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(54) Title: A MULTI-PURPOSE CONVERTIBLE CARRIAGE

(57) Abstract: One exemplary embodiment of the disclosed subject matter is a convertible carriage, comprising an at least one wheel, a framework having a width and a length, and a structure attached to the framework, the structure operable to progressively expand and retract the carriage lengthwise and comprises therein a drive mechanism for the at least one wheel

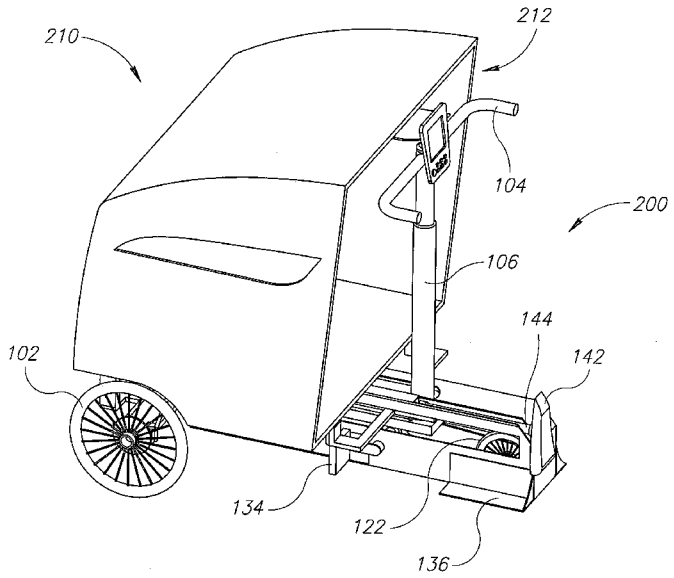


FIG.2

WO 2011/132185 A1

A MULTI-PURPOSE CONVERTIBLE CARRIAGE

RELATED APPLICATIONS

The present application claims a priority from a US provisional application Serial No. 61/325,842 filed on April 20, 2010.

BACKGROUND

The present disclosure generally relates to a carriage, and more specifically to a convertible carriage.

Some variants of baby strollers or tri-cycles with folding or conversion capabilities are known, where some examples are listed below.

US application No. 2009/0194957 reports a multifunctional chassis that may be converted into vehicle types, including strollers, walking learning aids, tricycles, go-carts, trailers, and hand carts.

Chinese patent No. CN201205954(Y) reports a folding front three-wheel bicycle, comprising two front wheels, a rear wheel, a handlebar, a chain wheel transmission mechanism, pedals, a saddle, a chassis, a telescopic handlebar supporting tube, a basket, a telescopic rear wheel mounting tube and a saddle support folding mechanism.

Chinese patent No. CN 201049713(Y) reports a tricycle comprising a left and a right rear supporting frames with a left rear wheel and a right rear wheel and a front tricycle frame with a front wheel where the left rear supporting frame is connected with the front tricycle frame and the right side of the left rear supporting frame is connected with the right rear supporting frame through an inner folding arm and an outer folding arm.

Chinese patent No. CN200948846(Y) reports tricycle, in particular to a tricycle whose chassis can be opened and closed, having folding chassis and a fixed chassis. The folding chassis is arranged at the rear end of the fixed chassis. One end of the folding chassis is connected with the fixed chassis by a hinge and the other end of the folding chassis is connected with a tailgate by a hinge. A lifting chain is arranged between the tailgate and the folding chassis. The two ends of the tailgate are provided with bolts which can connect the tailgate and the sideboard. The bottom of the carriage near the back axle is provided with a lever-type lock which can transversely lock two wheels at the same time.

US application No. 2006/0261575 reports a vehicle for carrying a child that is pushed along by one walking, jogging, or running, steerable with handlebars, and convertible from a push stroller to a rideable, operator-powered tricycle. The stroller converts from a stroller pushable from a back end to a tricycle by extending telescoping frame members and attaching a seat frame assembly comprising pedals, a crank, a continuous drive element, front and rear drive elements, and a first gear for driving a pair of rear wheels.

Chinese patent No. CN1654266A reports a bicycle with an automatically expanding frame having a turntable on the casing to wind the main and the auxiliary drawing threads and thus to drive the branch threads to draw different folding parts and supporting parts and to fold the bicycle.

Japanese patent No. JP3018290 (B1) reports a tricycle in which a vehicle body frame is provided on a head pipe, having a front wheel having a pedal part in a fork stem on a lower end part of the head pipe and two rear wheels, on both sides of a rear part of the vehicle body frame a handle post is inserted in and attached to the head pipe in an expandable manner, the length of the vehicle body frame is adjusted to adjust the gap between the front wheel and the rear wheels, and a baggage basket a part of the outer surface of which is formed to be a seat is fitted to the handle post in an attachable/detachable manner.

UK patent GB747786A reports a convertible tricycle and push-chair for children comprising a double bow frame carrying a seat and two rear wheels, a tubular member pivoted to the front of the frame, a steering rod, a front wheel and means for locking the member in a substantially vertical position to form a tricycle or in an inclined position with the steering rod extended as a handle to form a push-chair.

SUMMARY

One exemplary embodiment of the disclosed subject matter is a convertible carriage, comprising an at least one wheel, a framework having a width and a length, and a structure attached to the framework, the structure operable to progressively expand and retract the carriage lengthwise and comprises therein a drive mechanism for the at least one wheel.

In some embodiments, the carriage further comprises a steering mechanism for pivoting at least the at least one wheel or an at least one more wheel about an axis perpendicular to both the length and the width, wherein the steering mechanism is operable in either one of an expanded or a retracted state of the carriage.

In the context of some embodiments of the present disclosure, without limiting, 'progressively' implies in a continuous and/or stepwise manner.

In the context of the present disclosure, without limiting, 'lengthwise' implies in a direction of a length or in a longitudinal direction or with relation to a length.

In the context of the present disclosure, without limiting, 'widthwise' implies in a direction of or with a relation to a width.

In the context of the present disclosure, without limiting, using the preposition 'at' to denote a location does not necessarily imply an exact location but also a vicinity of the location.

BRIEF DESCRIPTION OF THE DRAWINGS

Some non-limiting exemplary embodiments or features of the disclosed subject matter are illustrated in the following drawings.

Identical or duplicate or equivalent or similar structures, elements, or parts that appear in one or more drawings are generally labeled with the same reference numeral, optionally with an additional letter or letters to distinguish between similar objects or variants of objects, and may not be repeatedly labeled and/or described.

Dimensions of components and features shown in the figures are chosen for convenience or clarity of presentation and are not necessarily shown to scale or true perspective. For convenience or clarity, some elements or structures are not shown or shown only partially and/or with different perspective or from different point of views.

References to previously presented elements are implied without necessarily further citing the drawing or description in which they appear.

Fig. 1A schematically illustrates a framework of a carriage, according to exemplary embodiments of the disclosed subject matter;

Fig. 1B schematically illustrates a framework of a carriage with a sliding structure mounted thereon, according to exemplary embodiments of the disclosed subject matter;

Fig. 2 schematically illustrates a partially expanded carriage having thereon a compartment as a superstructure, according to exemplary embodiments of the disclosed subject matter;

Fig. 3A schematically illustrates a carriage in a fully retracted state, according to exemplary embodiments of the disclosed subject matter;

Fig. 3B schematically illustrates a carriage in a fully expanded state, according to exemplary embodiments of the disclosed subject matter; and

Fig. 4 schematically illustrates a steering mechanism of a carriage, according to exemplary embodiments of the disclosed subject matter.

DETAILED DESCRIPTION

One technical problem dealt with by the disclosed subject matter is providing a carriage progressively expandable and retractable to a multiplicity of configurations.

Another technical problem dealt with by the disclosed subject matter is providing a steerable carriage progressively expandable and retractable to a multiplicity of configurations.

One technical solution is a carriage having at least one wheel and a progressively expandable and retractable telescopic construction comprising therein and/or thereon elements for driving the carriage.

Another technical solution is a carriage having at least one steerable wheel and a progressively expandable and retractable telescopic construction comprising therein and/or thereon elements for driving and steering the carriage.

A potential technical effect of the disclosed subject matter is multi-purpose expandable and retractable carriage.

A general non-limiting overview of practicing the present disclosure is presented below. The overview outlines exemplary practice of embodiments of the present disclosure, providing a constructive basis for variant and/or alternative and/or divergent embodiments, some of which are subsequently described.

An exemplary embodiment comprises a carriage based on a framework as an infrastructure having a front and rear aspects or sides the distance therebetween indicative of a length, a bottom and top aspects or sides the distance therebetween indicative of a height, and where a dimension perpendicular to both the length and height indicative of a width. The aspects apply also to parts or member connected to the framework.

At or near the front side of the framework are connected a front wheel or wheels such as two wheels, referred to also, without limiting as front wheels.

At the bottom aspect the framework comprises a rod stretching lengthwise, the rod having any cross-section such as rectangular or a circular or U-shaped cross-section.

On the rod and/or in grooves in the rod and/or around the rod is mounted a structure where the structure is movable or slidable relative to the rod, such that when the structure is moved in a direction of the rear side the carriage is expanded. Likewise, when the structure is moved from an expanded state towards the front side the carriage is retracted. Optionally, the structure is disposed inside the rod and/or in a groove therein such as inside

a space formed by a U-shape cross-section. For clarity and without limiting, the structure is also referred to as a sliding structure.

The sliding structure may be moved to an intermediate position or state, that is, between a fully retracted state and a fully expanded state, wherein the intermediate position may comprise a plurality of intermediate positions. Expanding and retracting to an intermediate position or positions is referred to as progressively expanding and retracting or a variation thereof, and an intermediate position or state is also referred to as a partially expanded state or position.

In some embodiments, the positions such as fully retracted state and/or fully expanded state and/or intermediate position are stabilized by fastening mechanisms such as releasable pin under elastic force and a hole, cam and groove, handle with a screw of any other fastening mechanism that releasably holds and/or fastens two members together. In some embodiments, the fastening mechanism allows to releasable lock the sliding structure such as to the framework with one manual operation, and likewise, optionally, to release the sliding structure by one manual operation. Optionally, the one manual operation is a combined operation such as twisting and pushing at the same time.

In some embodiments, the sliding structure is formed with a plurality of parts having different cross-sections widths or diameters and one part is disposed in another in a telescopic manner, thereby allowing expanding the carriage by a larger extent than by a single part.

In some embodiments, on the framework is mounted a hand-held member for holding and/or directing the carriage, such as handles or a bar or a steering wheel akin to bicycles, stroller or car, respectively. For brevity and without limiting the hand-held member is referred to as a handgrip.

In some embodiments, the front wheels are constructed with pivots that allow the front wheels to rotate about an axis perpendicular to both the length and the width of the carriage or generally parallel to the height of the carriage.

In some embodiments, the handgrip is movable and/or pivotable and is linked to the front wheels by a linkage such as cables or rods, thereby allowing steering the front wheels by the handgrip. The handgrip and the linkage are collectively referred to, without limiting, as a steering mechanism. It is noted that the steering mechanism may comprise other elements such as additional rods, cables, screws and so forth.

In some embodiments, the sliding structure comprises a wheel or a plurality of wheels, as exemplified by a wheel towards or near the rear side of the sliding structure, and collectively referred to, without limiting, as a rear wheel.

In some embodiments, the rear wheel is constructed with a pivot that allows the rear wheel to rotate about an axis generally parallel to the height of the carriage. Optionally, the steering mechanism comprises also the rear wheel. Optionally or alternatively, the steering mechanism comprises the rear wheel without including the front wheels.

In some embodiments, the steering mechanism is operable in fully retracted state and/or fully expanded state and/or intermediate position of the carriage.

In some embodiments, the sliding structure comprises therein a drive mechanism. Optionally, the drive mechanism is a pedaling mechanism comprising elements such as wheels and/or gears and/or chain, where the pedals and pedal bars are excluded from the interior mechanism. Optionally or additionally, the drive mechanism an electric mechanism comprising an electric motor powered by a battery. Thus, in some embodiments, the drive mechanism is a combination of manually operated mechanical mechanism and an electric mechanism. In some embodiments, the sliding structure and the pedals and pedal bars are structured to allow stash or store the pedals and/or pedal bars inside the sliding structure, at least partially.

In some embodiments, the drive mechanism is linked to the rear wheel thereby enabling the carriage to move. Optionally or alternatively, the drive mechanism is linked to the front wheels.

In some embodiments, the derive mechanism is protected or sealed for external conditions. For example, water and/or dust and/or weather effects such as humidity or temperature. In some embodiments, the derive mechanism is stored, at least partially, in a compartment in the sliding structure.

In some embodiments, the sliding structure comprises such as therein and/or thereon additional members. For example, one or more foldable seats, one or more brackets or support to allow standing and/or pushing the carriage akin to a scooter, or any other member such as a handle for support when a second seat is used.

In some embodiments, at least a top part or parts of the framework is formed to allow holding a superstructure thereon. For example, the superstructure comprises a compartment or a cabinet or housing for one or more toddlers, or the superstructure

comprises formations for holding merchandise, or the superstructure comprises a hood for shading or protection.

In some embodiments, a top part of the framework is retractably expandable widthwise, thereby allowing holding larger superstructures than a retraced or non-expanded framework.

Fig. 1A schematically illustrates a framework 100 of a carriage, according to exemplary embodiments of the disclosed subject matter.

For reference, present and further on, major aspects or axes and directions of the framework are indicated. A double-arrow 170 indicates the length where arrowhead 172 indicates the front aspect direction and arrowhead 174 indicates the rear aspect direction. A double-arrow 180 indicates the width and a double-arrow 190 indicates the height where arrowhead 192 indicates the top aspect direction and arrowhead 194 indicates the bottom aspect direction.

In some embodiments, framework 100 is generally formed from a rod 110 in a longitudinal direction and a bar 108 in a widthwise direction. At each widthwise end of bar 108 is attached a wheel 102, also referred to as front wheels, and on top of framework 100 is disposed a column 106 in a generally vertical orientation having a handgrip 104 at the top end thereof.

Framework 100 also comprises a plurality of holding member 112 to hold and/or support a superstructure on framework 100, the superstructure providing, for example, a surface or a space for the carriage's payload.

Fig. 1B schematically illustrates framework 100 with a sliding structure 120 mounted thereon in at an expanded state, according to exemplary embodiments of the disclosed subject matter.

Sliding structure 120 is formed as a partially closed box having or defining a cavity or housing, where at the rear end thereof sliding structure 120 comprises a wheel 122, also referred to as a rear wheel. Sliding structure 120 is movably or slidably mounted on rod 110 such that sliding structure 120 can progressively move between a closed or retracted state where the front end of sliding structure 120 is at or closest to the front of framework 100 or front end of rod 110 and an open or expanded state where the front end of sliding structure 120 is at or closest to the rear end of rod 110. The front wheels and the rear wheel form a stable basis where, in some embodiments, when moving or sliding structure 120 between states or positions rear wheel 122 spins, thereby allowing a smooth and

convenient expanding or retracting of the carriage and adjustment of an optional intermediate state.

In some embodiments, in the cavity of sliding structure 120 is formed a compartment 124 that houses a driving mechanism (not shown) that drives wheel 122 via a transmission assembly 128. Compartment 124 is protected, at least to a certain extent, from environmental conditions such as water or dust, where, in some embodiments, the compartment may be accessed such as for service by opening a cover 126.

In some embodiments, the driving mechanism comprises electrical motor powered by a battery. Optionally or additionally, the driving mechanism comprises a manual mechanism for pedaling 132 with pedals 134. In some embodiments, manual mechanism for pedaling 132 is protected by a cover (not shown) such as for protection from environmental conditions.

In some embodiments, sliding structure 120 comprises one or more additional members, some of which are foldable and/or retractable and/or slidable. For example, a seat 142 disposed on a support 144 which is foldable backwards to the rear of sliding structure 120.

In some embodiments, sliding structure 120 comprises two foldable seats. For example, one seat is folded side by side of the other seat, and in upright positions the seats are disposed lengthwise one after the other seat.

Optionally sliding structure 120 comprises auxiliary elements such as a foot support 136, which is optionally foldable or insertable into the cavity of sliding structure 120.

Fig. 2 schematically illustrates a carriage 200 in a partially expanded state, the carriage having thereon as a superstructure a compartment 210 having a cavity 212, according to exemplary embodiments of the disclosed subject matter.

Compartment 210 is held and supported on one or more of holding member 112 (not shown) and can be used for holding objects. For example, one or more carry-cots or bassinets.

Seat 142 on support 144 are exemplified in a folded position as described above, namely, that seat 142 disposed on a support 144 which is foldable backwards to the rear of sliding structure 120.

Fig. 3A schematically illustrates carriage 200 in a fully retracted state, according to exemplary embodiments of the disclosed subject matter, where seat 142 is folded back.

Fig. 3B schematically illustrates carriage 200 in a fully expanded state, according to exemplary embodiments of the disclosed subject matter, where seat 142 in upright position.

Comparing carriage 200 in Fig. 2 with carriage 200 in Fig. 3A and Fig. 3B it may be appreciated, for example, by the relative distance column 106 and wheel 122, that the carriage 200 in Fig. 2 is in a partially expanded state.

Fig. 4 schematically illustrates a steering mechanism 400 of carriage 200, illustrated in a fully retracted state, according to exemplary embodiments of the disclosed subject matter.

For each wheel 102 steering mechanism 400 comprises a pull-push rod 402 that is pulled and pushed as column 106 pivots under the control of handgrip 102. Pull-push rod 402 connects to an auxiliary rod 404 which connects to a lever 406 comprised as a part of the assembly of wheel 102. As column 106 pivots, pull-push rod 402 rotates pivot 414, thereby rotating auxiliary rod 404 about a hinge 412. Auxiliary rod 404 rotates lever 406 about a hinge 416, thereby directing wheel 102 to a direction regulated by handgrip 102.

In some embodiments, steering mechanism 400 is enclosed within sliding structure 120 and rod 110, as indicated by the dashed lines. Optionally, steering mechanism 400 is partially enclosed in sliding structure 120 and/or rod 110.

As steering mechanism 400 is constructed in framework 100, steering mechanism 400 is operable in any state of carriage 200, including fully expanded state and partially expanded stated.

In some embodiments, holding member 112 or other holding or supporting members are constructed to expand and retract such as by a telescopic construction, thereby enabling to expand and retract framework 100 widthwise, allowing accommodation to various sized of the superstructure.

In some embodiments, carriage 200 can expand from a length of around one meter to a length of around 1.8 meter. Optionally the range may be different, for example, around 70cm to around two meters, or any other range.

In some embodiments, when sliding structure 120 is long or the payload is heavy such that extra support is required, sliding structure 120 comprises an additional one or more wheels stored in the cavity of sliding structure 120. For example, as sliding structure 120 is pulled backwards, the additional wheel falls down or snapped down by an elastic

force. Likewise, as sliding structure 120 is pushed forward, the additional wheel is pushed up, such as by a slanted surface, back into the cavity of sliding structure 120.

In some embodiments, the structure of framework 100 and/or sliding structure 120 may be varied and framework 100 and/or sliding structure 120 may comprise a variety of members and components.

In some embodiments, carriage 200 may be used for various purposes in addition to a baby stroller. For example, carriage 200 may be used as a trailer, or, for example, carriage 200 may be used as a semi-trailer optionally without the front wheels using only the rear wheel, or without the rear wheel using only the front wheel.

There is thus provided according to the present disclosure a convertible carriage, comprising an at least one wheel, a framework having a width and a length, and a structure attached to the framework, the structure operable to progressively expand and retract the carriage lengthwise and comprises therein a drive mechanism for the at least one wheel.

In some embodiments, the carriage further comprises a steering mechanism for pivoting at least the at least one wheel or an at least one more wheel about an axis perpendicular to both the length and the width, wherein the steering mechanism is operable in either one of an expanded or a retracted state of the carriage.

In some embodiments, the drive mechanism comprises at least one of an electric motor or a pedaling mechanism, or a combination thereof, wherein the drive mechanism is powered by at least one of a manual power or a battery, or a combination thereof.

In some embodiments, the drive mechanism is protected for at least one of water or dust or weather, or a combination thereof.

In some embodiments, the framework is expandable and retractable widthwise.

In some embodiments, the structure is releasable fastenable to the framework, wherein the structure is releasable from the framework by one manual motion.

In some embodiments, the framework is formed to hold thereon a superstructure, wherein the superstructure is a compartment for an at least one toddler.

In some embodiments, the structure comprises an at least one additional member disposed therein or thereon or as a combination thereof, wherein the at least one additional member comprises an at least one seat.

In some embodiments, the at least one seat comprises a plurality of seats, wherein the at least one seat comprises at least one of a foldable seat or a retractable seat, or a combination thereof.

As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

When a range of values is recited, it is merely for convenience or brevity and includes all the possible sub-ranges as well as individual numerical values within and about the boundary of that range. Any numeric value, unless otherwise specified, includes also practical close values enabling an embodiment or a method, and integral values do not exclude fractional values. A sub-range values and practical close values should be considered as specifically disclosed values.

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the disclosed subject matter. While certain embodiments of the disclosed subject matter have been illustrated and described, it will be clear that the invention is not limited to the embodiments described herein. Numerous modifications, changes, variations, substitutions and equivalents are not precluded.

CLAIMS

1. A convertible carriage, comprising:

an at least one wheel;

a framework having a width and a length; and

a structure attached to the framework, the structure operable to progressively expand and retract the carriage lengthwise and comprises therein a drive mechanism for the at least one wheel.

2. The convertible carriage according to claim 1, further comprising a steering mechanism for pivoting at least the at least one wheel or an at least one more wheel about an axis perpendicular to both the length and the width.

3. The convertible carriage according to claim 2, wherein the steering mechanism is operable in either one of an expanded or a retracted state of the carriage.

4. The convertible carriage according to claim 1, wherein the drive mechanism comprises at least one of an electric motor or a pedaling mechanism, or a combination thereof.

5. The convertible carriage according to claim 1, wherein the drive mechanism is powered by at least one of a manual power or a battery, or a combination thereof.

6. The convertible carriage according to claim 1, wherein the drive mechanism is protected for at least one of water or dust or weather, or a combination thereof.

7. The convertible carriage according to claim 1, wherein the framework is expandable and retractable widthwise.

8. The convertible carriage according to claim 1, wherein the structure is releasable fastenable to the framework.

9. The convertible carriage according to claim 8, wherein the structure is releasable from the framework by one manual motion.

10. The convertible carriage according to claim 1, wherein the framework is formed to hold thereon a superstructure.

11. The convertible carriage according to claim 10, wherein the superstructure is a compartment for an at least one toddler.

12. The convertible carriage according to claim 1, wherein the structure comprises an at least one additional member disposed therein or thereon or as a combination thereof.

13. The convertible carriage according to claim 12, wherein the at least one additional member comprises an at least one seat.

14. The convertible carriage according to claim 13, wherein the at least one seat comprises a plurality of seats.

15. The convertible carriage according to claim 13, wherein the at least one seat comprises at least one of a foldable seat or a retractable seat, or a combination thereof.

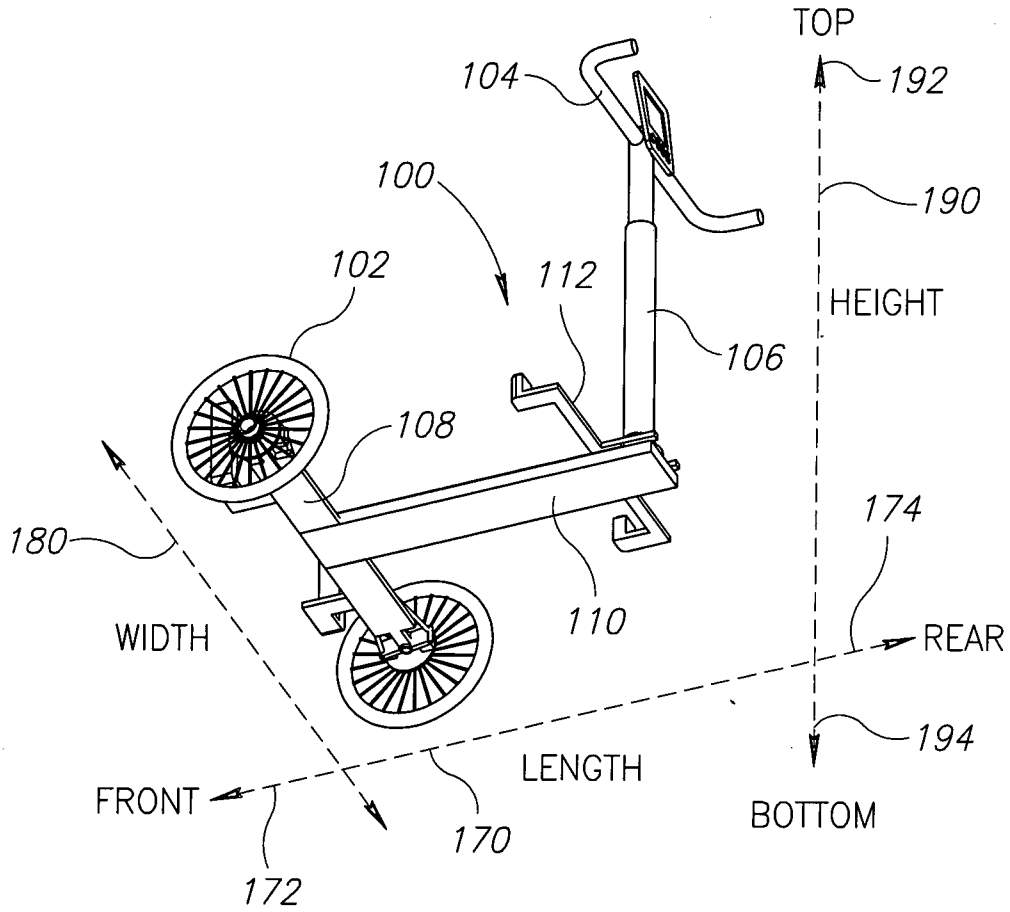

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FIG.1A

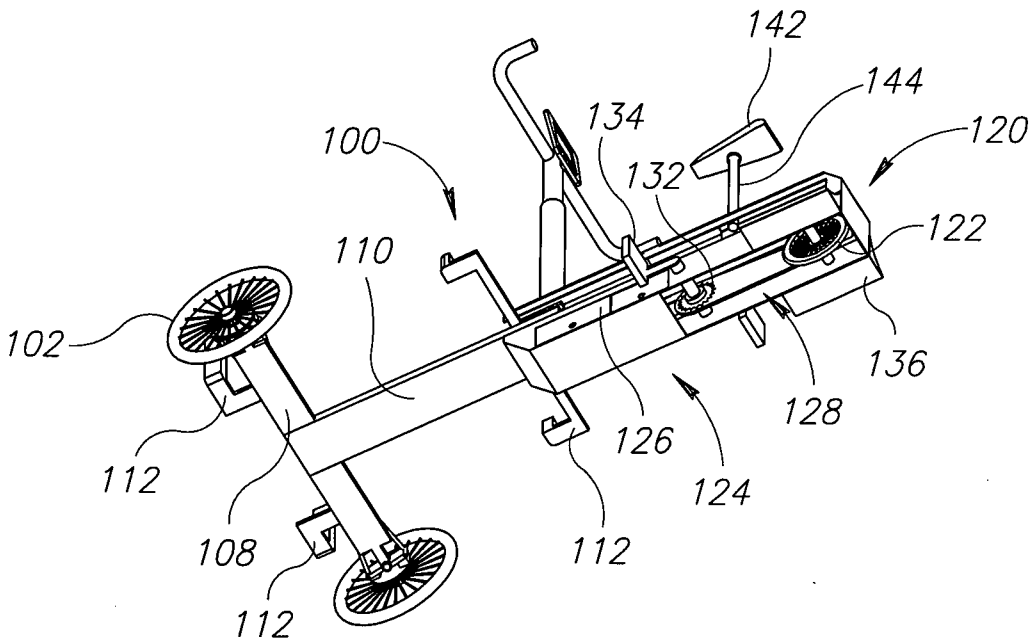

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FIG.1B

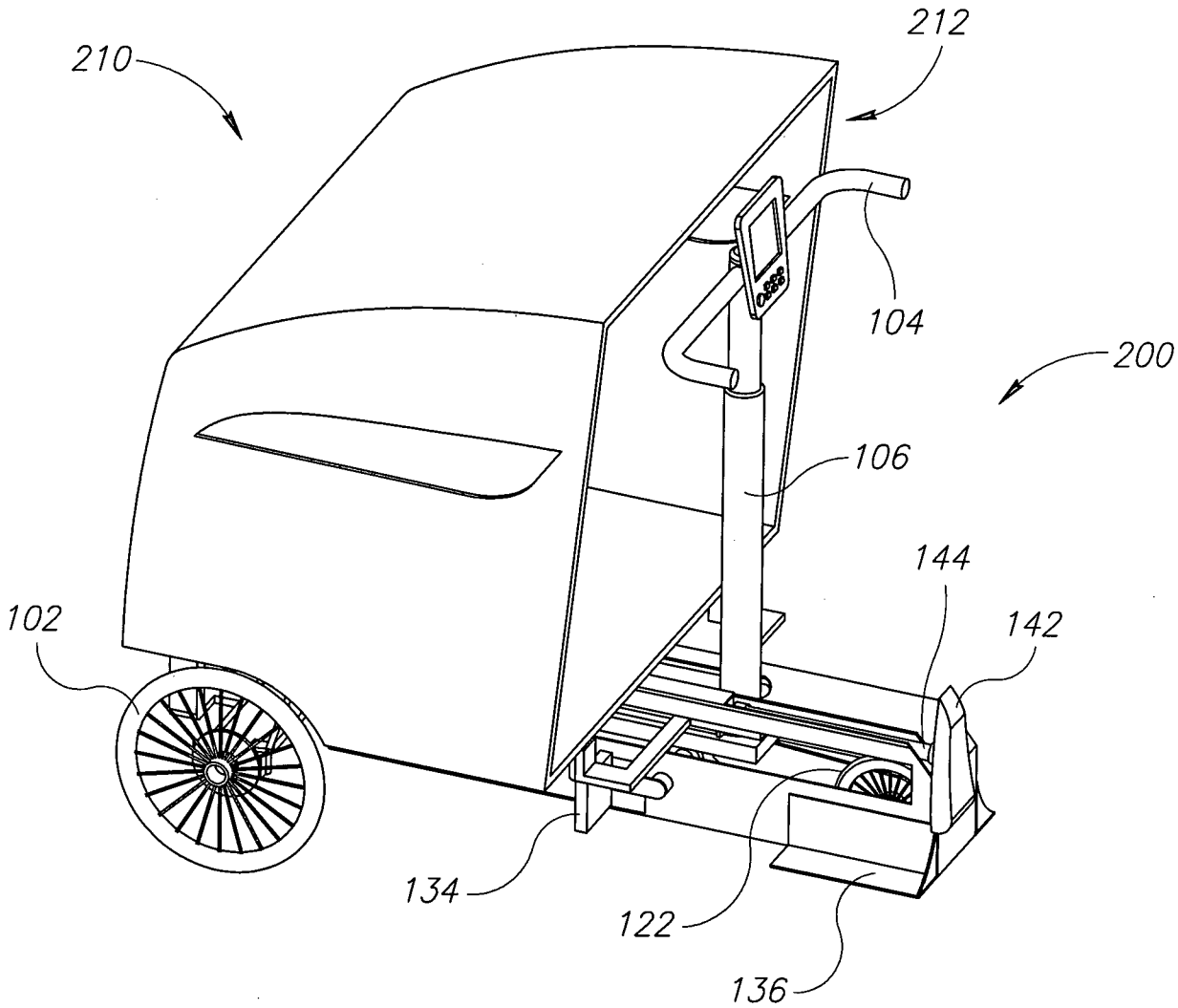


FIG.2

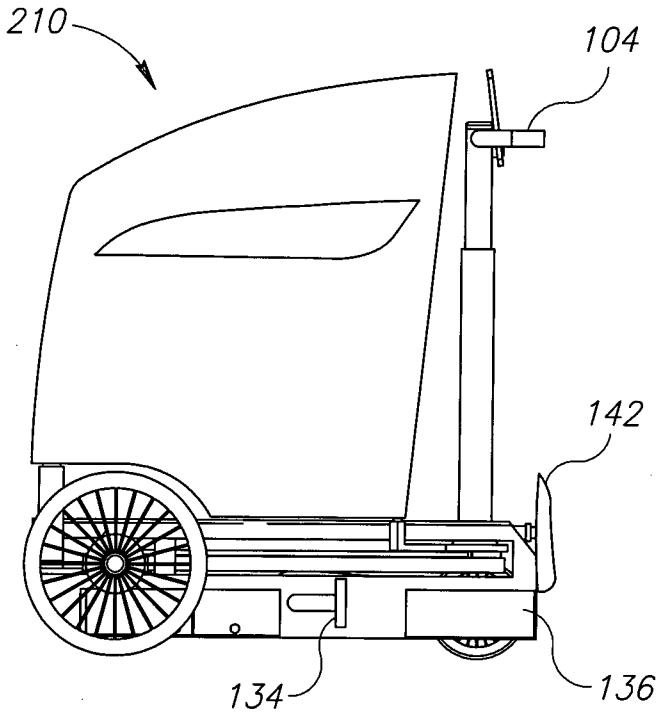


FIG.3A

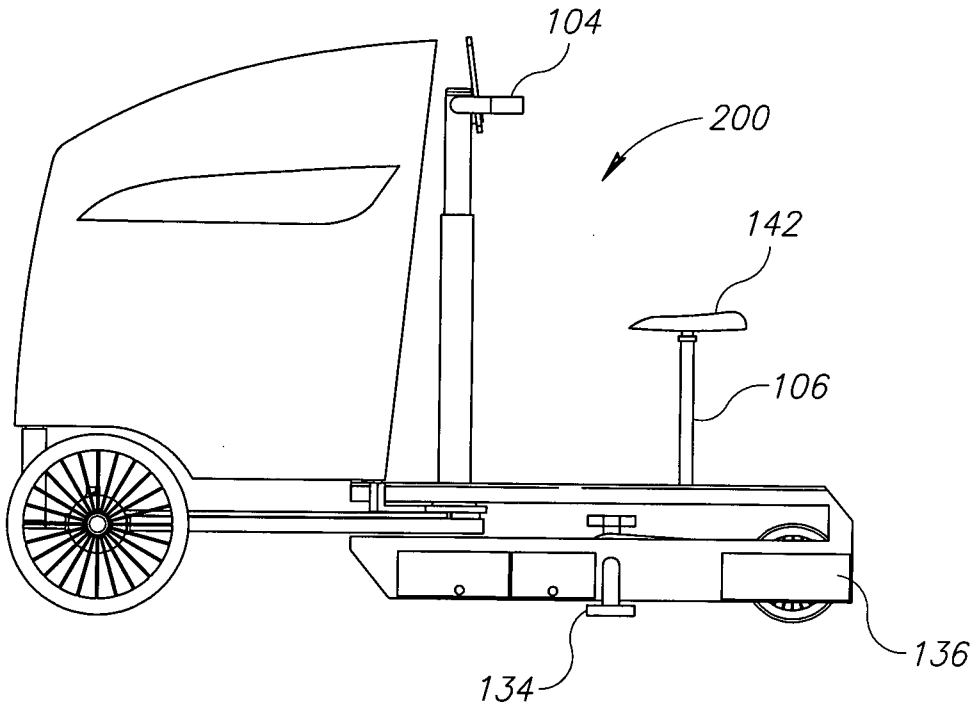


FIG.3B

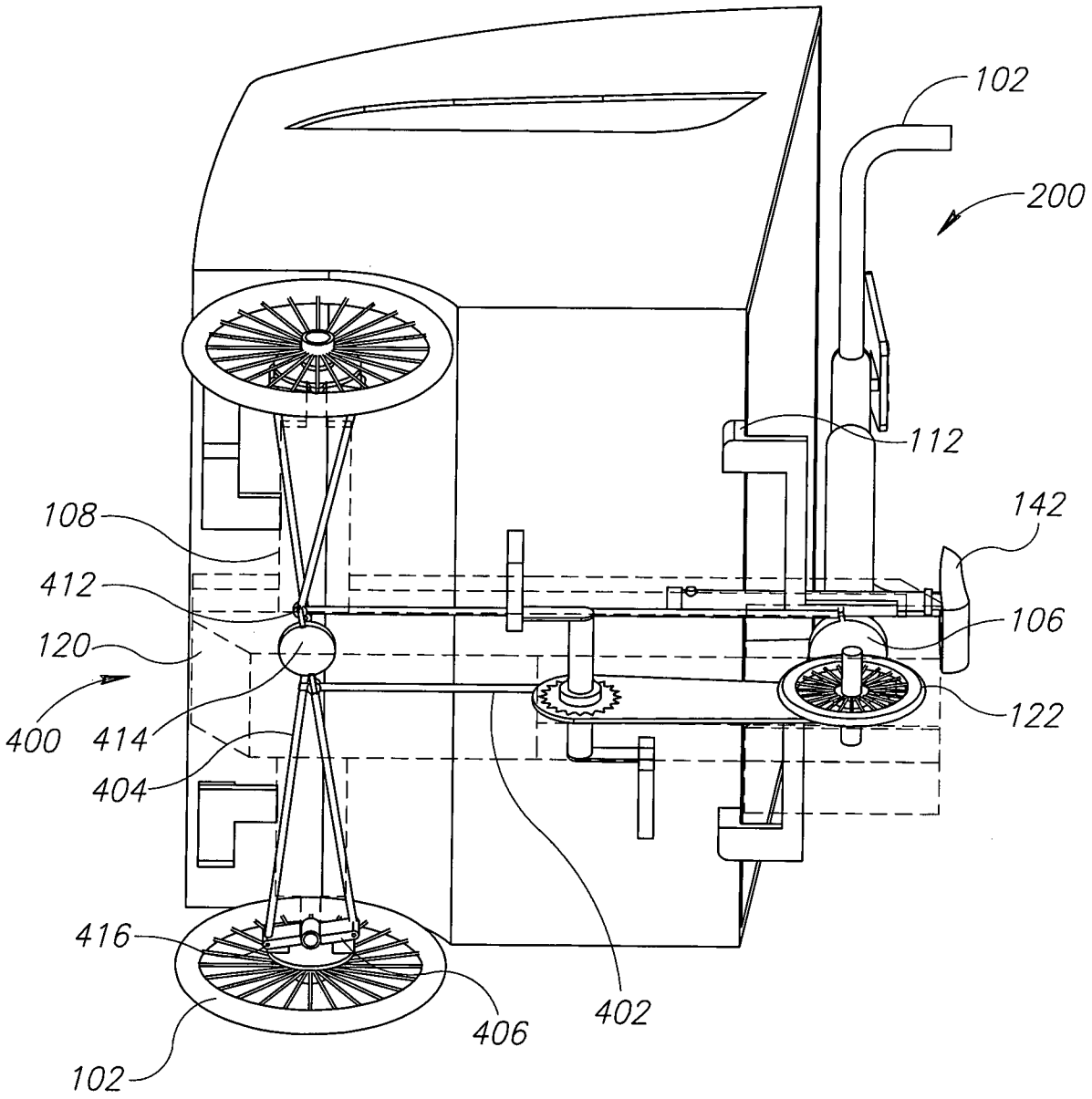


FIG.4

INTERNATIONAL SEARCH REPORT

International application No
PCT/IL2011/000311

A. CLASSIFICATION OF SUBJECT MATTER
INV. B62B7/12 B62K5/02 B62K15/00
ADD.

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)
B62B B62K

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 practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/261575 A1 (EHRENREICH MICHAEL [US] ET AL) 23 November 2006 (2006-11-23) cited in the application paragraph [0065] - paragraph [0087]; figures 1, 6, 7, 19, 24, 25	1-6,8-15
X	US 2009/014973 A1 (LAWLESS RAY [IE]) 15 January 2009 (2009-01-15) paragraphs [0055], [0056], [0060], [0061]; claims 1, 11, 12, 19, 20; figures 1, 2, 7, 8, 10	1-12
X	CN 201 205 954 Y (SHANGHAI HIGH MINDED BICYCLE C [CN]) 11 March 2009 (2009-03-11) cited in the application abstract; figures 1-7	1-6,8-13

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
4 August 2011	18/08/2011

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	page 1, line 53 - page 2, line 17; figures 1-3	13-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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