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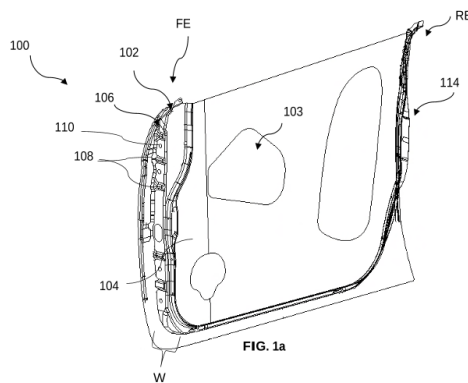
(71) Applicant(s): L&T TECHNOLOGY SERVICES LIMITED

(72) Inventor(s): Swamygowda, Lokesh HUlikal
Agarkhed, Bhimashankar
Raikar, Raghavendra

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(54) Title: A DOOR FOR A VEHICLE AND THE VEHICLE THEREOF

(57) Abstract: Present disclosure discloses a door (100) for a vehicle (200). The door comprises an outer panel (102) and an inner panel (104) connected to the outer panel (102) to define a void zone (113) for removably receiving auxiliary components therebetween. A ribbed structure (106) is defined on the inner panel and extends away from one end of the inner panel in a width wise direction. The ribbed structure comprises a plurality of ribs (108) defined in a spaced apart configuration. Each of the plurality of ribs extend in a traverse direction of the ribbed structure. A plurality of grooved sections (107) is defined between each rib of the plurality of ribs. Each grooved section of the plurality of grooved sections is defined with at least one through hole (110) configured to receive a mounting assembly (112) to pivotally couple the door to the vehicle.



FORM 2

THE PATENTS ACT 1970
(39 OF 1970)

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The Patent Rules, 2003

Complete Specification

(See Section 10 and Rule 13)

1. TITLE OF THE INVENTION

A DOOR FOR A VEHICLE AND THE VEHICLE THEREOF

2. APPLICANT(S)

(a) NAME : **L&T TECHNOLOGY SERVICES LIMITED**

(b) NATIONALITY : **INDIAN**

(c) ADDRESS : **DLF IT SEZ Park, 2nd Floor – Block 3
1/124, Mount Poonamallee Road,
Ramapuram, Chennai – 600 089,
INDIA.**

3. PREAMBLE TO THE DESCRIPTION

COMPLETE

The following specification particularly describes the invention and the manner in which it is
to be performed

TECHNICAL FIELD

5 [0001] Present disclosure relates to a field of automobiles. Particularly, but not exclusively the present disclosure relates to a door for a vehicle. Embodiments of the present disclosure further relate to the door manufactured with a reinforced structure to improve stiffness during assembly and eliminate sagging of the door over usage.

BACKGROUND

10 [0002] Automobiles have become a major necessity for everyone in their day-to-day life. Accordingly, demand for various kinds of vehicles, i.e., both passenger and commercial vehicles, is increasing at a rapid pace. Each vehicle includes many steps of manufacturing and further includes assembly of various components. These manufacturing and assembly processes are eventually designed by considering safety and convenience of passengers as a goal. One such assembly includes a vehicle door assembly. Conventionally, a door is assembled to a door frame which is integrated to a vehicle body. The door includes an outer panel and an inner panel joined together. A hinge reinforcing plate is connected to the inner panel through a permanent joining process such as welding or riveting. Further, a plurality of fastener holes are defined on the hinge reinforcing plate to receive a fastener. A nut plate is fixed to the hinge reinforcing plate such that the plurality of fastener holes is aligned with a plurality of holes defined on the nut plate. The hinge reinforcing plate is configured to receive a fastening bolt of a connecting assembly which is attached to the door frame. The connecting assembly includes at least one flange attached to the door frame. At least one flange may include fastening holes to receive a fastener which is secured between the connecting assembly and the nut plate to enable an assembly of the door and the door frame. The door is pivotally connected to the door frame.

25 [0003] However, conventional assembly includes many number of components that may take up more space and adds to weight and assembly time. Moreover, the nut plate is welded in three layers on the hinge reinforcing plate by a spot-welding process. This also increases the manufacturing time of the door and costs. In addition to this, due to weight of auxiliary components such as glass, locking system etc. which are generally equipped within the inner panel, the door tends to sag upon repeated use. This may occur due to low stiffness at the hinge plate mounting area. This sagging of the door ultimately results in poor locking, misalignment of the door which compromises safety of the occupants inside the vehicle. Additionally, the time for fixing the sagged door would require skilled labor and increased costs.

5 [0004] The present disclosure is directed to overcome one or more limitations stated above or any other limitations associated with the prior art. The information disclosed in this background of the disclosure section is only for enhancement of understanding of the general background of the invention and should not be taken as an acknowledgement or any form of suggestion that this information forms the prior art already known to a person skilled in the art.

SUMMARY OF THE INVENTION

10 [0005] One or more shortcomings of existing doors and door assemblies for a vehicle have been overcome, and additional advantages are provided through the constructional aspects of a door as claimed in the present disclosure. Additional features and advantages are realized through the techniques of the present disclosure. Other embodiments and aspects of the disclosure are described in detail herein and are considered a part of the claimed disclosure.

15 [0006] The limitations of the prior arts are addressed by a door for a vehicle as disclosed in the present disclosure. The door comprises an outer panel and an inner panel connected to the outer panel to define a void zone for removably receiving auxiliary components. A ribbed structure is defined on the inner panel, the ribbed structure extends away from one end of the inner panel in a widthwise direction. The ribbed structure comprises a plurality of ribs defined in a spaced apart configuration. Each of the plurality of ribs extend in a
20 traverse direction of the ribbed structure. A plurality of grooved sections is defined between each of the ribs of the plurality of ribs. Each grooved section of the plurality of grooved sections is defined with at least one hole configured to receive a mounting assembly to pivotally couple the door to the vehicle.

25 [0007] In an embodiment of the present disclosure, the door comprises a locking mechanism defined at one end of the inner panel. The locking mechanism is configured to lock and unlock the door of the vehicle.

30 [0008] In an embodiment of the present disclosure, the ribbed structure is defined with a width that is equal to the width of the inner panel.

[0009] In an embodiment of the present disclosure, each rib of the plurality of ribs are embossed from a surface of the inner panel.

35

[0010] In an embodiment of the present disclosure, the plurality of ribs are designed to include a geometrical shape in at least one of a triangular, rectangular, square and any polygonal shape.

5 [0011] In an embodiment of the present disclosure, the mounting assembly comprises at least one first bracket having a body portion defined with at least one fastener hole. At least one pair of first flanges are connected to the body portion and each flange of the at least one pair of first flanges. Each flange of the at least one pair of first flanges is defined with a first fastener hole to receive a fastener. At least one second bracket comprises a column and at
10 at least one pair of second flanges extend parallelly from the column at one end. Each of the at least one pair of second flanges is defined with a second fastener hole aligned to the at least one fastener hole of the body portion to receive the fastener. The at least one pair of second flanges are fastened to the body portion to pivotally couple the at least one first bracket and the at least one second bracket.

15 [0012] In an embodiment of the present disclosure, the mounting assembly comprises a connecting plate mounted on the ribbed structure. The connecting plate is defined with at least two openings aligned to the first fastener hole to receive the fastener to secure the at least one first bracket to the ribbed structure.

20 [0013] In an embodiment of the present disclosure, the first fastener hole of the at least one pair of first flanges is configured to align with the at least one hole to receive the fastener and couple the mounting assembly to the door.

25 [0014] In an embodiment of the present disclosure, the column is connected to a door frame of the vehicle to pivotally couple the door to the vehicle.

[0015] In an embodiment of the present disclosure, the ribbed structure is manufactured by a stamping process.

30 [0016] Present disclosure also discloses a vehicle comprising a body defined with an A-pillar and along a length of the vehicle and at least one B-pillar connected to the A-pillar and extending along a height of the vehicle. A door frame is connected to the body. A door is pivotally connected to the door frame at one end. The door comprises an outer panel, an
35 inner panel connected to the outer panel to define a void zone to removably receive auxiliary components. A ribbed structure is defined on the inner panel extending away from one end

of the inner panel in a widthwise direction. The ribbed structure comprises a plurality of ribs defined in a spaced apart configuration. Each of the plurality of ribs extend in a traverse direction of the ribbed structure. A plurality of grooved sections is defined between each rib of the plurality of ribs. Each grooved section of the plurality of grooved sections is defined with at least one hole. A mounting assembly is disposed between the door frame and the door. The mounting assembly comprises at least one first bracket connectable to the door. At least one second bracket is connected to the at least one first bracket at one end and to the door frame at an other end. The at least one first bracket is fastened to the ribbed structure about the at least one hole of the plurality of grooved sections through a fastener to pivotally couple the door to the door frame.

[0017] It is to be understood that the aspects and embodiments of the disclosure described above may be used in any combination with each other. Several of the aspects and embodiments may be combined to form a further embodiment of the disclosure.

[0018] The foregoing summary is illustrative only and is not intended to be in any way limiting. In addition to the illustrative aspects and features described above, further aspects and features will become apparent by reference to the drawings and the following detailed description.

BRIEF DESCRIPTION OF ACCOMPANYING DRAWINGS

[0019] The novel features and characteristics of the disclosure are set forth in the appended claims. The disclosure itself, however, as well as a mode of use, further objectives, and advantages thereof, will best be understood by reference to the following detailed description of an embodiment when read in conjunction with reference to the accompanying drawings wherein like reference numerals represent like elements and in which:

FIG. 1a illustrates a perspective view of a door for a vehicle in accordance with an embodiment of the present disclosure.

FIG. 1b illustrates an enlarged view of the door of **FIG. 1**, depicting a ribbed structure in accordance with an embodiment of the present disclosure.

FIG. 2 illustrates a front view of the door of **FIG. 1**, in accordance with an embodiment of the present disclosure.

FIG. 3 illustrates an exploded view a mounting assembly connected to the ribbed structure of the door, in accordance with an embodiment of the present disclosure.

FIG. 4 illustrates an exploded view of a vehicle and the door connectable to a vehicle body in accordance with an embodiment of the present disclosure.

[0020] The figures depict embodiments of the disclosure for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative
5 embodiments of the device and system illustrated herein may be employed without departing from the objective of the disclosure described herein.

DETAILED DESCRIPTION OF THE DRAWINGS

[0021] The foregoing has broadly outlined the features and technical advantages of the pre-
10 sent disclosure in order that the detailed description of the disclosure that follows may be better understood. Additional features and advantages of the disclosure will be described hereinafter which forms the subject of the claims of the disclosure. It should be appreciated by those skilled in the art that, the conception and specific embodiments disclosed may be readily utilized as a basis for modifying other devices, assemblies, and systems for carrying
15 out the same purposes of the present disclosure. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the scope of the disclosure as set forth in the appended claims. The novel features which are believed to be characteristics of the disclosure, to its device, a system, an assembly, together with further objects and advantages will be better understood from the following description when considered
20 in connection with the accompanying figures. It is to be expressly understood, however, that each of the figures is provided for the purpose of illustration and description only and is not intended as a definition of the limits of the present disclosure.

[0022] In accordance with various embodiments of the present disclosure, a door for a vehicle is disclosed. The door comprises an outer panel and an inner panel. The inner panel is
25 connected to the outer panel to define a void zone for removably receiving auxiliary components therebetween. A ribbed structure is defined on the inner panel, and the ribbed structure extends away from one end of the inner panel in a widthwise direction. The ribbed structure comprises a plurality of ribs defined in a spaced apart configuration. Each of the plurality of ribs extend in a traverse direction of the ribbed structure. A plurality of grooved
30 sections is defined between each of the ribs of the plurality of ribs. Each grooved section of the plurality of grooved sections is defined with at least one hole configured to receive a mounting assembly to pivotally couple the door to the vehicle.

[0023] The forthcoming paragraphs will elucidate the configuration of the door. Forthcoming embodiments elucidate a mounting configuration to assemble the door to a vehicle body and its operation in detail in conjunction to FIGs 1 to 4.

5 [0024] In an embodiment, the door of the configuration described above can be directly installed to a vehicle body without requiring any additional mounting structures such as hinge mounting plates and nut plates. This also eliminates the manufacturing process associated with installing the mounting structures to the door such as welding, riveting etc. and thereby reduces manufacturing costs. Further, the configuration of the ribbed structure being integrated to the inner panel of the door improves stiffness of the door at a point of assembly
10 of the door to the vehicle body. Advantageously, this reduces overall weight of the assembly while improving load bearing capacity of the door. Consequently, this eliminates the sagging of the door during its use over longer periods of time. This reduces the maintenance time of the door and consequently reduces the costs associated with the maintenance of the door.

15 [0025] While the embodiments in the disclosure are subject to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the figures and will be described below. It should be understood, however, that it is not intended to limit the disclosure to the particular forms disclosed, but on the contrary, the disclosure is to cover all modifications, equivalents, and alternative falling within the scope of the
20 disclosure.

[0026] It is to be noted that a person skilled in the art would be motivated from the present disclosure and modify the constructional aspects of any door for connecting the door to a vehicle body. However, such modifications should be construed within the scope of the present disclosure. Accordingly, the drawings show only those specific details that are pertinent to understand the embodiments of the present disclosure, so as not to obscure the
25 disclosure with details that will be readily apparent to those of ordinary skill in the art having benefit of the description herein.

[0027] The terms “comprise,” “comprising”, or any other variations thereof used in the disclosure, are intended to cover a non-exclusive inclusion, such that a system and method that
30 comprises a list of components does not include only those components but may include other components not expressly listed or inherent to such device, system, or assembly. In

other words, one or more elements in the system or the device proceeded by “comprises... a” does not, without more constraints, preclude the existence of other elements or additional elements in the system, assembly, or the device.

5 [0028] The following paragraphs describe the present disclosure with reference to FIG(s) 1 to 4. In the figures, the same element or elements which have similar functions are indicated by the same reference signs. With general reference to the drawings, a door (100) for a vehicle (200) in accordance with the teachings of a preferred embodiment of the present disclosure is illustrated and generally identified at reference numeral 100. The door (100) may be installed or connected to the vehicle body (202) by a worker or a technician.
10 It will be understood that the teachings of the present disclosure are not limited to a particular door (100) connected to the vehicle body (202) and may be used in any device or structure that requires the door for accessing or preventing entry within the structure based on the requirement.

15 [0029] The following detailed description is merely exemplary in nature and is not intended to limit application and uses. Furthermore, there is no intention to be bound by any theory presented in the preceding background or summary or the following detailed description. It is to be understood that the disclosure may assume various alternative orientations and step sequences, except where expressly specified to the contrary. It is also to be understood that the specific devices or components illustrated in the attached drawings and described in the
20 following specification are simply exemplary embodiments of the inventive concepts defined in the appended claims. Hence, specific dimensions or other physical characteristics relating to the embodiments that may be disclosed are not to be considered as limiting, unless the claims expressly state otherwise. Hereinafter, preferred embodiments of the present disclosure will be described referring to the accompanying drawings. While some specific
25 terms of “upper,” “lower”, “below”, “above”, “right”, “left”, “rear” or “front” and other terms containing these specific terms and directed to a specific direction will be used, the purpose of usage of these terms or words is merely to facilitate understanding of the present invention referring to the drawings. Accordingly, it should be noted that the meanings of these terms or words should not improperly limit the technical scope of the present inven-
30 tion.

[0030] Also, it is to be understood that the phraseology and terminology used herein is for description and should not be regarded as limiting. Unless specified or limited otherwise,

the terms “mounted,” “connected,” “supported,” and “coupled” and variations thereof are used broadly and encompass both direct and indirect mountings, connections, supports, and couplings. Further, “connected” and “coupled” are not restricted to physical or mechanical connections or couplings. It is to be understood that this disclosure is not limited to the specific devices, assemblies, methods, applications, conditions, or parameters described and/or shown herein and that the terminology used herein is to describe particular embodiments by way of example and is not intended to be limiting of the claimed invention. Hereinafter in the following description, various embodiments will be described. For purposes of explanation, specific configurations and details are outlined to provide a thorough understanding of the embodiments. However, it will also be apparent to one skilled in the art that the embodiments may be practiced without the specific details. Furthermore, well-known features may be omitted or simplified in order not to obscure the embodiment being described.

[0031] Referring to FIGs 1 to 4 in conjunction, which illustrates a door (100) for a vehicle (200) and various components associated with the door (100). Hereinafter, features of the door (100) along with its working may be elucidated.

[0032] Referring to FIG. 1, the door (100) among other components may comprise an outer panel (102) and an inner panel (104) wherein the inner panel (104) is connected to the outer panel (102). The outer panel (102) and the inner panel (104) are defined with a front end (FE) and a rear end (RE). The outer panel (102) comprises a panel body (103) and an outer window frame portion (103a) extending above the panel body (103). In an embodiment, the panel body (103) comprises a reinforcing structure (not shown in FIGS.) to impart stiffness to the outer panel (102). A door cover (103b) is affixed to an outer surface of the outer panel (102) to cover the panel body (103). In an embodiment, the door skin (103b) may be manufactured of a fire-reinforced plastic, or a sheet metal based on the requirement. A handle bar (109) is provided at the rear end (RE) of the outer panel (102) to operate a locking mechanism (not shown in FIGS.) to lock and unlock the door (100). The locking mechanism is accommodated within the inner panel (104) of the door (100).

[0033] The inner panel (104) is connected to the outer panel (102) and extends from the outer panel (102) with a predefined thickness. The inner panel (104) is defined with a length (L), a height (H) and a width (thickness) (W). The inner panel (104) comprises a main body portion (104a) and an inner window frame portion (104b) extending from the main body

portion (104a). The main body portion (104a) is defined with a support beam (111) extending from the front end (FE) to the rear end (RE) of the main body portion (104a) in a lengthwise direction to impart stiffness to the main body portion (104a). The main body portion (104a) is defined with several cutouts (104c) to define a void zone (113) between the outer panel (102) and the inner panel (104) when connected to each other. The void zone (113) is configured to receive auxiliary components such as but not limited to a storage container like water bottle, an umbrella, smartphone etc. In an embodiment, the main body portion (104a) includes a reinforcement structure (105) extending along a periphery of the inner panel (104). The reinforcement structure (105) is configured to improve strength of the inner panel (104). In an embodiment, the reinforcement structure (105) may be manufactured of a fiber-reinforced polymeric material installed around the periphery of the inner panel (104). A front end (FE) of the inner panel (104) is defined with a ribbed structure (106) extending in a widthwise direction (W) of the inner panel (104).

[0034] The ribbed structure (106) is defined at the front end (FE) and positioned along the length of the inner panel (104). The ribbed structure (106) comprises a plurality of ribs (108) defined in a spaced apart configuration. Each rib of the plurality of ribs (108) projects from a surface of the inner panel (104) up to a predefined height. In an embodiment, the predefined height of each rib of the plurality of ribs (108) is in a range of 3 to 5mm. In an embodiment, the cross-section of the plurality of ribs (108) may be designed to impart a geometrical shape not limiting to a triangular, a rectangular, a square or any other polygonal shape based on the requirement. Each of the plurality of ribs (108) extends in a traverse direction of the ribbed structure (106). In other words, each rib of the plurality of ribs (108) extends in a widthwise direction (W) of the ribbed structure (106). Further, a plurality of grooved sections (107) is defined between each of the plurality of ribs (108). Each grooved section of the plurality of grooved sections (107) is defined with at least one through hole (110). The at least one through hole (110) is configured to receive a mounting assembly (112) to pivotally couple the door (100) to the vehicle (200) about the ribbed structure (106). The ribbed structure (106) is defined with a width (w1) that is equal to the width (W) of the inner panel (104). In an embodiment, the ribbed structure (106) is manufactured by a stamping process and the ribbed structure (106) is configured to improve stiffness at a mounting region of assembly of the door (100) and the vehicle body (202).

[0035] Referring to FIG. 3, a mounting assembly (112) for assembling the door (100) to a vehicle body (202) is disclosed. The mounting assembly (112) is connected to the inner panel (104) at one end and to a vehicle frame (226) at an other end. The mounting assembly (112) comprises at least one first bracket (150) and at least one second bracket (156) connected to the at least one first bracket (150). The at least one first bracket (150) comprises a body portion (152) defined with at least one fastener hole (154). In an embodiment, the body portion (152) is in a U-shaped configuration and a pair of fastener holes (154) are defined along an axis (A-A) that is defined along a height of the ribbed structure (106). At least one pair of first flanges (116) are connected to a free end of the body portion (152). Each flange of the at least one pair of first flanges (116) extends perpendicularly from the body portion (152) in opposite directions. Each flange of the at least one pair of first flanges (116) is defined with a first fastener hole (153) to receive a fastener (155). The at least one pair of first flanges (116) are mounted on the ribbed structure (106) such that the first fastener hole (153) of each first flange is aligned with the at least one through hole (110) defined on each grooved section of the plurality of grooved sections (107). A fastener (155) is passed through the first fastener hole (153) and the at least one through hole (110) to join the at least one first bracket (150) and the ribbed structure (106). In an embodiment the fastener (155) may include but not limited to nuts and bolts, studs, screws etc.

[0036] The at least one second bracket (156) comprises a column (157) and at least one pair of second flanges (158) extending away from one end of the column (157). The column (157) is defined with a plurality of holes (157a) to receive the fastener (155). Each flange of the at least one pair of second flanges (158) are oriented parallel to each other. Each flange of the at least one pair of second flanges (158) is defined with a second fastener hole (159). The second fastener hole (159) is aligned to the at least one fastener hole (154) of the body portion (152) to receive the fastener (155) along the axis (A-A) to secure the at least one second bracket (156) to the at least one first bracket (150). The at least one pair of second flanges (158) are fastened to the body portion (152) to pivotally couple the at least one first bracket (150) and the at least one second bracket (156).

[0037] The mounting assembly (112) further comprises a connecting plate (160) mounted on the ribbed structure (106). The connecting plate (160) is positioned within the inner panel (104) i.e., under the ribbed structure (106) and opposite to the at least one first bracket (150). The connecting plate (160) is defined with at least two openings (162) that are aligned to

the first fastener hole (153) to receive the fastener (155) to secure the at least one first bracket (150) to the ribbed structure (106). The fastener (155) is tightened by nuts (164) and is removed by loosening the nuts to remove the fastener (155) and dismantle the at least one first bracket (150) from the ribbed structure (106).

5 [0038] Now referring to FIG. 4, a vehicle (200) is disclosed. The vehicle (200) comprises a body (202) defined with an A-pillar (222) extending along a length (L) of the vehicle from a bonnet to a boot portion i.e., from the front end (FE) to the rear end (RE) of the vehicle (200). At least one B-pillar (224) is connected to the A-pillar (222) and extending along a height of the vehicle (200). The at least one B-pillar (224) is configured to divide an interior
10 of the vehicle (200) into a front compartment (FC) and a rear compartment (RC). The A-pillar (222) and the at least one B-pillar (224) are configured to provide stability and strength to the vehicle (200) during a crash. In an embodiment, the at least one B-pillar (224) divides the A-pillar (222) to form two separate sections to accommodate the door (100). A door frame (226) is defined along the A-pillar (222) and at least one B-pillar (224). The door
15 frame (226) may include a grooved structure (not shown in FIGS.) to receive an elastic or a rubber material for sealing the door (100) with the door frame (226). A retaining member (not shown in FIGS.) may be defined at a central portion of the at least one B-pillar (224). The retaining member is configured to engage with the locking mechanism (114) of the door (100) in a locked condition and disengage with the locking mechanism (114) in an unlocked
20 condition to unlock and open the door (100). The column (157) of the at least one second bracket (156) is connected to the A-pillar (222) at the front end (FE) of the vehicle (200) by passing the fastener (155) through the plurality of holes (157a). The at least one second bracket (156) is further connected to the at least one first bracket (150) to pivotally couple the door (100) to the door frame (226) at the front end (FE).

25 [0039] In an embodiment, the ribbed structure (106) may be manufactured by at least one of an extrusion, bending and shaping process.

[0040] In an embodiment, the number of ribs of the plurality of ribs (108) defined on the ribbed structure (106) may be selected depending on the stiffness requirement of the door and on the type of vehicle (200) about which the door (100) is installed.

[0041] In an embodiment, the plurality of ribs (108) of the ribbed structure (106) may extend in a length wise direction of the ribbed structure (106) to improve stiffness of the door (100) near the at least one first bracket (150).

5 [0042] In an embodiment, the mounting assembly (112) may include a single bracket that is disposed between the door frame (226) and door (100) to pivotally connect the door frame (226) with the door (100).

[0043] The door (100) of the present disclosure is simple in construction and can be easily installed in variety of vehicles.

10 [0044] The door (100) of the present disclosure may be manufactured with the ribbed structure (106) in a single setup with improved stiffness. This eliminates the requirement of the hinge reinforcing plate and thereby reduces manufacturing steps and time for manufacturing. Advantageously, this reduces costs of manufacturing the door (100).

15 [0045] The ribbed structure (106) of the present disclosure increases strength of the door (100) and improves stiffness at a point of assembly of the door (100) with the door frame (226). Consequently, this prevents sagging of the door (100) near the mounting assembly (112) and improves life and reliability of the door (100).

[0046] The door (100) of the present disclosure can be directly installed to the door frame (226) in less time without requiring complex fastening elements or attachments such as hinge reinforcing plates.

20 [0047] It is to be understood that a person of ordinary skill in the art may develop a door, device and/or assembly of similar configuration without deviating from the scope of the present disclosure. Such modifications and variations may be made without departing from the scope of the present disclosure. Therefore, it is intended that the present disclosure covers such modifications and variations provided they come within the ambit of the appended
25 claims and their equivalents.

LIST OF REFERENCE NUMERALS

COMPONENT	NUMERAL
Door	100

Outer panel	102
Panel body	103
Outer window frame portion	103a
Door cover	103b
Inner panel	104
Main body portion	104a
Inner window frame portion	104b
Cut-outs	104c
Reinforcement structure	105
Ribbed structure	106
Plurality of grooved sections	107
Plurality of ribs	108
Handle bar	109
At least one hole	110
Support beam	111
Mounting assembly	112
Void zone	113
Locking mechanism	114
At least one pair of first flanges	116
At least one first bracket	150
Body portion	152
first fastener hole	153
At least one fastener hole	154
Fastener	155
At least one second bracket	156
Column	157
At least one pair of second flanges	158
Second fastener hole	159
Connecting plate	160
At least two openings	162
Vehicle	200
Body	202

A-pillar	222
B-pillar	224
Door frame	226

WE CLAIM:

1. A door (100) for a vehicle (200), the door (100) comprising:
 - an outer panel (102);
 - an inner panel (104) connected to the outer panel (102), to define a void zone (113) to removably receive auxiliary components;
 - a ribbed structure (106) defined on the inner panel (104) extending away from one end of the inner panel (104) in a widthwise direction, wherein the ribbed structure (106) comprises:
 - a plurality of ribs (108) defined in a spaced apart configuration, each of the plurality of ribs (108) extend in a traverse direction of the ribbed structure (106); and
 - a plurality of grooved sections (107) defined between each of the ribs of the plurality of ribs (108), wherein each grooved section of the plurality of grooved sections (107) is defined with at least one through hole (110) configured to receive a mounting assembly (112) to pivotally couple the door (100) to the vehicle (200).
2. The door (100) as claimed in claim 1, comprises a locking mechanism (114) defined at one end of the inner panel (104), wherein the locking mechanism (114) is configured to lock and unlock the door (100) of the vehicle (200).
3. The door (100) as claimed in claim 1, wherein the ribbed structure (106) is defined with a width that is equal to the width of the inner panel (104).
4. The door (100) as claimed in claim 1, wherein each rib of the plurality of ribs (108) are embossed from a surface of the inner panel (104) and the plurality of ribs (108) are designed to include a geometrical shape in at least one of a triangular, rectangular, square and any polygonal shape.
5. The door (100) as claimed in claim 1, wherein the mounting assembly (112) comprising:
 - at least one first bracket (150) comprises:
 - a body portion (152) defined with at least one fastener hole (154);

at least one pair of first flanges (116) connected to the body portion (152) and each flange of the at least one pair of first flanges (116), wherein each flange of the at least one pair of first flanges (116) is defined with a first fastener hole (153) to receive a fastener (155);

at least one second bracket (156) comprises:

a column (157);

at least one pair of second flanges (158) extending parallelly from the column (157) at one end, each of the at least one pair of second flanges (158) is defined with a second fastener hole (159) aligned to the at least one fastener hole (154) of the body portion (152) to receive the fastener (155); and

wherein the at least one pair of second flanges (158) are fastened to the body portion (152) to pivotally couple the at least one first bracket (150) and the at least one second bracket (156).

6. The door (100) as claimed in claim 5, wherein the mounting assembly (112) comprises a connecting plate (160) mounted on the ribbed structure (106), the connecting plate (160) is defined with at least two openings (162) aligned to the first fastener hole (153) to receive the fastener (155) to secure the at least one first bracket (150) to the ribbed structure (106).
7. The door (100) as claimed in claim 5, wherein the first fastener hole (153) of the at least one pair of first flanges (116) is configured to align with the at least one through hole (110) to receive the fastener (155) and couple the mounting assembly (112) to the door (100).
8. The door (100) as claimed in claim 5, wherein the column (157) is connected to a door frame (226) of the vehicle (200) to pivotally couple the door (100) to the vehicle (200).
9. A vehicle (200) comprising:
 - a body (202) defined with an A-pillar (222) and along a length (L) of the vehicle and at least one B-pillar (224) connected to the A-pillar (222) and extending along a height of the vehicle (200);
 - a door frame (226) connected to the body (202);

a door (100) pivotally connected to the door frame (226) at one end, the door (100) comprising:

an outer panel (102);

an inner panel (104) connected to the outer panel (102), to define a void zone (113) to removably receive auxiliary components;

a ribbed structure defined on the inner panel (104) extending away from one end of the inner panel (104) in a widthwise direction, wherein the ribbed structure (106) comprises:

a plurality of ribs (108) defined in a spaced apart configuration, each of the plurality of ribs (108) extend in a traverse direction of the ribbed structure (106);

a plurality of grooved sections (107) defined between each rib of the plurality of ribs (108), wherein each grooved section of the plurality of grooved sections (107) is defined with at least one through hole (110);

a mounting assembly (112) is disposed between the door frame (226) and the door (100), the mounting assembly (112) comprises:

at least one first bracket (150) connectable to the door (100);

at least one second bracket (156) connected to the at least one first bracket (150) at one end and to the door frame (226) at an other end; and

wherein the at least one first bracket (150) is fastened to the ribbed structure (106) about the at least one hole of the plurality of grooved sections (107) through a fastener (155) to pivotally couple the door (100) to the door frame (226).

10. The vehicle as claimed in claim 9, wherein the at least one first bracket (150) comprises:

a body portion (152) defined with at least one fastener hole (154);

at least one pair of first flanges (116) connected to the body portion (152) and each flange of the at least one pair of first flanges (116) extend opposite to each other, wherein each flange of the at least one pair of first flanges (116) is defined with a first fastener hole (153) to receive the fastener (155);

wherein the at least one second bracket (156) comprises:

a column (157);

at least one pair of second flanges (158) extending parallelly from the column (157) at one end, each of the at least one pair of second flanges (158) is defined with a second fastener hole (159) aligned to the at least one fastener hole (154) of the body portion (152) to receive the fastener (155); and

wherein the at least one pair of second flanges (158) are fastened to the body portion (152) to pivotally couple the at least one first bracket (150) and the at least one second bracket (156).

Dated this 8th day of September 2023

-- Digitally Signed--

Bhanu Prasad
(INPA No: **3253**)
Head, IPR Dept.,
L&T Technology Services Limited,
DLF 3rd Block, 2nd Floor,
Manapakkam, Chennai - 600089.

ABSTRACT

A DOOR FOR A VEHICLE AND THE VEHICLE THEREOF

Present disclosure discloses a door (100) for a vehicle (200). The door comprises an outer panel (102) and an inner panel (104) connected to the outer panel (102) to define a void zone (113) for removably receiving auxiliary components therebetween. A ribbed structure (106) is defined on the inner panel and extends away from one end of the inner panel in a width wise direction. The ribbed structure comprises a plurality of ribs (108) defined in a spaced apart configuration. Each of the plurality of ribs extend in a traverse direction of the ribbed structure. A plurality of grooved sections (107) is defined between each rib of the plurality of ribs. Each grooved section of the plurality of grooved sections is defined with at least one through hole (110) configured to receive a mounting assembly (112) to pivotally couple the door to the vehicle.

FIGS 1b and 3 are the representative figures.

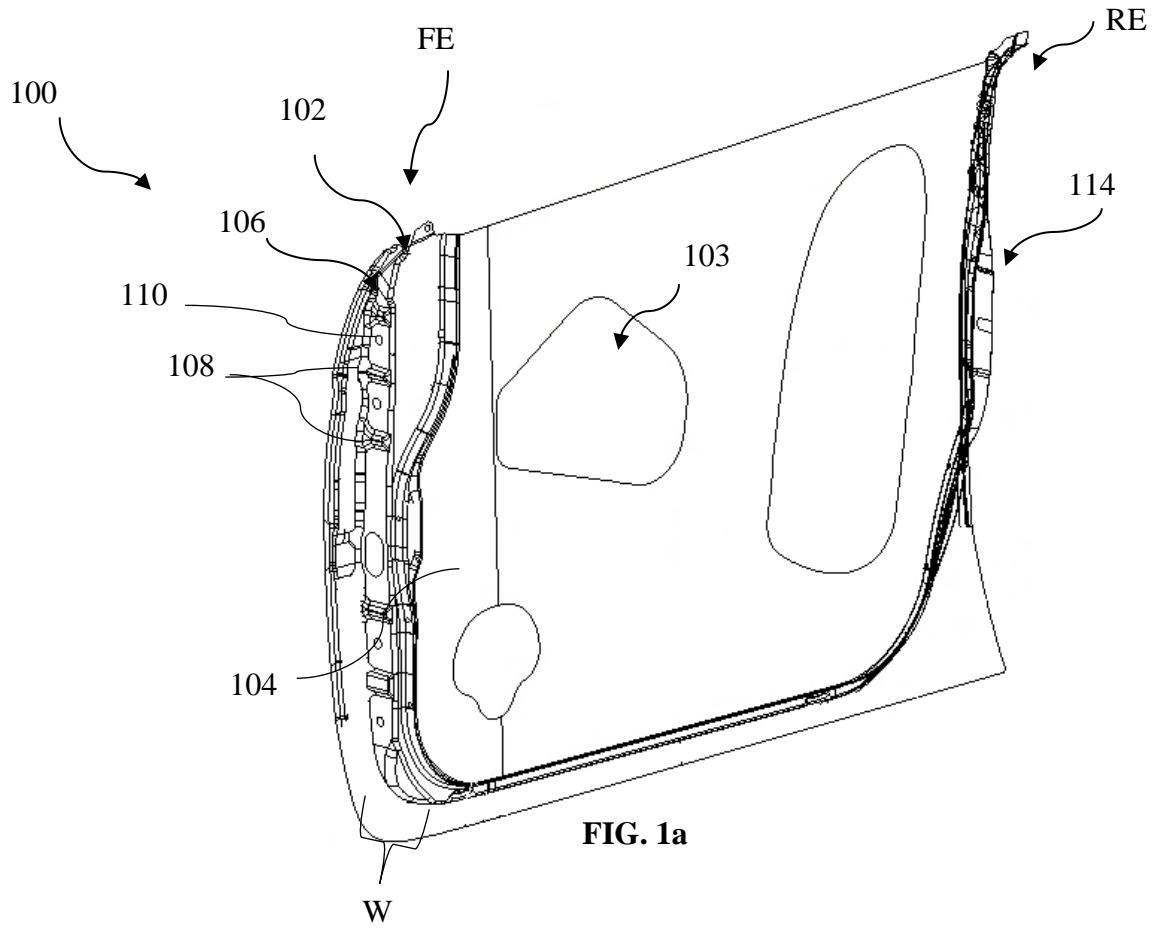


FIG. 1a

--Digitally Signed--
Bhanu Prasad (INPA No: 3253)
Head, IPR Dept.,
L&T Technology Services Limited,
DLF 3rd Block, 2nd Floor,
Manapakkam, Chennai - 600089.

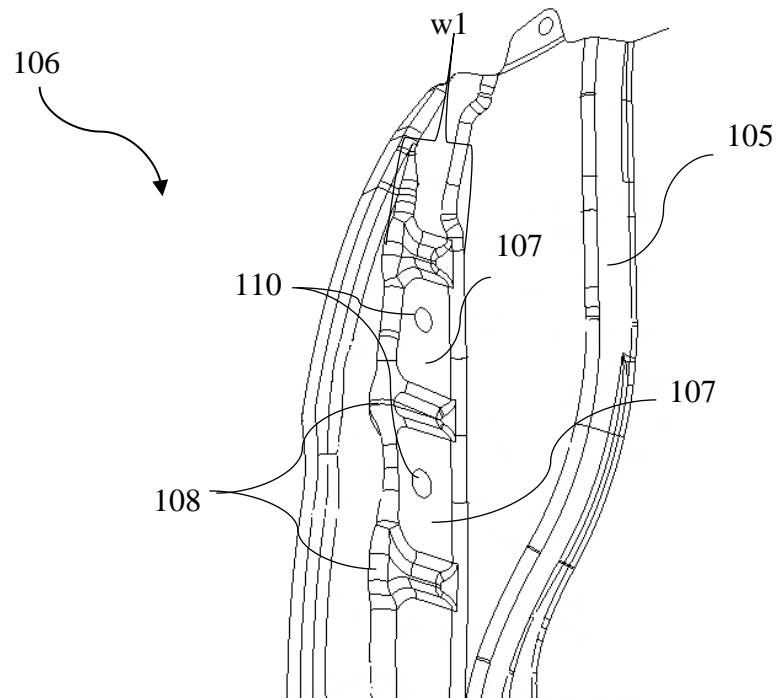


FIG. 1b

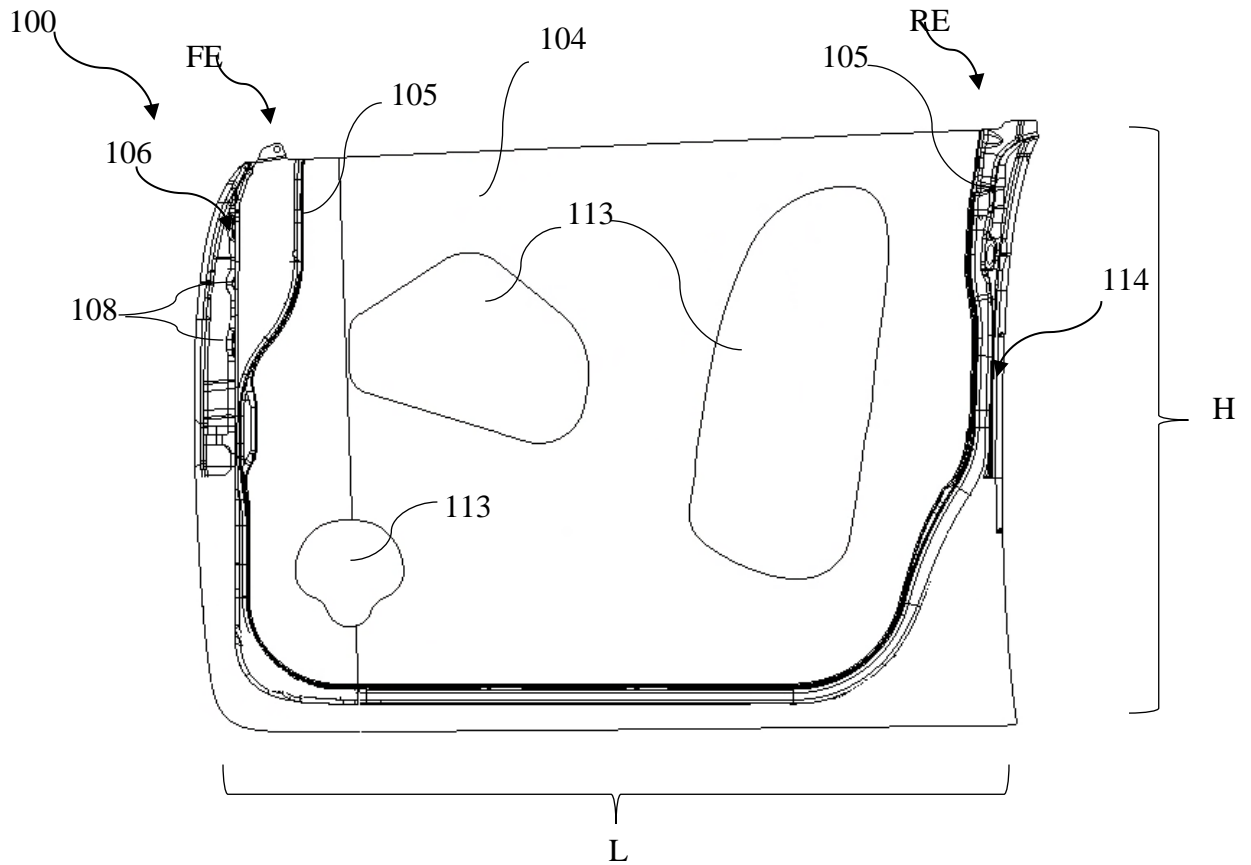


FIG. 2

--Digitally Signed--
Bhanu Prasad (INPA No: 3253)
Head, IPR Dept.,
L&T Technology Services Limited,
DLF 3rd Block, 2nd Floor,
Manapakkam, Chennai - 600089.

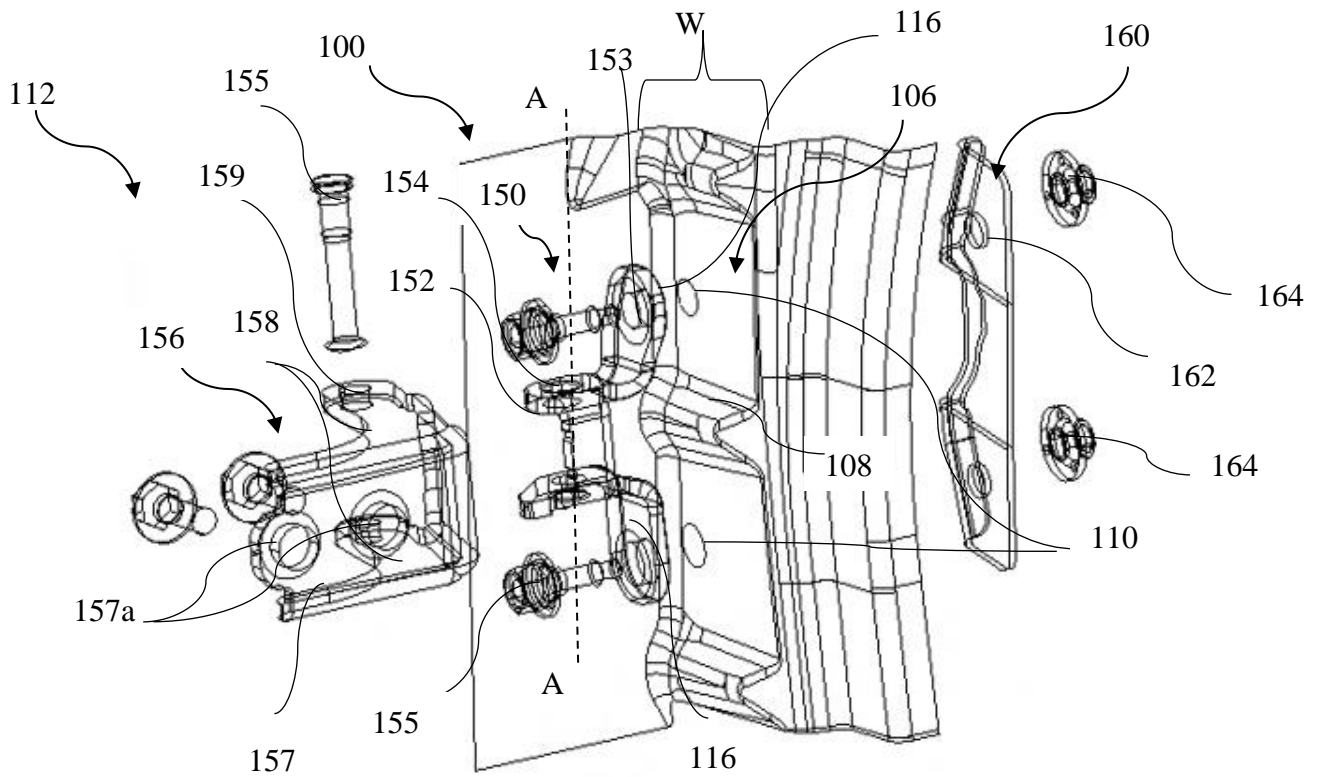


FIG. 3

--Digitally Signed--
Bhanu Prasad (INPA No: 3253)
Head, IPR Dept.,
L&T Technology Services Limited,
DLF 3rd Block, 2nd Floor,
Manapakkam, Chennai - 600089.

