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(54) Benævnelse: **Transformerbar trehjulet cykel**

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Description

[0001] The present invention relates to a tricycle that is transformable in order to reduce its size or to enable it to be used in auxiliary manner for transporting loads that are not very bulky but that are too heavy to be carried a long way in the hand.

[0002] Bicycles are known that can be folded in order to be carried by hand, stored in a boot, or fastened on the luggage rack of a car. After being folded, the two wheels lie almost exactly one on the other on a common axis. The intended purpose for such folding bicycles is indeed achieved if account is taken only of the problem of overall size, however their stability remains somewhat precarious. Furthermore, such folded bicycles cannot carry a load on a baggage-carrier.

[0003] Document DE-U-20208156 discloses a transformable tricycle comprising a first element with a frame, a saddle, and rear wheels, and a second element with a drive wheel and a steering system.

[0004] Also known is a foldable tricycle with a front wheel that has an electric motor concentric with the hub. That tricycle, which is usable mainly as a scooter, may be associated with a seat enabling a person to be moved while sitting down, e.g. a handicapped person. That tricycle, once folded, cannot be used for transporting loads.

[0005] Proposals have thus been made to create a tricycle that is transformable so as to reduce its overall size in a folded configuration by envisaging, for that configuration, a support polygon that is inscribed between two wheels of the transformable tricycle and that

is associated with a bearing device secured to the support. The center of gravity of the transformable tricycle when folded, whether empty or loaded, should thus lie well within said support polygon. Thus, the transformable tricycle is stable in the folded configuration. It can receive a load on its baggage-carrier in the unfolded position, i.e. in its road configuration, and there is no difficulty in it continuing to be loaded during the operation of being transformed into the folded position. The reverse operation is also possible.

[0006] That transformable tricycle vehicle is advantageously, but not exclusively, usable in an urban zone on tips that alternate between the transformable tricycle travelling on the road in a road configuration, and travelling in the folded configuration in locations that are accessible to pedestrians only (public places, sidewalks, public transport, shops, for example).

[0007] To this end, in the wording of claim 1, the invention relates to a transformable tricycle, comprising a first element including a frame fitted in its top portion with a saddle and in its bottom portion with two wheels freely rotatable about a horizontal axis of rotation, for providing the transformable tricycle with transverse stability, a second element including in its top portion a handlebar supported by a handlebar bracket fastened to a fork by hinge means, said fork pivoting in a tube and being fitted with a drive wheel actuated by rotary drive means, a third element including a connection spacer having two portions hinged by a device pivoting about a hinge axis and including a locking and unlocking device, the top portion of the tube being connected to the front of the frame by a device hinged on a hinge axis, the bottom portion of the tube being connected to the rear of the frame by means of the

spacer, being hinged at its front end to the tube, and being hinged at its rear end to the frame in the proximity of the wheels of the first element, said hinge axes enabling the transformable tricycle to be folded from an unfolded shape in which the tricycle can be used for running on a road to a folded shape of the tricycle, referred to as a cart shape.

[0008] The three elements form an assembly that is triangulated, and thus un-deformable.

[0009] The folded assembly reduces to a cart that is suitable for running on the two wheels of the first element, being easily handled by being pulled or pushed like a warehouse hand truck or "dolly".

[0010] Advantageously, the hinge axes are parallel to the axis of rotation of the wheels of the first element.

[0011] According to a characteristic of the invention, the handlebar bracket is provided with a device hinged on a hinge axis and with a locking and unlocking device suitable for being locked to enable the tricycle to be used in its unfolded shape.

[0012] Furthermore, the fork includes, in its top portion, a top-of-fork tube having engaged and clamped therein a tube, the handlebar bracket being hinged to said tube via corresponding hinge means.

[0013] In addition, the handlebar is foldable and comprises two half-handlebars connected to a handlebar support by a hinged device pivoting about at least one hinge axis and a locking and unlocking device suitable for being locked to stiffen said foldable handlebar.

[0014] Under such circumstances, the two half-handlebars can include meshing means co-operating between them.

[0015] The frame may also include means for bearing against the ground, which means in combination with the wheels of the first element serve to guarantee that the transformable tricycle is stable in its folded shape.

[0016] According to another characteristic of the invention, in the folded shape of the tricycle, the drive wheel extends perpendicularly to the wheels of the first element.

[0017] In an embodiment of the invention, the frame includes a hinged handle assembly comprising a base secured to a top portion of the frame or of the second element, an arm pivotally mounted on the base to pivot between a raised position and a lowered position, a handle fastened on the movable arm, and locking and unlocking means for locking and unlocking the arm in the raised or the lowered position.

[0018] Preferably, the tube of the second element is made up of a removable half-tube engaging in a tube provided with a housing in its bottom portion, of a clasp, and of an attachment receptacle therefor, for use in releasably fastening the half-tube on the tube in order to be able to separate the second element of the frame from the spacer.

[0019] In this embodiment, the first and third elements may optionally be used alone as a pulled or pushed cart on the two wheels of the first element, after being separated from the second element.

[0020] Furthermore, the frame may be secured to a baggage-carrier that, in the folded shape of the

tricycle, is to be located in the proximity of the ground, and that in combination with the wheels of the first element guarantees that the transformable tricycle is stable on the ground.

[0021] The rotary drive means of the drive wheel may comprise a set of pedals, a transmission chain engaging firstly with a sprocket wheel of said set of pedals and secondly with a pinion secured to said drive wheel.

[0022] In a variant, the rotary drive means of the drive wheel may comprise an electric motor, either in addition to the above-mentioned pedal-operated transmission means, in which case it constitutes an electric motor for providing assistance, or else as a replacement for the above-mentioned pedal-driven transmission means, in which case the tricycle is driven entirely with the help of the electric motor.

[0023] The invention can be better understood and other details, characteristics, and advantages of the invention appear on reading the following description made by way of nonlimiting example and with reference to the accompanying drawings, in which:

· Figure 1 is an elevation view of the transformable tricycle in the road configuration, i.e. in its un-folded shape;

· Figure 2 is an elevation view, in the same plane as Figure 1, showing the transformable tricycle in the cart configuration, i.e. in its folded shape, and stabilised on the ground;

· Figure 3 is a front view of the transformable tricycle in its folded shape;

· Figure 4 is an exploded fragmentary view in perspective of the transformable tricycle showing an embodiment of the foldable handlebar;

· Figure 5 is a rear perspective view showing a stage of folding the transformable tricycle;

· Figure 6 is a fragmentary view in perspective of a variant, showing the removable assembly of the frame and the spacer on the second element;

· Figure 7 is a view corresponding to Figure 1, showing another embodiment in which the baggage-carrier is lowered and secured to the frame;

· Figure 8 is a view corresponding to Figure 2, and showing the Figure 7 tricycle;

· Figure 9 is a diagrammatic view in perspective showing the riding position of the transformable tricycle;

· Figures 10, 11, 12, and 13 are views corresponding respectively to Figures 1, 2, 3, and 4 showing another embodiment of the invention; and

· Figure 14 is a section view of the foldable handlebar shown in Figure 13, on the plane P of Figure 13.

[0024] Figures 1 to 5 show a first embodiment of a transformable tricycle of the invention. It comprises three elements that are assembled together.

[0025] In particular, the first element comprises a frame 1 fitted in its top portion and along its longitudinal axis with a saddle 2, and with a saddle support tube 2b that is split in its top portion and that is provided with a locking and unlocking device 19a. The tube 2b is receiving a saddle rod 2a when the tricycle is in its unfolded position, also referred to as its road configuration. The saddle rod 2a is fastened under the saddle 2, and the tube 2b is welded to said frame 1, e.g. at three levels, so as to guarantee that it is supported.

[0026] A horizontal tube 18 is welded on one side of the high portion of the frame 1 for the purpose of receiving

the saddle rod 2a in the cart configuration of the tricycle, i.e. when the tricycle is in its folded position.

[0027] The tube 18 is split at a "bottom" end and it is fitted with a locking and unlocking device 19.

[0028] The tricycle also includes a hinged handle assembly comprising a base 16b secured to a high portion of the frame 1, an arm 16 pivotally mounted on the base 16b between a raised position (in continuous lines in Figures 2 and 3) and a lowered position (in continuous lines in Figures 1 and 5 and in dashed lines in Figure 2), a handle 16a fastened to the movable arm 16, and means for locking and unlocking the arm in the raised or lowered position.

[0029] When the movable arm 16 is in the raised position and the tricycle is in the cart configuration, the handle 16a enables a user to pull or push the tricycle or cart manually.

[0030] On the bottom portion of the frame 1, on either side of the frame 1, there are fastened two forks 8a, 8b each receiving a respective wheel 3, 3a, referred to as a "small" wheel. The wheels 3, 3a rotate freely about a horizontal axis of rotation 3b that is perpendicular to the longitudinal axis A (shown in Figure 5), being arranged on either side of the saddle 2 and thus providing the transformable tricycle with transverse stability under all circumstances, i.e. equally well in the folded position and in the unfolded position.

[0031] On the fronts of the two forks 8a, 8b receiving the small wheels 3, 3a, rear brake calipers 32a, 32b are fastened to the frame 1 to act on said small wheels 3, 3a. These calipers are actuated by a brake lever 41 via

brake cables sliding in sheaths. The brake lever 41 acts on the rear brake calipers 32a, 32b via a system for equal distribution of braking power.

[0032] Legs 31, 31a for bearing against the ground are welded on either side of the frame 1, and in association with the small wheels 3, 3a, they serve to guarantee that the transformable tricycle is stable when in the cart configuration (Figures 2 and 3), with or without a load.

[0033] A foldable baggage-carrier 30 for carrying loads is situated behind the saddle 2 and is pivotally mounted on the frame 1 about a hinge axis 30c. Stops 30a, 30b (Figure 5) serve to block said foldable baggage-carrier 30 in the lowered position. A thrust-closed clasp serves to block the foldable baggage-carrier 30 in the raised position.

[0034] Figures 7 and 8 show a variant embodiment in which the baggage-carrier 50 is secured to the frame. In this variant, the baggage-carrier 50 is not foldable. Nevertheless, it should be observed that when the tricycle is in the cart configuration (Figure 8), the baggage-carrier 50 is at ground level, thus making it easy to place a load 53 thereon. Also, in the cart configuration, the baggage-carrier 50 and the small wheels 3, 3a, serve to guarantee that the tricycle or cart is stable on the ground, with or without a load 53.

[0035] In the cart configuration, the frame 1 makes rear loading easier by sliding the load 53 (along arrow 51). Thereafter, the assembly with the load 53 can be tilted (as shown by arrow 52) with the help of the handle 16a, and the assembly can be transported without effort.

[0036] A second element of the transformable tricycle is formed by a steering and drive device 4 comprising, in

its top portion, steering control means constituted by a foldable handlebar, a handlebar bracket 5 constituted by a tube, e.g. a square section tube, that is fastened to a tube 6 via a hinged device 27a on a hinge axis 28a, and a locking and unlocking device 29a suitable for being locked when the tricycle is unfolded (road configuration). The tube 6 is inserted and clamped in a top-of-fork tube by a clamping screw and a clamping member, in conventional manner.

[0037] The foldable handlebar, which can be seen better in Figure 4, is made up of two half-handlebars 35, 35a connected to a common handlebar support 40 by a plate 37 that is pivotally mounted on the support 40 to pivot about a hinge axis 36. The handlebar also has a locking and unlocking device 38 suitable for being locked to make said foldable handlebar rigid when the tricycle is in the unfolded position. The device 38 can also be unlocked in order to be able to fold the two half-handlebars 35, 35a along the handlebar bracket 5 and optionally to snap fasten them to clips 43, 43a mounted on the handlebar bracket 5.

[0038] The handlebar support 40 is fastened on the handlebar bracket 5 via a clamping plate 39 and two nuts. An indexed gear control 42 is fastened on the half-handlebar 35 together with the brake lever 41. A brake lever 41a is fastened to the half-handlebar 35a and serves to act on a front brake caliper 32 via a cable sliding in a sheath.

[0039] In its bottom portion, the steering and drive device 4 for has the top-of-fork tube pivotally mounted in a tube 7 and welded at its bottom portion to a fork 8 proper, fitted with a drive wheel 9. The wheel 9 is designed to be braked by the front brake caliper 32.

[0040] A set of pedals 10 serves to rotate the drive wheel 9 via a transmission chain 11 that meshes firstly with a sprocket wheel 12 of the set of pedals 10, and secondly with a pinion 12a secured to the drive wheel 9. The wheel 9 may be fitted with an incorporated gear hub 12b that is connected to the indexed gear control 42 by a cable sliding in a sheath.

[0041] The set of pedals 10 is provided with foldable pedals 23, 23a and it is fastened to a pedal set support 24 (Figures 3 and 5) holding said set of pedals 10 stationary and above the drive wheel 9. At the rear, the pedal set support 24 is fastened to the top of said fork 8 and at the front it is supported by two struts 24a, 24b having their bottom portions fastened on either side of said drive wheel 9, in the vicinity of the axis of rotation 9b of said drive wheel 9. The front brake caliper 32 is fastened to the pedal set support 24.

[0042] A third element of the tricycle comprises a connection spacer 20 maintaining the bottom spacing between the frame 1 and the steering and drive device 4. This spacer 20 is made up of two portions 25 and 26 hinged together by a pivot device 27 about a hinge axis 28 and including a locking and unlocking device 29. The portion 26 is situated at the front and the portion 25 is situated at the rear. The portion 25 is Y-shaped, with one branch connected to the hinge device 27 and with the opposite, other two branches, extending towards respective ones of the wheels 3, 3a.

[0043] The three elements of the tricycle are assembled together by connecting them together via the hinged devices on the hinge axes.

[0044] More particularly, the tube 7 of the steering and drive device 4 is connected in its top portion to the

frame 1 via a hinged device 15 about a hinge axis 13. The tube 7 is also connected, in its bottom portion, to the rear of said frame 1, via the spacer 20.

[0045] In particular, the tube 7 is connected to the front of the spacer 20 via a hinged device 14 about a hinge axis 21. The frame 1 is also connected to the rear portion of the spacer 20 by a device made up of hinge axes 22, 22a situated close to the small wheels 3, 3a.

[0046] The spacer 20 folds into two portions by means of the hinged device 27 about the hinge axis 28. The hinge axes 13, 21, 22, 22a, and 28 enable the transformable tricycle to be folded from the unfolded shape or road configuration to the folded shape or cart configuration. The hinge axes 13, 21, 22, 22a, and 28 are parallel to the axis of rotation 3b of the small wheels 3, 3a. In the cart configuration, a thrust-closed clasp 14a fastened under the hinged device 14 becomes attached to an attachment receptacle 14b that is located at the bottom of the tube 2b and that enables the steering and drive device 4 to be blocked on the frame 1.

[0047] In the cart configuration, the drive wheel 9 is perpendicular to the small wheels 3, 3a.

[0048] The operation of folding the tricycle, from its unfolded position to its folded position, comprises six steps:

· the first step consists in folding the foldable pedals 23, 23a down onto the pedal set 10;

· the second step consisting folding the steering and drive device 4 down onto the frame 1. To do this, it is appropriate to unlock the locking and unlocking device 29, to open the hinged device 27 while folding the steering and drive device 4 down onto said frame 1 by causing it to pivot through one quarter of a turn, and

then pressing it against said frame 1 until the thrust-closed clasp 14a snaps onto its attachment receptacle 14b, the drive wheel 9 being perpendicular to the small wheels 3, 3a;

· the third step consists in folding the foldable handlebar. To do this, it is appropriate to unlock the locking and unlocking device 38, to open the hinged device 37, to fold down of the two half-handlebars 35, 35a, and to snap them onto their catches 43, 43a;

· the fourth step consists in folding the handlebar bracket 5. To do this, it is appropriate to unlock the locking and unlocking device 29a, to open the hinged device 27a, and to fold said handlebar bracket 5 down onto the rear of said drive wheel 9;

· the first step consists in moving the saddle 2. To do this, it is appropriate to unlock the locking and unlocking device 19a, to remove the assembly formed by the saddle 2 and the saddle rod 2a from the tube 2b, to engage the saddle rod 2a in the tube 18, and to lock the locking and unlocking device 19; and

· the sixth step consists in raising and locking the handle assembly 16, 16a, 16b.

[0049] The operation of unfolding takes place in opposite manner. To minimize overall size (e.g. in order to store the assembly in a box), it is appropriate to leave the handle assembly 16, 16a, and 16b in the folded position and to raise the foldable baggage-carrier 30.

[0050] In the embodiment shown in Figure 6, the tube 7 is formed by a half-tube 7b mounted on a tube 7a and having its bottom end engaging in a circularly arcuate housing 45 formed in the bottom portion of the tube 7a.

[0051] The half-tube 7b also has its top portion held by a clasp 46 co-operating with an attachment receptacle 46a.

[0052] The half-tube 7b can thus be pressed against the tube 7a and fastened firstly by its bottom end engaging in the housing 45 and secondly by the clasp 46 engaging in its attachment receptacle 46a.

[0053] The frame 1 is fastened at the top portion of the half-tube 7b by means of the hinge device 15. The spacer 20 is fastened to the bottom portion of the half-tube 7b by means of the hinge device 14.

[0054] Such a device for fastening the half-tube 7b to the tube 7a makes it easy to fasten or remove the half-tube 7b relative to the tube 7a. It is thus possible, if necessary, to separate the steering and drive device 4 quickly from the frame 1 and the spacer 20, in particular when the tricycle is in the cart configuration.

[0055] Any other releasable fastener means between firstly the steering and drive device 4 and secondly the frame 1 together with the spacer 20 could be used.

[0056] In this embodiment, the brake cable used for actuating the brake calipers 32a, 32b fitted to the wheels 3, 3a, and the corresponding sheath are separated into two portions: respectively a front cable and sheath, and a rear cable and two sheaths. The front portion of the brake cable and the front sheath are to remain on the steering and drive device 4 after separation from the half-tube 7b and the tube 7a. Likewise, the rear portion of the brake cable and the rear sheaths are to remain on the frame 1 and/or on the spacer 20, after separation from the half-tube 7b and the tube 7a.

[0057] The above-mentioned front and rear portions are releasably connected together, e.g. by means of a clip 48. The rear end of the above-mentioned front sheath may

include an abutment 47 for attaching in releasable manner to an engagement plate 47a that is fastened to the frame.

[0058] More particularly, the rear portion of the brake cable 48a may connect the two calipers 32a, 32b in such a manner that traction applied to a point on the rear portion 48a, e.g. traction in a middle zone of said rear portion 48a, causes the calipers 32a, 32b fitted to the wheels 3, 3a to be actuated.

[0059] In the unfolded position of the tricycle, i.e. in its road configuration, the front and rear brake cables are fastened to each other by the clip 48, and the abutment 47 of the front sheath can be attached to or engaged in the engagement plate 47a.

[0060] In order to separate the steering and drive device 4 from the remainder of the tricycle, it is appropriate:

- to extract the abutment 47 from the engagement plate 47a;
- to open the clip 48 and detach the rear brake cable 48a;
- to open the clasp 46 and disengage it from the attachment receptacle 46a;
- to tilt the steering and drive device 4 forwards to move the top of the tube 7a away from the top of the half-tube 7b; and
- to raise the frame 1 and the spacer 20 in order to extract the bottom portion of the half-tube 7b from the housing 45 situated in the bottom portion of the tube 7a.

[0061] It is then possible to unlock the locking and unlocking device 29, to open the hinged device 27 while folding the half-tube 7b down onto said frame 1 until the thrust-closed clasp 14a snaps onto its attachment receptacle 14b.

[0062] The operation is performed in the opposite manner in order to attach the frame 1 and the spacer 22 the steering and drive device 4.

[0063] Figures 10 and 14 show another embodiment, having differences relative to the embodiment of Figures 1 to 5 that are explained below.

[0064] In this embodiment, the arm 16 of the handle assembly is hinged to the steering and drive device 4, more particularly to the tube 6 and under the hinged device 27a, and may be in the form of a pivoting bracket having the handle 16a fastened thereto.

[0065] Another handle 54 is pivotally mounted on the pedal set support 24 close to the bottom end of the tube 7, this handle 54 serving to facilitate folding and unfolding the tricycle. Such a handle 54 may also be provided in the other embodiments.

[0066] Also in this embodiment, the legs 31, 31a for bearing against the ground are made directly with the spacer 20 and extend to the rear branches of the spacer 20.

[0067] As can be seen in Figures 13 and 14, the foldable handlebar may comprise two half-handlebars 35, 35a, each having a plate 37, 37a. The plates 37, 37a are hinged to the handlebar support 40 about axes 36, 36a. The support 40 is fastened to the handlebar bracket 5 using locking and unlocking means 55. More particularly, the handlebar support 40 has two clamping portions 56, 56a defining between them a space into which the handlebar bracket 5 is inserted, which bracket can be clamped between the clamping portions 56, 56a with the help of the locking and unlocking means 55.

[0068] Each plate 37, 37a has meshing means 57, 57a cooperating with the meshing means 57a, 57 of the opposite plate. In this way, pivoting one of the half-handlebars 35, 35a about its hinge axis 36, 36a causes the other half-handlebar 35a, 35 to be pivoted likewise through the action of the meshing means 57, 57a.

[0069] Such a foldable handlebar may also be used in the other embodiments described above. In a variant, such a handlebar could be used on any type of bicycle or tricycle, whether or not it is foldable.

[0070] Other variants may also be envisaged.

[0071] The pedal set may thus drive the wheel via meshing means, such as a gear train, with an appropriate gear ratio. Also, the chain transmission may be replaced by a belt, e.g. a cog belt, engaging the "sprocket" wheel of the pedal set and the pinion of the drive wheel, which are then made appropriately for this technology. Drive for the transformable tricycle may also be obtained by combining a pedal set as described above with an electric assistance motor.

[0072] Finally, the system for driving the drive wheel 9 by means of a pedal set may be replaced by an electric motor that serves on its own to rotate the drive wheel 9. Such an electric motor is powered by a battery, which may be mounted on the frame 1.

[0073] The caliper brakes could equally well be replaced by disk brakes.

[0074] Furthermore, the materials used for making the transformable tricycle may be steel, alloys of aluminum or of any other metal, plastics materials, composite materials having carbon fibers or other kinds of fibers,

all of which materials can be worked using conventional techniques. The tyres on the wheels may be solid or hollow, inflatable or otherwise.

[0075] Finally, any equipment known in the "cycle" field may be adapted to comply in particular with the standards and rules in force in the fields involved with using the subject matter of the invention.

[0076] In order to be suitable for use on public roads, the transformable tricycle may need to be fitted with at least a mudguard, front and rear lighting systems, reflectors or retro reflectors, side reflectors, a bell, or any other appropriate equipment in compliance with road safety in the country concerned.

PATENTKRAV

1. Transformerbar trehjulet cykel omfattende et første element omfattende en ramme (1), som ved sin øverste del er forsynet med en sadel (2) og ved sin nederste del med to hjul (3, 3a), som er frit drejelige omkring en horisontal rotationsakse (3b) med henblik på at tilvejebringe tværgående stabilitet for den transformerbare trehjulede cykel, og et andet element, som ved sin øvre del omfatter et styr (35, 35a), i hvilken trehjulet cykel styret er understøttet af et styrbeslag (5) fastgjort til en gaffel via hængselorganer (27a), hvilken gaffel drejer i et rør (7) og er forsynet med et drivhjul (9), som påvirkes af roterende drivorganer (10, 11, 12, 12a), idet den trehjulede cykel yderligere omfatter et tredje element, som omfatter et forbindelsesafstandsstykke (20), som har to dele (25, 26), som er hængslede ved hjælp af en indretning (27), som drejer omkring en hængselakse (28), og som omfatter en låse- og oplåsnings-indretning (29), idet den øvre del af røret (7) er forbundet med den forreste del af rammen (1) via en indretning (15), som er hængslet omkring en hængselakse (13), den nedre del af røret (7) er forbundet med den bageste del af rammen (1) ved hjælp af afstandselementet (20), som er hængslet (14, 21) ved sin forreste ende til røret (7) og som er hængslet (22, 22a) ved sin bageste ende til rammen (1), i nærheden af hjulene (3, 3a) i det første element, idet hængselakserne (13, 21, 22, 22a, 28) gør det muligt at den transformerbare trehjulede cykel kan foldes fra en udfoldet form, i hvilken den trehjulede cykel kan anvendes til at køre på en vej, til en foldet form for den trehjulede cykel, betegnet som en vognform.

2. Transformerbar trehjulet cykel ifølge krav 1, hvor hængselakserne (13, 21, 22, 22a, 28) er parallelle med rotationsaksen (3b) for hjulene (3, 3a) i det første element.

3. Transformerbar trehjulet cykel ifølge krav 1 eller krav 2, hvor styrbeslaget (5) er forsynet med en indretning (27a), som er hængslet omkring en hængselakse (28a), og med en låse- og oplåsningsindretning (29a), som er egnet til at blive låst for at muliggøre at den trehjulede cykel kan anvendes i sin udfoldede form.

4. Transformerbar trehjulet cykel ifølge ethvert af kravene 1 til 3, hvor gaflen i sin øvre del omfatter et øvre gaffelrør, hvori der indgriber og er fastklemt et rør (6), idet styrbeslaget (5) er hængslet til det nævnte rør (6) via tilsvarende hængselorganer (27a).

5. Transformerbar trehjulet cykel ifølge ethvert af kravene 1 til 4, hvor styret kan foldes og omfatter to halvstyr (35, 35a), som er forbundet med en styrunderstøtning (40) via en hængselindretning (37), som drejer omkring i det mindste én hængselakse (36), og en låse- og oplåsningsindretning (38), som er egnet til at blive låst for at gøre det foldbare styr stift.

6. Transformerbar trehjulet cykel ifølge krav 5, hvor halvstyrene (35, 35a) omfatter indbyrdes samvirkende indgrebsorganer (57, 57a).

7. Transformerbar trehjulet cykel ifølge ethvert af kravene 1 til 6, hvor rammen (1) omfatter organer (31, 31a) til at hvile imod jorden, hvilke organer tjener til, i kombination med hjulene (3, 3a) i det første element, at sikre at den transformerbare trehjulede cykel er stabil når den er i sin sammenfoldede form.

8. Transformerbar trehjulet cykel ifølge ethvert af kravene 1 til 7, hvor, i den sammenfoldede form for den trehjulede cykel, drivhjulet (9) strækker sig vinkelret på hjulene (3, 3a) i det første element.

9. Transformerbar trehjulet cykel ifølge ethvert af kravene 1 til 8, hvor rammen (1) omfatter et hængslet styrarrangement omfattende en basis (16b) fastgjort til en øvre del af rammen (1) eller af det andet element, en arm (16), som er drejeligt monteret på basis (16b) for at dreje imellem en hævet position og en sænket position, et håndtag (16a) fastgjort på den bevægelige arm (16), og låse- og oplåsningsorganer til at låse og oplåse armen i den hævede eller sænkede position.

10. Transformerbar trehjulet cykel ifølge ethvert af kravene 1 til 9, hvor røret (7) i det andet element er udformet af et aftageligt halvrør (7b), som indgriber i et rør (7a), som er forsynet med et hus (45) i sin nedre del, af et spænde (46), og et indgrebselement (46a) til fastgørelse af spændet, til at anvendelse ved udløselig fastgørelse af halvrøret (7b) til røret (7a), med henblik på at være i stand til at adskille det andet element i rammen (1) fra afstandselementet (20).

11. Transformerbar trehjulet cykel ifølge ethvert af kravene 1 til 10, hvor rammen (1) er fastgjort til en bagagebærer (50), som, i den foldede form for den trehjulede cykel, skal være placeret i nærheden af jorden, og som tjener til, i kombination med hjulene (3,

3a) i det første element, at sikre at den transformerbare trehjulede cykel er stabil på jorden.

12. Transformerbar trehjulet cykel ifølge ethvert af kravene 1 til 11, hvor de roterende drivorganer for drivhjulet (9) omfatter et sæt pedaler (10), en drivkæde (11), som for det første indgriber med et kædehjul (12) for det nævnte sæt pedaler (10), og for det andet med et kædehjul (12a) fastgjort til drivhjulet (9).

13. Transformerbar trehjulet cykel ifølge ethvert af kravene 1 til 12, hvor de roterende drivorganer for drivhjulet (9) omfatter en elektrisk motor.

Fig. 1

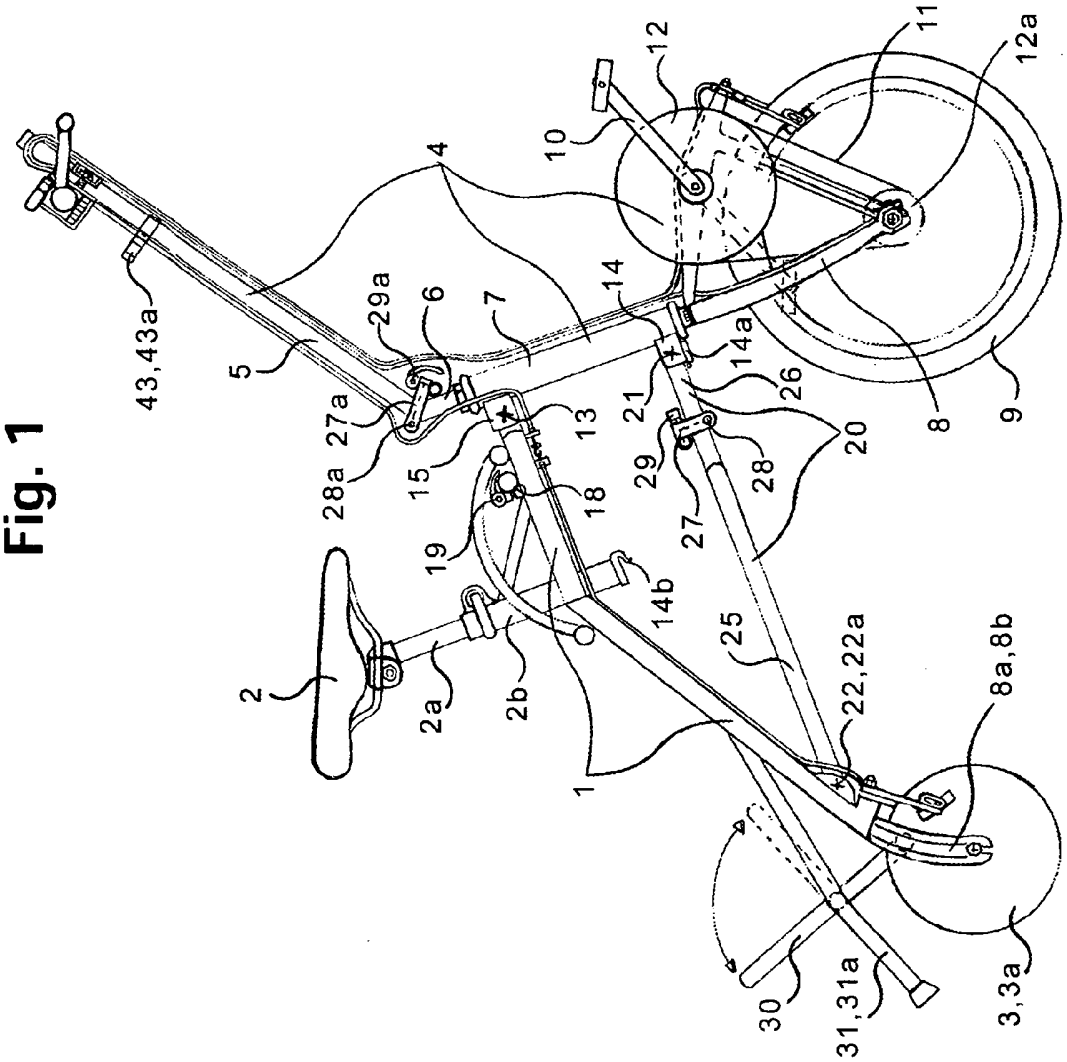
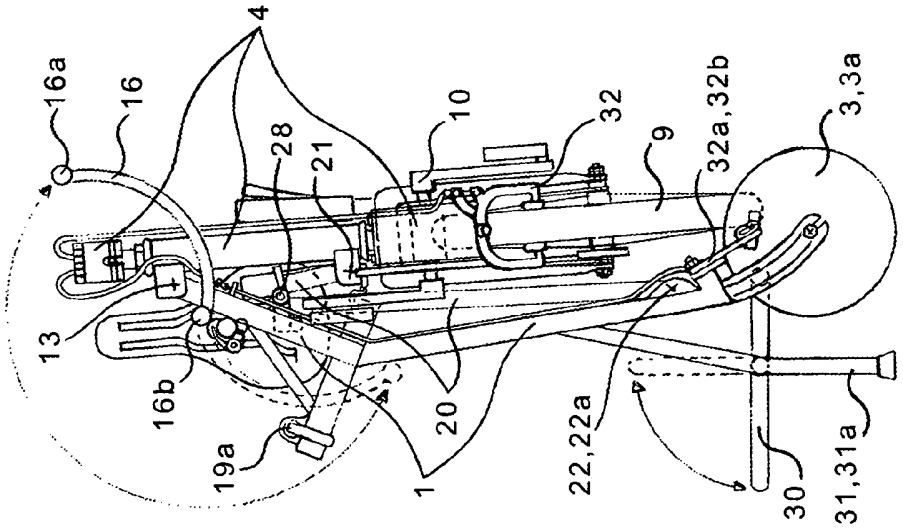

43,43a
5
4
10
12
11
12a
29a
6
7
14
14a
21
26
27a
28a
15
13
18
29
20
8
9
19
27
28
2
14b
25
2a
2b
22,22a
8a,8b
1
30
31,31a
3,3a

Fig. 2


4
16a
16
28
21
10
32
9
32a,32b
3,3a
13
16b
19a
20
1
22,22a
30
31,31a

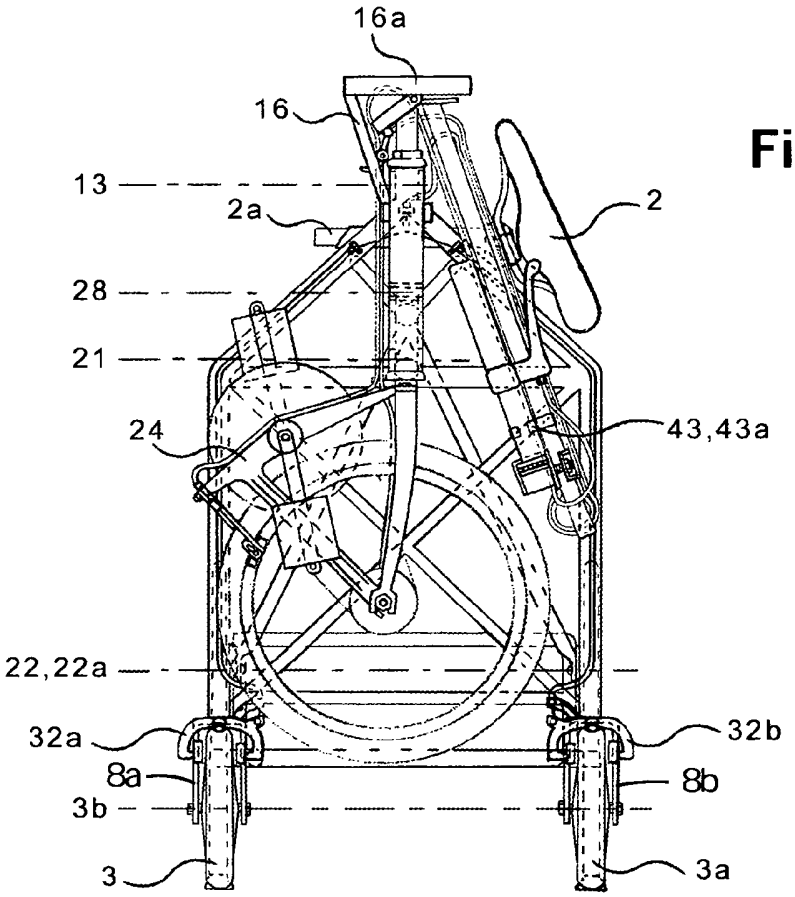

16a
16
13
2a
2
28
21
24
43,43a
22,22a
32a
32b
8a
8b
3b
3
3a

Fig. 3

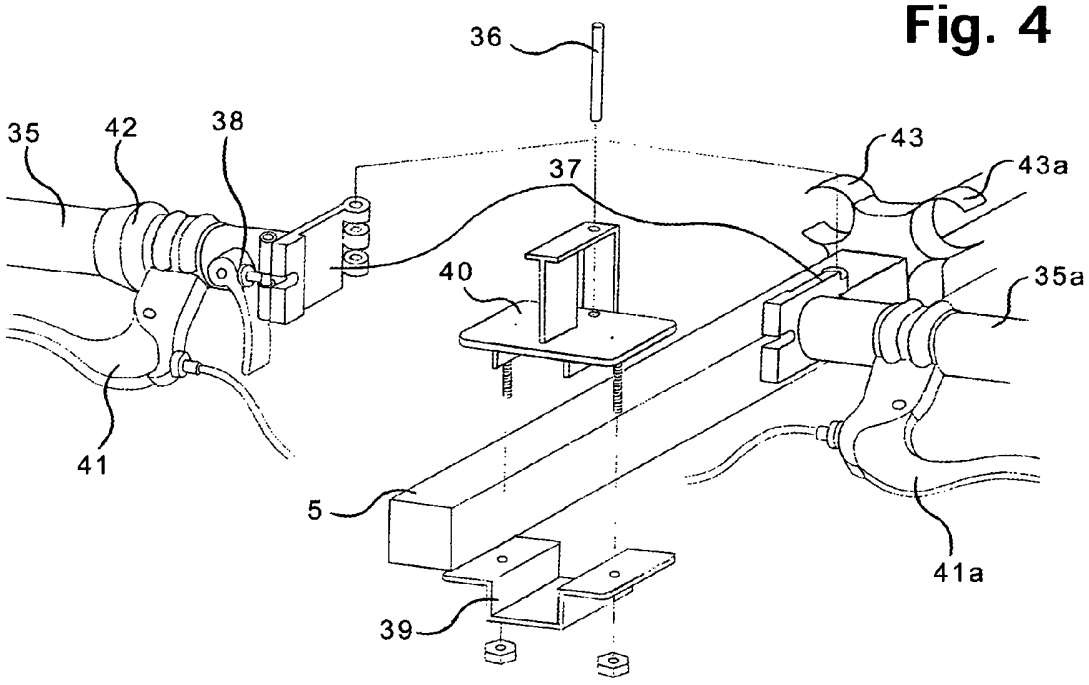

36
35
42
38
37
43
43a
40
35a
41
5
41a
39

Fig. 4

Fig. 5

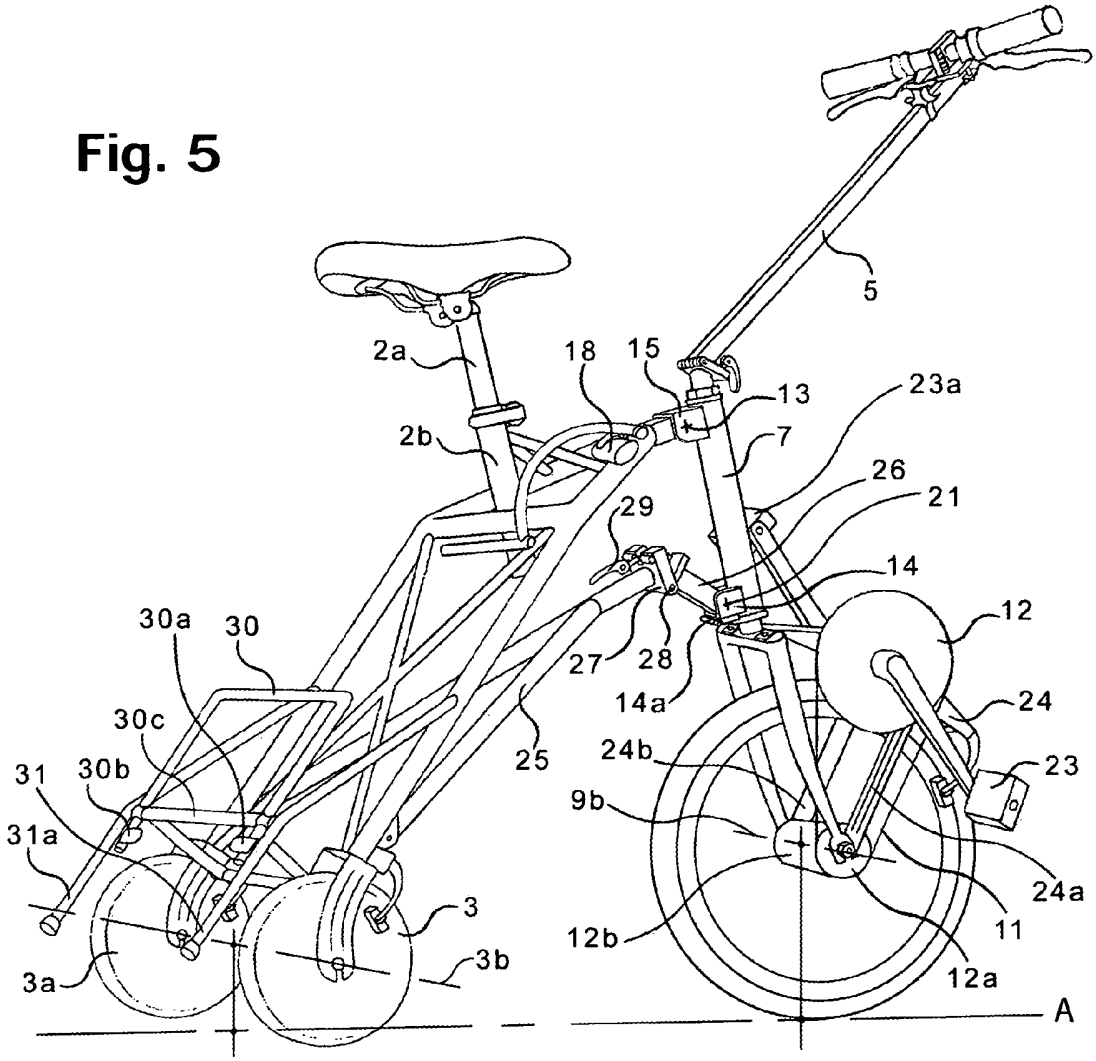

5
2a
18
15
13
23a
2b
7
26
21
29
14
30a
30
12
27
28
14a
24
30c
25
24b
23
31
30b
9b
31a
24a
3
11
12b
3b
3a
12a
A

Fig. 6

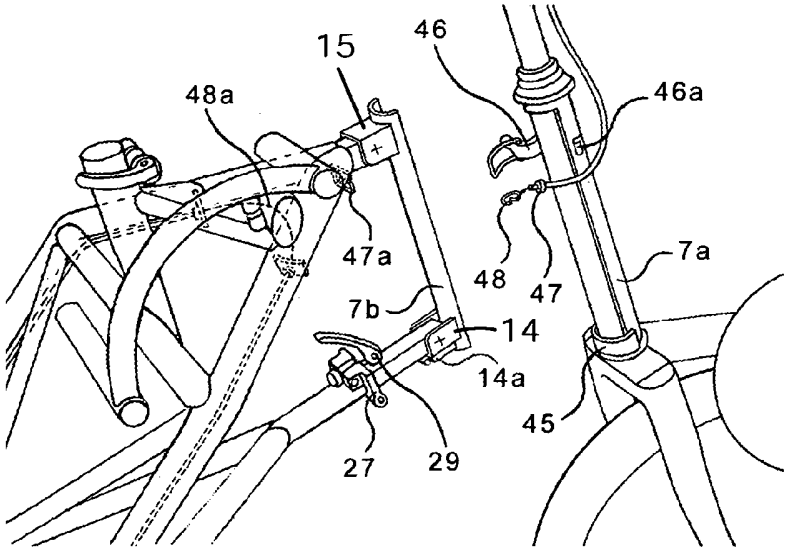

15
46
48a
46a
47a
48
47
7a
7b
14
14a
45
27
29

Fig. 7

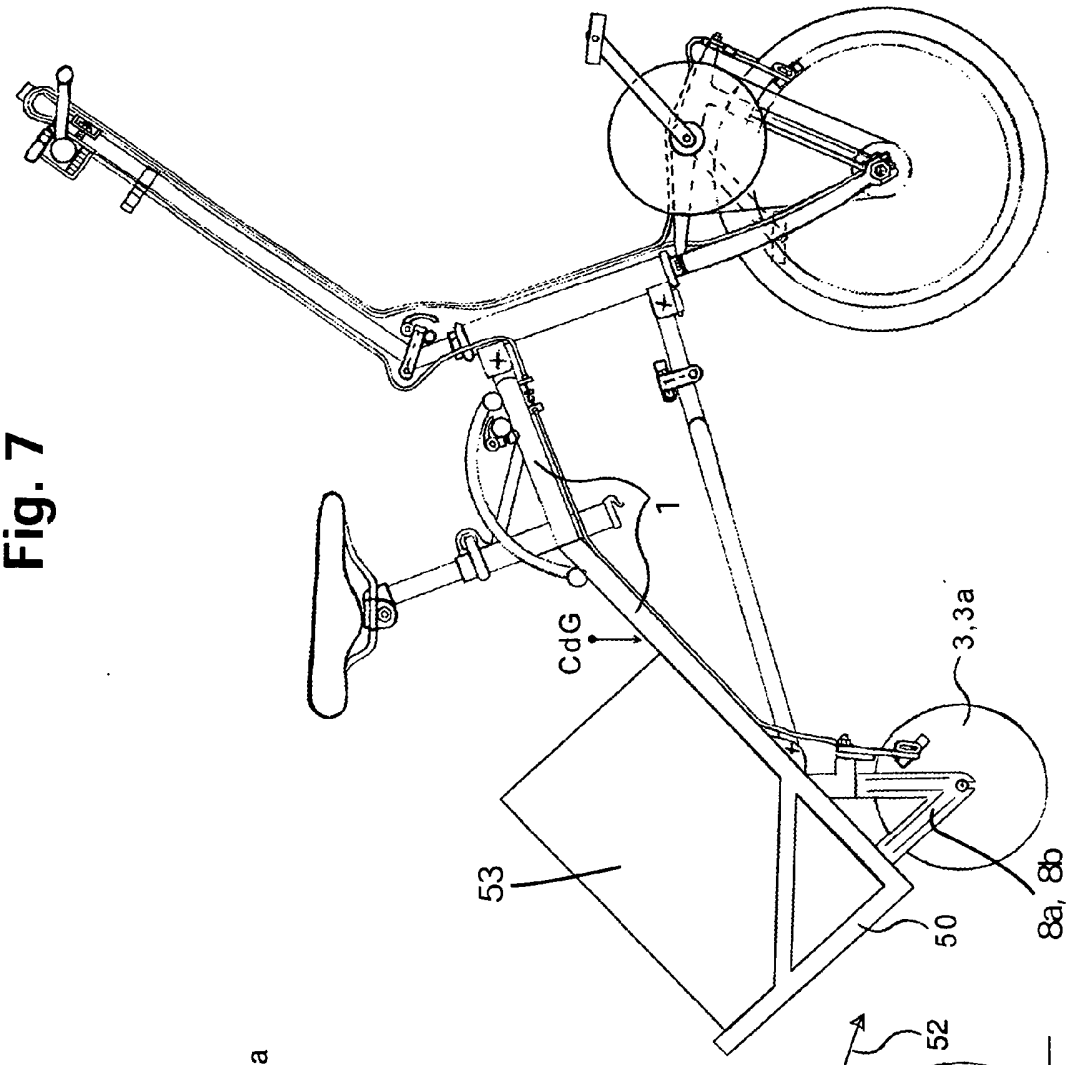
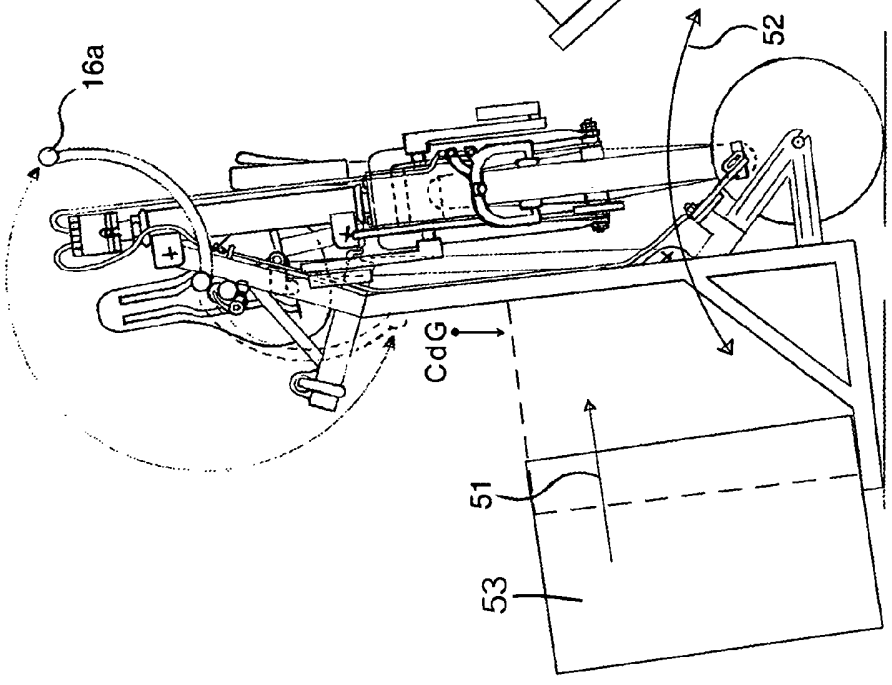


Fig. 8



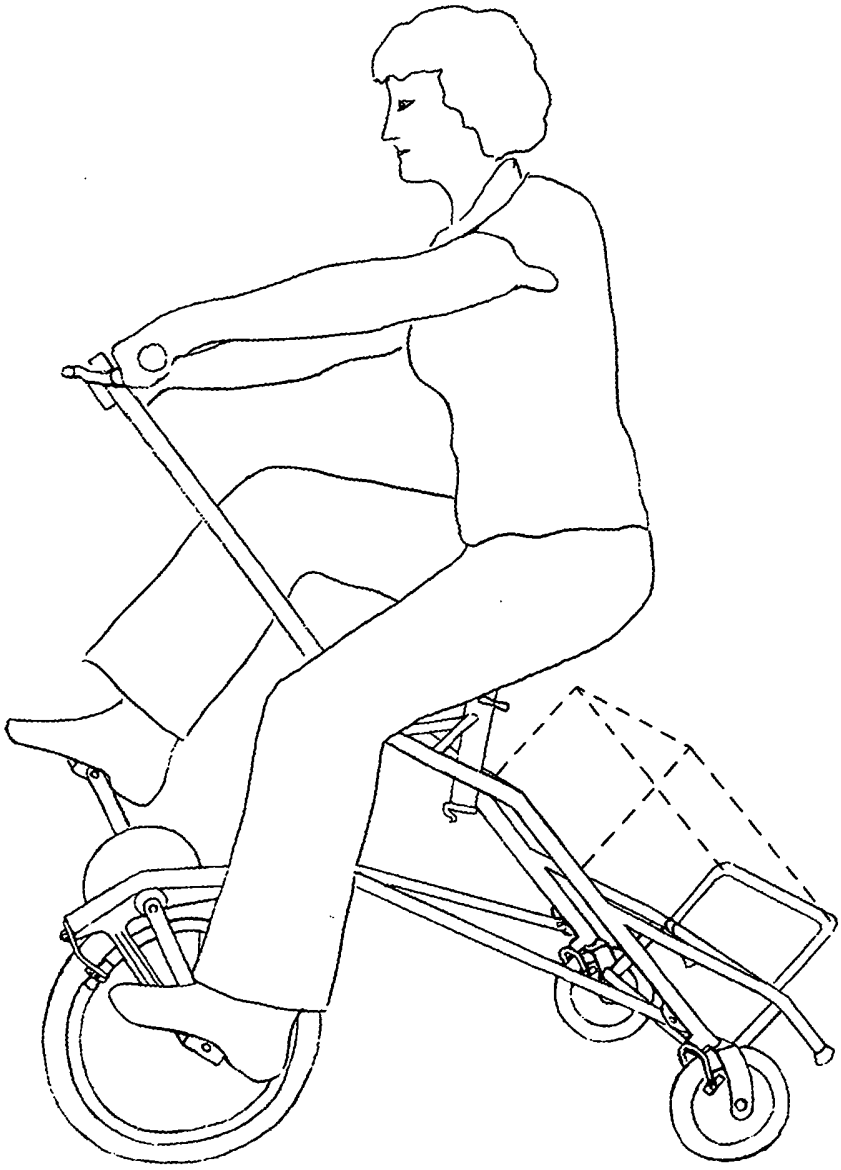


Fig. 9

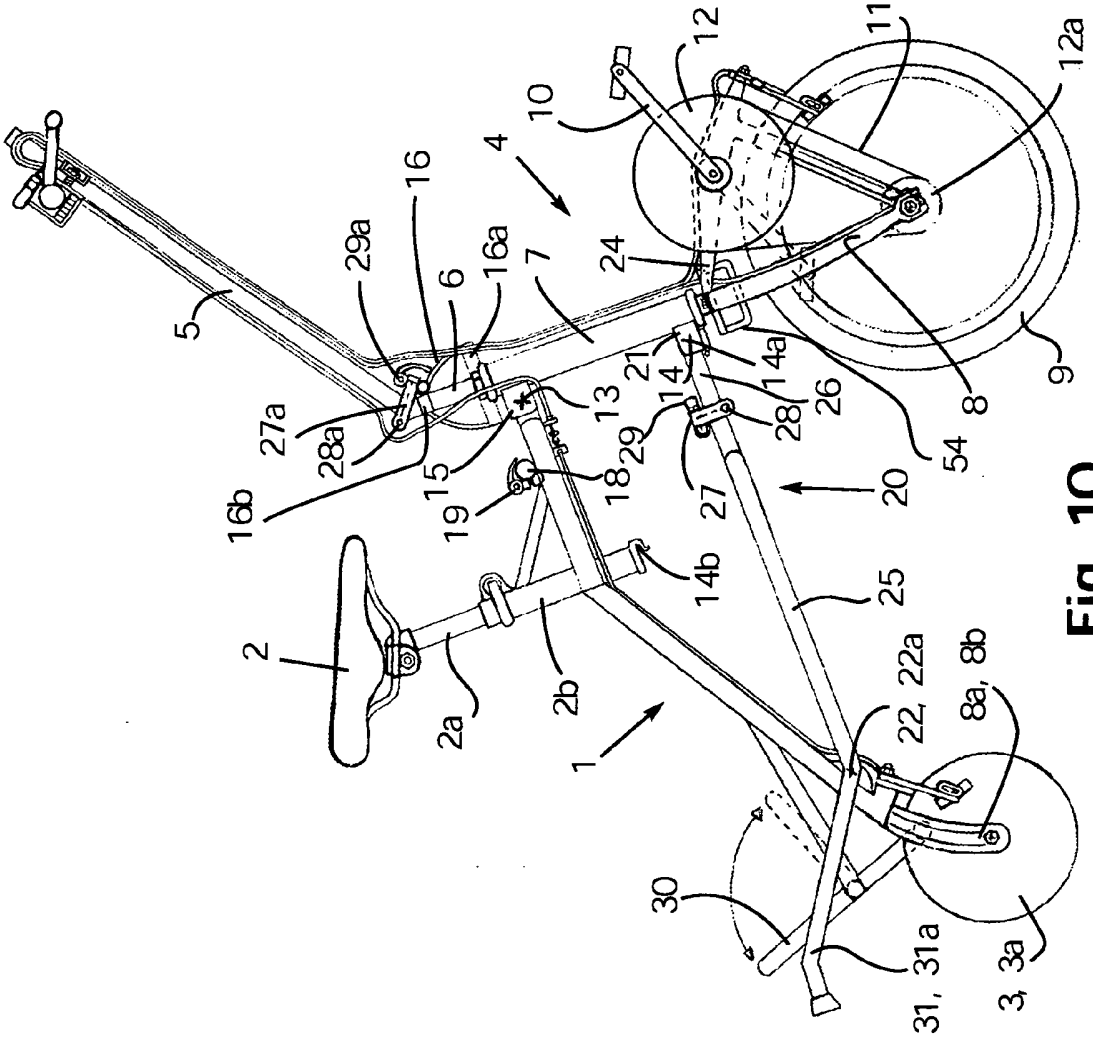
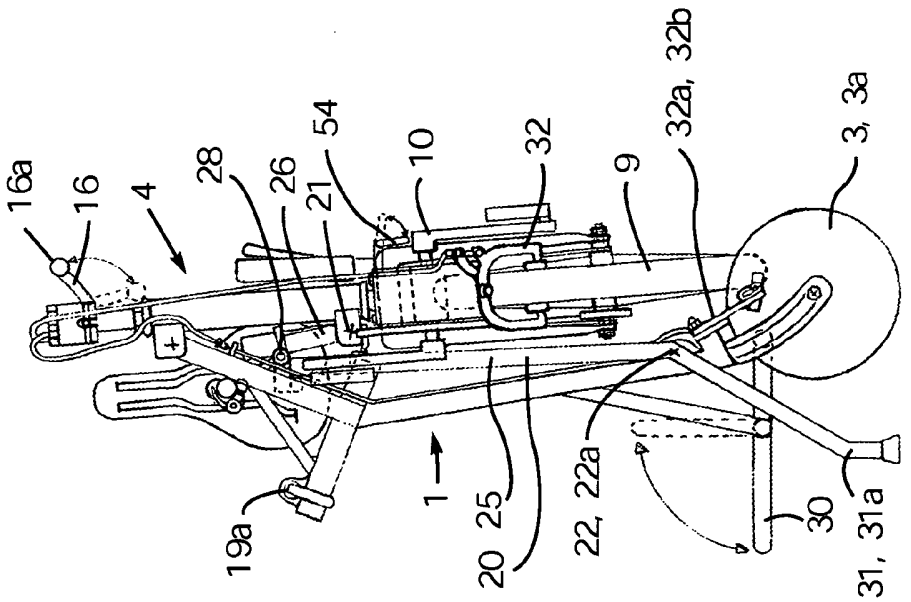

5
29a
16
6
16a
7
4
10
12
11
12a
24
21
14
14a
26
8
9
54
27a
28a
16b
15
19
18
13
29
27
28
20
2
2a
2b
14b
25
1
22, 22a
8a, 8b
30
31, 31a
3, 3a

Fig. 10

Fig. 11


16a
16
4
28
26
21
54
10
32
9
32a, 32b
3, 3a
19a
1
20
25
22, 22a
30
31, 31a

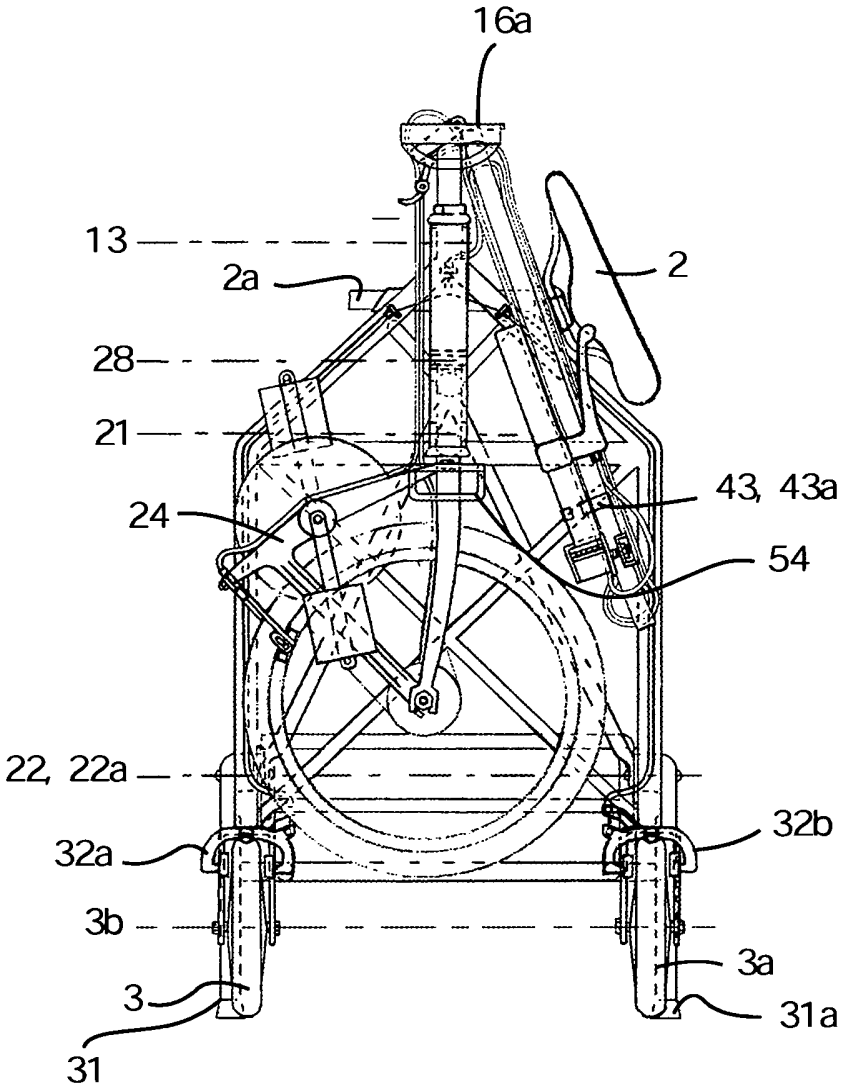


Fig. 12

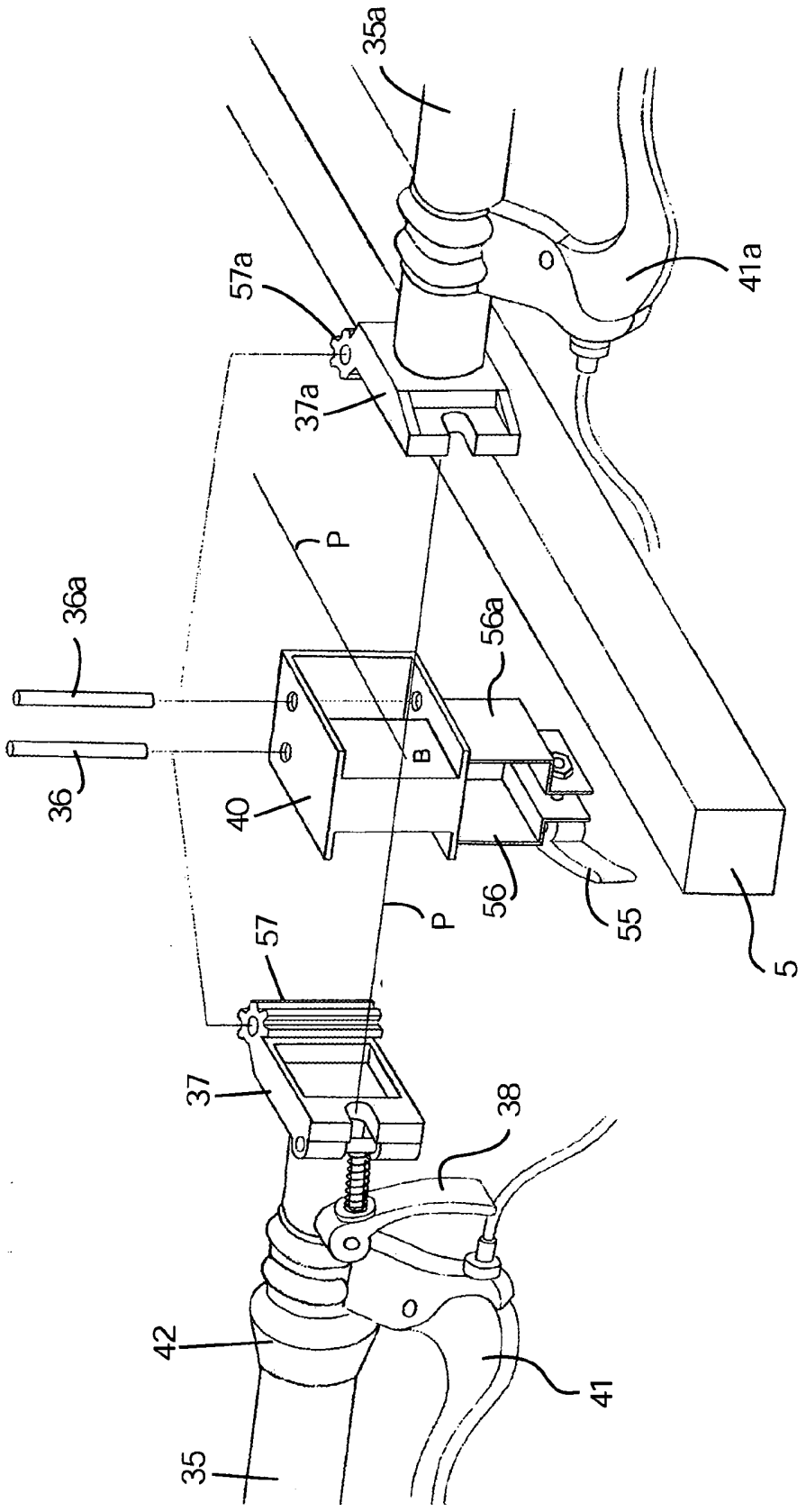


Fig. 13

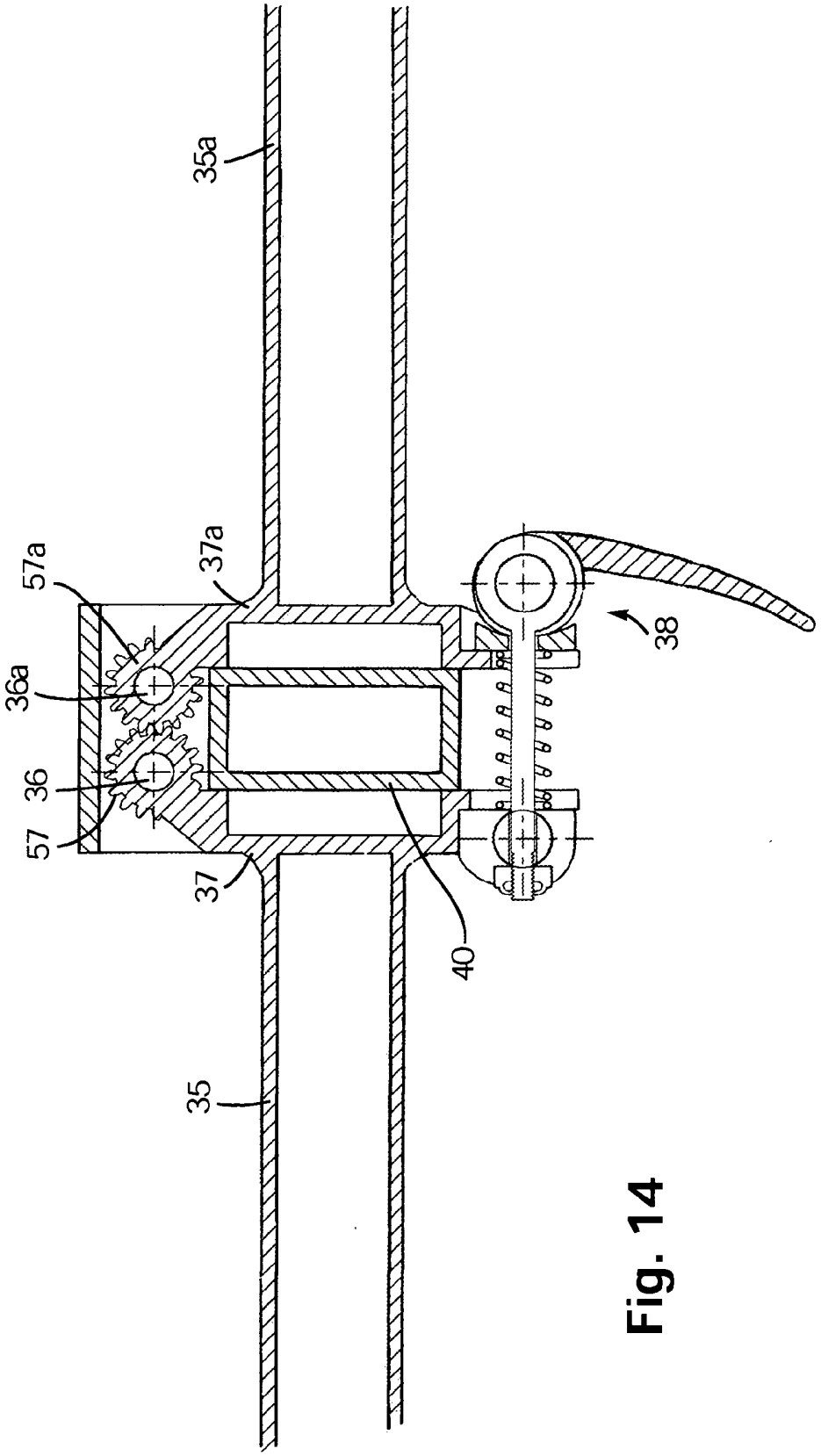


Fig. 14