4	Patente US 4 560 181, cuyo inventor es Matthew A. Herron, quien le cedió sus derechos a la Design Loft, Inc.	«Wheelchair operated by hand pedalled reciprocating motion»(Una silla de ruedas que está propulsada por un movimiento de vaivén manual)	1985-12-24
D5	Patente US 4 811 964, cuyo inventor es Douglas J. Horn	«Wheelchair propelled by rowing»(Una silla de ruedas impulsada por movimientos de remo)	1989-03-14
D6	Patente US 4 865 344, cuyos inventores son Bernardino S. Romero y Bruce D. Bayes, quienes le cedieron sus derechos a E. Lakin Phillips	«Wheelchair hand propulsion apparatus»(Un aparato de propulsión manual para una silla de ruedas)	1989-09-12
D7	Patente US 5 228 709, cuyo inventor es Fong-Chung Kao, quien le cedió sus derechos a Kung-Hsiung Wu	«Wheelchair driving mechanism»(Un mecanismo de propulsión de una silla de ruedas)	1993-07-20
D8	Patente US 5 743 544, cuyo inventor es Michael J. Weaver	«Wheelchair drive system with ratchet and wheel lock»(Un sistema de propulsión para silla de ruedas con un trinquete y un bloqueo de ruedas)	1998-04-28
D9	Publicación DE 197 57 270 A1, cuyo inventor es Heinrich Kutsche, quien le cedió sus derechos a Gottfried Kutsche-Schilling	«Handantriebsystem für Rollstuhlselfstfahrer»(un sistema de propulsión manual para autoimpulsar sillas de ruedas)	1999-07-01-

Se anexan copias de las páginas pertinentes

NOTAS: No se realizó una evaluación de los demás requisitos de patentabilidad, porque se objetó la claridad de las reivindicaciones. Una vez hayan sido superadas las objeciones establecidas en este Concepto Técnico, se podrán hacer los exámenes correspondientes.

No obstante lo anterior, con base en los documentos encontrados hasta el momento, en especial el D7, no se prevén objeciones respecto a la novedad del objeto solicitado.

5. De las conclusiones:

Los requisitos de patentabilidad de la presente solicitud se encontrarían afectados negativamente por la falta de claridad y completitud de la descripción y las reivindicaciones y por la falta de definición y de sustento de estas últimas.

En cumplimiento del artículo 85 en concordancia con el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica al solicitante que debe dar respuesta dentro del término de treinta días contados a partir de la fecha de

notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el artículo 8 de la resolución reglamentaria n.º 00210 del 15 de enero de 2001, advirtiéndole que contra él no procede recurso alguno en la vía gubernativa.



ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe de División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista, de fecha
21 MAYO 2009

CONCEPTO TÉCNICO n.º 1508

EXAMINADOR TÉCNICO
Código n.º 202009

(12) SOLICITUD INTERNACIONAL PUBLICADA EN VIRTUD DEL TRATADO DE COOPERACIÓN
EN MATERIA DE PATENTES (PCT)

(19) Organización Mundial de la Propiedad
Intelectual
Oficina internacional



(43) Fecha de publicación internacional
6 de Diciembre de 2007 (06.12.2007)

PCT

(10) Número de Publicación Internacional
WO 2007/138417 A1

(51) Clasificación Internacional de Patentes:
A61G 5/02 (2006.01)

(71) Solicitantes e

(72) Inventores: DIAZ ORTIZ, Jorge Ivan [CO/CO]; Calle 67A No. 56B-45, Barrio Modelo Norte 52, Bogota, D.C. (CO). ORTIZ PEREZ, Jose Guillermo [CO/CO]; Calle 67A No. 56B-45, Barrio Modelo Norte 52, Bogota, D.C. (CO).

(21) Número de la solicitud internacional:

PCT/IB2007/001342

(22) Fecha de presentación internacional:

9 de Marzo de 2007 (09.03.2007)

(25) Idioma de presentación:

español

(26) Idioma de publicación:

español

(30) Datos relativos a la prioridad:

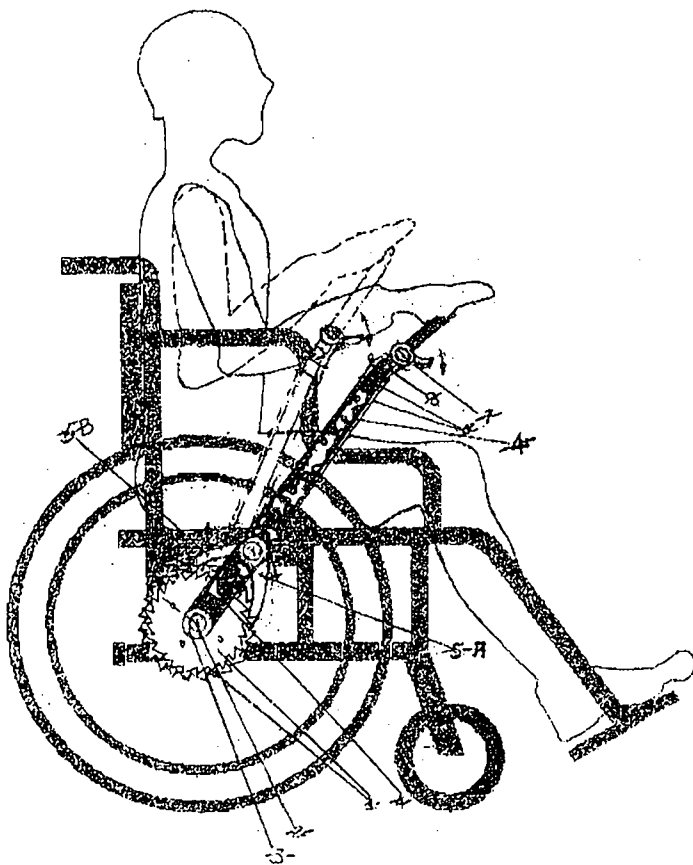
06-051587 30 de Mayo de 2006 (30.05.2006) CO

(81) Estados designados (a menos que se indique otra cosa, para toda clase de protección nacional admisible): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO,

[Continúa en la página siguiente]

(54) Title: WHEELCHAIR WITH A MANUAL DEVICE FOR PROVIDING IT WITH BETTER MOBILITY

(54) Título: SILLA DE RUEDAS CON DISPOSITIVO MANUAL PARA DARLE UNA MEJOR MOVILIDAD



(57) Abstract: Wheelchair with a driving mechanism, characterized by two toothed discs of different diameter which are screwed to the knobs of each one of the (large) wheels of the chair. A lever is assembled with the central shaft (screw which fastens the wheel of the chair) and at the same time is coupled to this shaft by revolving around said screw, said lever providing a central independent rocking movement. Two pawls with a shaft and bearings are coupled to the intermediate part of this very lever by means of two wires which are coupled in the upper part of the levers by means of handles which, when actuated, cause these pawls to engage in the toothed discs which move the chair either forwards (large disc) or backwards (small disc); said levers have a hinge movement to provide the person with easy access (he/she may sit down and actuate the lever).

(57) Resumen: Silla de ruedas con mecanismo impulsor caracterizado por 2 discos dentados de diferente diametro atornillado a las manzanas de cada una de las ruedas (grandes) de la silla. Con el eje central (tornillo que sujeta la rueda de la silla) y a la vez a este eje esta ensamblada una palanca por medio de un rodamiento a dicho tornillo, la cual da un movimiento vacular independiente central. A esta misma palanca van ensamblados en la parte intermedia dos trinquetes con eje y rodamientos que por medio de dos guayas ensambladas en la parte superior de las palancas, por medio de unas manijas que al accionarlas

[Continúa en la página siguiente]

INTERNATIONAL SEARCH REPORT

International application No. PCT/IB 2007/001342

A. CLASSIFICATION OF SUBJECT MATTER A61G 5/02 (2006.01) According to International Patent Classification (IPC) or to both national classification and IPC														
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A61G 5/00, 5/02, 5/08, 5/10 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)														
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>SU 1210824 A (SHKUROVA D.F. et al.) 15.02.1986</td> <td>1-8</td> </tr> <tr> <td>A</td> <td>SU 1607806 A1 (KOLEVATOV M.N.) 23.11.1990</td> <td>1-8</td> </tr> <tr> <td>A</td> <td>US 3104112 A (J.W. CRAIL) 17.09.1963</td> <td>1-8</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	A	SU 1210824 A (SHKUROVA D.F. et al.) 15.02.1986	1-8	A	SU 1607806 A1 (KOLEVATOV M.N.) 23.11.1990	1-8	A	US 3104112 A (J.W. CRAIL) 17.09.1963	1-8
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
A	SU 1210824 A (SHKUROVA D.F. et al.) 15.02.1986	1-8												
A	SU 1607806 A1 (KOLEVATOV M.N.) 23.11.1990	1-8												
A	US 3104112 A (J.W. CRAIL) 17.09.1963	1-8												
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.														
* Special categories of cited documents: <table border="0"> <tr> <td> "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family										
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family													
Date of the actual completion of the international search 03.10.2007		Date of mailing of the international search report 25.10.2007												
Name and mailing address of the ISA/ Russian Federation, 123995, Moscow, G-59, GSP-5. Berezhkovskaya nab., 30-1 Facsimile No. de fax (7095) 243-3337		Authorized officer A. Kharyukin Telephone No. (495) 730-7675												

33

DI

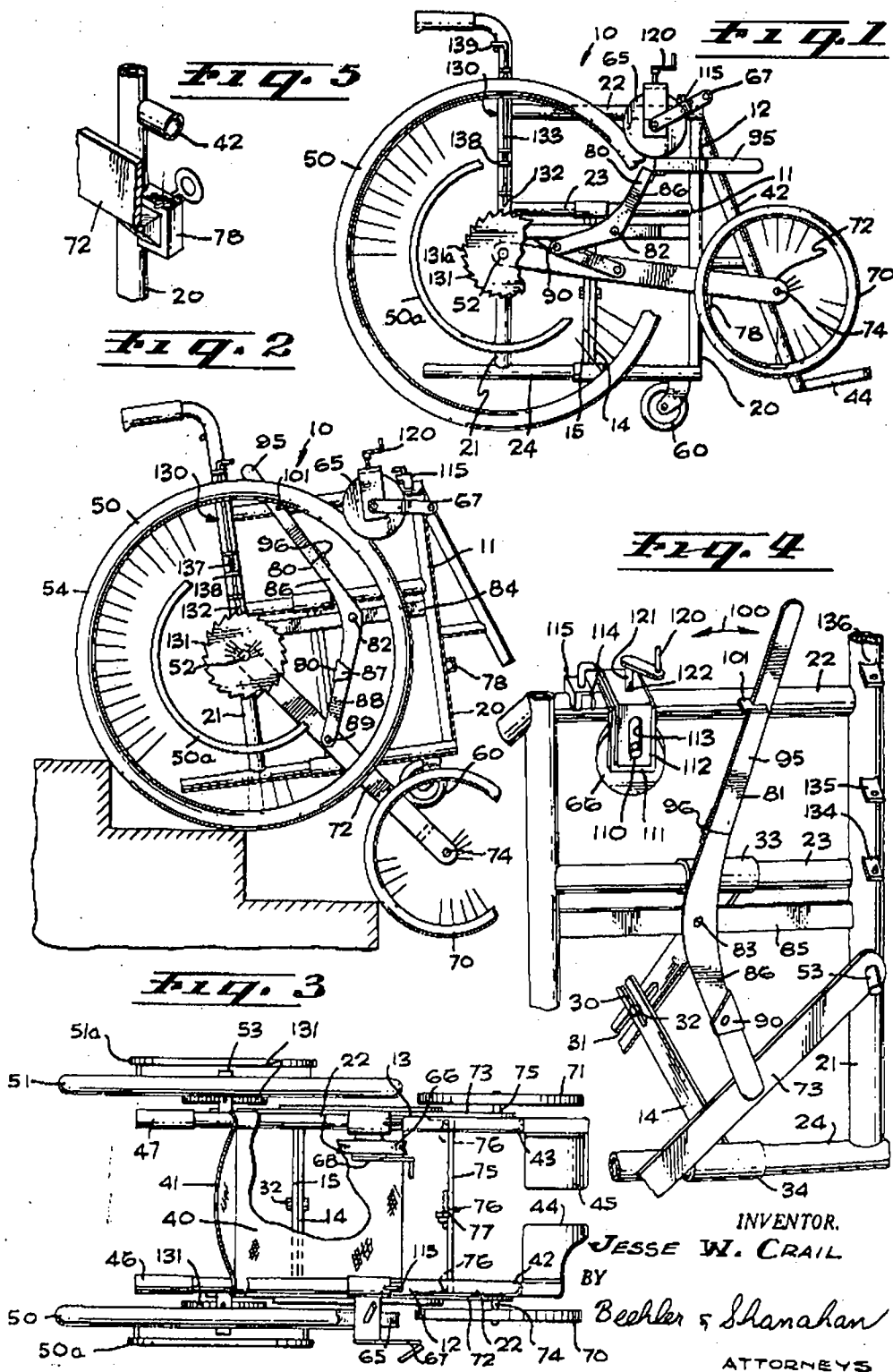
Sept. 17, 1963

J. W. CRAIL

3,104,112

STAIR CLIMBING WHEEL CHAIR

Filed July 2, 1962



INVENTOR.
JESSE W. CRAIL
BY
Becker & Shanahan
ATTORNEYS

United States Patent Office

3,104,112

Patented Sept. 17, 1963

1

3,104,112

STAIR CLIMBING WHEEL CHAIR

Jesse W. Crail, 3802 Edenhurst Ave., Los Angeles, Calif.
Filed July 2, 1962, Ser. No. 206,698

4 Claims. (Cl. 280-5.2)

This invention relates generally to stair climbing wheel chairs, and more particularly to such a wheel chair in which auxiliary front wheels can be lowered and releasably locked into stair climbing position by a backward swinging linkage means, in combination with an adjustable pressure driving means which can be temporarily retracted for operation of said backward swinging linkage means.

A great variety of wheel chairs have been designed for the convenient transport of persons who suffer from some disability which prevents them from walking for an extended period of time, or from walking at all. A large and important category of wheel chair designs include a means of locomotion in which the user himself supplies the driving power. Many handicapped persons are handicapped only with respect to walking, and are equal to or superior to unhandicapped persons in the strength and dexterity of their arms and hands. Wheel chairs have, therefore, been designed with manually operated crank means, reciprocating drive levers and the like. Usually, such occupant-operated chairs are also provided with handles at the back so that they can be pushed by an attendant when the occupant does not wish to make the physical exertion required when he is supplying his own power of locomotion.

However, many healthy handicapped persons do not want to rely upon the presence of an attendant, and prefer to travel alone almost as freely as if they were able to walk as well as the average unhandicapped person. Many excellent wheel chairs heretofore known have provided the handicapped person with complete mobility as long as he has restricted himself to horizontal or nearly horizontal services. Up to the present time, no wheel chair capable of climbing stairs has come into widespread use.

Various stair climbing wheel chairs have been proposed, but all have suffered from some major limitation which made them unsuited or impractical for most wheel chair users. Thus, some stair climbing wheel chair designs have involved such extensive and massive mechanism that only the most athletic of wheel chair users could apply the muscle power needed to operate them on stairs, or even on horizontal services. Other stair climbing wheel chairs have required electrical or gasoline power means.

Almost all widely used wheel chairs can be folded into a collapsed position. Experience has proven that this feature is a very important one, not merely for convenience in storage when the chair is not in use, but also for transporting the chair when the occupant travels by automobile or by public transportation means, or when the occupant wishes to sit in a theater seat and temporarily store the chair in a space small enough to prevent it from blocking the passage of other people. Some previously proposed stair climbing wheel chairs have involved a construction inconsistent with collapsibility; consequently, such designs have never been accepted into general use.

It is an important object of the present invention to provide a stair climbing wheel chair construction which can be used in folding wheel chairs.

It is another important object of the present invention to provide a wheel chair in which the stair climbing mechanism is light, very strong, and readily operable on stairs by a person of average strength, without the aid of any auxiliary motor means.

2

It is important to note that in the achievement of these objects, it has been necessary to provide safety means to prevent any runaway of the wheel chair during the stair climbing operation. Also, the manual drive mechanism used during stair climbing has been made retractable so that ordinary hand rings can be used when traveling on the level.

Still another important feature of the present invention, which makes it substantially superior to previously known stair climbing designs, is that the wheel chair occupant is able to convert his wheel chair into stair climbing position, while at the same time lifting the weight of himself and his chair, by means of the linkage which enables him to apply the maximum strength of his arms.

The objects and advantages of the invention are achieved by means of a construction which will best be understood from a description of one preferred specific embodiment, which is illustrated in the accompanying drawings, in which:

FIGURE 1 is a right side elevational view of a wheel chair constructed according to the invention, with the stair climbing mechanism retracted and out of use, so that the chair can be conveniently moved over a horizontal surface by the occupant;

FIGURE 2 is a right side elevational view of the chair of FIGURE 1, but with the stair climbing mechanism lowered into stair climbing position;

FIGURE 3 is a plan view of the wheel chair as viewed in FIGURE 1, but showing the left manual driving wheel rotated into a retracted position;

FIGURE 4 is a perspective view of a fragmentary portion of the wheel chair, as seen from a point looking at the left rear vertical frame member, but with portions of the chair disassembled to reveal construction which would otherwise be concealed; and

FIGURE 5 is a detail perspective view of a latch employed for locking the stair climbing mechanism in retracted position as illustrated in FIGURE 1.

In the drawings, the wheel chair, indicated generally by the numeral 10, is seen to have all its essential parts mounted on a folding metal frame indicated generally by the numeral 11, and comprised of right and left side frame members 12 and 13, respectively, best seen in the plan view of FIGURE 3, and folding crossbar members 14 and 15.

The side frame members 12 and 13 are substantially identical in construction. The frames may be of standard types used in wheel chairs well known in presently used designs. For example, chrome plated steel tubing welded into the shape shown, or any convenient equivalent shape may be employed. In the particular embodiment illustrated, right side frame 12 (and also left side frame 13) is comprised of front and rear vertical members 20 and 21, and three horizontal members 22, 23, and 24, all welded together into an integral side frame structure. Upper horizontal member 22 serves as an arm rest; middle horizontal member 23 is a seat frame member; and the lower horizontal member 24 is a base member for the side frame 12.

As seen in FIGURE 3, the folding crossbar members 14 and 15 serve to hold the side frame members 12 and 13 parallel to each other and spaced from each other a distance corresponding to the width of the wheel chair seat.

The novelty of the present invention does not reside in the particular means by which folding is achieved, or in the particular construction of folding crossbars 14 and 15. The novelty resides in a combination which provides a stair climbing wheel chair, and in a stair climbing mechanism which, unlike many previously known stair

climbing mechanisms, can be incorporated in wheel chairs of the folding type. Thus, in the specific embodiment illustrated, the folding crossbars 14 and 15 are merely slotted as indicated at 30 and 31, and are adjustable between folding and open position by means of any suitable type of locking bolt 32; the crossbars 14 and 15 are rotatably connected by sleeves 33 and 34 on seat frame member 23 and base frame member 24, respectively, of the side frames 12 and 13. It will be understood, however, that any suitable folding mechanism may be used between the side frames 12 and 13 for holding them in erected position for wheel chair use, or folded together for storage.

The plan view of FIGURE 3 reveals that a readily foldable fabric seat 40 and fabric back 41 (shown partially broken away to illustrate the folding crossbars 14 and 15 in plan) are stretched between the side frames 12 and 13. Also, as is conventional in most folding wheel chairs, each of the side frames 12 and 13 is provided at the forward portion with foot support brackets 42 and 43, which support folding foot rests 44 and 45, respectively. Push handles 46 and 47 are provided at the rear of the wheel chair 10 on the upper ends of rear vertical members 21.

The main wheels provided for rolling of the wheel chair are not the twenty-five inch hard-tire wheels usually found in most of the folding wheel chairs available on the market at the present time, but are larger, and use pneumatic tires. The main wheels, right and left main wheels 50 and 51, respectively, are rotatably mounted on right and left stub wheel shafts 52 and 53, respectively. The main wheels are provided with hand-propulsion rings 50a and 51a seen in plan in FIG. 3, and partially broken away in FIGS. 1 and 2 for purposes of illustration of the stair climbing mechanism. The stub shafts 52 and 53 are integrally mounted on the rear verticals 21 of right and left side frames 12 and 13, usually just a short space below the level of the seat frame members 23. Main wheels 50 and 51 are usually of a light spoke and rim construction with inflated rubber tires 54. Also, the main wheels are usually of relatively large diameter, being between thirty inches by two inches in the specific embodiment, so as to provide the wheel chair user with a smooth rolling transport despite irregularities in ground surface, and also, so that an attendant may push or pull the wheel chair up the average stairway, which usually has treads and risers of about ten inches and seven inches, respectively.

The forward part of the wheel chair 10 is provided with rolling support by right and left identical swiveling casters, typically illustrated by right caster 60. Preferably, the two swiveling casters 60 are mounted under the forward portions of side frames 12 and 13, respectively.

It has been common in previously known wheel chairs to provide the occupant with crank-operated friction wheels with which to achieve self-locomotion. Right and left friction wheels 65 and 66, and their associated cranks 67 and 68, are illustrated as mounted on arm rest member 22 of the side frames 12 and 13. They are adapted, when in driving position as illustrated in FIGURES 1 and 2 for right friction wheel 65, to bear against the tread of tires 54, and thereby enable an occupant to drive the main wheels 50 and 51 by manual rotation of cranks 67 and 68. However, the friction wheels 65 and 66 in the illustrated specific embodiment of the present invention are mounted in a novel manner in order to coact with other components of the inventive combination which makes it possible to use the wheel chair of the invention for self-locomotion up a stairway.

It is a much preferred form of the present invention to make the friction wheels 65 and 66 retractable from a driving position as illustrated for right friction wheel in FIGURES 1, 2, and 3, and for left friction wheel in FIGURE 4, on the one hand, and, on the other hand, a retracted position illustrated in FIGURE 3 for left friction wheel 66. Also, as will be described hereinafter, it

is much preferred to provide the right and left friction wheels with adjustable drive pressure means.

Before proceeding to a detailed description of the preferred form of retractable friction wheels 65 and 66, the principal stair climbing mechanism will be described. The wheel chair 10 is provided with right and left stair climbing wheels 70 and 71, which are mounted at the forward ends of arms 72 and 73, on stub shafts 74 and 75, respectively.

Arms 72 and 73 are pivotally mounted to side frames 12 and 13, preferably in a simple and convenient way by being mounted on main wheel stub shafts 52 and 53, inboard of main wheels 50 and 51. Thus, the stair climbing wheels 70 and 71 may be selectively swung between a retracted position, as illustrated in FIGURE 1, when not in use; and a stair climbing position, as illustrated in FIGURE 2, when lowered for stair climbing use.

The right and left arms 72 and 73 may be braced to each other to form a rigid unitary frame structure by means of transverse brace 75, which is preferably hinged at the ends and middle as indicated by hinges 76, so as to be foldable with the wheel chair 10. A standard type of bolt latch 77, or any convenient type of releasable locking means is provided on the transverse brace 75 to lock it into unfolded position.

Also, as illustrated in FIGURE 5, a retractable spring latch 78 is mounted on the forward side of side frame 12 so as to provide releasable means for locking the arms 72 and 73 in the raised position illustrated in FIGURE 1.

The arms 72 and 73 are pulled downward into the stair climbing position of FIGURE 2 by means of right and left linkages, 80 and 81, respectively, which are pivotally mounted at fulcrums 82 and 83, respectively, in relatively massive fulcrum support bars 84 and 85, respectively, which are integral parts of right and left side frames, 12 and 13, respectively.

The linkages 80 and 81 are identical, and are constructed as illustrated for linkage 80 in FIGURES 1 and 2. A bell crank 86 is mounted in the fulcrum 82. At its lower end, it is connected by pivot connection 87 to an arm link 88, which is in turn pivotally connected at 89 to arm 72. A locking stop 90 is welded to the upper end of arm link 88, so that it forms a rigid brace for arm 72 when the linkage 80 is pulled into the position illustrated in FIGURE 2.

Preferably, the upper end of valve crank 86 is provided with a folding lever ram 95, hinged to the bell crank 85 at 96. This folding nature makes it possible to fold the lever 95 downward and out of the way of the friction wheels 65 and 66, when the wheel chair 10 is traveling horizontally, and the stair climbing apparatus is out of use, as illustrated in FIGURE 1.

Although the operating levers 95 could be formed to by-pass the cranks 67 and 68, while the latter are in their normal outboard position, it is much preferred to make friction wheels 65 and 66 retractable, as illustrated for friction wheel 66 in FIGURE 3, by means to be described hereinafter, so that the seated occupant of wheel chair 10 will have a maximum of leverage with a minimum of reach for converting from horizontal travel position of FIGURE 1 to the stair climbing position of FIGURE 2.

In FIGURE 4, the arch of movement of the lever 95 is illustrated by the arrow 100. Also, it will be seen that a catch 101 is welded to the outboard side of the arm member 22 so as to catch lever arm 95 and retain the linkage 81 in stair climbing disposition. An identical construction is provided for the right side frame 12.

FIGURES 3 and 4 illustrate retraction and adjustment for the friction wheels 65 and 66. It will be understood that the crank 68 has been removed from the friction wheel 66 in FIGURE 4, in order to better illustrate the vertical adjustment of friction wheel 66. As seen in FIGURE 4, friction wheel 66 carries an integral crank shaft

United States Patent [19]
Gilles

[11] 4,274,650
[45] Jun. 23, 1981

DZ

[54] **HAND DRIVE ASSEMBLY FOR A WHEELCHAIR**

[76] Inventor: **Hans Gilles, 249 Springhill, Rosemere, Quebec, Canada**

[21] Appl. No.: 50,569

[22] Filed: Jun. 21, 1979

[51] Int. Cl.³ **B62M 1/14**
[52] U.S. Cl. **280/242 WC; 74/63; 280/249; 280/260**
[58] Field of Search **280/242 WC, 242 R, 249, 280/260; 74/63**

[56] **References Cited**

U.S. PATENT DOCUMENTS			
292,179	1/1884	Riley	280/249
661,992	11/1900	Hunt	280/260
1,687,812	10/1928	Weber	280/242 WC
2,643,898	6/1953	Everest	280/242 WC
2,847,058	8/1958	Lee	280/249 X
3,937,519	2/1976	Schoolden	280/242 WC

FOREIGN PATENT DOCUMENTS

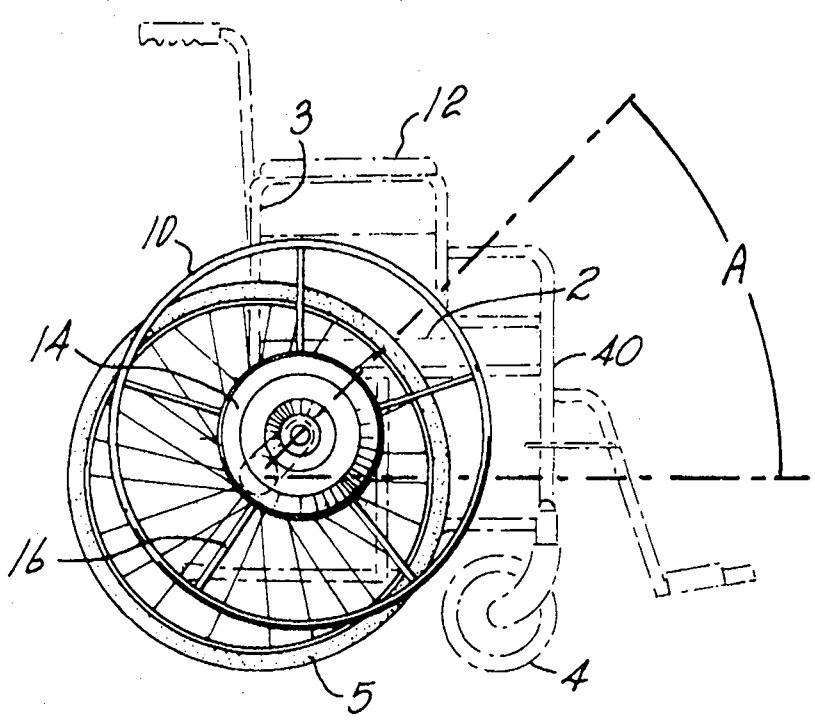
2307697	12/1976	France	280/242 WC
11536	of 1898	United Kingdom	280/260
16934	of 1899	United Kingdom	280/260

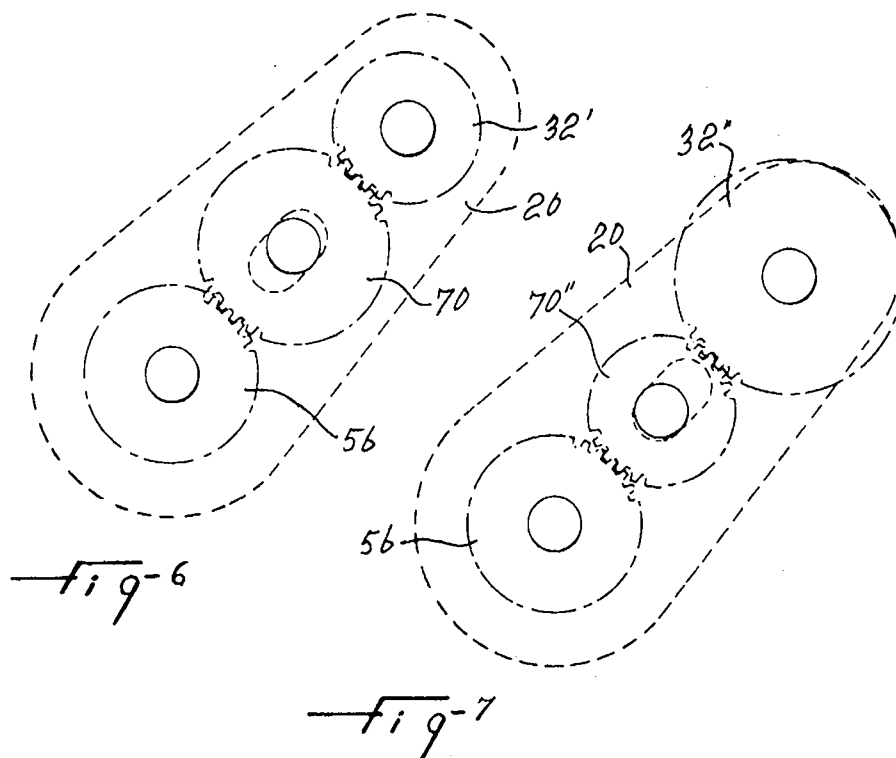
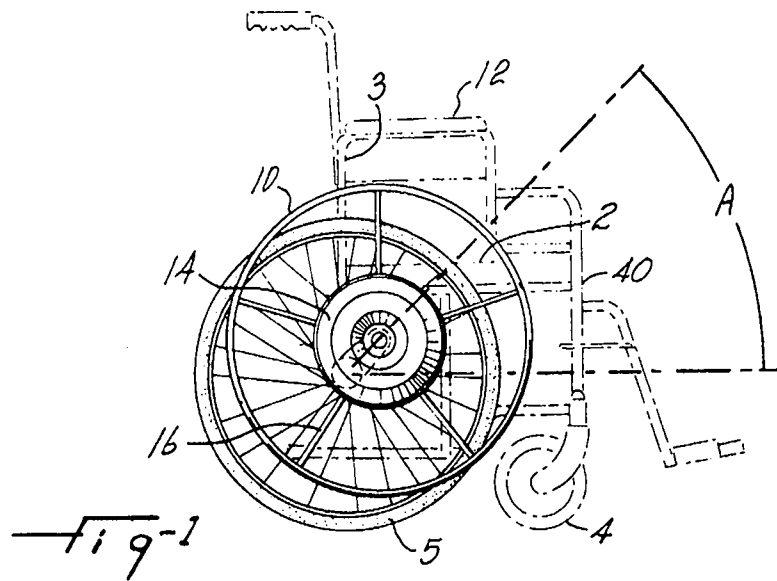
Primary Examiner—John P. Silverstrim

[57] **ABSTRACT**

A hand drive assembly for a wheelchair is disclosed. The assembly comprises a main axle adapted to be installed on each side of a regular wheelchair for rotatably mounting the wheel of the chair, a main gear rotatably mounted on the main axle and adapted to be coupled to the wheel, an elongated plate mounted upwardly at one end on the main axle and at a predetermined angular position with respect to the vertical ahead of the wheel, a driving axle rotatably mounted at the other end of the gear plate, a driving gear secured to the driving axle, a hand drive ring coupled to the driving axle for driving such driving gear, and an intermediate gear rotatably mounted on the gear plate and coupling the driving gear to the main gear to transmit motion of the hand drive ring to the regular wheel of the wheelchair.

1 Claim, 7 Drawing Figures





United States Patent [19]

Lucken

[11] 4,453,729

[45] Jun. 12, 1984

38
D3

[54] OCCUPANT PROPELLABLE WHEELCHAIR

[76] Inventor: Wesley O. Lucken, 1149 S. Chantilly, Anaheim, Calif. 92806

[21] Appl. No.: 420,034

[22] Filed: Sep. 20, 1982

[51] Int. Cl.³ B62M 1/16

[52] U.S. Cl. 280/242 WC; 74/141; 192/46; 280/244; 280/253; 297/DIG. 4

[58] Field of Search 280/211, 241, 242 R, 280/242 WC, 244, 246, 253, 255; 297/DIG. 4; 192/30 R, 46; 74/138, 141

[56] References Cited

U.S. PATENT DOCUMENTS

2,621,678 12/1952 Snyder et al. 74/141
3,309,110 3/1967 Bulmer 280/242 R
3,666,292 5/1972 Bartos 280/234
3,877,725 4/1975 Barroza 280/242 WC
3,994,509 11/1976 Schaeffer 280/242 WC
4,274,651 6/1981 Dumont 280/242 WC

FOREIGN PATENT DOCUMENTS

4473 of 1882 United Kingdom 280/253

Primary Examiner—Joseph F. Peters, Jr.

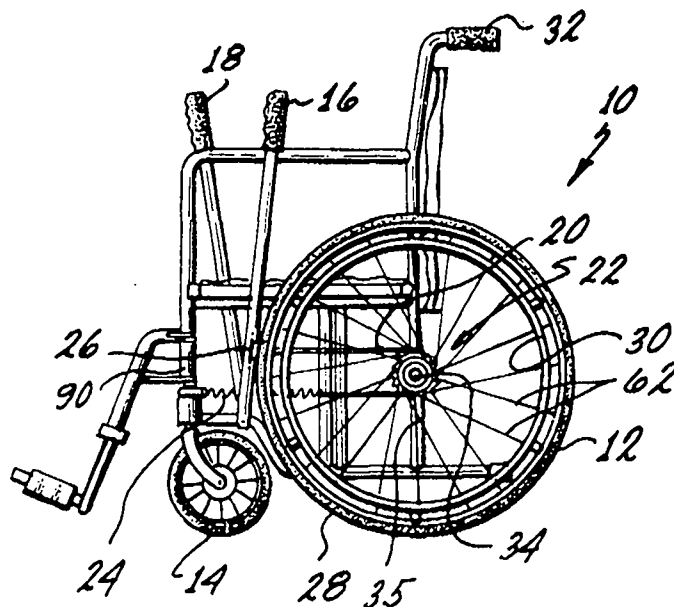
Assistant Examiner—D. Lynn Fugate

Attorney, Agent, or Firm—K. H. Boswell; Edward D. O'Brian

[57] ABSTRACT

A wheelchair having a frame capable of supporting the occupant includes a plurality of wheels including two driving wheels. Left and right side levers are mounted on the wheelchair such that the tops of the levers can be moved back and forth reciprocally toward and away from the occupant of the wheelchair. When the levers are in a position towards the occupant of the wheelchair, they are in a neutral position and by pushing away from the occupant from the neutral position to a displaced position, a power stroke is performed. Movement of the levers in the reverse direction back toward the occupant constitutes a return stroke of the same. A power transfer mechanism includes a first and second ratchet operatively associated with each of the driving wheels. The first ratchet allows the driving wheel to free wheel at all times in a forward direction. The second ratchet allows the driving wheel to free wheel in both a forward and reverse direction whenever the lever associated with that wheel is in the neutral position, and as the lever is moved in the power stroke away from the occupant, the second ratchet transfers this movement through the first ratchet to rotate the driving wheel in the forward direction. The second ratchet transfers no movement to the first ratchet as the lever moves back toward the occupant in the return stroke.

9 Claims, 7 Drawing Figures



United States Patent [19]**Herron**[11] **Patent Number:** **4,560,181**[45] **Date of Patent:** **Dec. 24, 1985**

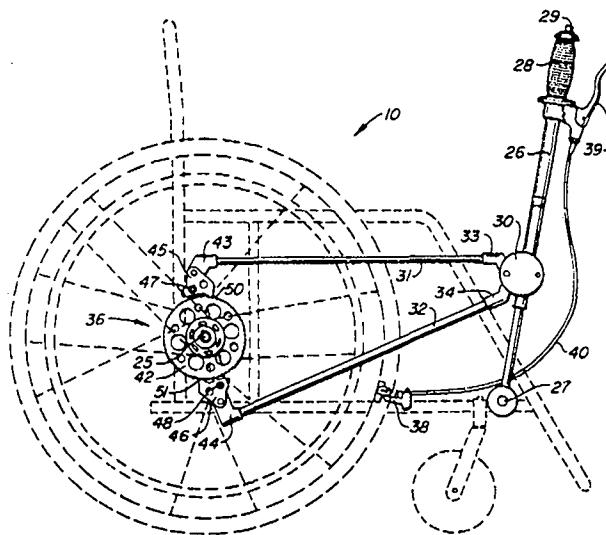
D4

[54] **WHEELCHAIR OPERATED BY HAND
PEDALLED RECIPROCATING MOTION**[75] **Inventor:** **Matthew A. Herron, Palo Alto, Calif.**[73] **Assignee:** **Design Loft, Inc., Palo Alto, Calif.**[21] **Appl. No.:** **576,068**[22] **Filed:** **Jan. 30, 1984**[51] **Int. Cl.⁴** **B62M 1/14**[52] **U.S. Cl.** **280/242 WC; 297/DIG. 4;**
280/244[58] **Field of Search** **280/244, 246, 255, 242 WC;**
297/DIG. 4[56] **References Cited****U.S. PATENT DOCUMENTS**

879,947	2/1908	Crecelius	280/246
1,332,819	3/1920	Eklund	280/246
4,354,691	10/1982	Saunders et al.	280/242 WC
4,358,126	11/1982	Mitchell et al.	280/242 WC

Primary Examiner—Joseph F. Peters, Jr.*Assistant Examiner*—Donn McGiehan*Attorney, Agent, or Firm*—Townsend and Townsend[57] **ABSTRACT**

A wheelchair and drive mechanism powered by reciprocating operation of a drive lever. The drive mechanism provides a continuously variable gear ratio allowing wheelchair operation at varying speeds and on differing inclines; and is readily fitted to a standard wheelchair by a drive-associated bayonet mount. A drive mechanism ratchet wheel includes an upper and lower radial crank secured for rotation thereabout by an axle. Each crank includes a pawl assembly that engages with circumferential ratchet wheel teeth to transfer drive energy supplied to the radial cranks from connecting arms to the ratchet wheel. The connecting arms are coupled to a reciprocating lever arm and operate in concert with the pawls to alternately engage with and transfer energy to the ratchet wheel, or disengage therefrom. While one connecting arm and associated pawl is transferring energy to the ratchet wheel, the other connecting arm is disengaging an associated pawl from the ratchet wheel. Energy is transferred during both a forward and rearward stroke of the lever arm to effect efficient wheelchair and drive operation.

19 Claims, 19 Drawing Figures

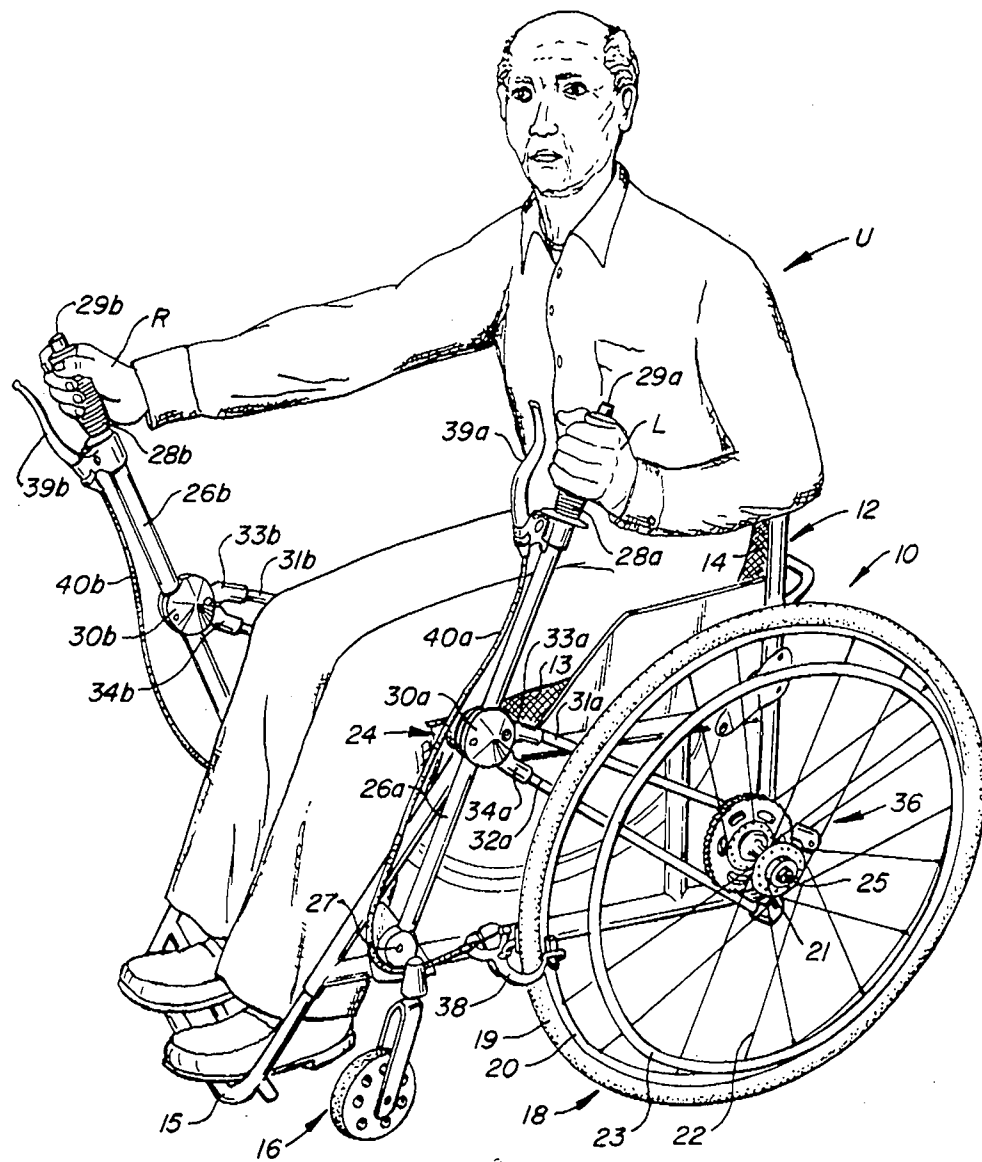


FIG. 1.

D4

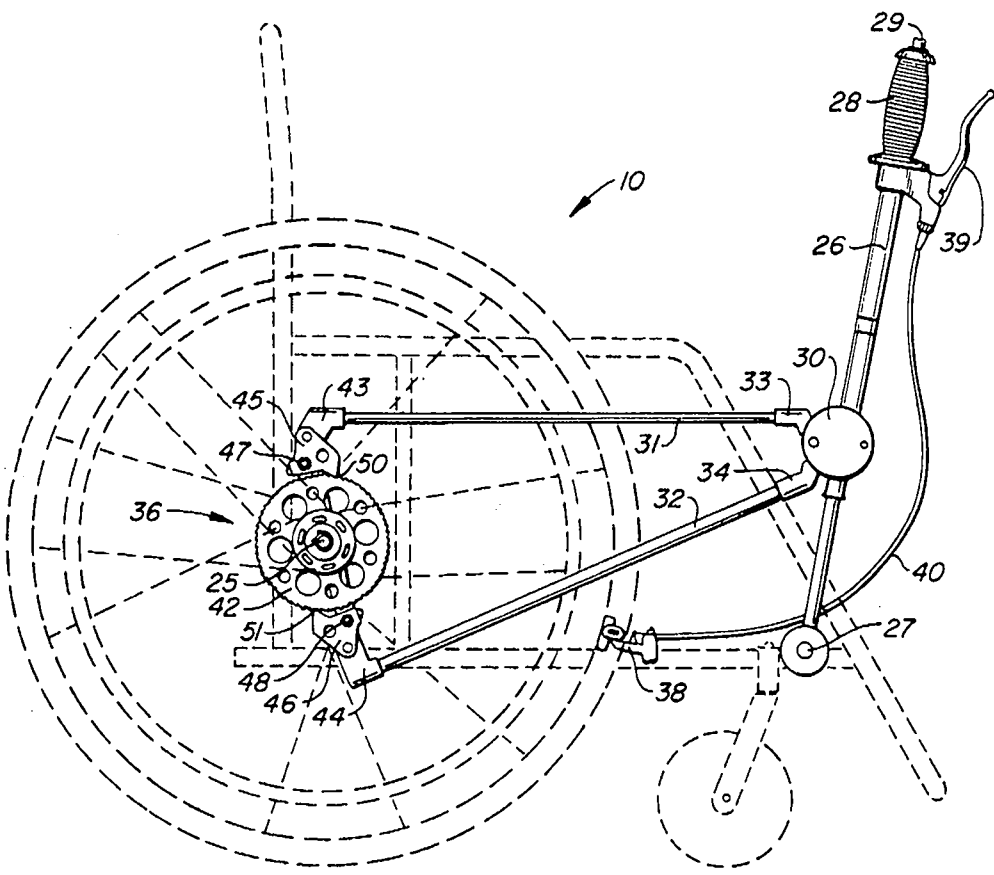


FIG. 2.

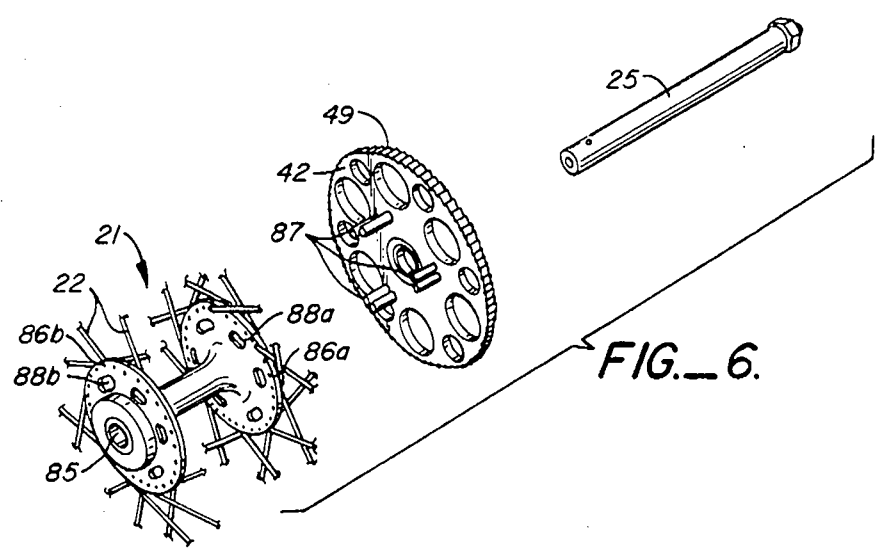


FIG. 6.

United States Patent [19]
Horn

[11] Patent Number: 4,811,964
[45] Date of Patent: Mar. 14, 1989

DS

- [54] WHEELCHAIR PROPELLED BY ROWING
[76] Inventor: Douglas J. Horn, 12813 Saint
Andrew Dr., Kansas City, Mo. 64145
[21] Appl. No.: 100,902
[22] Filed: Sep. 25, 1987
[51] Int. Cl.⁴ B62M 1/16
[52] U.S. Cl. 280/250.1; 188/2 F;
280/243; 280/246; 280/255; 297/DIG. 4
[58] Field of Search 280/241, 242 R, 242 WC,
280/243, 244, 246, 252, 253, 255; 297/DIG. 4;
188/2 F, 26

4,455,029 6/1984 Taylor .
4,560,181 12/1985 Herron .
4,632,414 12/1986 Ellefson .

FOREIGN PATENT DOCUMENTS

930676 6/1955 Fed. Rep. of Germany 280/246
362343 6/1906 France 280/243
558164 8/1923 France 280/243
929537 12/1947 France 280/242 R
2455540 1/1981 France 280/243
453544 12/1949 Italy 280/242 R

Primary Examiner—David M. Mitchell
Assistant Examiner—Charles R. Watts
Attorney, Agent, or Firm—Litman, McMahon & Brown

[56] References Cited

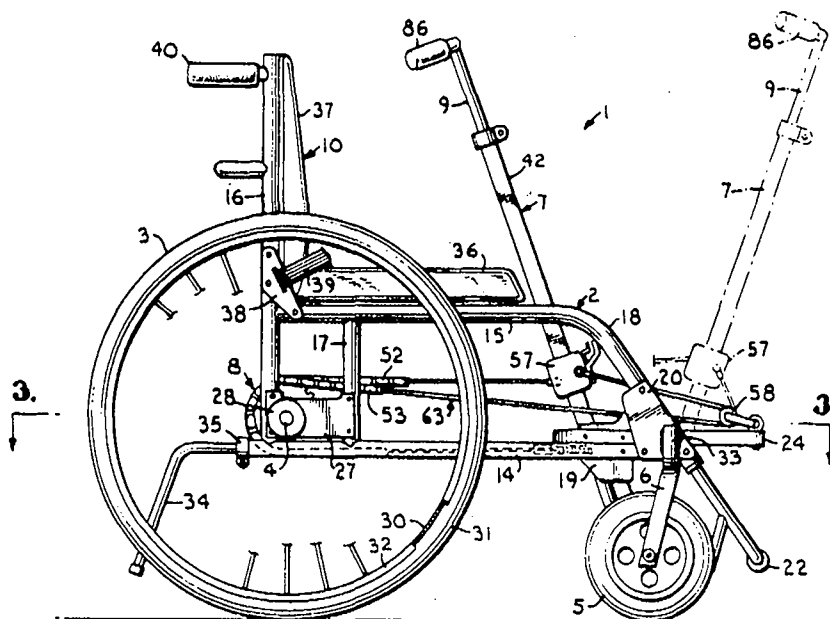
U.S. PATENT DOCUMENTS

838,228 12/1906 Williams 280/242 WC X
1,041,936 10/1912 Worthington 280/240
1,308,270 7/1919 Barrellier 280/240
2,578,828 12/1951 Nelson 280/242 WC
2,653,037 9/1953 Lassiter .
3,301,574 1/1967 Good .
3,563,568 2/1971 Sasse et al. .
3,666,292 5/1972 Bartos .
3,953,054 4/1976 Udden et al. .
3,994,509 11/1976 Schaeffer .
4,061,206 12/1977 Wood 188/26
4,272,096 6/1981 Efros .
4,300,784 11/1981 Efros .
4,305,600 12/1981 Mendez 280/243 X
4,316,616 2/1982 Boivin .
4,358,126 11/1982 Mitchell et al. .
4,421,334 12/1983 Efros .
4,453,729 6/1984 Lucken .

[57] ABSTRACT

A wheelchair propelled by rowing action includes a wheelchair frame with a pair of large main rear wheels connected by an axle, a rowing lever pivotally connected to the frame, a steering shaft with a handlebar grip mounted coaxially within the rowing lever and connected by a universal joint to a steering linkage connected to caster brackets mounting small front wheels, a pair of ratcheted sprockets mounted on the axle, a pair of sprocket chain segments connected by cables through pulleys to the rowing lever such that pulling and pushing of the rowing lever alternately causes driving engagement of one of the ratchets with the axles for propulsion and causes the other to slip. The leverage exerted by the rowing lever on the ratcheted sprockets is adjustable.

24 Claims, 3 Drawing Sheets



United States Patent [19]
Romero, Sr. et al.

[11] **Patent Number:** 4,865,344
 [45] **Date of Patent:** Sep. 12, 1989

D6

- [54] **WHEELCHAIR HAND PROPULSION APPARATUS**
- [75] **Inventors:** Bernardino S. Romero, Sr., Miami; Bruce D. Bayes, Treasure Island, both of Fla.
- [73] **Assignee:** E. Lakin Phillips, Herndon, Va.; a part interest
- [21] **Appl. No.:** 218,567
- [22] **Filed:** Jul. 13, 1988
- [51] **Int. Cl.⁴** B62M 1/04
- [52] **U.S. Cl.** 280/242; 280/304.1; 280/358; 74/142
- [58] **Field of Search** 280/242 R, 242 WC, 244, 280/236, 246, 25.2, 253, 255, 256, 289 WC, 257, 258; 74/142; 192/64, 47

- [56] **References Cited**
- U.S. PATENT DOCUMENTS**
- | | | | |
|-----------|---------|----------------|------------|
| 302,090 | 7/1884 | Bernhard | 280/244 |
| 838,228 | 12/1906 | Williams | 280/7.15 |
| 846,130 | 3/1907 | Muller | 280/246 |
| 1,058,173 | 4/1913 | Whitaker | 280/244 |
| 2,643,898 | 6/1953 | Everest et al. | 280/242 UC |
| 4,455,029 | 6/1984 | Taylor | 280/5.28 |
| 4,460,190 | 7/1984 | Spiess | 280/247 |

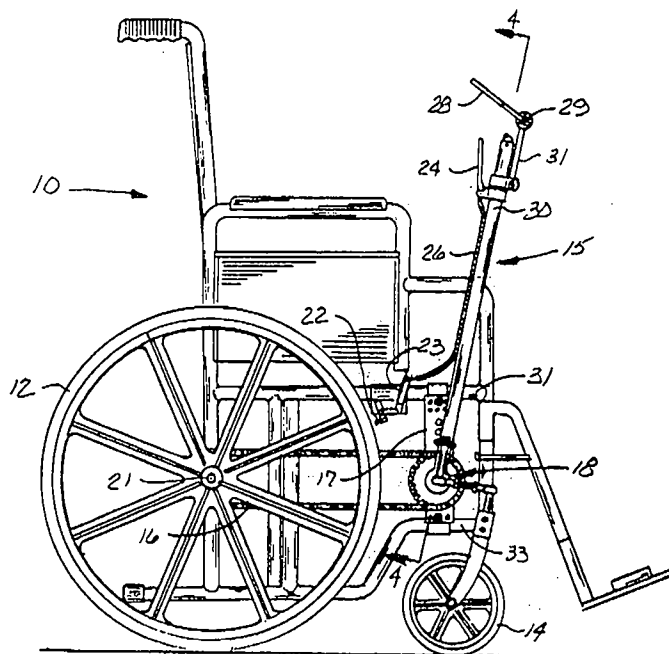
- | | | | |
|-----------|--------|---------|------------|
| 4,506,900 | 3/1985 | Korosue | 280/242 WC |
| 4,641,847 | 2/1987 | Busse | 280/242 WC |
| 4,652,026 | 3/1987 | Byrge | 280/242 WC |

Primary Examiner—Charles A. Marmor
Assistant Examiner—Richard Camby
Attorney, Agent, or Firm—Herbert W. Larson

[57] **ABSTRACT**

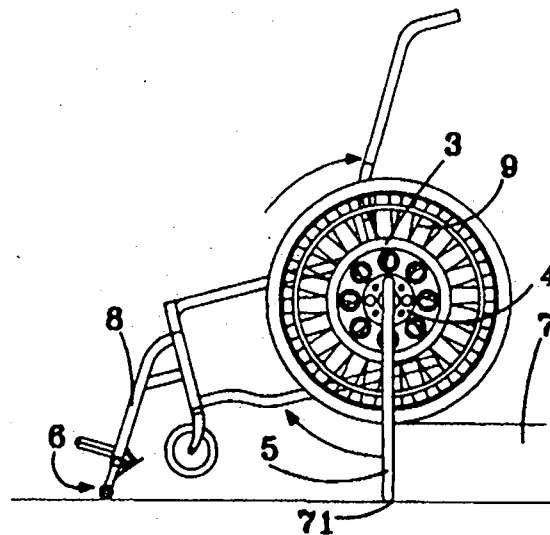
An apparatus or attachment to a wheelchair to allow a patient to move the chair in a forward, reverse, right or left direction. The apparatus comprises a push rod, spring mounted, actuating at a first end a pawl capable of engaging a ratchet axially mounted on a mounting plate attached to the side of the chair. A hand operated shift element activates a cam roller to move the push rod at a second end in a vertical direction. A bicycle type multi linked gear and chain connects the ratchet to the rear driving wheels of the chair. Movement of the push rod in its vertical position changes gears and a handle attached to the top of the push rod assembly permits movement of the chair by direct drive to the bicycle chain. A linkage connecting the push rod housing to the front mounted caster wheel allows the patient to move the caster wheels by turning the push rod handle connected to its housing.

7 Claims, 5 Drawing Sheets



[45] **Date of Patent:** Jul. 20, 1993

4 Claims, 6 Drawing Sheets



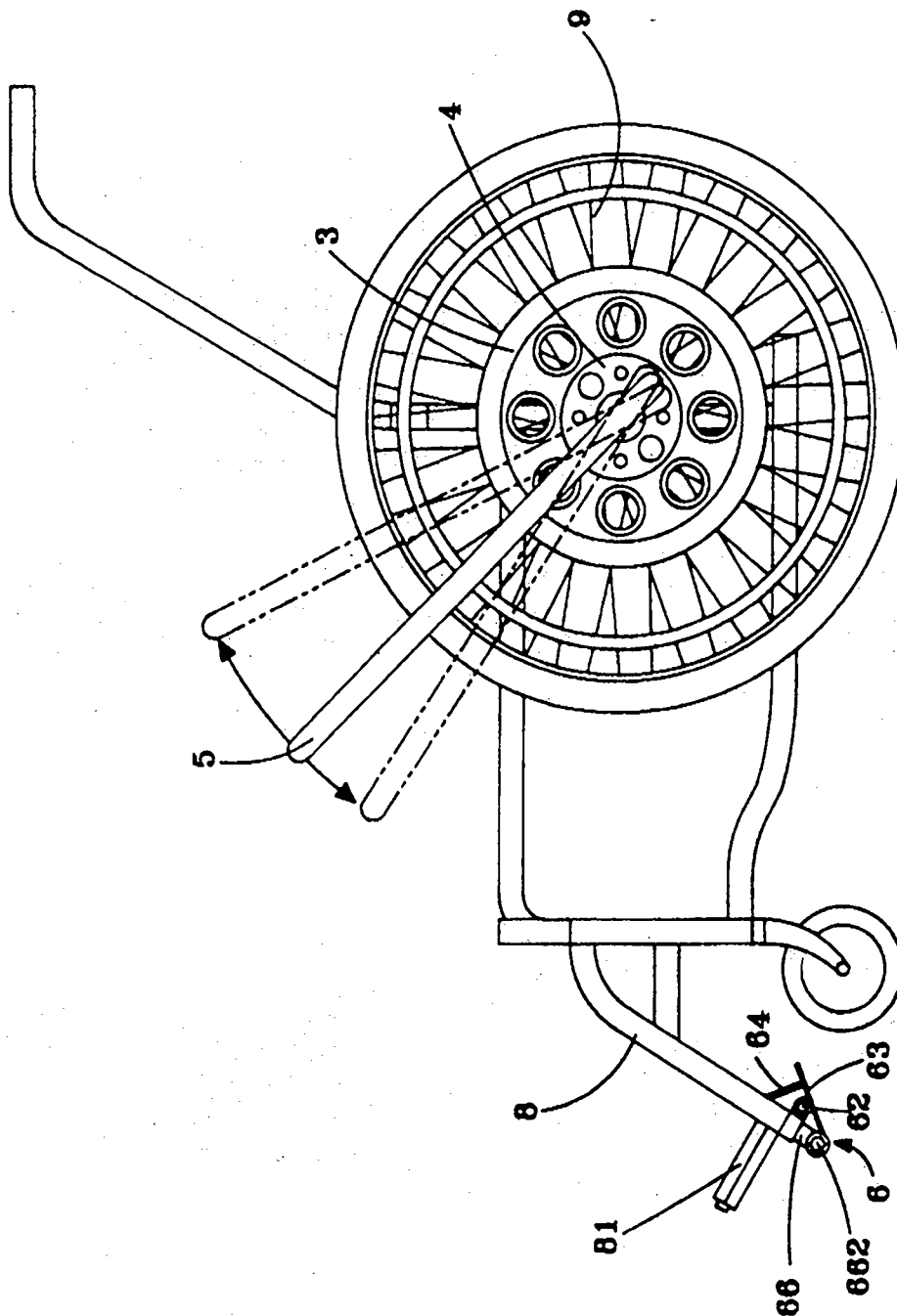


Fig. 3

WHEELCHAIR DRIVING MECHANISM

BACKGROUND OF THE INVENTION

The present invention relates to a wheelchair driving mechanism and relates more particularly to a hand-driven wheelchair driving mechanism for driving a wheelchair by the user.

An invalid person may have to use a supporting device such as a wheelchair or a crutch for moving or walking. A wheelchair is very helpful to those invalid people having problems on their legs. Various wheelchairs are known and designed for the use of invalids. These wheelchairs may be collapsible, lightweight, comfortable in use, or attractive in outer appearance, however, they commonly use a push rim fastened to each large wheel for pushing with the hand. These push rim needs much labor to rotate. Furthermore, these wheelchairs have no supporting means in helping the user passing over steps or obstacles in the way.

SUMMARY OF THE INVENTION

The present invention has been accomplished under the aforesaid circumstances. It is therefore one object of the present invention to provide a wheelchair driving mechanism which can be operated to continuously rotate the large wheels of a wheelchair with less labor. It is another object of the present invention to provide a wheelchair driving mechanism which can be operated by the wheelchair user to move the wheelchair over a step or an obstacle. It is still another object of the present invention to provide a wheelchair driving mechanism which can be used with any existing wheelchair.

According to one aspect of the present invention, a wheelchair driving mechanism is generally comprised of a circular casing fastened to the spokes of either large wheel of a wheelchair by chucks, a circular table connected to the circular casing and controlled to rotate in one direction by a ratchet wheel mechanism, and a driving disk fastened to the circular table for rotating the respective large wheel by the hand, wherein the driving disk has a rim for pushing with the hand, and a plurality of circular recessed for rotating the driving disk with the fingers continuously. According to another aspect of the present invention, a hand lever is fastened to the driving disk for rotating the respective large wheel with less labor and for supporting the wheelchair on the ground permitting the wheelchair to be moved over an obstacle. According to still another aspect of the present invention, an adjustable foot plate stand with rollers is fastened to either hanger bracket of the wheelchair below the respective foot plate for supporting the wheelchair in moving over an obstacle.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded view of a wheelchair driving mechanism according to the present invention;

FIG. 2 shows the structure of the ratchet wheel mechanism in an enlarged scale;

FIG. 3 shows the wheelchair rotated to move by a hand lever according to the present invention;

FIG. 4 shows the wheelchair moved on a flat ground;

FIG. 5 shows the wheelchair moved to the step with the hand lever stopped against the riser of the step;

FIG. 6 shows the position of the wheelchair supported on the hand lever and moved to the top edge of the step;

FIG. 7 shows the wheelchair moved over the step; FIG. 8 is an exploded view of an adjustable foot plate stand according to the present invention; and

FIG. 9 is an assembly view of the adjustable foot plate stand fastened to the hanger bracket.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the annexed drawings in detail a wheelchair driving mechanism as constructed in accordance with the present invention is generally comprised of a ratchet wheel mechanism 1, a circular casing 2, a driving disk 3, a circular table 4, a hand lever 5, and an adjustable foot plate stand 6. Of course, two wheelchair driving mechanisms should be used and respectively attached to the two large wheels of a wheelchair for steering control.

Referring to FIGS. 1, 2 and 3, the driving disk 3 comprises a rim 33, a plurality of circular recesses 31 equiangularly spaced from one another within the rim 33, a plurality of bolt holes 35 and through holes 36 alternatively formed on a center bearing 34 thereof around a circle and respectively and equidistantly spaced from one another. The ratchet wheel mechanism 1 is fixedly fastened in a center hole (not shown) on the circular table 4. The circular table 4 has a plurality of bolt holes 41 and through holes 42 at locations corresponding to the bolt holes 35 and through holes 36 on the driving disk 3. By threading screw bolts 32 through the bolt holes 35 on the driving disk 3 into the bolt holes 41 on the circular table 4, the circular table 4 is fastened to the driving disk 3 at one side. As the circular table 4 has been connected to the driving disk 3, the through holes 42,36 are respectively aligned. The ratchet wheel mechanism 1 is comprised of a hollow shaft 12 extended out of the circular table 4 and inserted into a hole (not shown) on the circular casing 2 and locked in place by a lock device (not shown). Therefore, the driving disk 3 and the circular table 4 become fastened to the circular casing 2 by the ratchet wheel mechanism 1. The circular casing 2 has a plurality of radial chucks 21 on a back side thereof, of which each has a spoke slot 22, which receives a respective spoke 9 of the adjacent large wheel A, and a plurality of bolt holes 23 through the spoke slot 22. As the radial chucks 21 have been respectively mounted on respective spokes 9 of the adjacent large wheel A, screw bolts (not shown) are respectively threaded into the bolt holes 23 on each radial chuck 21 to lock the circular casing 2 to the spokes 9 of the adjacent large wheel A. The hand lever 5 is made from an angle bar comprised of a transverse rod 52 and vertical rod 51. The vertical rod 51 of the hand lever 5 comprises a hand pad 55 adjacent to a top end thereof connected to the transverse rod 52, and two perpendicular plug rods 53, 54 spaced adjacent to a bottom end thereof. By inserting the perpendicular plug rods 53,54 through two opposed through holes 36 on the driving disk 3 into two corresponding through holes 42 on the circular table 4, the hand lever 5 is connected to the driving disk 3 and the circular table 4. As illustrated in FIG. 2, the ratchet wheel mechanism 1 is comprised of a plurality of catches 14 retained inside a toothed hole 11 by respective springs 13. Rotating the ratchet wheel mechanism 1 clockwise causes it to run idle. Rotating the ratchet wheel mechanism 1 counter-clockwise causes it rotate the driving disk 3. When two wheelchair driving mechanisms of the present invention have been fastened to the two large wheels of a wheelchair, the

ratchet wheel mechanism of one wheelchair driving mechanism should be fastened in reverse direction against the ratchet wheel mechanism of the other wheelchair driving mechanism, and therefore the wheelchair can be rotated on its own axis. The ratchet wheel mechanism 1 is of the known art and not within the scope of the present invention, therefore no further description is given. By means of the operation of the ratchet wheel mechanism 1, the user can move the wheelchair by continuously pushing the rim 33 of the driving disk 3 or inserting fingers into either circular recess 31 and rotating it, when the hand lever 5 is not used. For changing the steering direction, the driving wheel 3 of one wheelchair driving mechanism is held tightly in the hand and the driving wheel 3 of the other wheelchair driving mechanism is rotated. The hand lever 5 may be fastened to the driving disk 3 of the respective wheelchair driving mechanism for rotating the driving disk 3 in driving the wheelchair with less labor (see FIG. 3).

Referring to FIGS. 4, 5, 6 and 7, by stopping the transverse rod 52 of the hand lever 5 against the riser 71 of the step 7 then rotating the driving disk 3 to move the wheelchair, the wheelchair can be conveniently moved over the step 7 by the user.

Referring to FIGS. 8 and 9, the adjustable foot plate stand 6 is comprised of a camp 61, a follower plate 63 and an extension leg 66. The clamp 61 is mounted on the respective hanger bracket 8 below the foot plate 81 with two opposite eye ends 661 attached together and fastened to two spaced lugs 631 on the follower plate 63. By inserting a bolt 62 through the hole 632 on each lug 631 and the eye ends 661 of the clamp 61 then screwed up with a locknut 621, the two opposite eye ends 661 of the clamp 61 is retained in between the two spaced lugs 631 of the follower plate 63, and therefore the follower plate 63 becomes pivoted to the clamp 61. The follower plate 63 has a perpendicular rod 633 adjacent to a top end thereof connected to the foot plate 81 by a compression spring 64. The extension leg 66 has a top end inserted into an axial hole (not shown) on the bottom edge of the hanger bracket 8 and a bottom end coupled with two opposite rollers 664,665 by a bolt 662 and a locknut 663. The extension leg 66 further comprises a plurality of notches 661 at different levels. By stopping the bottom edge of the follower plate 63 against either notch 661, the extension leg 66 is prohibited from being moved back into the hanger bracket 8. By means of removing the bottom edge of the follower plate 63 from the notch 661, the extension leg 66 can be adjusted to the desired height. Of course, stop means may be used to secure the top end of the extension rod 66 inside the hanger bracket 8, and therefore the extension leg 66 does not disconnect from the hanger bracket 8. As the extension leg 66 has been adjusted to a proper height, the rollers 664,665 are movably supported on the ground to help the user in moving the wheelchair over a step or an obstacle.

I claim:

1. A wheelchair driving mechanism comprising:
 - a circular casing having a plurality of radial chucks fastened to spokes on either large wheel of a wheelchair, said radial chucks each having a spoke slot, which receives a respective spoke, and bolt holes through the spoke slot, through which screw bolts are respectively inserted and locked with a respective locknut to fasten the respective chuck to the respective spoke;
 - a circular table having a ratchet wheel mechanism fastened to said circular casing for permitting the circular table to be driven to rotate said circular casing as the circular table is rotated in one direction and for permitting the circular table to run idle as the circular table is rotated in the reverse direction, a plurality of through holes and a plurality of bolt holes alternatively arranged around a circle and equiangularly spaced from one another;
 - a driving disk having a rim for pushing with a hand, a plurality of bolt holes and a plurality of through holes alternatively made around a center bearing thereof, and a plurality of circular recesses around said bearing within said rim, the bolt holes on said driving disk being respectively fastened to the bolt holes on said circular table by screw bolts and locknuts, the through holes on said driving disk being respectively aligned with the through holes on said circular table; and
 - an adjustable foot plate stand fastened to either hanger bracket of said wheelchair below the respective foot plate, said adjustable foot plate stand comprising an extension leg inserted in an axle hole on the respective hanger bracket, a follower plate having a middle part pivoted to the respective hanger bracket by a clamp and a bolt and locknut set, and, a top end fastened to the respective foot plate by a compression spring, and a bottom end controlled to stop said extension leg in place.
2. The wheelchair driving mechanism of claim 1 wherein the radial chucks are spaced from one another according to the interval in the spokes of the respective large wheel of the wheelchair.
3. The wheelchair driving mechanism of claim 1 which further comprises a hand lever fastened to said driving disk for rotating the respective large wheel of the wheelchair through said driving disk, said circular table and said circular casing, said hand lever being made from an angle rod consisting of a transverse rod and a vertical rod, said vertical rod having a hand pad at a higher position and two spaced perpendicular plug rods at lower positions, each perpendicular plug rod being inserted in either through hole on said driving disk and the corresponding through hole on said circular table.
4. The wheelchair driving mechanism of claim 1 wherein said extension leg has a bottom end coupled with at least one roller.

* * * * *

48



US005743544A

D8

United States Patent [19]

Weaver

[11] Patent Number: 5,743,544

[45] Date of Patent: Apr. 28, 1998

[54] **WHEELCHAIR DRIVE SYSTEM WITH RATCHET AND WHEEL LOCK**

5,301,971 4/1994 Brereton 280/250.1
5,362,081 11/1994 Beidler et al. 280/250.1

[76] Inventor: **Michael J. Weaver**, 105 Airport Rd.,
Lot 145, St. Simons Island, Ga. 31522

Primary Examiner—Andrew C. Pike

[57] ABSTRACT

[21] Appl. No.: 656,105

[22] Filed: May 31, 1996

[51] Int. Cl.⁶ B62M 1/14

[52] U.S. Cl. 280/249; 280/250.1; 297/DIG. 4;
188/2 F; 74/384; 74/405

[58] Field of Search 280/249, 250.1,
280/304.1; 297/DIG. 4; 74/384, 405; 188/2 F,
82.1, 82.3, 82.5

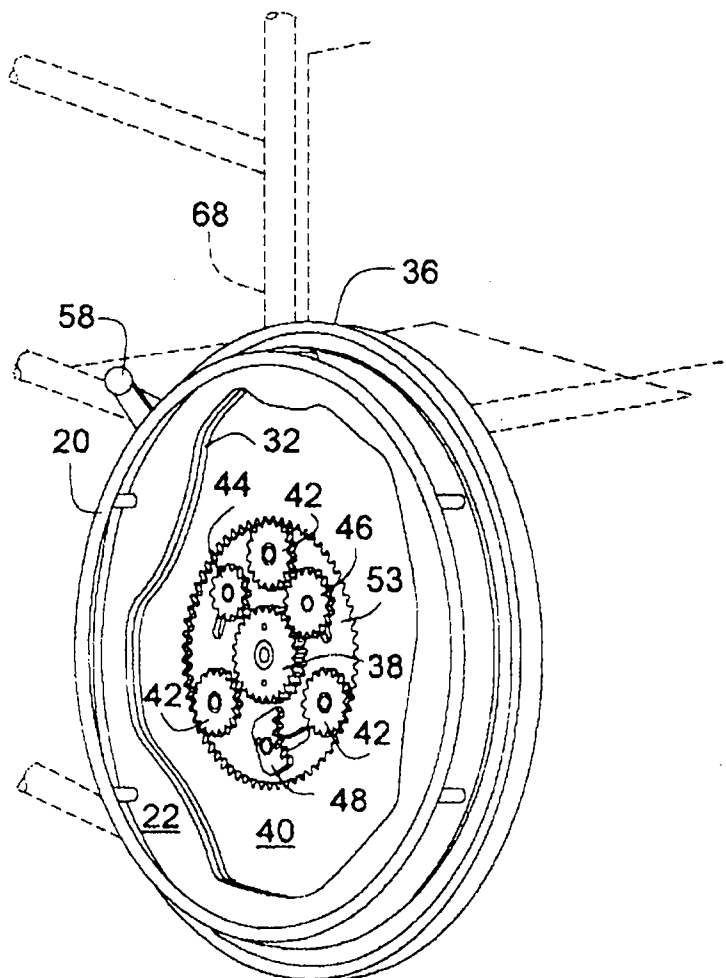
[56] References Cited

U.S. PATENT DOCUMENTS

3,563,568	2/1971	Sasse et al.	280/230
4,274,650	6/1981	Gilles	280/249 X
4,727,965	3/1988	Zach et al.	192/6 A
5,037,120	8/1991	Parisi	280/250.1
5,160,156	11/1992	Menoos	280/250.1
5,211,414	5/1993	Galumbeck	280/250.1
5,236,398	8/1993	Barnett	474/149

An improved wheelchair wheel and hub assembly is described that interposes reduction gearing between the handring or rotatable hand wheel and the drivewheel of the assembly. This gearing provides some mechanical advantage to users who may lack sufficient strength to propel themselves in a conventional wheelchair, especially in a home environment. A single speed assembly is described which is operated conventionally by rotating handrings either forward or rearward to produce a corresponding rotation of the drive wheel but, unlike conventional wheels, a complete revolution of the handring results in only a partial revolution of the drive wheel. In the hub of the assembly is a wheel locking mechanism which enables the wheel to be easily and positively locked for the safety of the user, preventing rotation of the wheel in either direction. Additionally, a ratcheting mechanism is incorporated into the hub design which can be engaged to allow forward rotation but prevent rearward rotation of the drive wheels.

12 Claims, 4 Drawing Sheets



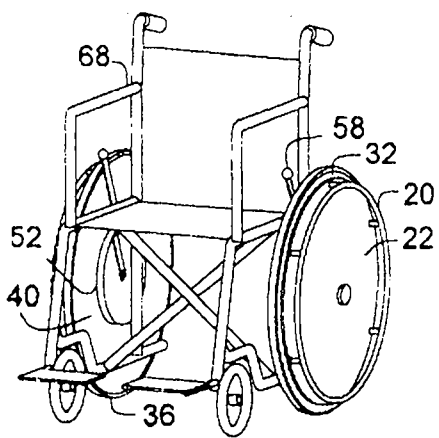


FIG. 1

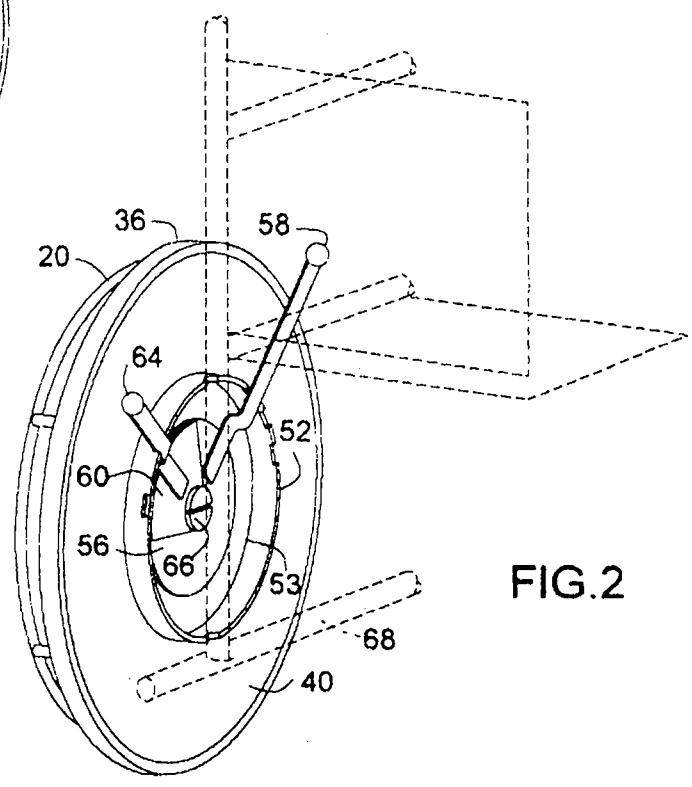


FIG. 2

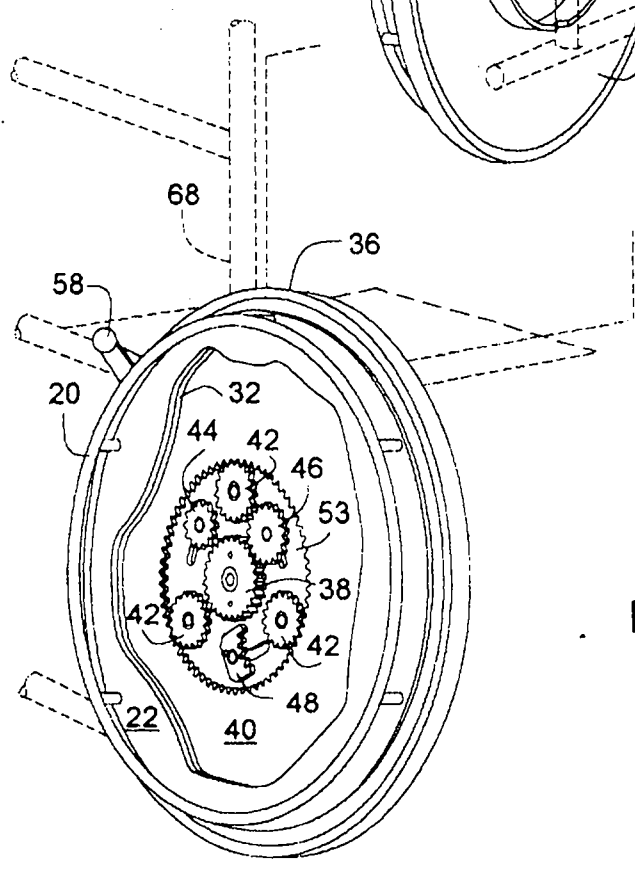


FIG. 3

50



D9

18 BUNDESREPUBLIK
DEUTSCHLAND



DEUTSCHES
PATENT- UND
MARKENAMT

12 Offenlegungsschrift
10 DE 197 57 270 A 1

51 Int. Cl.⁶:
A 61 G 5/02
B 62 B 5/04
B 62 B 5/06

21 Aktenzeichen: 197 57 270.7
22 Anmeldetag: 22. 12. 97
43 Offenlegungstag: 1. 7. 99

DE 197 57 270 A 1

71 Anmelder:
Kutsche-Schilling, Gottfried, 45468 Mülheim, DE

72 Erfinder:
Kutsche, Heinrich, 35039 Marburg, DE

65 Für die Beurteilung der Patentfähigkeit in Betracht
zu ziehende Druckschriften:

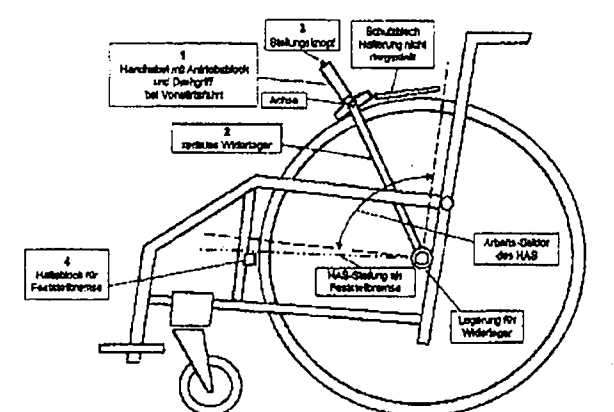
DE	31 08 676 A1
DE	26 42 278 A1
US	52 63 729
US	52 32 236
US	50 36 959
EP	01 29 426 A2
EP	00 67 035 A1

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

Prüfungsantrag gem. § 44 PatG ist gestellt

54 Handantriebssystem für Rollstuhl-Selbstfahrer

57 Das Handantriebssystem für Rollstuhl-Selbstfahrer besteht aus dem Handhebel mit Antriebsblock (1); die eine starre Einheit bilden und beweglich über eine Achse mit dem radialen Widerlager (2) verbunden sind; beidseitig angebracht.
Das radiale Widerlager sitzt beweglich über der Achsaufnahme des Antriebsrades.
Das radiale Widerlager stellt die Verbindung zwischen dem Handhebel mit Antriebsblock und der Radaufnahme her.
Durch die Wirkungsweise des Handhebels mit Antriebsblock mit dem radialen Widerlager wird auf die Lauffläche des Rades eine Reibungskraft erzeugt, die den Schlupf zwischen Antriebsblock und Lauffläche verhindert.
Die weitere Bewegung der Hand am Handhebel erzeugt die Drehung des Rades.
Mit der Reibungskraft lassen sich durch Bedienung des Handhebels mit Antriebsblock und radialem Widerlager auch Bremskräfte erzeugen.
Der Stellungsknopf (3) löst den Handhebel mit Antriebsblock aus seiner Arretierung, so daß er (1) beliebig aus der Mittelstellung in die Vorwärts- oder Rückwärtsstellung gebracht werden kann.
Durch Einrasten des Handhebels mit Antriebsblock im Halteblock (4) wird das HAS zur Feststellbremse.



DE 197 57 270 A 1

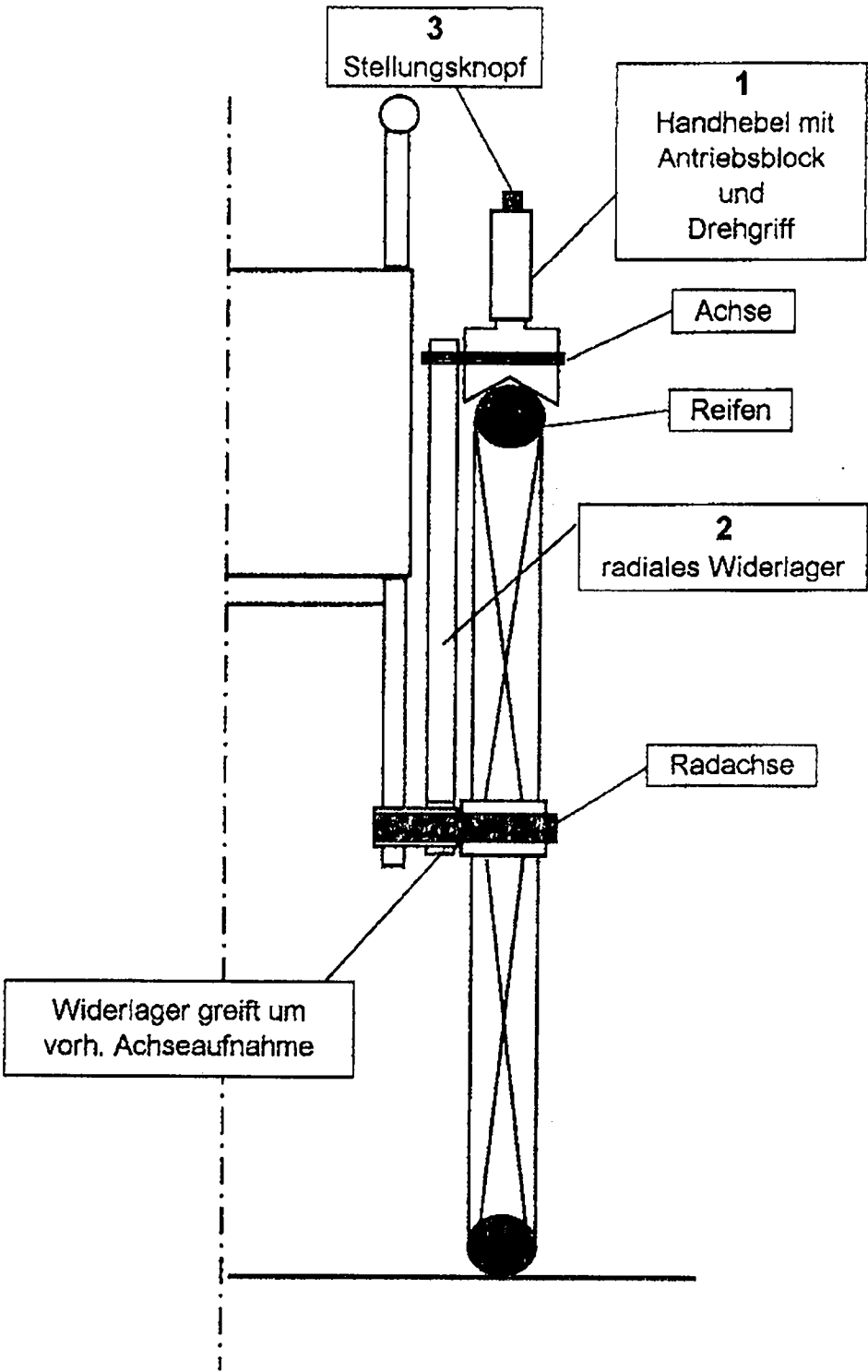


Bild 2

52

Dg

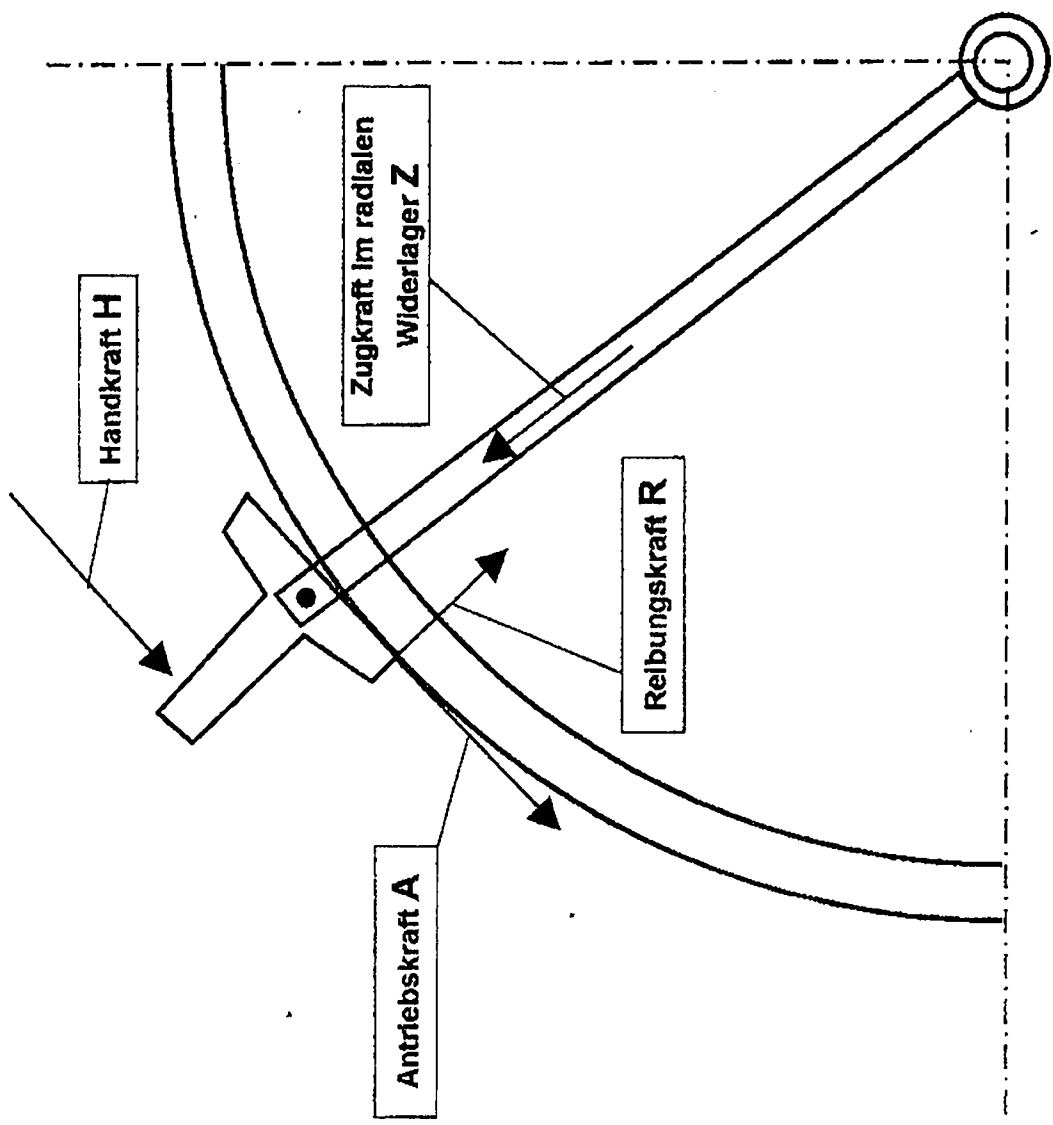


Bild 3