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(54) Title: STRADDLE-TYPE VEHICLE WITH A RECEIVING CHAMBER ASSEMBLY

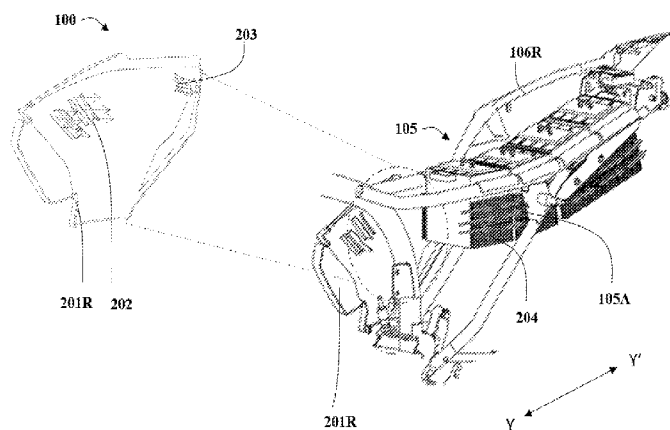


Figure 2a

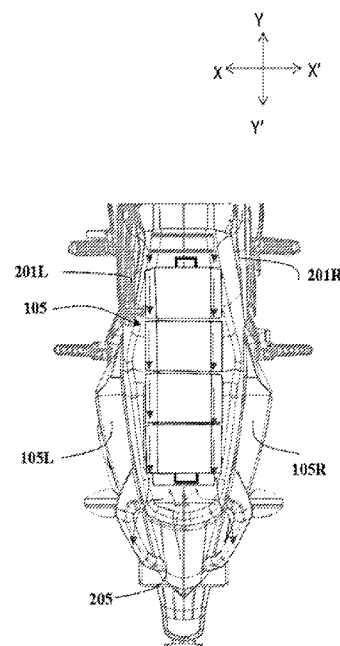


Figure 2b

(57) Abstract: The present invention relates to frame assembly (101) for a straddle type vehicle (100). The frame assembly (101) comprises a pair of left and right rear tubes (103L, 103R). The pair of left and right rear tubes (103L, 103R) being extending in a longitudinal direction (Y-Y') of said vehicle (100) from a portion of a main tube (102). A receiving chamber assembly (105) being mounted on said pair of left and right rear tubes (103L, 103R) of a said frame assembly (101). The receiving chamber assembly (105) being accessible in an open condition of said seat assembly (107). Therefore, seat assembly (107) covers the receiving chamber assembly (105) which provides antitheft arrangement without an additional locking mechanism.



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STRADDLE-TYPE VEHICLE WITH A RECEIVING CHAMBER ASSEMBLY

TECHNICAL FIELD

[0001] The present subject matter relates to a vehicle. More particularly, to a straddle type vehicle.

5

BACKGROUND

[0002] Over the past few years, the investment and market viability of the alternative powertrain vehicle is growing in a wide range because of the high costs of fossil-based fuel and at the same time pressing need to be environment-friendly leading to alternative means of transportation. The alternative means include electric vehicles, electric vehicles with or without a supplemental IC engine (i.e.,
10 hybrid electric vehicle), or fuel cell-powered vehicles. The alternative powertrain vehicles are environmentally clean as it does not pollute the air during its operation and its operation is silent. Hence preference of users is rapidly shifting towards alternative powertrain vehicles for their regular usage. But electrochemical cells
15 including batteries must withstand predetermined temperature ranges as well as shock, vibration, and abuse hence optimal placement & stable packaging of electrochemical cells without any compromise in space for luggage compartment is always a challenge for automobile players.

[0003] The above information disclosed in this Background section is only for
20 enhancement of understanding of the background of the disclosure and therefore it may contain information that does not form the prior art that is already known in this country to a person of ordinary skill in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] The present invention is described with reference to an exemplary
25 embodiment of a straddle type two-wheeled vehicle colloquially called a motorcycle wherein a rider has to straddle and sit. This invention is implementable in two-wheeled vehicles/three-wheeled vehicles or four-wheeled vehicles. The same numbers are used throughout the drawings to reference like features and

components. Further, the inventive features of the invention are outlined in the appended claims.

[0005] Non-limiting and non-exhaustive embodiments of the invention are described with reference to the following figures, wherein like reference numerals
5 refer to like parts throughout the various views unless otherwise specified. It should be appreciated that the following figures may not be drawn to scale.

[0006] Descriptions of certain details and implementations follow, including a description of the figures, which may depict some or all of the embodiments described below, as well as a discussion of other potential embodiments or
10 implementations of the inventive concepts presented herein. An overview of embodiments of the invention is provided below, followed by a more detailed description with reference to the drawings.

[0007] **Figure 1a** illustrates an exploded view of the vehicle (100) where few parts are omitted from the figure, as per embodiment, in accordance with one
15 example of the present subject matter.

[0008] **Figure 1b** illustrates a perspective view of the vehicle (100) where few parts are omitted from the figure, as per embodiment, in accordance with one example of the present subject matter.

[0009] **Figure 2a** illustrates a perspective view of the vehicle (100) where few
20 parts are omitted from the figure and an enlarged localized perspective view of a right-side cover (201R), as per embodiment, in accordance with one example of the present subject matter.

[00010] **Figure 2b** illustrates the partial top view of the vehicle (100) as per embodiment, in accordance with one example of the present subject matter.

25 [00011] **Figure 3** illustrates a partial perspective view and a localized enlarged view of the frame assembly (101) where few parts are omitted from the figure, as per embodiment, in accordance with one example of the present subject matter.

[00012] **Figure 4a** illustrates a front side cut section view of the frame assembly (101) across the A-A' plane as per embodiment, in accordance with one example of
30 the present subject matter.

- [00013] . **Figure 4b** illustrates a graphical representation depicting the difference of the section modulus between the conventional frame assembly and present frame assembly (101) as per embodiment, in accordance with one example of the present subject matter.
- 5 [00014] **Figure 5** illustrates a rear side cut section view across B-B' axis of the frame assembly (101) of the vehicle (100), and a localized enlarged view of the frame assembly (101) of the vehicle (100) as per embodiment, in accordance with one example of the present subject matter.
- [00015] **Figure 6a** illustrates a front side perspective view and rear side
10 perspective view of the frame assembly (101) of the vehicle (100) as per alternative embodiment where few parts are omitted from the figure as per embodiment, in accordance with one example of the present subject matter.
- [00016] **Figure 6b** illustrates an exploded view of the frame assembly (101) as
per alternative embodiment, where few parts are omitted from the figure as per
15 embodiment, in accordance with one example of the present subject matter.

DETAILED DESCRIPTION

- 20 [00017] In the following description, numerous specific details are set forth to provide a thorough understanding of the embodiments. One skilled in the relevant art will recognize, however, that the techniques described herein can be practiced without one or more of the specific details, or with other methods, components, materials, etc. In other instances, well-known structures, materials, or operations
25 are not shown or described in detail to avoid obscuring certain aspects.
- [00018] Various features and embodiments of the present invention here will be discernible from the following further description thereof, set out hereunder. Further "front" and "rear", and "left" and "right" referred to in the ensuing description of the illustrated embodiment refer to front and rear, and left and right
30 directions as seen from a rear portion of the vehicle and looking forward. Furthermore, a longitudinal axis Y – Y' unless otherwise mentioned, refers to a

front to rear axis relative to the vehicle, while a lateral axis X – X' unless otherwise mentioned, refers generally to a side to side, or left to right axis relative to the vehicle.

[00019] However, it is contemplated that the disclosure in the present invention
5 may be applied to any vehicle without defeating the spirit of the present subject matter. The detailed explanation of the constitution of parts other than the present invention which constitutes an essential part has been omitted at suitable places.

[00020] Electrochemical cells including batteries are used as an electric source for an electric vehicle or a hybrid-powered vehicle is required to have high voltage and
10 large capacity. The high-capacity battery adversely affects the storage space being configured to receive large articles in the vehicle. Further, the principal drawback of the existing batteries is the excessive time duration required to recharge a battery. To address the said issue, the battery swap system is known. However, batteries are heavy, and exchanging these batteries is a huge task as the battery is to be removed
15 from the vehicle and charged in a battery charger or at a remote station. More specifically, the plurality of panels mounted to a frame assembly needs to be removed for accessing the battery that makes accessing the batteries cumbersome. Therefore, swapping the battery is time-consuming, as it is not readily accessible. Also, a dedicated locking provision is typically provided for securing the batteries in
20 the vehicle which undesirably adds to the time and effort.

[00021] Further, in the battery, however, heat is developed not only by chemical reactions but also by Joule loss caused during charge and discharge cycles, increasing the temperature of the battery. The increase in temperature affects battery life and other battery properties. Therefore, various kinds of battery cooling systems
25 are implemented to solve the above problem. However, a known cooling system comprises external cooling means which adds more weight and cost to the vehicle. Importantly, such systems are more viable for a four-wheeled vehicle owing to the feasibility of space & layout as well as the overall cost impact. However, for a straddle type two-wheeler or a three-wheeler (trike), there exists a challenge to
30 design a compact, low weight, low cost, and efficient cooling system with good durability and reliability.

[00022] At the same time, the automobile manufacturers need to cater to different market segments and users with product offerings and variants meeting the demands of respective users. These could involve variants in form of size, the capacity of the vehicle, range of usage, cost, ease of manufacturing, etc. From the
5 manufacturer's point of view, once a platform product is designed, the product economics would be viable based on the numbers sold. Therefore, it is always a challenge for an automobile manufacturer to have a vehicle layout and design which can be flexible to cater to the variants and the demands and enable modified versions with minimum changes in the vehicle layout, assembly time,
10 manufacturing set-up, etc. The challenge is further complicated when the vehicle architecture/platform requirement needs to cater to different powertrains like the Internal combustion engine (ICE) to an Electric Powertrain or a Hybrid powertrain. Thus, the transition towards electric vehicles is a major challenge for the OEM's (Original Equipment Manufacturer) in terms of manufacturing, as it requires
15 revamping of core processes to prepare for mass production of the electric vehicles.

[00023] Hence, there is a need for an improved storage assembly for a vehicle overcoming all the above problems as well as overcoming problems of the known art.

[00024] The invention is based on the object of making available an improved
20 storage assembly for a straddle type vehicle which is of compact construction and is relatively simple, and which makes it possible to swap the batteries as and when required.

[00025] It is another object of the present invention is to provide a theft-proof, reliable, secure and efficient storage system being configured to maintain the
25 optimum temperature of the electro chemical cells.

[00026] To this end, as per the first aspect, the frame assembly for a vehicle is disclosed which comprises of a pair of left and right rear tube. The pair of left and right rear tube being extending in a longitudinal direction of said vehicle from a portion of a main tube. A receiving chamber assembly being configured to be
30 accommodated within said pair of left and right rear tubes of said frame assembly and said receiving chamber assembly extending in said longitudinal direction of

said vehicle. The receiving chamber assembly being disposed below said seat assembly. Further, the receiving chamber assembly includes one or more receiving chamber. The one or more said receiving chamber is connected through a flexible mechanical linkage.

5 [00027] In accordance with this configuration and embodiment, the seat assembly covers the receiving chamber assembly. Therefore, said receiving chamber assembly becomes accessible in an open condition of said seat assembly thereby providing antitheft arrangement without additional locking mechanism.

[00028] As per the second embodiment a frame assembly for a vehicle comprises
10 a pair of left and right rear tubes; and a receiving chamber assembly, said receiving chamber assembly includes one or more receiving chamber, wherein one of said receiving chamber rests on an elastic member said elastic member is mounted on the frame assembly. The elastic member is mounted on a support plate, said support plate is attached to the frame assembly. Further, at least one of said pair of left and
15 right rear tubes being configured to have one or more lock arm being configured to arrest the oscillating movement of said receiving chamber.

[00029] In accordance with this configuration, the elastic member is provided at the bottom of the receiving chamber. The elastic member aids the removal of the receiving chamber thereby providing convenience to the user.

20 [00030] As per further embodiment said receiving chamber being configured to have one or more attachment portion to secure receiving chamber to said frame assembly. The attachment portion is configured to have an arc-shaped profile. The arc-shaped profile being configured to have predetermined included angle ranging from 20 degrees to 180 degrees. The attachment portion of said receiving chamber
25 is sandwiched between said rear tube and a seat bush of said seat assembly to provide reliable mounting.

[00031] In accordance with this configuration, one of the primary efficacies of the present invention is that the receiving chamber structure is optimized for weight and stiffness. The high weight of electrochemical cells tends to creates stress on the
30 receiving chamber specifically on the attachment portions. Thus, the attachment portion is configured to have the arc-shape profile at a predetermined included

angle which bears the weight of a plurality of electrochemical cells or large articles and other forces acting on it especially on unmetalled/rugged roads. Further, the load of the plurality of electrochemical cells or large articles is uniformly distributed which will not allow stress at the attachment portion of the receiving
5 chamber exceeding the strength of the material.

[00032] As per further aspect, a portion of said receiving chamber assembly is covered by a pair of left and right side covers. The pair of left and right-side covers being configured to have vents. The receiving chamber being configured to have a plurality of fins.

10 [00033] In accordance with this configuration, one of the primary efficacies of the present invention is the improved durability of electrochemical cells because electrochemical cells operate at the desired temperature range due to cooling from the natural air which passes through the plurality of fins in the receiving chamber. More specifically, the receiving chamber is profiled to have the plurality of fins at a
15 predetermined location, thus the incoming air can be easily guided through the receiving chambers without the use of any external suction means like blowing fan, etc. Further, the plurality of cooling fins on the outer casing allows more heat dissipation. High heat transfer from electrochemical cells is achieved as fins in the receiving chamber come in contact with incoming air at ambient temperature.

20 [00034] In accordance with this configuration, one of the primary efficacies of the present invention is that the receiving chamber assembly is easy to install due to the absence of external means like a radiator, etc. which involves a plurality of pipes. Further, the radiator requires external power to run the cooling fan/blowers which will consume more energy and lead to the frequent discharge of the electrochemical
25 cells.

[00035] As per further aspect, wherein said one or more receiving chamber being configured to accommodate one or more electrochemical cells. The electrochemical cell is removably mounted to one or more said receiving chamber.

[00036] In accordance with this configuration, one of the primary efficacies of the
30 present invention is that the electrochemical cells are easily accessible after opening the seat assembly.

- [00037] As per further aspect, said at least one receiving chamber being configured to accommodate daily use objects including a tool kit, medical kit.
- [00038] In accordance with this configuration, one of the primary efficacies of the present invention is that the daily use objects are easily accessible after opening the
5 seat assembly.
- [00039] As per further embodiment said a tandem seat mounted on said pair of left and right rear tubes. The tandem seat includes a rider seat and a pillion seat, wherein an opening being provided between said rider seat and said pillion seat to access daily use objects including tool kit, medical kit.
- 10 [00040] In accordance with this configuration, one of the primary efficacies of the present invention is that the stored daily use articles are easily and quickly accessible through an opening provided between the rider seat and pillion seat.
- [00041] As per further embodiment wherein at least one of said plurality of receiving chamber being configured to have substantially greater storage volume
15 than other receiving chambers.
- [00042] In accordance with this configuration, one of the primary efficacies of the present invention is the flexibility to add more electrochemical cells to meet the customers' expectations relative to performance, range, and reliability.
- [00043] As per an embodiment, receiving chamber are stacked along the length
20 direction of the vehicle such that the chambers are of decreasing order of height.
- [00044] In accordance with this configuration, this design enhances the flexibility for the user as well as the manufacturer to configure plurality of receiving chambers with varying capacity as well as avoid any compromise on the layout space in the rear wheel well which it is typically restricted by the suspension stroke movement
25 during riding.
- [00045] The present subject matter is further described with reference to accompanying figures. It should be noted that the description and figures merely illustrate the principles of the present subject matter. Various arrangements may be devised that, although not explicitly described or shown herein, encompass the
30 principles of the present subject matter. Moreover, all statements herein reciting

principles, aspects, and examples of the present subject matter, as well as specific examples thereof, are intended to encompass equivalents thereof.

[00046] The foregoing disclosure is not intended to limit the present disclosure to the precise forms or particular fields of use disclosed. As such, it is contemplated
5 that various alternate embodiments and/or modifications to the present disclosure, whether explicitly described or implied herein, are possible in light of the disclosure. Having thus described embodiments of the present disclosure, a person of ordinary skill in the art will recognize that changes may be made in form and detail without departing from the scope of the present disclosure. Thus, the present
10 disclosure is limited only by the claims.

[00047] In the foregoing specification, the disclosure has been described with reference to specific embodiments. However, as one skilled in the art will appreciate, various embodiments disclosed herein can be modified or otherwise implemented in various other ways without departing from the spirit and scope of
15 the disclosure. Accordingly, this description is to be considered as illustrative and is for the purpose of teaching those skilled in the art the manner of making and using various embodiments of the disclosure. It is to be understood that the forms of the disclosure herein shown and described are to be taken as representative embodiments. Equivalent elements, materials, processes or steps may be substituted
20 for those representatively illustrated and described herein. Moreover, certain features of the disclosure may be utilized independently of the use of other features, all as would be apparent to one skilled in the art after having the benefit of this description of the disclosure. Expressions such as “including”, “comprising”, “incorporating”, “consisting of”, “have”, “is” used to describe and claim the present
25 disclosure are intended to be construed in a non-exclusive manner, namely allowing for items, components or elements not explicitly described also to be present. Reference to the singular is also to be construed to relate to the plural.

[00048] Further, various embodiments disclosed herein are to be taken in the illustrative and explanatory sense, and should in no way be construed as limiting of
30 the present disclosure. All joinder references (e.g., attached, affixed, coupled, connected, etc.) are only used to aid the reader's understanding of the present

disclosure, and may not create limitations, particularly as to the position, orientation, or use of the systems and/or methods disclosed herein. Therefore, joinder references, if any, are to be construed broadly. Moreover, such joinder references do not necessarily infer that two elements are directly connected to each other.

[00049] Additionally, all numerical terms, such as, but not limited to, “first”, “second”, “third”, “primary”, “secondary”, “main” or any other ordinary and/or numerical terms, should also be taken only as identifiers, to assist the reader's understanding of the various elements, embodiments, variations and/or modifications of the present disclosure, and may not create any limitations, particularly as to the order, or preference, of any element, embodiment, variation and/or modification relative to, or over, another element, embodiment, variation and/or modification.

[00050] It will also be appreciated that one or more of the elements depicted in the drawings/figures can also be implemented in a more separated or integrated manner, or even removed or rendered as inoperable in certain cases, as is useful in accordance with a particular application. Additionally, any signal hatches in the drawings/figures should be considered only as exemplary, and not limiting, unless otherwise specifically specified.

[00051] The embodiments of the present invention will now be described in detail with reference to the accompanying drawings. As per illustrated embodiment the vehicle includes straddle type multi-wheeled electric vehicle or straddle type multi-wheeled hybrid vehicle electric vehicle.

[00052] **Figure 1a** illustrates an exploded view of the vehicle (100) where few parts are omitted from the figure, as per embodiment, in accordance with one example of the present subject matter. **Figure 1b** illustrates a perspective view of the vehicle (100) where few parts are omitted from the figure, as per embodiment, in accordance with one example of the present subject matter. For sake of brevity, **Figure 1a** and **Figure 1b** will be discussed together. As per illustrated embodiment, a straddle vehicle (100) (hereinafter “vehicle”) includes a frame assembly (101) to support different parts of said vehicle (100). The frame assembly (101) includes at

least a main tube (102) extending rearwards from said head pipe (not shown), a pair of left and right rear tubes (103L,103R) extending rearwards from a portion of said main tube (102), a pair of side tubes (right side tube not shown, 104L) extending inclinedly downwardly and forwardly from said pair of rear tubes (103).

5 Particularly, the frame assembly (101) forms the skeleton of the vehicle (100) and provides rigidity to the vehicle (100). More particularly, at least the pair of left and right rear tubes (103L, 103R) and the pair of left and right-side tubes (not shown, 104L) form a rear portion of the frame assembly (101) and contribute to rigidity thereof. A seat assembly (107) is disposed above a receiving chamber assembly

10 (105). The seat assembly (107) includes a tandem seat mounted on said pair of left and right rear tubes (103L, 103R). The tandem seat includes a rider seat (107D) and a pillion seat (107B). As per alternative embodiment, the seat assembly includes a split seat including the rider seat (107D) and the pillion seat (107B) mounted on said pair of left and right rear tube (103L, 103R). In the present embodiment, an

15 opening (107C) is provided between said rider seat (107D) and said pillion seat (107B) to access the receiving chamber assembly (105). The opening (107C) is provided with a cover (107E) wherein the cover (107E) is conforming to the contour of the seat assembly (107) on the exterior surface.

[00053] The receiving chamber assembly (105) is mounted on the frame assembly

20 (101). As per the illustrated embodiment, the receiving chamber assembly (105) is mounted on the pair of left and right rear tubes (103L, 103R). A portion of the receiving chamber assembly (105) is surrounded by a pair of left and right tail covers (106L, 106R) on left and right side of the vehicle (100). The receiving chamber assembly (105) includes one or more receiving chambers (105A). As per

25 an embodiment, the receiving chamber (105A) are stacked along the length direction of the vehicle (100) such that the receiving chambers (105A) are of decreasing order of height (H) e.g., H1, H2 etc. as seen in Fig 1b. This design enhances the flexibility for the user as well as the manufacturer to configure plurality of receiving chambers (105A) with varying capacity as well as avoid any

30 compromise on the layout space in the rear wheel well which it is typically restricted by the suspension stroke movement during riding.

[00054] **Figure 2a** illustrates a perspective view of the vehicle (100) where few parts are omitted from the figure and an enlarged localized perspective view of a right-side cover (201R), as per embodiment, in accordance with one example of the present subject matter. **Figure 2b** illustrates the partial top view of the vehicle (100) as per embodiment, in accordance with one example of the present subject matter. For sake of brevity, **Figure 2a** and **Figure 2b** will be discussed together. A pair of side covers (201R, 201L) is configured to have a plurality of vents (202). As per the illustrated embodiment, the right-side cover (201R) is shown in figure 2(a). The side covers (201R, 201L) are disposed of in the lateral direction (X--X') of the vehicle (100). As per the preferred embodiment, the side covers (201R, 201L) are detachably attached to the frame assembly (101) through one or more mounting lug (203). The incoming air is guided by a plurality of vents (202) in the side cover (201R) towards the receiving chamber assembly (105). The receiving chamber (105A) is configured to increase the amount of incoming air and to minimize the disturbance and reduction of airflow. This is accomplished through a plurality of fins (204) in the side surfaces of the receiving chamber (105A). The air passes through fins (204) provided on the side surfaces of the receiving chamber (105A), and heat is exchanged to the fresh air. More specifically, as per the illustrated embodiment, the incoming air is guided by a plurality of fins (204) over the receiving chamber (105A) towards a subsequent receiving chamber (105A) as shown by the arrows. Then, hot air (represented by arrow lines in Fig 2b) exists from the rear side of the vehicle through a gap (not shown) provided between the pair of said tail covers (106L, 106R) and a rear fender (205).

[00055] **Figure 3** illustrates a partial perspective view and a localized enlarged view of the frame assembly (101) where few parts are omitted from the figure, as per embodiment, in accordance with one example of the present subject matter. Since there is a plurality of receiving chambers (105A) attached using flexible mechanical linkages (301), the reference would be made to only one of them for brevity. The flexible mechanical linkages (301) are provided on any one of the front and the rear surfaces of the receiving chamber (105A). As per the illustrated embodiment, the flexible mechanical linkage (301) includes hinges that connect the

receiving chambers (105A) which as per an embodiment are four in number. Further, at least one of the receiving chambers (105A) is configured to receive electrochemical cells (302). The electrochemical cells (302) are configured to have a lid (303). The lid (303) being configured to have a handle (304) to pull out the
5 electrochemical cells (302) from the receiving chamber (105A) for dismantling. Further, in one implementation, at least one of the receiving chambers (105A) is configured to receive daily use articles like a tool kit, medical kit. The receiving chamber (105A) is configured to have attachment portions (305). As per the illustrated embodiment, the attachment portions (305) are provided on the side
10 surfaces of the receiving chamber (105A) such that it is extending in the longitudinal direction (Y-Y') of the vehicle (100). The attachment portion (305) is configured to have an arcuate shape with a predetermined included angle (A). The predetermined included angle (A) as per an embodiment ranges from 20 degrees to 180 degrees.

15 [00056] **Figure 4a** illustrates a front side cut section view of the frame assembly (101) across the A-A' plane as per embodiment, in accordance with one example of the present subject matter. **Figure 4b** illustrates a graphical representation depicting the difference of the section modulus between a conventional frame assembly and present frame assembly (101) as per embodiment, in accordance with one example
20 of the present subject matter. Preferably, the vertical axis signifies the section modulus (mm^3). For sake of brevity, **Figure 4a** and **Figure 4b** will be discussed together. The receiving chamber assembly (105) has a positive impact on the section modulus of the frame assembly (101) in the assembled condition. This improves the lateral stiffness of the frame assembly (101). More specifically, the
25 sidewalls of the receiving chamber (105A) are formed with some load transferring features such as attachment portions (305) which increase the sectional modulus of the sidewall of the receiving chamber (105A) and prevent bending and/or buckling. The attachment portions (305) are preferable of an arc-shape in cross-section and are substantially continuous along the longitudinal length of the receiving chamber
30 (105A). Preferably, the arc-shaped profile of attachment portions (305) is incorporated into side surfaces of the receiving chamber (105A) to limit the

deflections. Further, the attachment portions (305) on the receiving chambers (105A) provide the rigidity required for supporting and transferring the load from the receiving chamber (105A) to a pair of left and right rear tubes (103L, 103R) in a mounted condition. For example, sidewalls of receiving chambers (105A) may otherwise be subject to buckling or crimping as a result of vertical loads. Further, the frame assembly (101) benefits from an increase in the section modulus to limit deflections as evident from the graphical representation as shown in figure 4b. The graphical representation shows column A and Column B. The height of column A represents the section modulus of a conventional frame assembly and the height of column B shows the increase in section modulus as a result configuring receiving chamber assembly (105) on the frame assembly (101) of the vehicle (100).

[00057] Figure 5 illustrates a rear side cut section view across B-B' axis of the frame assembly (101) of the vehicle (100), and a localized enlarged view of the frame assembly (101) of the vehicle (100) as per embodiment, in accordance with one example of the present subject matter. The attachment portions (305) provided on both the sides of said receiving chamber (105A) is sandwiched between said rear tubes (103L, 103R) and a seat bush (107A) of said seat assembly (107) to provide reliable, stable and secure mounting. Once the seat has a payload in form of occupant, the weight is transferred from the seat to the seat bushes (107A) which in turn exert arresting force onto the attachment portion (305) thereby further enhancing the secure attachment of the receiving chamber (105A) with the frame assembly (101). As per an embodiment, the seat bush (107A) is made of elastic material which further augments the stability by absorbing any undesirable vibrations, achieve vibration resistance and dampen any micro deformations of the attachment portions (305).

[00058] Figure 6a illustrates a front side perspective view and rear side perspective view of the frame assembly (101) of the vehicle (100) as per alternative embodiment where few parts are omitted from the figure as per embodiment, in accordance with one example of the present subject matter. Figure 6b illustrates an exploded view of the frame assembly (101) as per alternative embodiment, where few parts are omitted from the figure as per embodiment, in accordance with one

example of the present subject matter. For sake of brevity, **Figure 6a** and **Figure 6b** will be discussed together. As per the illustrated embodiment, the bottom portion of the receiving chamber (105A) rests on a preloaded elastic member e.g., elastic member (601). The elastic member (601) is mounted on the frame assembly
5 (101). As per the illustrated embodiment, the elastic member (601) is mounted on a support plate (602). The support plate (602) is welded to the frame assembly (101). Further, one or more lock arm (603) to secure the receiving chamber (105A) is configured on at least one of said rear tubes (103L, 103R) of the frame assembly (101), to arrest the oscillating movement of the receiving chamber (105A). As per
10 illustrated embodiment, the lock arm (603) is provided on the right-side rear tube (103R) of the frame assembly (101).

[00059] According to the above architecture, one of the primary efficacies of the present invention is that the receiving chamber assembly is implementable without any major change in an existing frame assembly, to convert existing fossil
15 fuel-based vehicles with automatic or manual transmission into an electric vehicle/hybrid electric vehicle.

[00060] According to the above architecture, one of the primary efficacies of the present invention is that the receiving chamber assembly can be coupled to the platform of a new vehicle for different market segments by OEM's because the
20 present invention provides flexibility to manufacture variants in form of size, the capacity of the vehicle, range of usage, cost, ease of manufacturing, etc. The design of receiving chamber assembly is flexible to cater to the variants and the demands and enable modified versions with minimum changes in the vehicle layout, assembly time, manufacturing set-up, etc. and does not require a major revamping
25 of core processes to prepare for mass production of electric vehicles during the transition from internal combustion engines.

[00061] According to the above architecture, one of the primary efficacies of the present invention is that the receiving chamber assembly provides flexibility to the customer to restore the original state i.e., from an electric vehicle to IC powered
30 vehicle with fewer efforts due to less weight and simple design. The user can restore the vehicle to IC powered vehicle just by removing the receiving chamber

assembly without the use of specialized tools and do away with the excess weight while at same time leverage the space as a secure storage space to store items.

[00062] While the present invention has been shown and described with reference to the foregoing preferred embodiments, it will be apparent to those skilled in the art that changes in form, connection, and detail may be made therein without departing from the spirit and scope of the invention.

List of references:

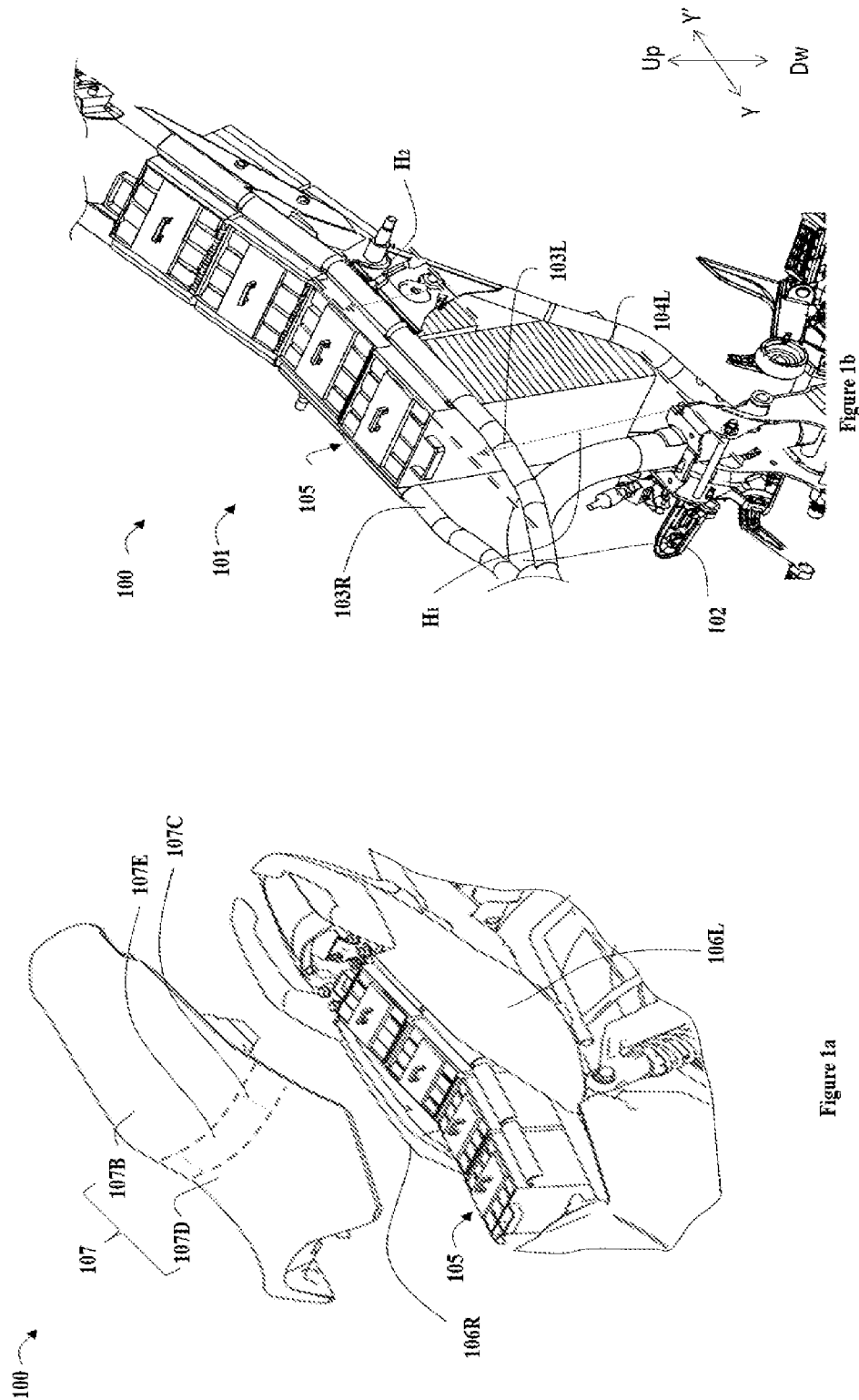
10	Y-Y' - Longitudinal axis	107D - Rider seat
	100 - Vehicle	107E - Cover
	101 - Frame assembly	201L, 201R - Pair of left and right side covers
	102 - Main tube	
	103L, 103R - Pair of left and right rear tubes	30 202 - Plurality of vents
15		203 - Mounting lugs
	104L, 104R - Pair of left and right-side tubes	204 - Plurality of fins
	106L, 106R - Pair of left and right tail covers	205 - Rear fender
		301 - Flexible mechanical linkage
20	105 - Receiving chamber assembly	35 302 - Electrochemical cells
	105A - Receiving chamber	303 - Lid
	107 - Seat assembly	304 - Handle
	107A - Seat bush	305 - Attachment portions
	107B - Pillion seat	601 - Elastic member
25	107C - Opening	40 602 - Support plate
		603 - Lock arm

We Claim:

1. A vehicle (100) comprising
a frame assembly (101), said frame assembly (101) includes
a pair of left and right rear tubes (103L, 103R),
5 said pair of left and right rear tubes (103L, 103R) being extending
in a longitudinal direction (Y-Y') of said vehicle (100) from a portion
of a main tube (102);
a seat assembly (107); and
a receiving chamber assembly (105) being configured to accommodate
10 within said pair of left and right rear tubes (103L, 103R) of said frame
assembly (101) and said receiving chamber assembly (105) extending in
said longitudinal direction (Y-Y') of said vehicle (100).
2. The vehicle (100) as claimed in claim 1, wherein said receiving chamber
assembly (105) includes one or more receiving chamber (105A), wherein
15 one or more said receiving chamber (105A) being connected through a
flexible mechanical linkage (301).
3. A vehicle (100) comprising:
a frame assembly (101), said frame assembly (101) includes
a pair of left and right rear tubes (103L, 103R); and
20 a receiving chamber assembly (105), said receiving chamber assembly
(105) includes
one or more receiving chamber (105A), wherein one of a said
receiving chamber (105A) rests on an elastic member (601), said elastic
member (601) is mounted on said frame assembly (101).
- 25 4. The vehicle (100) as claimed in claim 1 or claim 3, wherein said receiving
chamber assembly (105) being disposed of below said seat assembly
(107).
5. The vehicle (100) as claimed in claim 3, wherein said elastic member
(601) is mounted on a support plate (602), said support plate (602) is
30 attached to the frame assembly (101).

6. The vehicle (100) as claimed in claim 3, wherein at least one of said pair of left and right rear tubes (103L, 103R) being configured to have one or more lock arm (603) being configured to arrest the oscillating movement of said receiving chamber (105A).
- 5 7. The vehicle (100) as claimed in claim 2 or claim 3, wherein at least said receiving chamber (105A) being configured to have one or more attachment portion (305) to secure receiving chamber (105A) to said frame assembly (101).
8. The vehicle (100) as claimed in claim 7, wherein said attachment portion
10 (305) being configured to have an arc-shaped profile.
9. The vehicle (100) as claimed in claim 8, wherein said arc-shaped profile being configured to have predetermined included angle ranges from 20 degrees to 180 degrees.
10. The vehicle (100) as claimed in claim 7, wherein said attachment portion
15 (305) of said receiving chamber (105A) is sandwiched between said rear tube (103L, 103R) and a seat bush (107A) of said seat assembly (107) to provide reliable and vibration resistant mounting.
11. The vehicle (100) as claimed in claim 1 or claim 3, wherein a portion of said receiving chamber assembly (105) is covered by a pair of left and
20 right side covers (201L, 201R).
12. The vehicle (100) as claimed in claim 11, wherein said pair of left and right side covers (201L, 201R) being configured to have plurality of vents (202).
13. The vehicle (100) as claimed in claim 2 or claim 3, wherein said receiving
25 chamber (105A) being configured to have a plurality of fins (204).
14. The vehicle (100) as claimed in claim 2 or claim 3, wherein said one or more receiving chamber (105A) being configured to accommodate daily use objects including a tool kit.
15. The vehicle (100) as claimed in claim 2 or claim 3, wherein said one or
30 more receiving chamber (105A) being configured to accommodate one or more electrochemical cells (302).

16. The vehicle (100) as claimed in claim 1 or claim 3, wherein said receiving chamber assembly (105) being accessible in an open condition of said seat assembly (107).
17. The vehicle (100) as claimed in claim 15, wherein said electrochemical cell (302) is removably mounted to one or more said receiving chamber (105A).
18. The vehicle (100) as claimed in claim 1 or claim 3, wherein one or more said plurality of receiving chamber (105A) being configured to have substantially greater storage volume than other receiving chambers (105A).
19. The vehicle (100) as claimed in claim 1, wherein said seat assembly includes a tandem seat mounted on said pair of left and right rear tubes (103L, 103R), wherein said tandem seat includes a rider seat (107D) and a pillion seat (107B).
20. The vehicle (100) as claimed in claim 1, wherein an opening (107C) being provided between said rider seat (107D) and said pillion seat (107B) to access daily use objects including tool kit, medical kit.
21. The vehicle (100) as claimed in claim 2 or claim 3, wherein the receiving chamber (105A) are stacked along the length direction of the vehicle (100) such that the receiving chambers (105A) are of decreasing order of height (H).
22. The vehicle (100) as claimed in any of the preceding claims includes one of a multi wheeled straddle type electric vehicle and a hybrid electric vehicle.



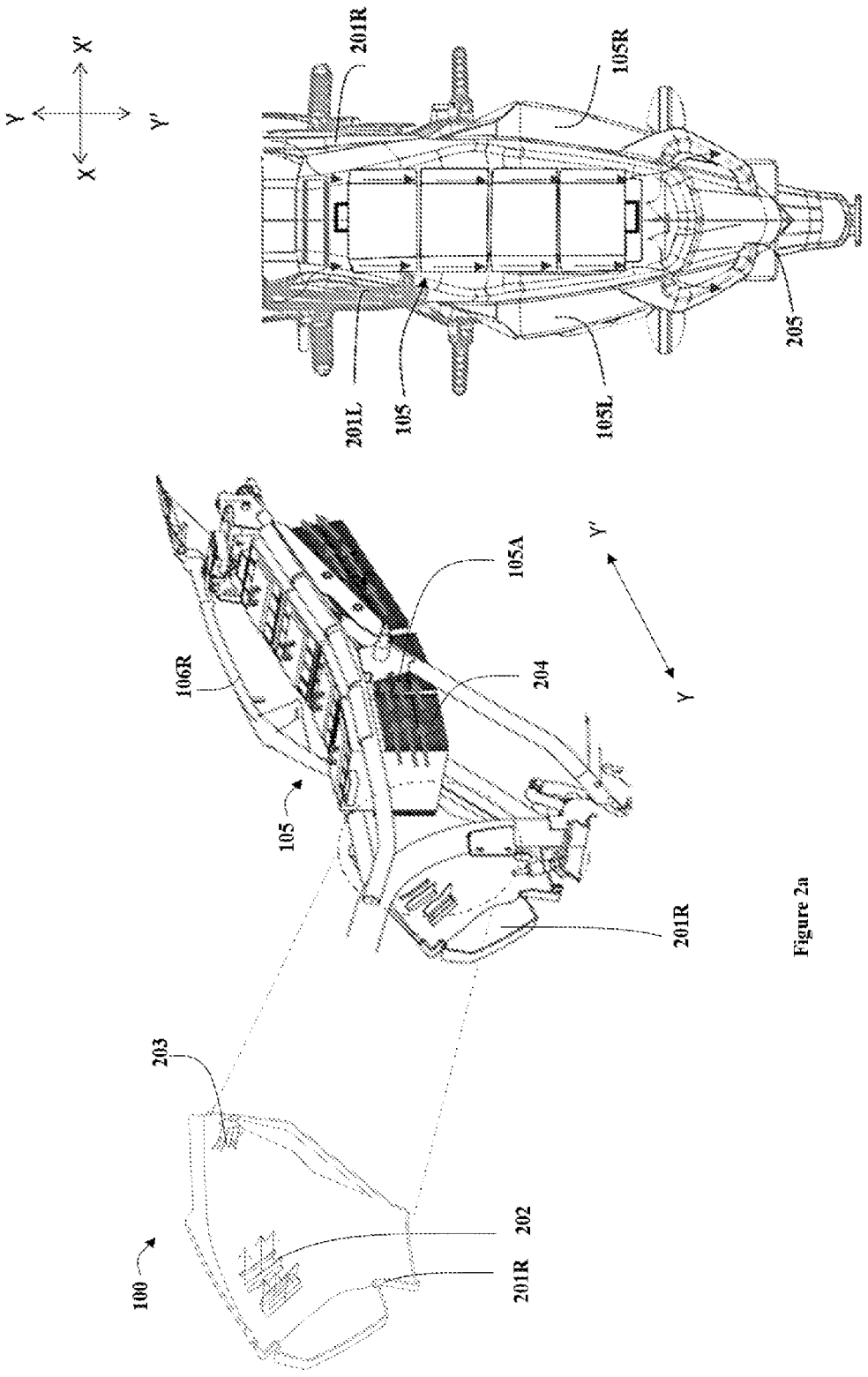


Figure 2b

Figure 2a

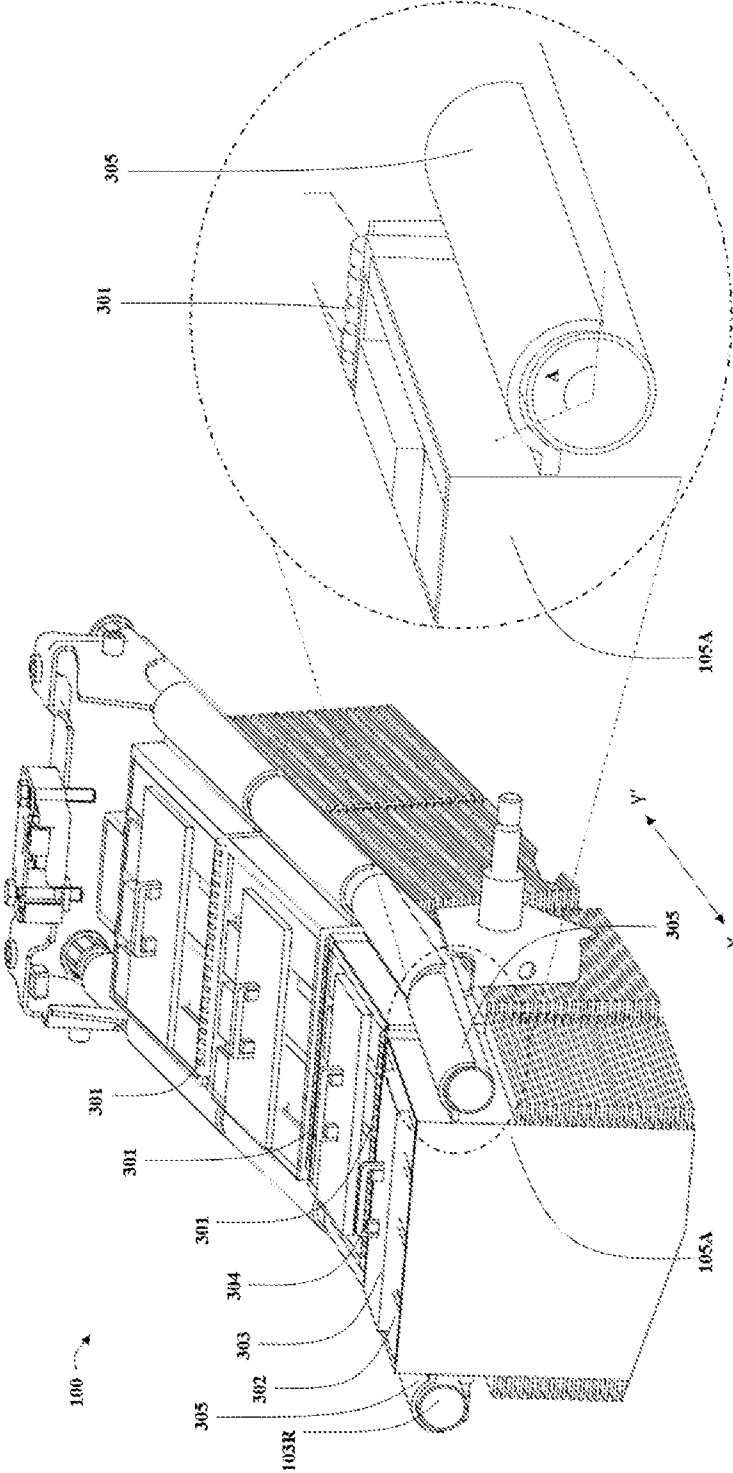


Figure 3

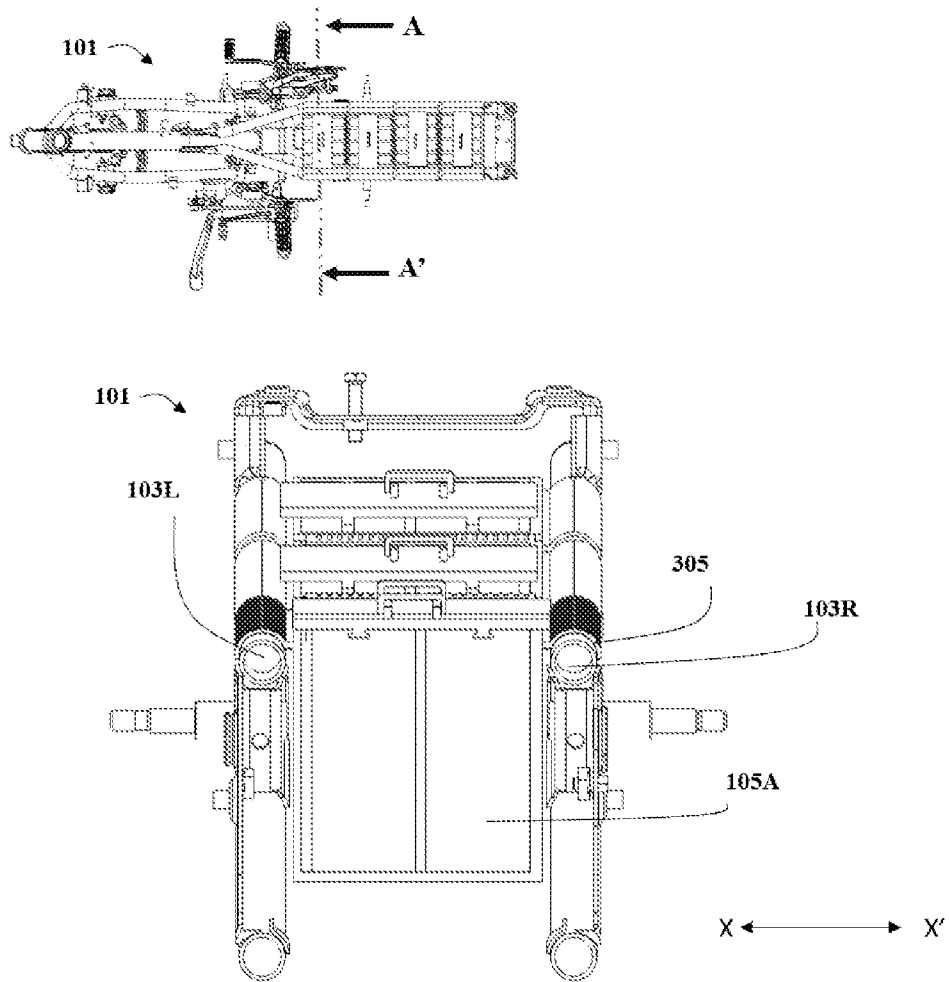


Figure 4a

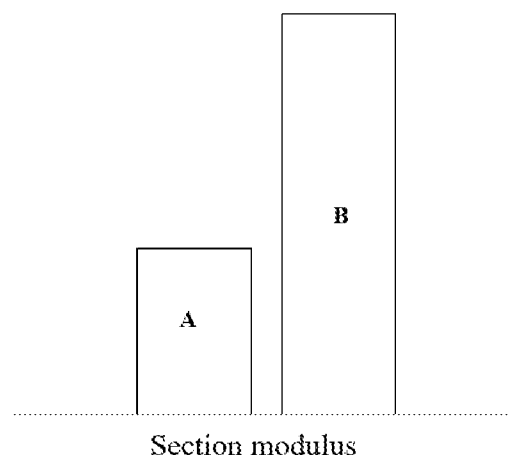


Figure 4b

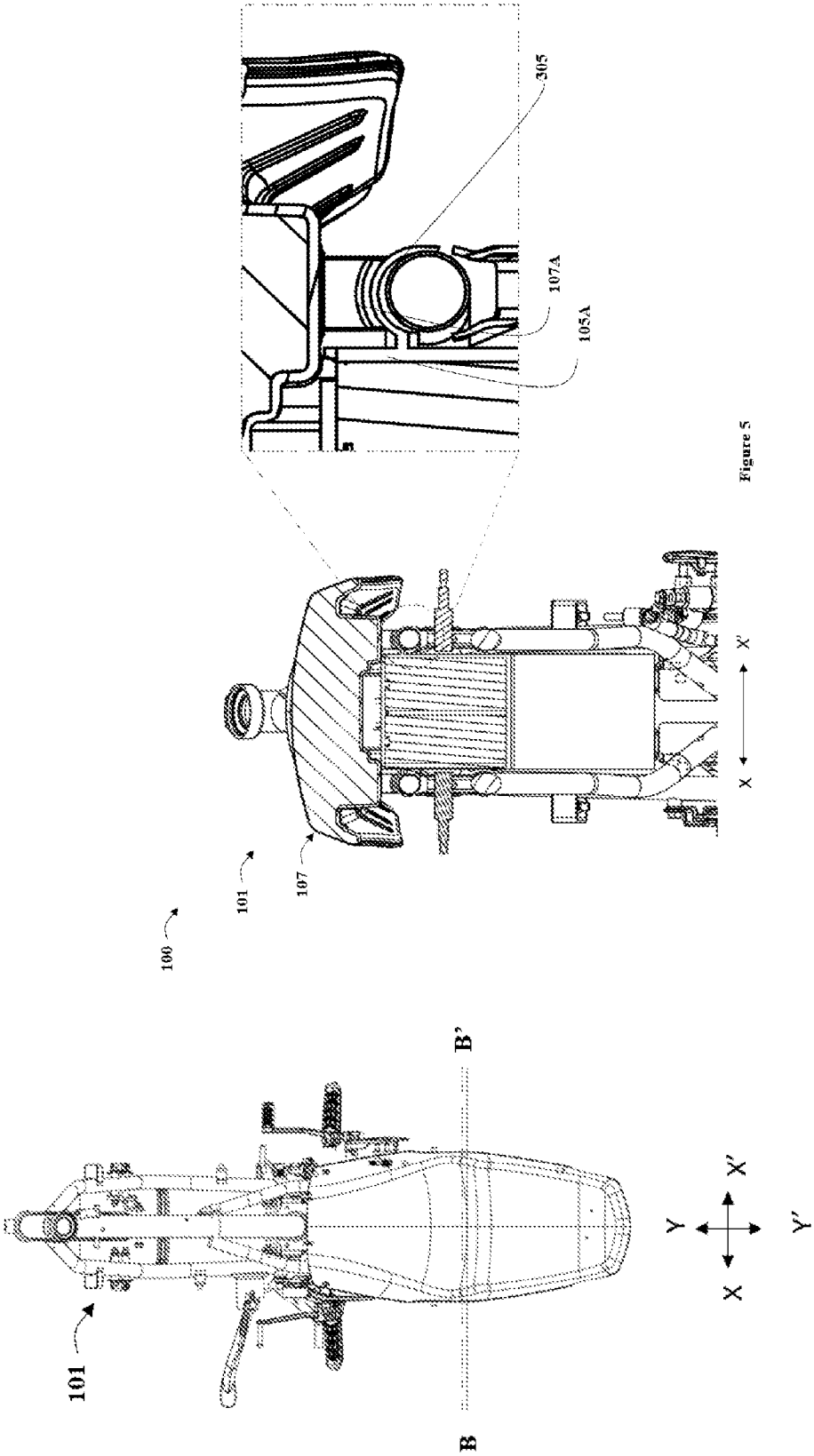


Figure 5

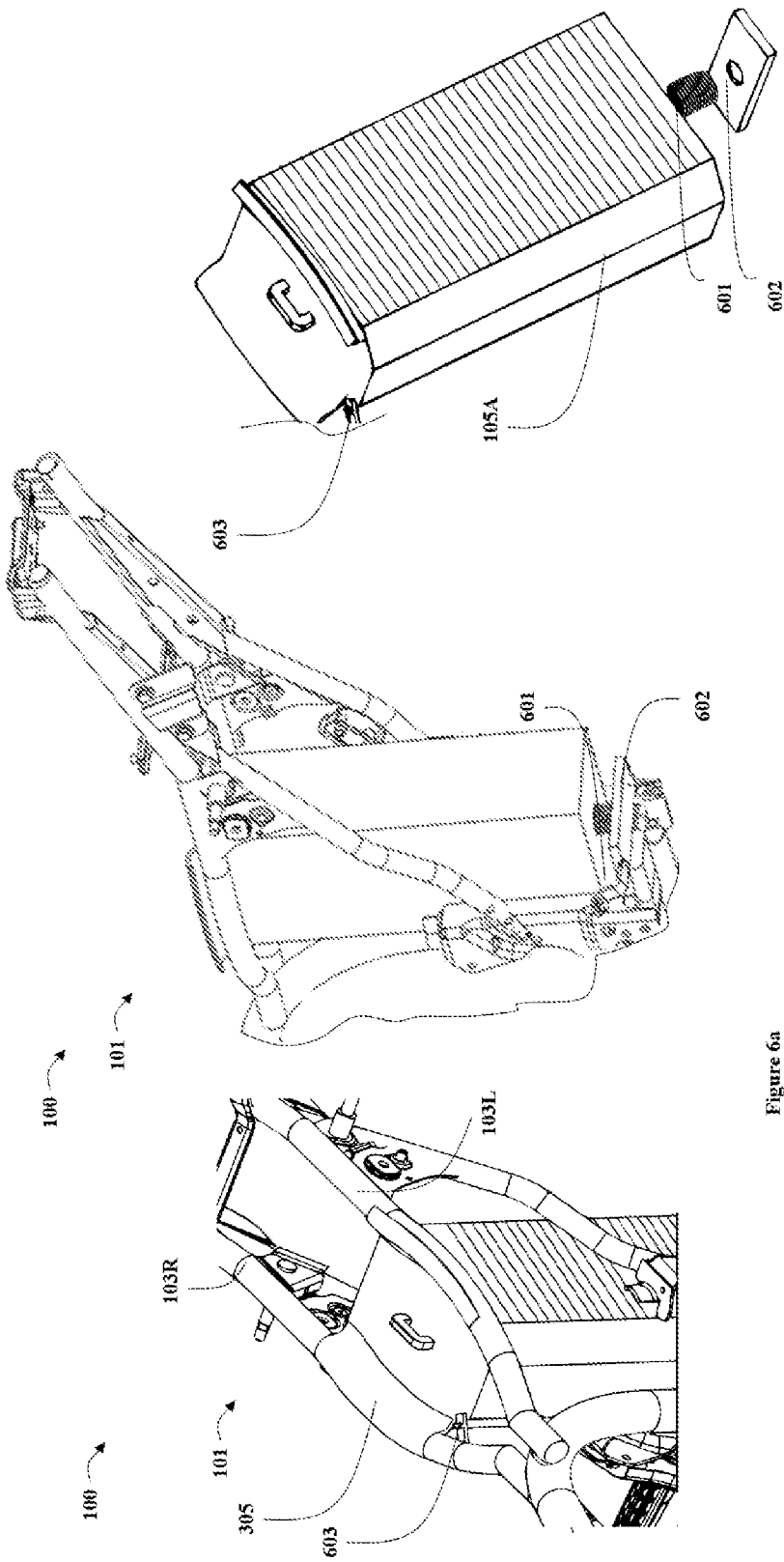


Figure 6b

Figure 6a

INTERNATIONAL SEARCH REPORT

International application No
PCT/IN2021/051177

A. CLASSIFICATION OF SUBJECT MATTER INV. B62J9/14 B62J9/22 B62J9/23 B62J1/08 B62J1/12 B62J43/16 B62J43/23 B62J43/28 B62J9/40 B62J17/10 B62K11/02		
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) B62J B62K B62M B60L B60K H01M		
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) 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	WO 2015/092818 A1 (TVS MOTOR CO LTD [IN];	1, 4, 11,
	NILESHWAR PRAMILA RAO [IN] ET AL.)	16, 18,
	25 June 2015 (2015-06-25)	19, 22
A	paragraphs [0014] - [0021], [0030],	2, 7-10,
	[0031]	13-15,
	figures 1-6, 10	17, 21

X	JP 2000 272566 A (SUZUKI MOTOR CO)	1, 2, 4,
	3 October 2000 (2000-10-03)	7-10,
		13-19, 21
A	figures 1-8	11, 22

X	CN 111 688 862 A (CHONGQING ANDES	1, 4, 11,
	MECHANICAL/ELECTRICAL TRADE CO LTD)	16, 18,
	22 September 2020 (2020-09-22)	19, 22
A	figures 1-8	2, 7-10,
		13-15,
		17, 21

	-/-	
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "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	Date of mailing of the international search report	
1 March 2022	09/05/2022	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Truchot, Alexandre	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2021/051177

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims;; it is covered by claims Nos.:
1, 2, 19 (completely); 4, 7-11, 13-18, 21, 22 (partially)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No

PCT/IN2021/051177

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2012/103710 A1 (ATSUCHI MICHIO [JP] ET AL) 3 May 2012 (2012-05-03) paragraphs [0018] - [0041] figures 1-6 -----	1, 4, 11, 18, 19, 22 2, 7-10, 13-17, 21
X A	JP S61 268576 A (HONDA MOTOR CO LTD) 28 November 1986 (1986-11-28) figures 1-7 -----	1, 4, 18, 19 2, 7-11, 13-17, 21, 22

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IN2021/051177

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2015092818 A1	25-06-2015	NONE	
JP 2000272566 A	03-10-2000	JP 3684906 B2	17-08-2005
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CN 111688862 A	22-09-2020	NONE	
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		JP S61268576 A	28-11-1986

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1, 2, 19(completely); 4, 7-11, 13-18, 21, 22(partially)

Flexible mechanical linkage

2. claims: 3, 5, 6(completely); 4, 7-18, 21, 22(partially)

Elastic member

3. claim: 12(partially)

Vents

4. claim: 20

Opening
