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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 June 2019 (27.06.2019)

WIPO | PCT

(10) International Publication Number
WO 2019/123465 A1

(51) International Patent Classification:
B62B 5/04 (2006.01)

(21) International Application Number:
PCT/IL2018/051381

(22) International Filing Date:
20 December 2018 (20.12.2018)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

62/608,302	20 December 2017 (20.12.2017)	US
62/609,985	22 December 2017 (22.12.2017)	US
62/686,301	18 June 2018 (18.06.2018)	US
PCT/US2018/044629	31 July 2018 (31.07.2018)	US

(71) Applicants: **KETER PLASTIC LTD.** [IL/IL]; 2 Sapir Street, Industrial Zone, 4685206 Herzelyia (IL). **MILWAUKEE ELECTRIC TOOL CORPORATION** [US/US]; 13135 West Lisbon Road, Brookfield, Wisconsin 53005 (US).

(72) Inventors: **BRUNNER, Yaron**; Kibbutz Gvat, POB 248, 3657900 Kibbutz Gvat (IL). **MENASHRI, Omer**; Kibbutz Afikim, 1514800 Kibbutz Afikim (IL). **SHANY, Izhar**; Kibutz Gvat, 36579 Kibutz Gvat (IL). **PARIZER, Uri**; Kibbutz Hukok, POB 133, 1292300 Kibbutz Hukok (IL). **SQUIERS, Grant T.**; 3745 E. Cudahy Avenue, Cudahy, Wisconsin 53110 (US).

(74) Agent: **SOKOL, Edith** et al.; REINHOLD COHN & PARTNERS, 26A Habarzel Street, 6971037 Tel-Aviv (IL).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

(54) Title: TROLLEY AND MECHANICAL BRAKING SYSTEM THEREFOR

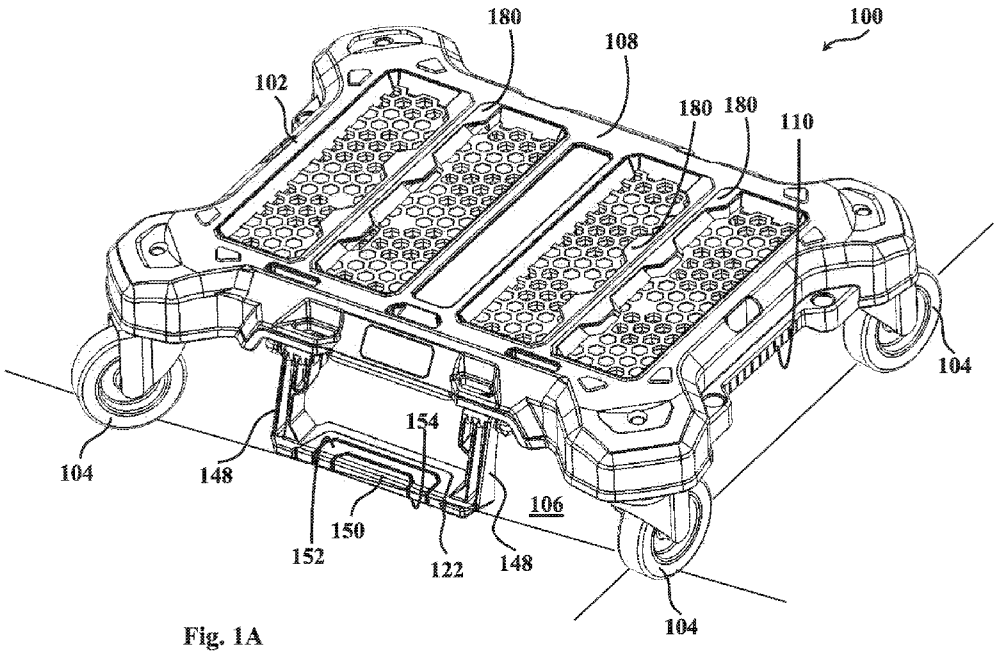


Fig. 1A

(57) Abstract: The present disclosure relates to mechanical braking systems for wheeled trolleys, trolleys comprising a mechanical braking system and methods for controlling movement thereof.

WO 2019/123465 A1

[Continued on next page]

EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*

TROLLEY AND MECHANICAL BRAKING SYSTEM THEREFOR

TECHNOLOGICAL FIELD

The present disclosure relates to mechanical braking systems for wheeled trolleys, trolleys comprising a mechanical braking system and methods for controlling movement thereof.

BACKGROUND

Trolleys, wheeled platforms and the like are conventionally used for easy transport of bulky and heavy objects. It is desirable to provide improved means of control of movement the trolley, in particular when maneuvering objects onto and off of the trolley.

GENERAL DESCRIPTION

According to a first aspect of this disclosure, there is provided a wheeled trolley comprising: a platform base member; a wheel set defining a ground contact surface; and a foot lever articulated to the platform base member through a biasing mechanism. The foot lever is configured to have a first position in which it is not in contact with the ground contact surface, and a second position in which the lever is in contact with the ground contact surface, against a biasing effect of the biasing mechanism, and the foot lever is biased into said first position by the biasing mechanism.

According to another aspect, there is provided a mechanical braking system for a wheeled trolley as defined above.

Further provided is a method for controlling movement of a trolley as disclosed herein, comprising applying force to the foot lever to urge the lever against the biasing effect from the first position into the second position.

Any one or more of the following features, designs and configurations can be incorporated in any of the aspects of this disclosure, solely or in any combination thereof:

- The biasing mechanism can comprise a pivoting structure and a biasing member.
- The pivoting structure cam be arranged to pivot about an axis of rotation, and wherein the foot lever and the biasing member are arranged on the pivoting structure on opposite sides across the axis of rotation from one another.
- The pivoting structure can be pivotably articulated to the platform about an axis of rotation and wherein the biasing member is disposed at one side of the axis of rotation and below the platform, and the foot lever is disposed at an opposite side of the axis of rotation adjacent an edge of the platform.
- The biasing member can bias the foot lever into the first position, and wherein, in use, a force applied to the foot lever against the biasing effect of the biasing member urges the foot lever into the second position. Further, when in use, upon removal of the applied force, the biasing member can bias the foot lever to return to the first position.
- The biasing member can be an elastically deformable member disposed between a bottom face of the platform and a support member articulated to the pivoting structure, e.g. the biasing member can be a compression spring.
- The pivoting structure can have a first arm extending substantially parallel to the axis of rotation, and two parallelly extending second arms extending from the first arm, where the support member is articulated to said first arm and wherein the foot lever extends between respective end portions of the second arms.
- In the first position, an end portion of each of the second arms bears against a bottom face of the platform adjacent an edge of the platform, optionally wherein bearing of an end portion of at least one of the second arms is against the bottom face of the platform is cushioned.
- The foot lever can be pivotably articulated at the ends of the second arms about an axis parallel to the axis of rotation.

- The pivoting structure can be articulated to the platform by a pair of articulation members, each fixed to a respective second arm, said articulation members being configured with an articulation axel, the articulation axels co-extends with the axis of rotation. Particularly, each of the articulation axels is integral with the articulation member, or each of the articulation axels is removably received within the articulation member.
- The biasing member can be a tension spring articulated to the second arms, and disposed between the axis of rotation and the platform edge.
- The foot lever can be pivotably articulated to the pivoting structure.
- The foot lever, when in its first position, can have an operable position disposed closest to the ground contact surface, and a collapsed position, in which the foot lever is stowed in proximity to the platform.
- The trolley can further comprise an arresting mechanism for arresting the foot lever at the stowed position.
- The foot lever can have a foot-engaging surface at a top face thereof and a ground-engaging surface and a bottom face thereof, and wherein the ground-engaging surface comprises one or more ground contact elements.
- The foot lever can have a foot-engaging surface, that extends below a bottom face of an edge of the platform, at a distance facilitating inserting at least a front portion of a user's foot.
- The foot lever can be pivotally articulable between a position in which an end of the foot lever is at a first distance away from the ground contact surface and a position in which the end of the foot lever is at a second distance away from the ground contact surface, wherein the second distance is greater than the first distance.
- The pivoting structure can be integrally configured with the foot lever.
- The mechanical braking system can be detachably attachable at a bottom face of the trolley.
- The trolley can have a top surface of the platform that is configured with utility module articulation arrangement, for detachably-attaching thereto of at least one utility module.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to better understand the subject matter that is disclosed herein and to exemplify how it may be carried out in practice, embodiments will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Figs. 1A-1C show, respectively:

a top perspective view of a trolley and a mechanical braking system according to one embodiment of this disclosure (Fig. 1A),

a top perspective view of the mechanical braking mechanism of Fig. 1A without the trolley (Fig. 1B),

and a bottom perspective view of the trolley and mechanical braking system (Fig. 1C).

Figs. 2A-2C show, respectively:

a top perspective view of a trolley and a mechanical braking system according to another embodiment of this disclosure (Fig. 2A),

a planar side-view cross-section along line II-II of Fig, 2A (Fig, 2B),

and a perspective top view of the particular example of the mechanical braking system (Fig. 2C).

Fig. 3A is a schematic side-view illustrating foot-operation of the mechanical braking system.

Fig. 3B is a perspective view illustrating respective first and second positions of the mechanical braking system.

DETAILED DESCRIPTION OF EMBODIMENTS

An embodiment of a trolley, also known as a dolly cart or hand truck, generally designated **100** is shown in Figs. **1A-1C**. Trolley **100** comprises a platform base member **102** attached to a wheel set comprising four castor wheels **104**. The wheel set defines a ground contact surface **106** (shown in Fig. 1A), which is a surface contacted by the wheel set. Platform base member **102** comprises a top face **108** and a bottom surface **110**. In this context, "top surface" and "bottom surface" refer to surfaces respectively further from and closer to the ground contact surface. Similarly, "up" and

"down" refer to direction away from and towards the ground contact surface respectively.

The top face **108** of the platform base member **102** is generally used for placing of heavy or bulky items, for transport thereof (as shown schematically in Fig. 3A).

The trolley **100** further comprises a mechanical braking system **120** disposed at the bottom surface **110** of the platform base member **102**. With reference to Fig. 1B, there is shown the mechanical braking system **120** without the platform base member **102** or castor wheels **104**. The mechanical braking system **120** comprises a foot lever **122** attached to a biasing mechanism **124**. Biasing mechanism **124** comprises a pivoting structure **126**, and a biasing member **128** in the form of, in this example, a compression spring. In the exemplified embodiment, the biasing member **128** is disposed between spring receptacle **130** at the bottom surface **110** of the platform base member **102** (Fig. 1C) and a support member **132** articulated to the pivoting structure **126**. The pivoting structure **120** comprises two second arms **134** and **136**, parallelly extending one to the other, and extending from first arm **138** at a substantially right-angle. The support member **132** is articulated to the first arm **138**.

The pivoting structure **120** is articulated to the platform **102** by a pair of articulation members **140**, each fixed to a respective second arm **134,136**, the articulation members being configured with an articulation axel **142**. In the present example, each of axels **142** is split into left and right coextending portions **142'** and **142''**. The axels 142 define between them an axis of rotation **144.** Each of the axels **142** is configured, for snap engagement, however pivotably, within axel receptacle **143** configured at the bottom surface of the platform **102**.

The first arm **138** extends substantially parallel to the axis of rotation **144**, and two parallelly extending second arms **134,136** extend from the first arm; such that the support member **132** is articulated to the first arm.

The compression spring **128** is received, at a first end thereof, within receptacle **158** of the support member **132** and an opposite, top end within receptacle **160** at the bottom face of the platform **102**, so as to pivotally bias the braking mechanism **120** into a first position, in which the foot lever is not in contact with the ground contact surface.

In other embodiments (not shown), a contraction biasing member can be disposed intermediate the axis of rotation **144** and the end portions of the second arms

134,136. It is noted that instead of a compression spring, other biasing members are also encompassed by the present disclosure, e.g. a piston mechanism, resilient member, etc.

The foot lever **122** extends between respective end portions of the second arms **134,136**, and in this particular example is pivotably secured about a pivot axis **146**, which is parallel to the axis of rotation **144**.

The foot lever **122** comprises two parallel arms **148** and a foot-engaging member **150**, which has a foot-engaging surface **152** and a ground-engaging surface **154**. The ground engaging surface **154** can be fitted with at least one ground contact element **156** (as seen in Fig. 1C).

The top face **108** of platform **102** is configured with utility module articulation arrangement, generally designated **180**, for detachably-attaching thereto of at least one utility module, as described for example, in Applicants' PCT patent publication WO2017/191628, incorporated herein by reference for its relevant parts.

At its normal state, the braking mechanism is disposed in the first position, so that the foot lever is remote from the ground contact surface and does not hinder the rolling or moving of the trolley along the surface. When it is required to load/unload/articulate/detach a utility module **400** from the top face **108** of the trolley **300** (as seen, for example in Fig. 3A), it is advantageous to temporarily prevent the trolley from displacing over the ground surface **106**, whereupon applying a force **F** by a user's foot **R** to the foot lever **122** against the biasing effect of the biasing member **128** urges the foot lever into a second position, in which it is in contact with the ground contact surface. This can also be seen in **Fig. 3B**, in which the lever is shown in a dashed line in the first position, and in solid line in the ground-engaging second position.

Another example of a trolley **200** and its associated mechanical braking mechanism **220** is shown in **Figs. 2A-2C**. It is noted that in Figs. 2A-3C, elements having same functionality as those of Figs. 1A-1C will be given similar reference numbers, shifted by 100.

In the exemplary trolley of Figs. 2A-2C, pivoting structure **220** is a continuous frame-like member that is constituted by the first arm **238** and its two integrally-formed second arms **234,236**, and continuously extending to lever arms **248**, and further to a horizontal portion **249** onto which the lever **222** is articulated.

In this specific example, articulation members **240** are each configured with an axel bushing **241**, each receiving an axel **242** in a removable manner. The axel **242** is configured for pivotal articulation within axel receptacle (not seen) at the bottom face of the platform.

Shown in Fig. 2B is a side-view cross section of trolley **200**. As can be seen, the foot-engaging surface **252** of the foot lever **222** extends below a bottom face of an edge of the platform **253**, at a distance **D** facilitating inserting at least a front portion of a user's foot (as exemplified in Fig. 3A). Although this is shown specifically for the embodiment of Figs 2A-2C, it is to be understood that the same principle of operation also applies to the example shown in Figs. 1A-1C.

Those skilled in the art to which this invention pertains will readily appreciate that numerous changes, variations, and modifications can be made without departing from the scope of the presently disclosed subject matter, *mutatis mutandis*.

CLAIMS:

1. A wheeled trolley comprising:

a platform base member;

a wheel set defining a ground contact surface; and

a foot lever articulated to the platform base member through a biasing mechanism, said foot lever being configured to have a first position in which it is not in contact with the ground contact surface, and a second position in which the lever is in contact with the ground contact surface, against a biasing effect of the biasing mechanism, and wherein the foot lever is biased into said first position by the biasing mechanism.

2. The trolley of claim 1, wherein the biasing mechanism comprises a pivoting structure and a biasing member.

3. The trolley of claim 2, wherein the pivoting structure is arranged to pivot about an axis of rotation, and wherein the foot lever and the biasing member are arranged on the pivoting structure on opposite sides across the axis of rotation from one another.

4. The trolley of claim 2, wherein the pivoting structure is pivotably articulated to the platform about an axis of rotation and wherein the biasing member is disposed at one side of the axis of rotation and below the platform, and the foot lever is disposed at an opposite side of the axis of rotation adjacent an edge of the platform.

5. The trolley of any one of claims 2 to 4, wherein the biasing member biases the foot lever into the first position, and wherein, in use, a force applied to the foot lever against the biasing effect of the biasing member urges the foot lever into the second position.

6. The trolley of claim 5, wherein, in use, upon removal of the applied force, the biasing member biases the foot lever to return to the first position.

7. The trolley of any one of claims 1 to 6, wherein the biasing member is an elastically deformable member disposed between a bottom face of the platform and a support member articulated to the pivoting structure.

8. The trolley of claim 7, wherein the biasing member is a compression spring.

9. The trolley of claim 7 or 8, wherein the pivoting structure has a first arm extending substantially parallel to the axis of rotation, and two parallelly extending second arms extending from the first arm, where the support member is articulated to

said first arm and wherein the foot lever extends between respective end portions of the second arms.

10. The trolley of claim 9, wherein in the first position, an end portion of each of the second arms bears against a bottom face of the platform adjacent an edge of the platform.

11. The trolley of claim 10, wherein bearing of an end portion of at least one of the second arms is against the bottom face of the platform is cushioned.

12. The trolley of any one of claims 7 to 11, wherein the foot lever is pivotably articulated at the ends of the second arms about an axis parallel to the axis of rotation.

13. The trolley of any one of claims 7 to 12, wherein the pivoting structure is articulated to the platform by a pair of articulation members, each fixed to a respective second arm, said articulation members being configured with an articulation axel, the articulation axels co-extends with the axis of rotation.

14. The trolley of claim 13, wherein each of the articulation axels is integral with the articulation member.

15. The trolley of claim 13, wherein each of the articulation axels is removably received within the articulation member.

16. The trolley of any one of claims 7 to 15, wherein the biasing member is a tension spring articulated to the second arms, and disposed between the axis of rotation and the platform edge.

17. The trolley of any one of the preceding claims, wherein the foot lever is pivotably articulated to the pivoting structure.

18. The trolley of claim 17, wherein the foot lever, when in its first position, has an operable position disposed closest to the ground contact surface, and a collapsed position, in which the foot lever is stowed in proximity to the platform.

19. The trolley of claim 18, further comprising an arresting mechanism for arresting the foot lever at the stowed position.

20. The trolley of any one of the preceding claims, wherein the foot lever has a foot-engaging surface at a top face thereof and a ground-engaging surface and a bottom face thereof, and wherein the ground-engaging surface comprises one or more ground contact elements.

21. The trolley of any one of the previous claims, wherein a foot-engaging surface of the foot lever extends below a bottom face of an edge of the platform, at a distance facilitating inserting at least a front portion of a user's foot.

22. The trolley of any one of the preceding claims, wherein the foot lever is pivotally articulable between a position in which an end of the foot lever is at a first distance away from the ground contact surface and a position in which the end of the foot lever is at a second distance away from the ground contact surface, wherein the second distance is greater than the first distance.

23. The trolley of any one of claims 1-21, wherein the pivoting structure is integrally configured with the foot lever.

24. The trolley of any one of the preceding claims 23, wherein the mechanical braking system is detachably attachable at a bottom face of the trolley.

25. The trolley of any one of claims 1 to 24, wherein a top surface of the platform is configured with utility module articulation arrangement, for detachably-attaching thereto of at least one utility module.

26. A method for controlling movement of a trolley according to any one of claims 1 to 25, comprising applying force to the foot lever to urge the lever against the biasing effect from the first position into the second position.

27. A method according to claim 26, further comprising releasing the applied force, and biasing the foot lever via the biasing effect to return to the first position.

28. A mechanical braking system for a wheeled trolley having a platform base member and a wheel set defining a ground contact surface, the mechanical braking system comprising:

a foot lever articulable to the platform base member through a biasing mechanism, said foot lever being configured to have a first position in which it is not in contact with the ground contact surface, and a second position in which the lever is in contact with the ground contact surface, against a biasing effect of the biasing mechanism, and wherein the foot lever is biased into said first position by the biasing mechanism.

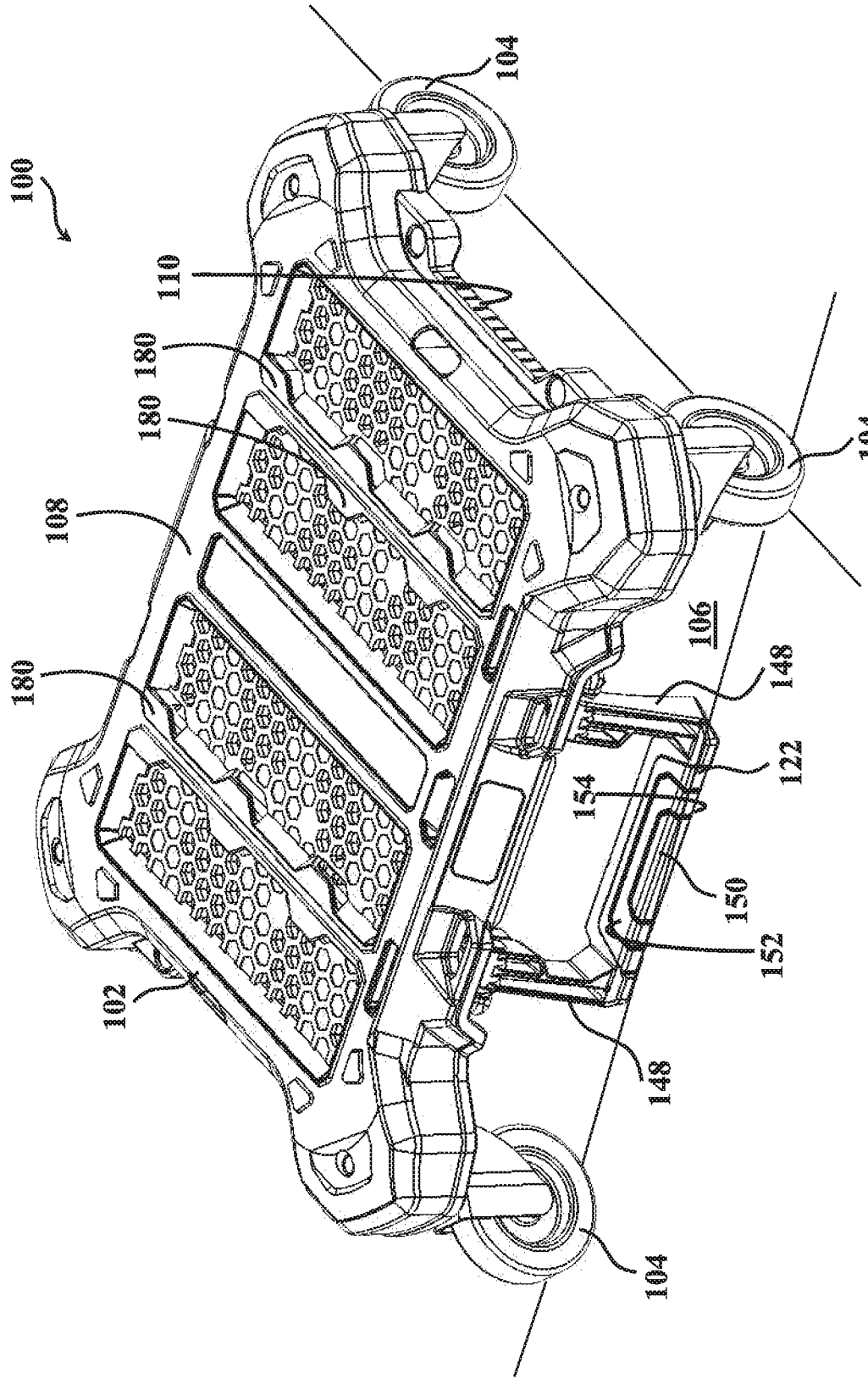

100
102
104
104
104
106
108
110
122
148
148
150
152
154
180
180
180

Fig. 1A

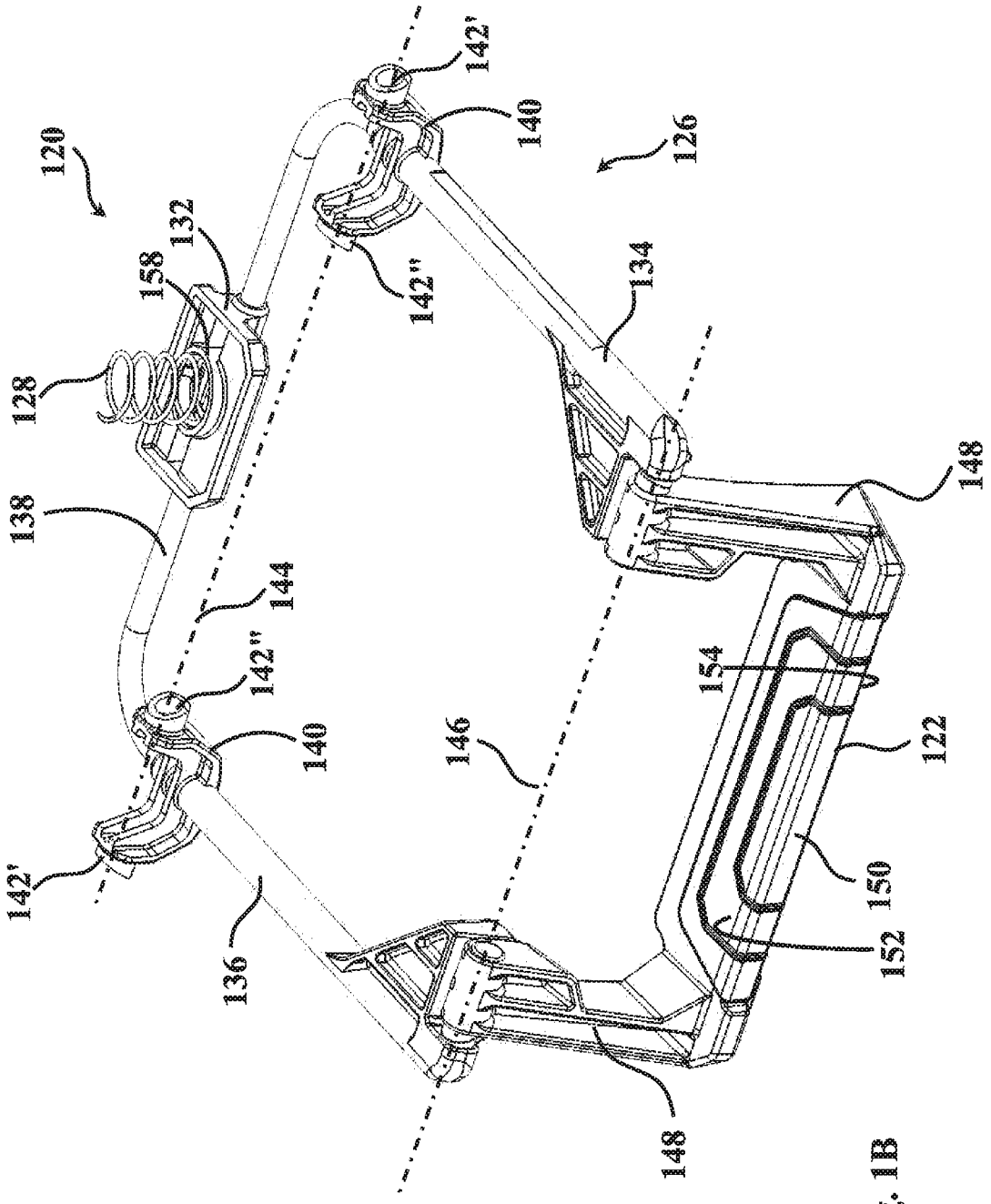

120
126
132
158
128
138
144
142''
140
142'
136
146
134
148
154
122
150
152
148
142'
140
142''

Fig. 1B

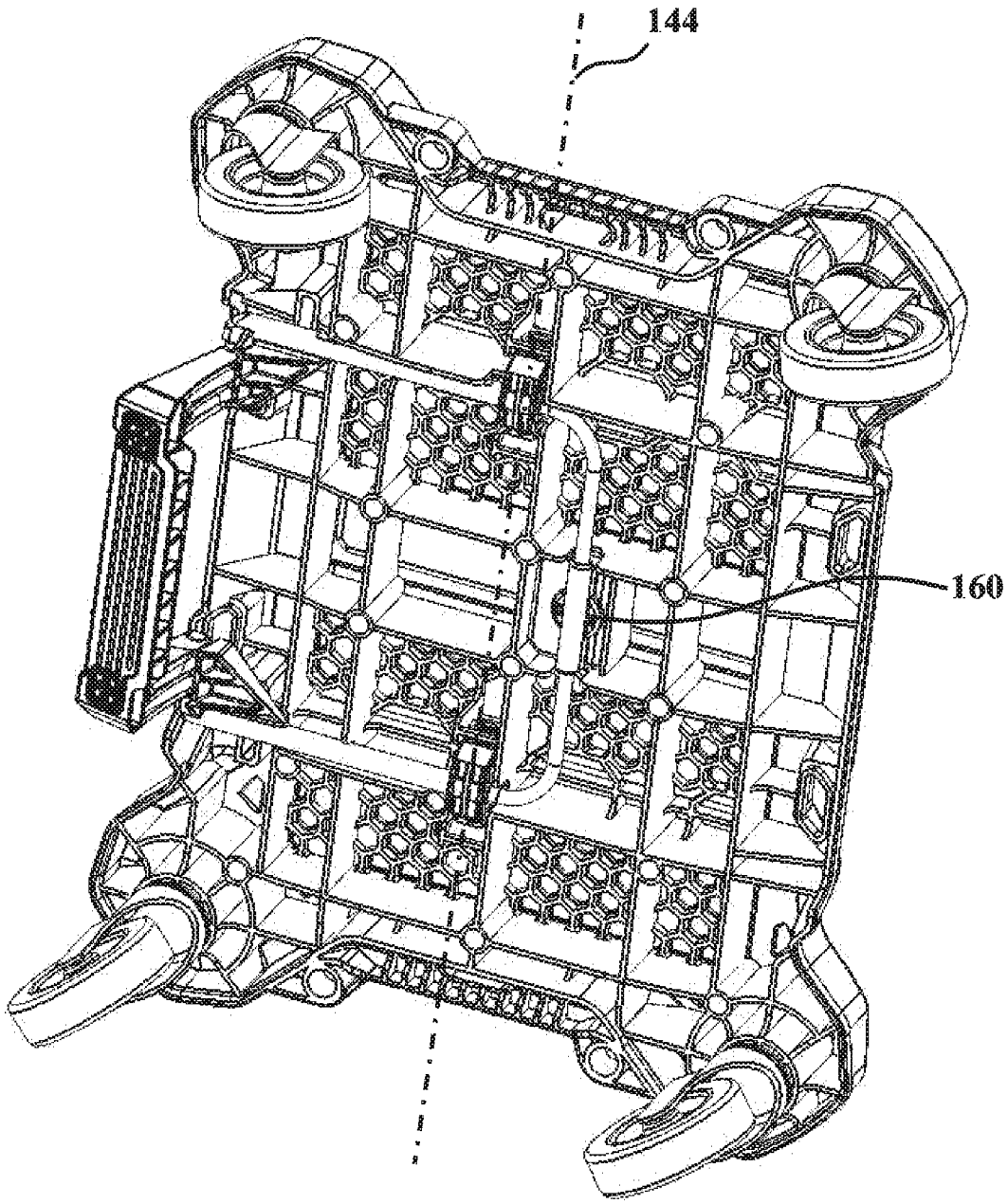


Fig. 1C

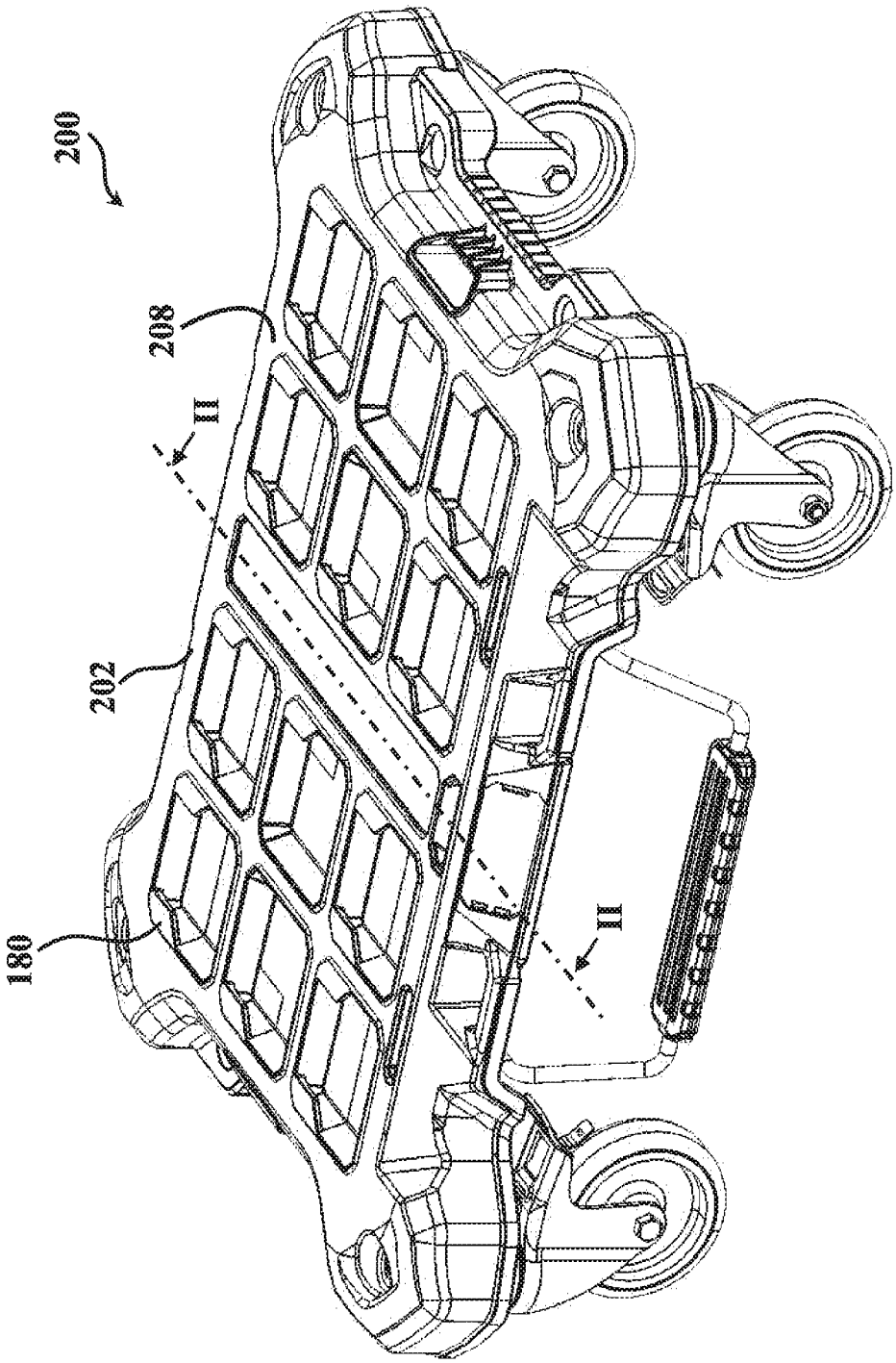


Fig. 2A

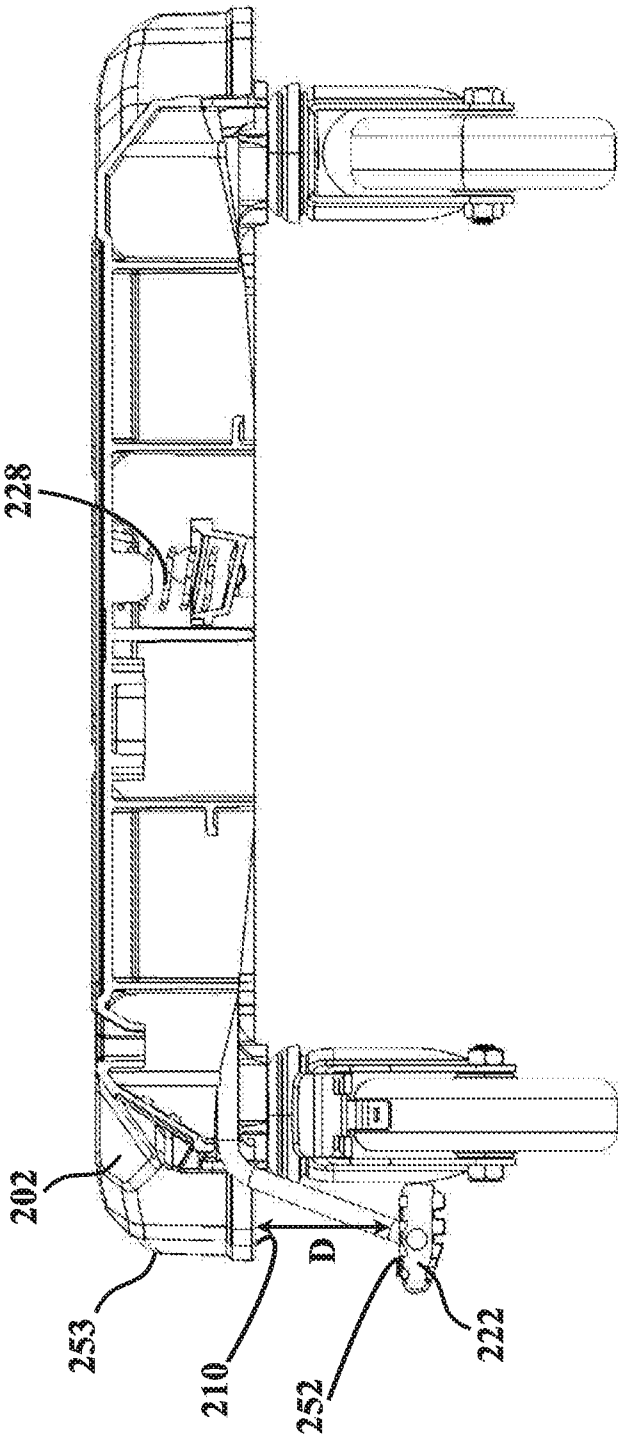


Fig. 2B

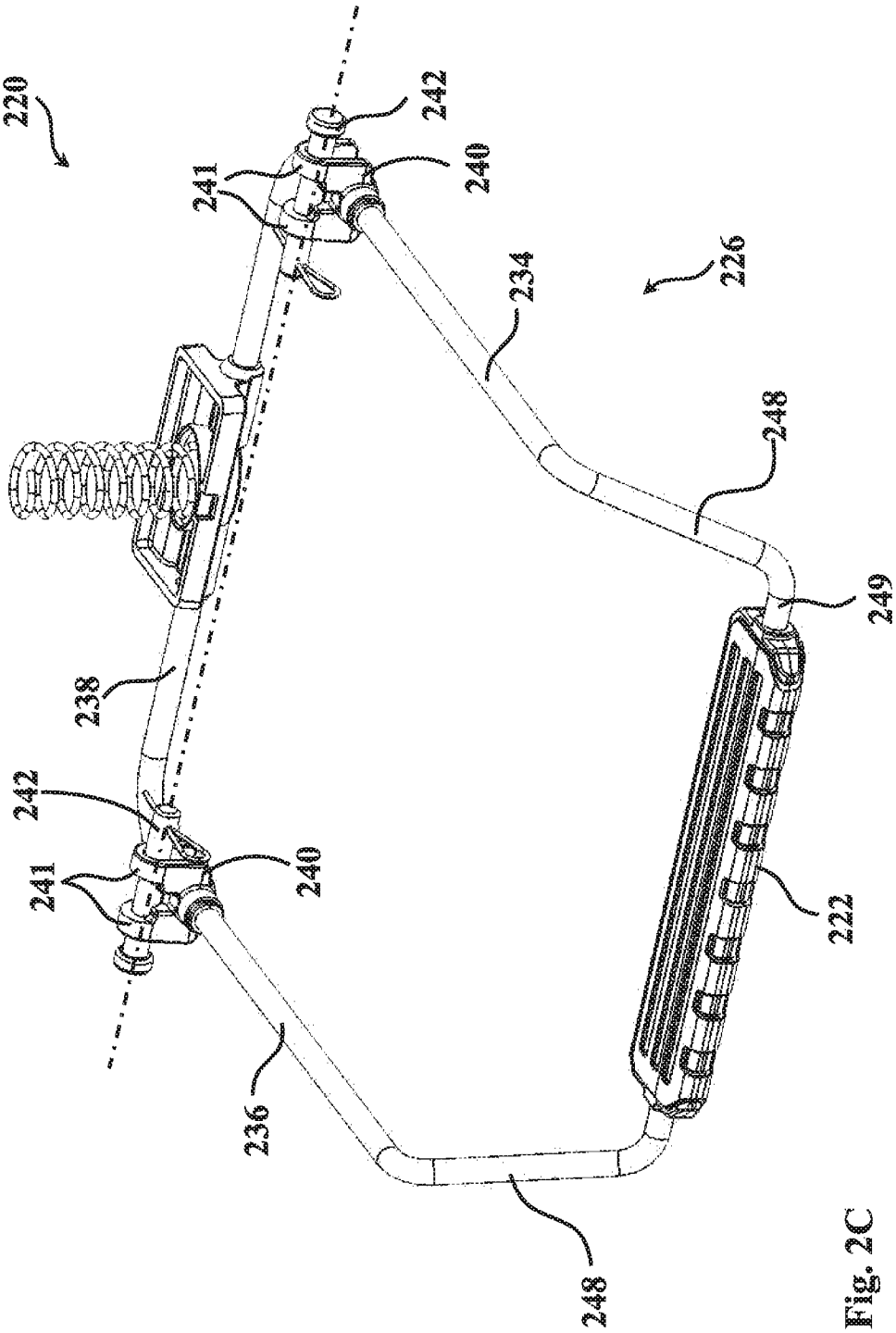


Fig. 2C

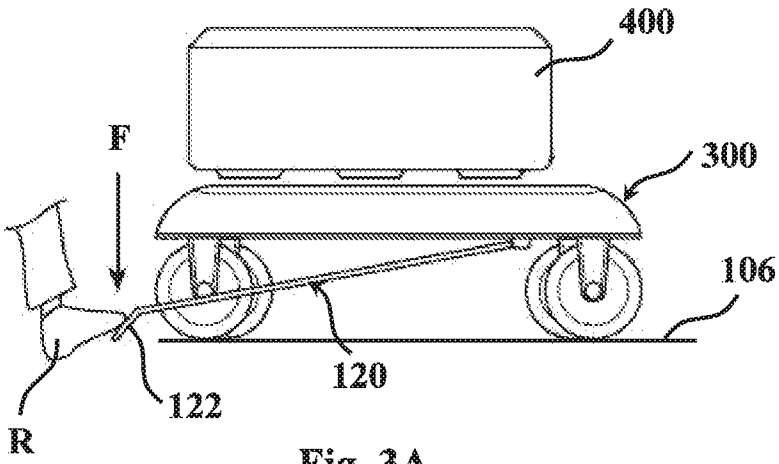


Fig. 3A

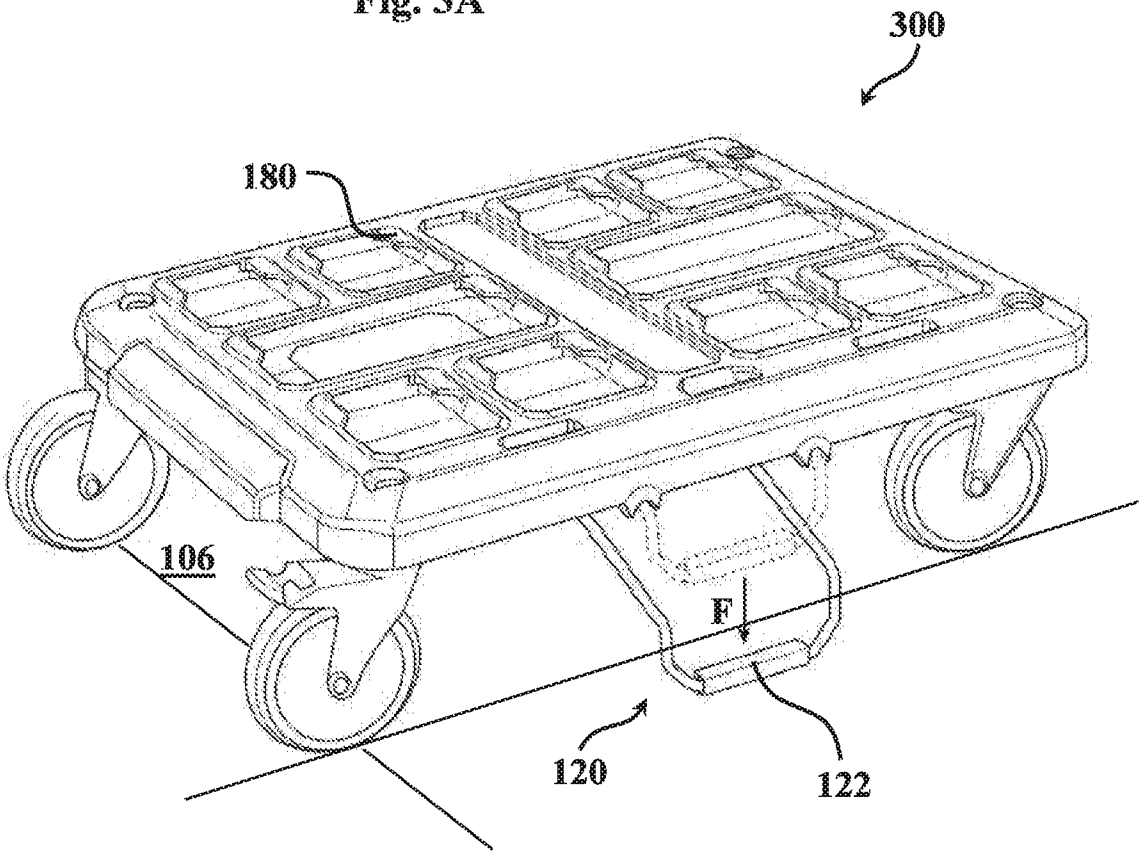


Fig. 3B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL2018/051381

A. CLASSIFICATION OF SUBJECT MATTER
IPC (2019.01) B62B 5/04

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)
IPC (2019.01) B62B 5/04, B62B 9/08, B60B 33/00

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)
Databases consulted: Esp@cenet, Google Patents, FamPat database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4168076 A JOHNSON NOEL K 14 Jun 1979 (1979/06/14) Entire document	1,2,5-8,20,22,26-28
A	US 5035445 A POULIN WILLIE F 30 Jul 1991 (1991/07/30) Entire document	1-28
A	GB 694707 A GEORGE ARTHUR CHARD 22 Jul 1953 (1953/07/22) Entire document	1-28

☐ 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
27 Feb 2019	10 Mar 2019

Name and mailing address of the ISA:	Authorized officer
Israel Patent Office Technology Park, Bldg.5, Malcha, Jerusalem, 9695101, Israel Facsimile No. 972-2-5651616	ORGAD Yaniv Telephone No. 972-2-5651787

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IL2018/051381

Patent document cited search report	Publication date	Patent family member(s)	Publication Date
US 4168076 A	14 Jun 1979	US 4168076 A	18 Sep 1979
US 5035445 A	30 Jul 1991	US 5035445 A	30 Jul 1991
GB 694707 A	22 Jul 1953	GB 694707 A	22 Jul 1953