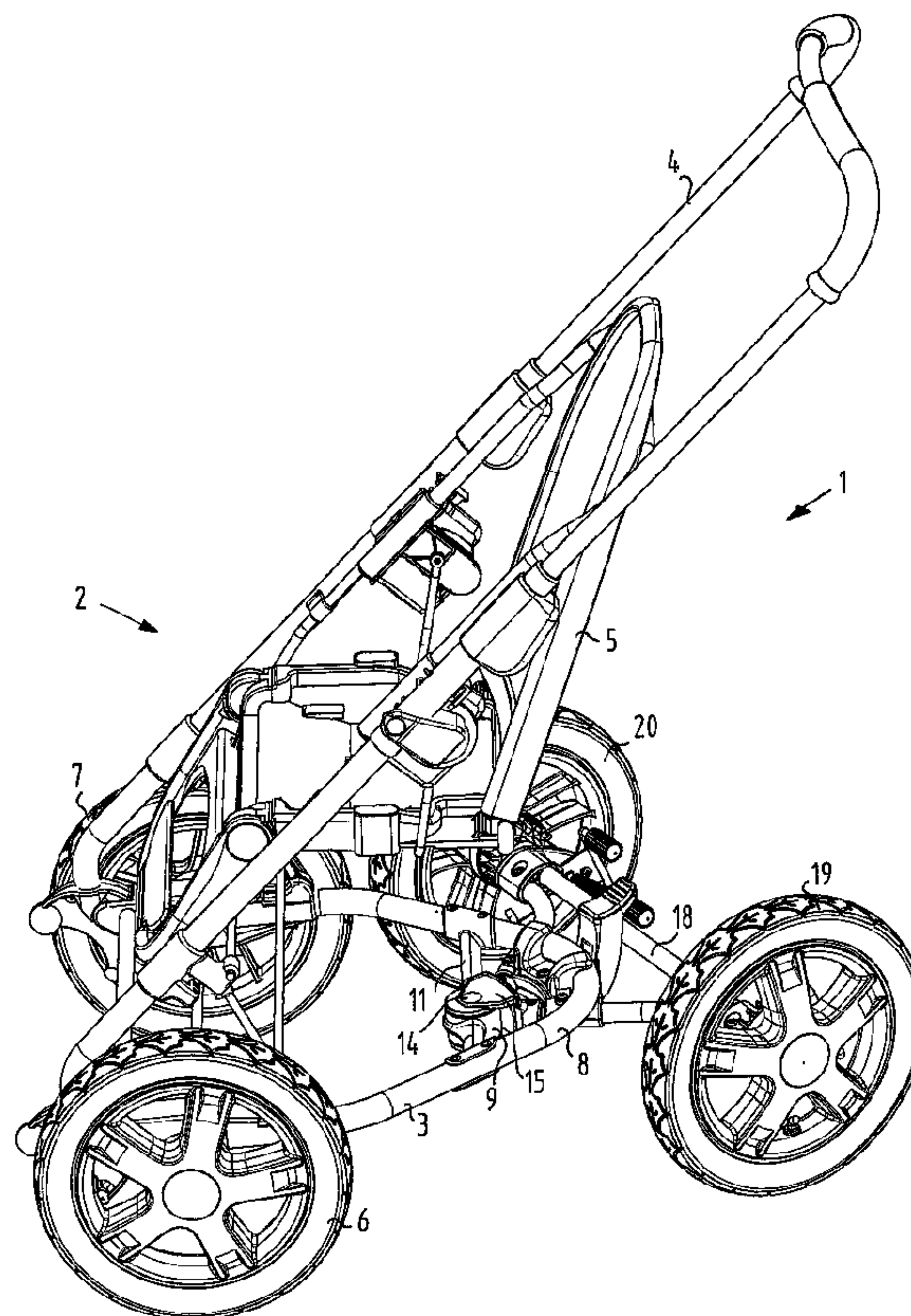




(86) Date de dépôt PCT/PCT Filing Date: 2001/07/24
(87) Date publication PCT/PCT Publication Date: 2002/02/21
(45) Date de délivrance/Issue Date: 2009/06/30
(85) Entrée phase nationale/National Entry: 2003/01/24
(86) N° demande PCT/PCT Application No.: NL 2001/000573
(87) N° publication PCT/PCT Publication No.: 2002/014135
(30) Priorités/Priorities: 2000/07/26 (NL1015809);
2001/04/27 (NL1017961)

(51) Cl.Int./Int.Cl. *B62B 7/04* (2006.01)
(72) Inventeurs/Inventors:
DRIESSEN, FRANCISCUS JOHANNES CORNELUS,
NL;
BOST, BART WILLEM JOZEF, NL
(73) Propriétaire/Owner:
MUTSY B.V., NL
(74) Agent: FETHERSTONHAUGH & CO.

(54) Titre : POUSSETTE A ROUES DIRECTRICES
(54) Title: BABY-CARRIAGE WITH STEERABLE WHEELS



(57) Abrégé/Abstract:

The invention relates to a hand-propelled vehicle for passenger transport, in particular a pushchair, comprising a chassis with at least three wheels, at least two of which are pivotally connected to the chassis, wherein the pivotable wheels are connected by at least one shaft which is pivotally connected to a fixed part of the chassis. The pivotable wheels are further situated behind the at least one fixed wheel as seen in the direction of travel of the vehicle, and the pivot connection of the shaft to the fixed part of the chassis is situated in front of the shaft as seen in the direction of travel. It is thus possible to arrange a steering function in frame constructions where there is no room for pivotable front wheels.



(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
21 February 2002 (21.02.2002)

PCT

(10) International Publication Number
WO 02/14135 A1(51) International Patent Classification⁷: **B62B 7/04**

(21) International Application Number: PCT/NL01/00573

(22) International Filing Date: 24 July 2001 (24.07.2001)

(25) Filing Language: Dutch

(26) Publication Language: English

(30) Priority Data:

1015809	26 July 2000 (26.07.2000)	NL
1017961	27 April 2001 (27.04.2001)	NL

(71) Applicant (for all designated States except US): **MUTSY B.V.** [NL/NL]; Nieuwkerksedijk 14, NL-5051 HT Goirle (NL).

(72) Inventors; and

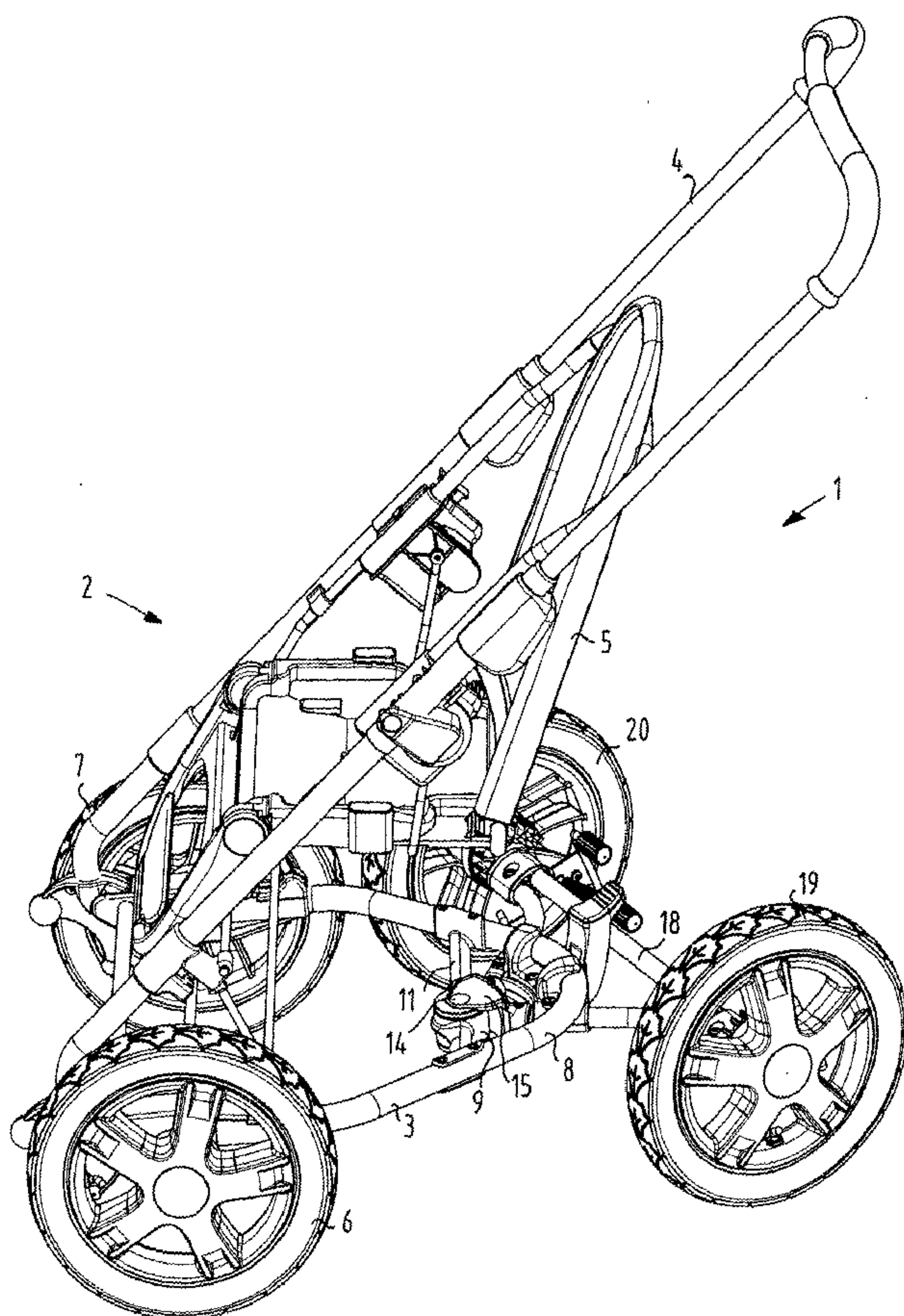
(75) Inventors/Applicants (for US only): **DRIESSEN, Franciscus, Johannes, Cornelus** [NL/NL]; Hogewal 124, NL-5053 AT Goirle (NL). **BOST, Bart, Willem, Jozef** [NL/NL]; Ruiterij 8 B, NL-6221 EW Maastricht (NL).

(74) Agent: **EVELEENS MAARSE, Pieter**; Arnold & Siedsma, Sweelinckplein 1, NL-2517 GK The Hague (NL).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

[Continued on next page]

(54) Title: BABY-CARRIAGE WITH STEERABLE WHEELS



(57) Abstract: The invention relates to a hand-propelled vehicle for passenger transport, in particular a pushchair, comprising a chassis with at least three wheels, at least two of which are pivotally connected to the chassis, wherein the pivotable wheels are connected by at least one shaft which is pivotally connected to a fixed part of the chassis. The pivotable wheels are further situated behind the at least one fixed wheel as seen in the direction of travel of the vehicle, and the pivot connection of the shaft to the fixed part of the chassis is situated in front of the shaft as seen in the direction of travel. It is thus possible to arrange a steering function in frame constructions where there is no room for pivotable front wheels.

WO 02/14135 A1

WO 02/14135 A1

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

21766-1047

1

BABY-CARRIAGE WITH STEERABLE WHEELS

The invention relates to a hand-propelled vehicle for passenger transport, in particular a pushchair, or perambulator comprising a chassis with at least three
5 wheels, at least two of which are pivotally connected to the chassis.

Such a vehicle is generally known in the form of a pushchair, a buggy, a stroller or a wheelchair.

There are two types of pushchair, i.e. with
10 relatively small solid wheels such as buggies, and with relatively large wheels with pneumatic tires such as strollers. The latter type, which is marketed by applicant under the name Freerider, is becoming increasingly popular.

Pushchairs with small wheels are often provided
15 with steerable, or in fact co-steering wheels. These wheels are then embodied as castors and are generally arranged at the front of the pushchair.

The large wheels with pneumatic tires are generally not steerable since pivot-mounting of large wheels
20 is more difficult, and a conventional pivot construction would be voluminous and expensive. A pivotally mounted wheel is furthermore not very stable during reverse movement of the vehicle.

An aspect of the invention is to provide a vehicle
25 of the above described type which can be manufactured relatively simply and at low cost, and which in particular takes up little space in the folded-down position and which moreover has an excellent forward movement stability.

The invention relates to such a vehicle wherein
30 the pivotable wheels are connected by at least one shaft

21766-1047

1a

which is pivotally connected to the fixed part of the chassis.

The invention also relates to hand-propelled vehicle for passenger transport comprising a chassis with at least three wheels, at least two of which are pivotally connected to the chassis by at least one shaft which is pivotally connected to a fixed part of the chassis, wherein the pivotable wheels are situated behind the at least one fixed wheel as seen in the direction of travel of the vehicle, and the pivot connection of the shaft of the fixed part of the chassis is situated in front of the shaft as seen in the direction of travel, wherein a slidable support bearing is placed between the pivotable shaft and the pivot connection.

Although the invention is intended in the first instance for pushchairs, it can also be applied to other hand-propelled vehicles, such as wheelchairs.

A better forward movement stability is obtained by placing the pivotable wheels together on a shaft.

According to another preferred embodiment the pivotable wheels are situated behind the at least one
5 fixed wheel in the direction of travel of the vehicle, and the pivot connection of the shaft to the fixed part of the chassis is situated in front of the shaft as seen in the direction of travel.

This measure also results in an improved stability,
10 especially during reverse travel.

According to a further preferred embodiment the distance between the pivot point and the shaft is in the order of magnitude of half the distance between the pivotable wheels.

15 Unexpectedly, this dimensioning measure also results in an increase in stability.

A specific preferred embodiment known from NL 1015809 provides for the arranging of a rolling bearing in the pivot point.

20 The pivot point is after all heavily loaded. By providing a rolling bearing these loading forces can be absorbed well without this resulting in excessive wear.

Yet another preferred embodiment provides a slidable support bearing between the pivotable shaft and
25 the pivot connection.

This support bearing also serves to absorb the great forces and moments which act on the pivot connection. By placing the support bearing at a considerable distance from the pivot point large moments
30 can be absorbed with relatively small forces and pressures, thereby reducing wear.

An even more specific embodiment provides for the arranging of a rolling bearing in the support bearing, which support bearing is adapted to absorb at least a
35 part of the normal force between the pivotable shaft and the pivot connection.

Tests have taught that the load on the support bearing proved to be greater than supposed. Pivoting can take place more easily through the arranging of rolling
40 bearings, so that the travel comfort is improved.

In order to further improve comfort and to increase the rigidity of the frame, the support bearing is provided with two rolling bearings, the axis of which encloses an angle which is greater than 30°.

5 According to yet another preferred embodiment the vehicle comprises friction-increasing means which comprise at least one friction member connected to the pivotable shaft or the fixed part of the chassis and engaging on the fixed part or the shaft.

10 The pivoting of the pivotable wheels hereby becomes subject to friction, so that with careful adjustment this measure also increases the stability. This would seem to conflict with the arrangement of rolling bearings in the support bearing, but the rolling
15 bearings serve to absorb normal forces and to reduce wear, while the friction-increasing means serve to form a defined friction force during pivoting.

According to yet another preferred embodiment the vehicle comprises means for fixing the pivot connection
20 in a determined position between the shaft and the fixed part of the chassis.

The pivoting of the wheels is blocked with these measures, so that a carriage is obtained with the travel performance of a classic pushchair. It is self-evident
25 however that for this purpose the pivoting means must be fixed in the pivot position.

According to yet another preferred embodiment the fixation means comprise at least one movable blocking member connected to the pivotable shaft or the fixed
30 part of the chassis and co-acting with the fixed part or the pivotable shaft, which member is biased to its blocking position.

The present invention will be elucidated hereinbelow with reference to the annexed figures, in
35 which:

figure 1 is a perspective view of a pushchair according to the present invention;

figure 2 is a partly broken away perspective detail view of the pushchair shown in figure 1;

40 figure 3 shows a view corresponding with figure 2 in another position; and

figure 4 shows a view corresponding with figure 3 of an embodiment wherein rolling bearings are arranged in the support bearing.

Figure 1 shows a pushchair 1. Pushchair 1 comprises
5 a frame 2 which is formed by a V-shaped tube part 3 to which is fastened a substantially U-shaped, obliquely extending push bracket 4. Push bracket 4 is connected to V-shaped tube part 3 by means of a folding mechanism not shown in the drawing. It is possible by means of the
10 folding mechanism to carry the push bracket 4 to the practically horizontal position so as to reduce the volume of the pushchair. Push bracket 4 can moreover be pressed in by means of telescopic tubular parts accommodated therein.

15 For the further components of the frame and their functions, further reference is made to Netherlands patent application number 9400645. The components in question will not be described in full since they do not form part of the present invention.

20 A carrier element 5 for a child to be transported in the pushchair is further fixed to push bracket 4. The carrier element shown in figure 1 is formed by a seat manufactured from soft material which is suitable for transporting children from the age at which they can
25 sit. For transport of smaller children use can be made of a different type of child carrier fastened to the V-shaped tube part, for instance a carrycot.

Wheels provided with pneumatic tires are further mounted rotatably on the V-shaped tube part.

30 The top of V-shaped tube part 3 is embodied in the form of a bend, the central line of which extends in a circular arc. A bearing bush 9 is arranged fixedly with the V-shaped tube part in the centre of said circular arc. Bearing bush 9 is connected to V-shaped tube part 3
35 by means of two connecting rods 10,11.

A shaft 14 extends through bearing bush 9. On both sides of bearing bush 9 the shaft 14 is connected to an ear-shaped part 15 which is thus rotatable around shaft 14. The ear-shaped part 15 is connected to a rear shaft
40 18 by means of two brackets 16,17. Two wheels 19,20 are mounted on rear shaft 18. By means of the construction

described up to this point a rear shaft is obtained which is pivotable relative to the whole carriage.

As a result of the fact that the rear shaft is situated a considerable distance from bearing bush 9 as seen in the direction of movement of the carriage, the bearing present in bearing bush 9 is subjected to a considerable moment. This results in an excessive load on this bearing bush 9.

In order to reduce this load a pressure part 21 is arranged between brackets 16,17. On its upper side the pressure part 21 is provided with a clamping part 22 which is in contact with the part 8 curved in circular form of V-shaped tube part 3. The combination of V-shaped tube part 3 and pressure part 21 thus acts as an additional support for the bearing. This relieves the load on the bearing.

So as to likewise not load the bearing excessively in the situation where the carriage is for instance lifted, a clamping part 22 which can slide over the upper side of V-shaped tube part 3 is connected to pressure part 21.

A pushchair is thus obtained which has good travel characteristics owing to its co-steered rear shaft. It is important here that the rotation point, formed in this case by bearing 9, is situated a considerable distance in front of rear shaft 18. In the present embodiment this distance herein amounts to about half the width of rear shaft 18. A certain measure of freedom is of course possible within this dimensioning; it is thus possible to place the bearing further to the front or further to the rear.

In some situations the steerability of rear shaft 18 is less desirable, for instance when the pushchair must be moved over an obstacle such as a curb. It is therefore possible to lock the pivoting function of the rear shaft. A locking pin 23 is arranged for this purpose in pressure part 21. Locking pin 23 is movable in substantially vertical direction. When rear shaft 18 is parallel to the front shaft, locking pin 23 is situated under a hole 24 arranged in V-shaped tube part 3. A helical spring 25 is arranged to push the pin 23

into hole 24. The above described locking device has the function that locking is obtained automatically in the right-hand position of rear shaft 18.

This locking function can be released by means of a transverse pin 26 which is connected rigidly to locking pin 23 and which extends through a hole in the locking pin. Moving this pin downward prevents locking pin 23 moving into the hole and there performing the locking function. For downward movement of transverse pin 26 a lever 27 is connected rotatably to pressure part 21, wherein lever 27 is provided with two contoured edges 28 for moving transverse pin 26 upward or downward. Lever 27 is formed such that it can be operated by foot.

For rotatable mounting and easy fitting thereof, the lever 27 is provided with two snap connections 29 which engage on shaft ends which are not shown in the drawing but which extend on either side of locking pin 23, and which are fixedly connected to pressure part 21.

It is further pointed out that, likewise for the purpose of facilitating assembly, pressure part 21 is constructed from two components 21a and 21b manufactured from plastic. These components are mutually connected by means of screws 30. The screws further extend through clamping part 22, which is thereby also connected in one operation to the pressure part. Screws 30 also serve to connect pressure part 21 to brackets 16 respectively 17, which connect bearing 29 to rear shaft 18.

Rear shaft 18 is otherwise provided with a per se known braking device. The braking device is provided with a rod 31 which is rotatably connected to rear shaft 18 by means of two levers 32, each placed in the vicinity of one of the rear wheels. The geometry of lever 32 is formed such that shaft 31 is movable between two positions, wherein in a first position shaft 31 is situated a short distance from rear shaft 18 and engages on a braking element arranged in the rear wheels, and a second position wherein rod 31 is clear of the relevant braking element.

Lever 32 is herein provided with two operating elements 33 with which the lever can be moved between the two positions. A spring (not shown in the drawing)

is further arranged for holding the rod 31 in the relevant positions.

Figure 4 finally shows how two rolling bearings 35, 36 of small dimensions are accommodated in pressure part 21. Bearings 35, 36 with their shaft 37 respectively 38 are herein embedded in the pressure part 21 which is provided for this purpose with a recess. The recess is so large that the ring of the bearing does not come into contact with the pressure part, but only with the arcuate part 8.

21766-1047

8

CLAIMS:

1. Hand-propelled vehicle for passenger transport comprising a chassis with at least three wheels, at least two of which are pivotally connected to the chassis by at least one shaft which is pivotally connected to a fixed part of the chassis, wherein the pivotable wheels are situated behind the at least one fixed wheel as seen in the direction of travel of the vehicle, and the pivot connection of the shaft of the fixed part of the chassis is situated in front of the shaft as seen in the direction of travel, wherein a slidable support bearing is placed between the pivotable shaft and the pivot connection.
2. Vehicle as claimed in claim 1, wherein the support bearing is provided with at least one rolling bearing which is adapted to absorb at least a part of the normal force between the pivotable shaft and the pivot connection.
3. Vehicle as claimed in claim 2, wherein the support bearing is provided with two first rolling bearings, the axis of which encloses an angle which is greater than 30°.
4. Vehicle as claimed in any one of claims 1 to 3, wherein the distance between the pivot connection and the shaft is in the order of magnitude of half the distance between the pivotable wheels.
5. Vehicle as claimed in any one of claims 1 to 4, wherein a second rolling bearing is arranged in the pivot connection.
6. Vehicle as claimed in any one of claims 1 to 5, further comprising friction-increasing means which comprise at least one friction member connected to the pivotable

21766-1047

9

shaft or the fixed part of the chassis and engaging on the fixed part or the shaft.

7. Vehicle as claimed in any one of claims 1 to 6, further comprising means for fixing the pivot connection in
5 a determined position between the shaft and the fixed part of the chassis.

8. Vehicle as claimed in claim 7, wherein the fixation means comprise at least one movable blocking member connected to the pivotable shaft or the fixed part of the
10 chassis and co-acting with the fixed part or the shaft, which member is biased to its blocking position.

9. Vehicle as claimed in claim 8, wherein the blocking member is a biased pin for engaging in an opening.

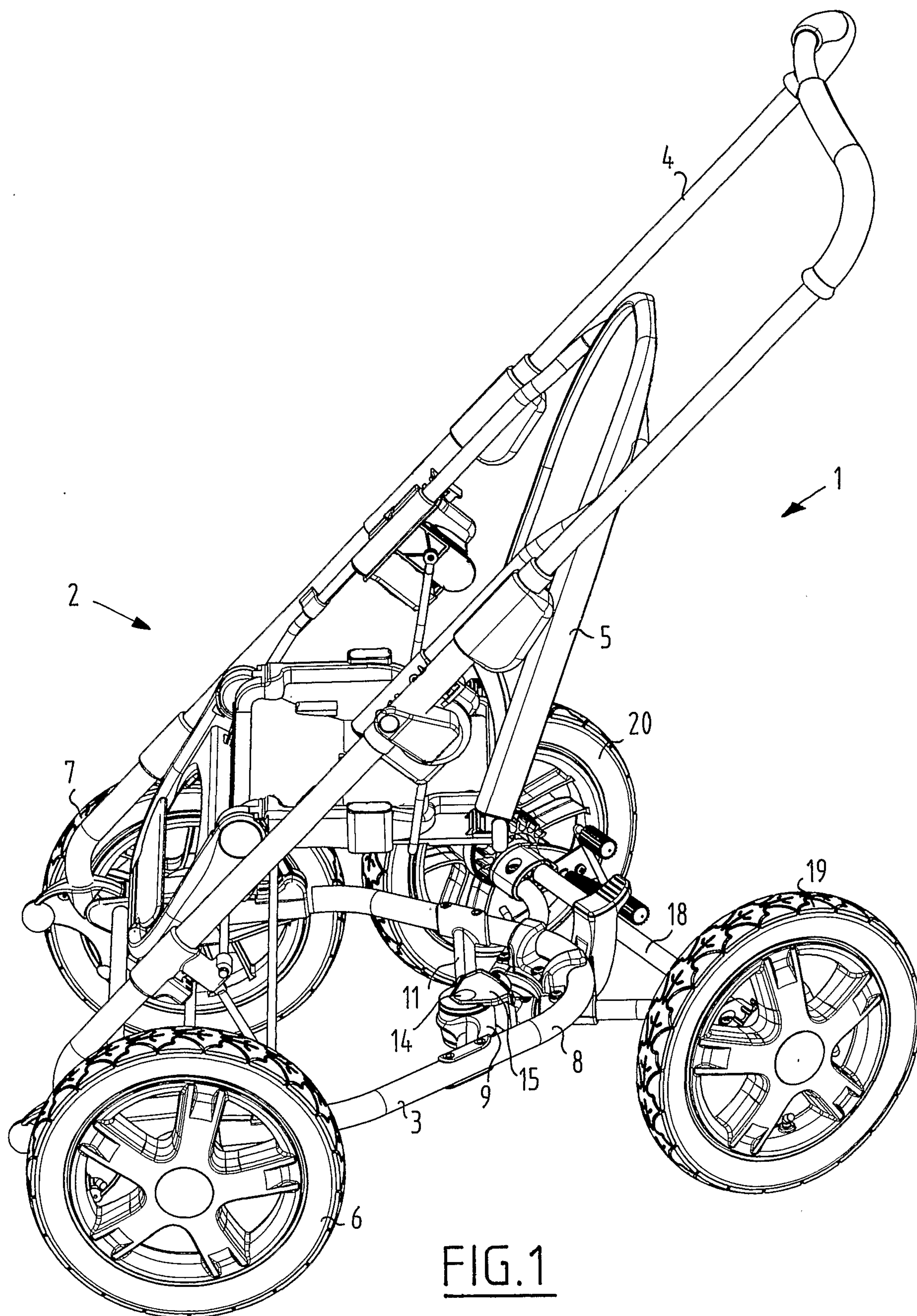
10. Vehicle as claimed in any one of claims 1 to 9,
15 wherein the vehicle is provided with a number of hinges for folding together at least a part of the vehicle, and wherein the pin of each of the hinges extends transversely of the rotation axis.

FETHERSTONHAUGH & CO.

OTTAWA, CANADA

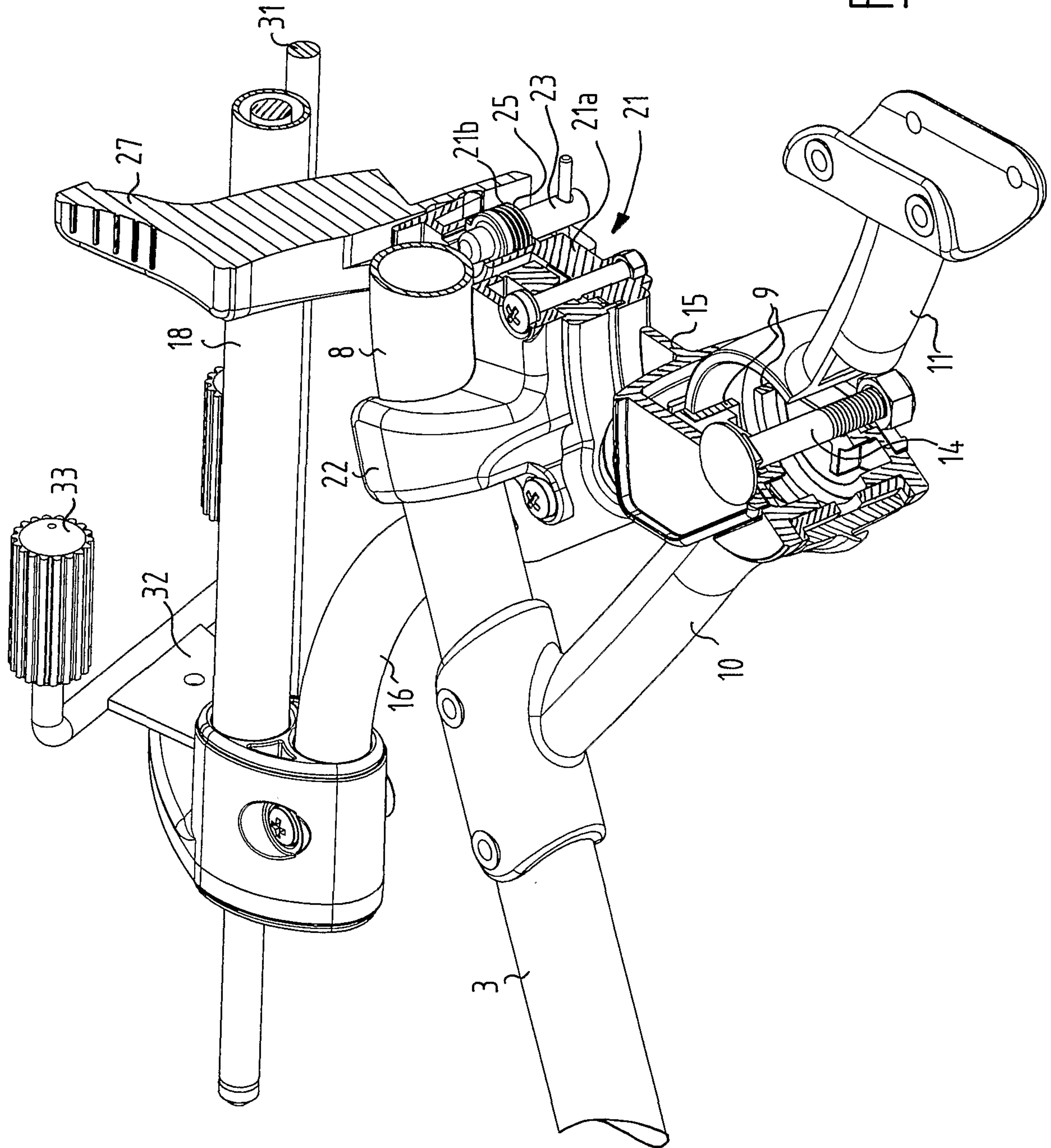
PATENT AGENTS

1/4

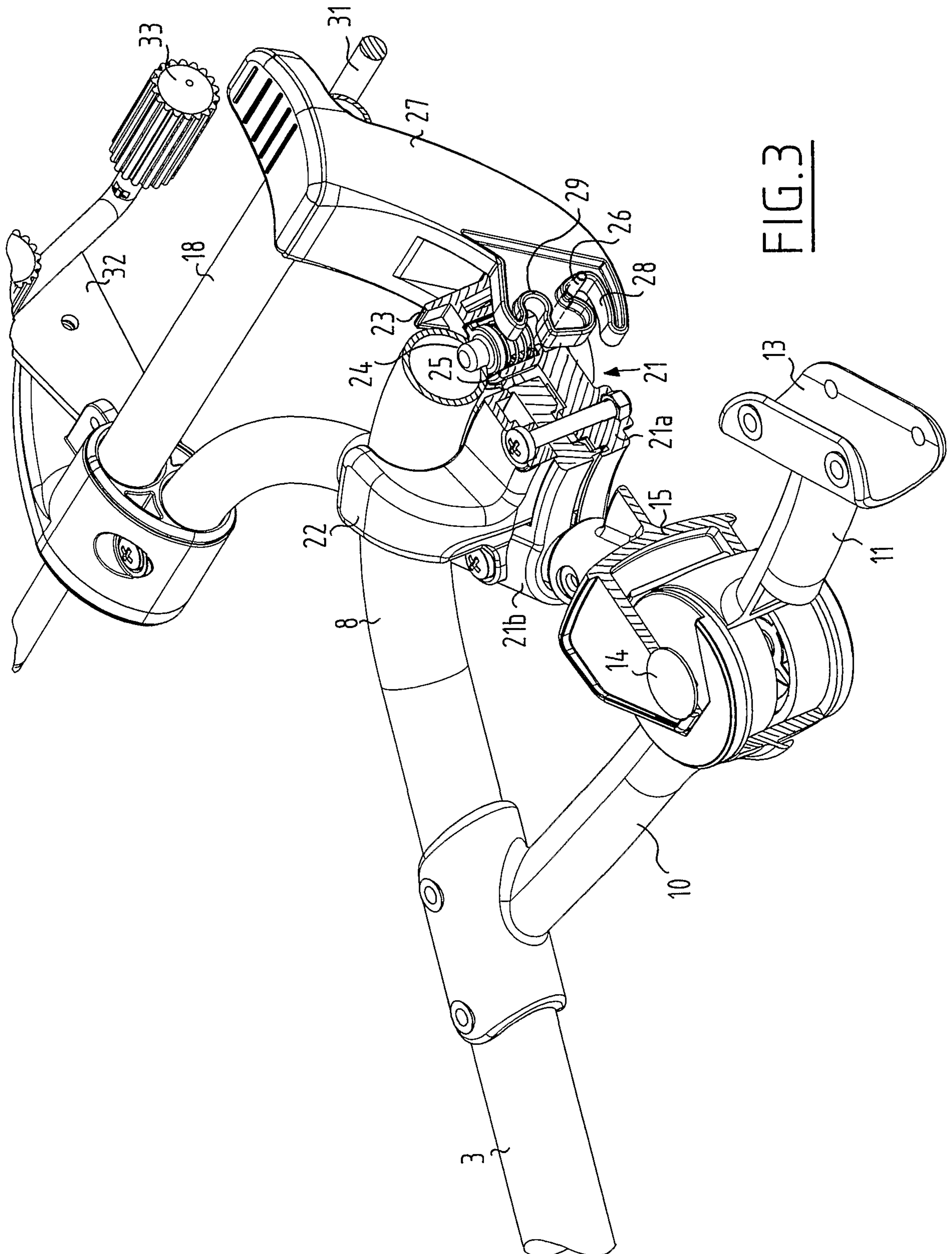
FIG. 1

2/4

FIG. 2



3/4



4/4

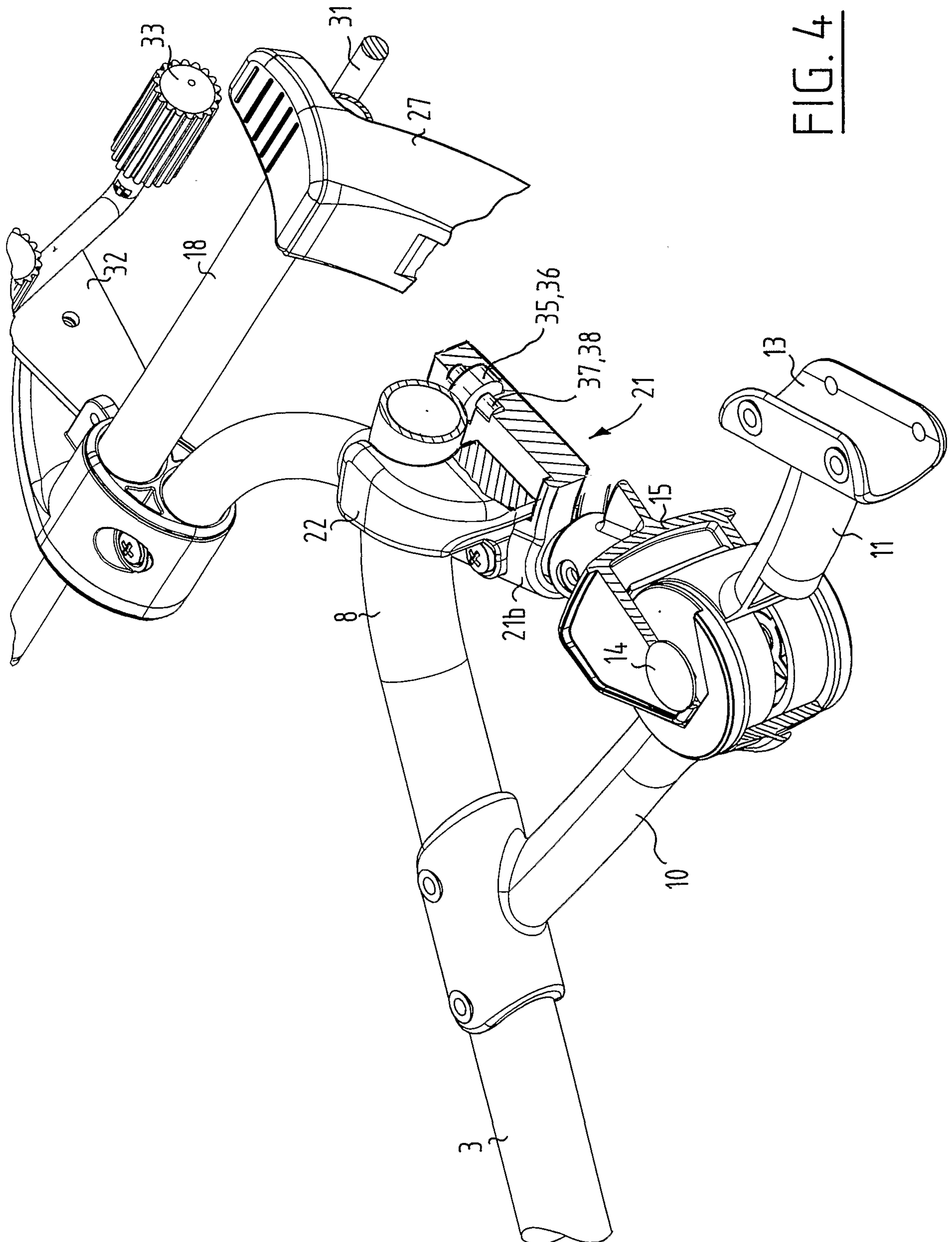


FIG. 4

