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(19) **United States**

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Hall et al.

(10) **Pub. No.: US 2024/0052657 A1**

(43) **Pub. Date:** **Feb. 15, 2024**

(54) **MODULAR DWELLING UNIT HAVING
VERTICALLY SPACED ZONES**

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(72) Inventors: **David R. Hall**, Provo, UT (US);
Benjamin Jensen, Orem, UT (US);
Jonathon Marshall, Mapleton, UT
(US)

(21) Appl. No.: **18/450,383**

(22) Filed: **Aug. 15, 2023**

Related U.S. Application Data

(60) Provisional application No. 63/371,485, filed on Aug.
15, 2022.

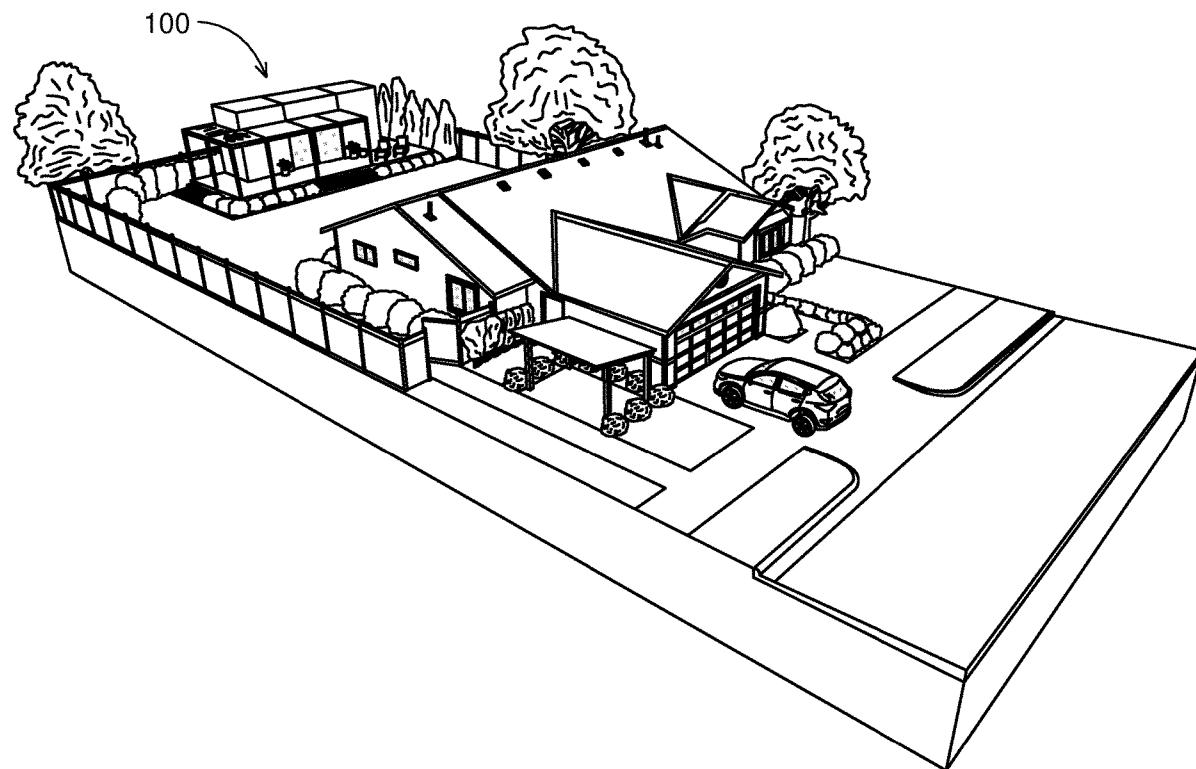
Publication Classification

(51) **Int. Cl.**
E04H 1/00 (2006.01)

(52) **U.S. Cl.**
CPC **E04H 1/005** (2013.01)

(57) **ABSTRACT**

A modular dwelling is disclosed that includes a dwelling unit, a rectangular base, four exterior walls extending from the base to the roof, and at least one entrance through one of the exterior walls. The dwelling unit also includes a utility zone disposed above the base, a residential zone disposed above the utility zone, a storage zone above the dwelling zone, a mechanical zone above the storage zone, and lifting devices in the mechanical zone adapted to raise and lower furnishings between the storage zone and the dwelling zone. Preferably, the modular dwelling includes multiple dwelling units arranged side by side and/or stacked vertically.



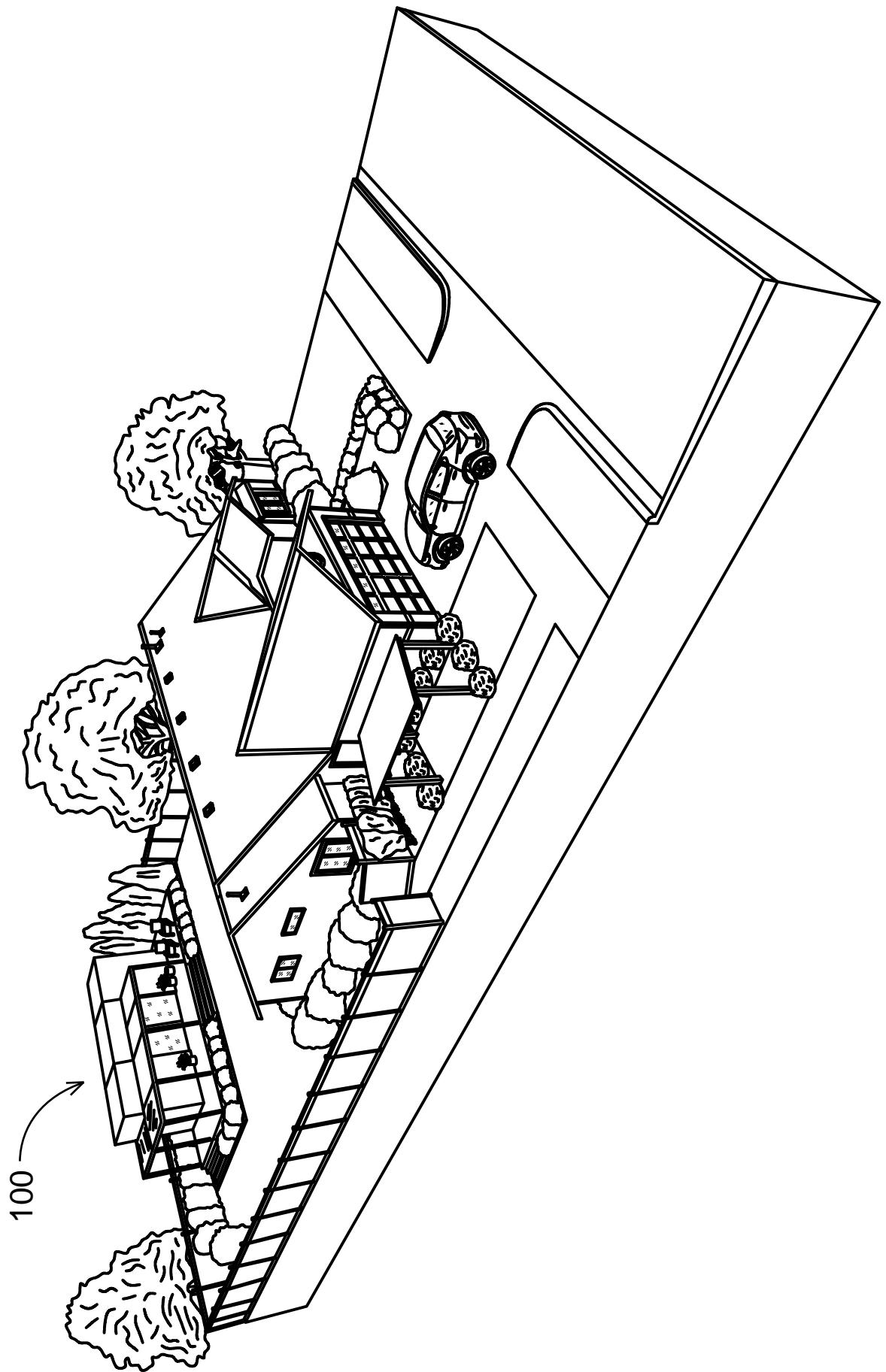


FIG. 1

FIG. 2

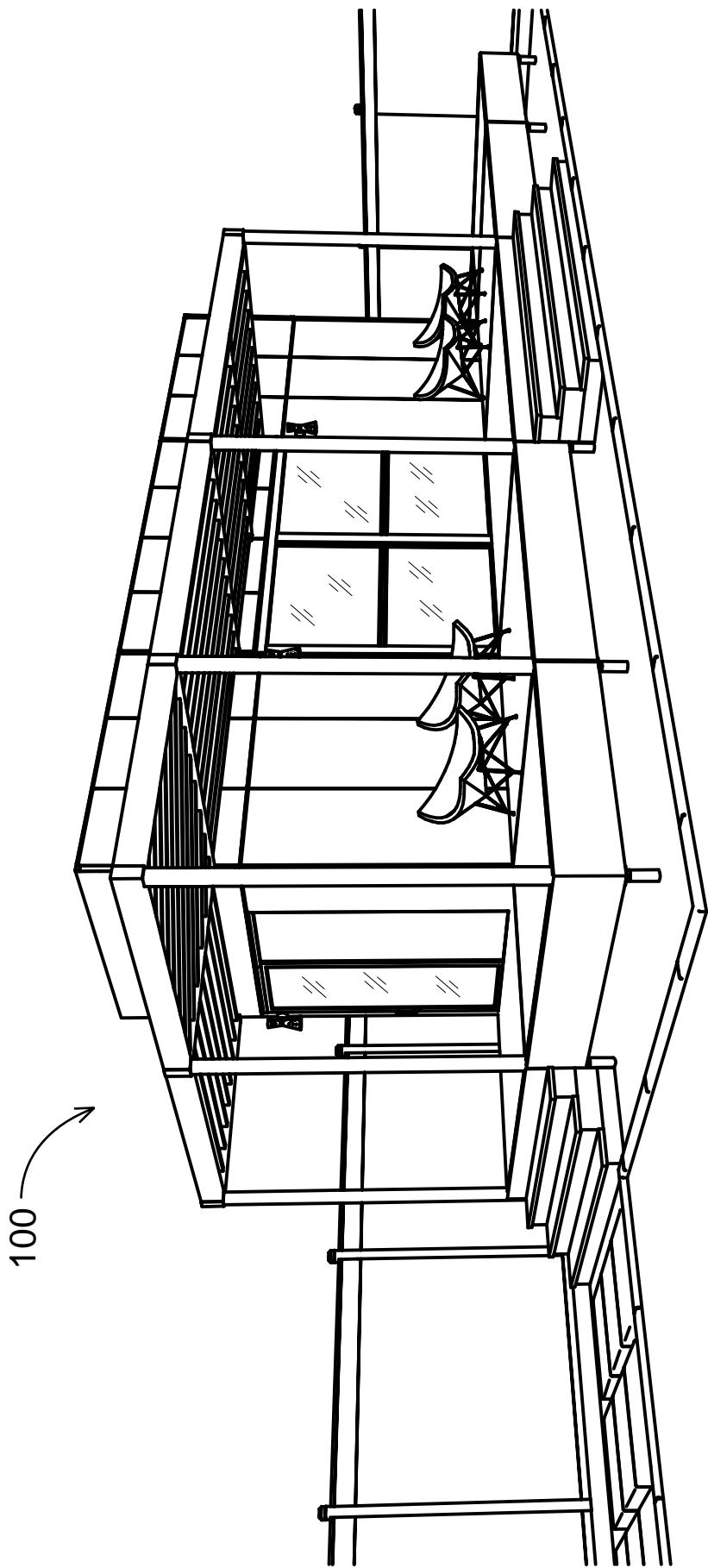


FIG. 3

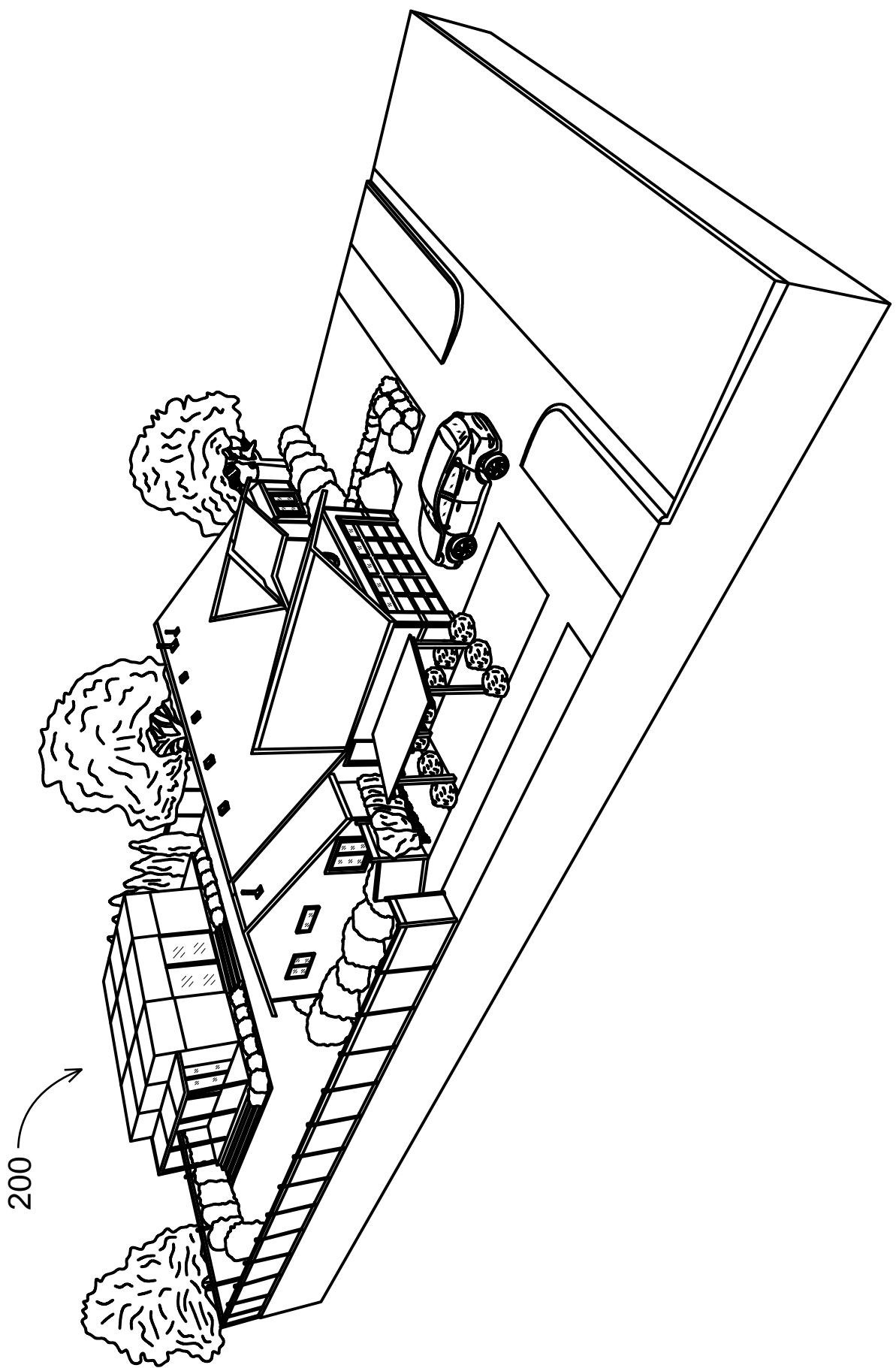


FIG. 4

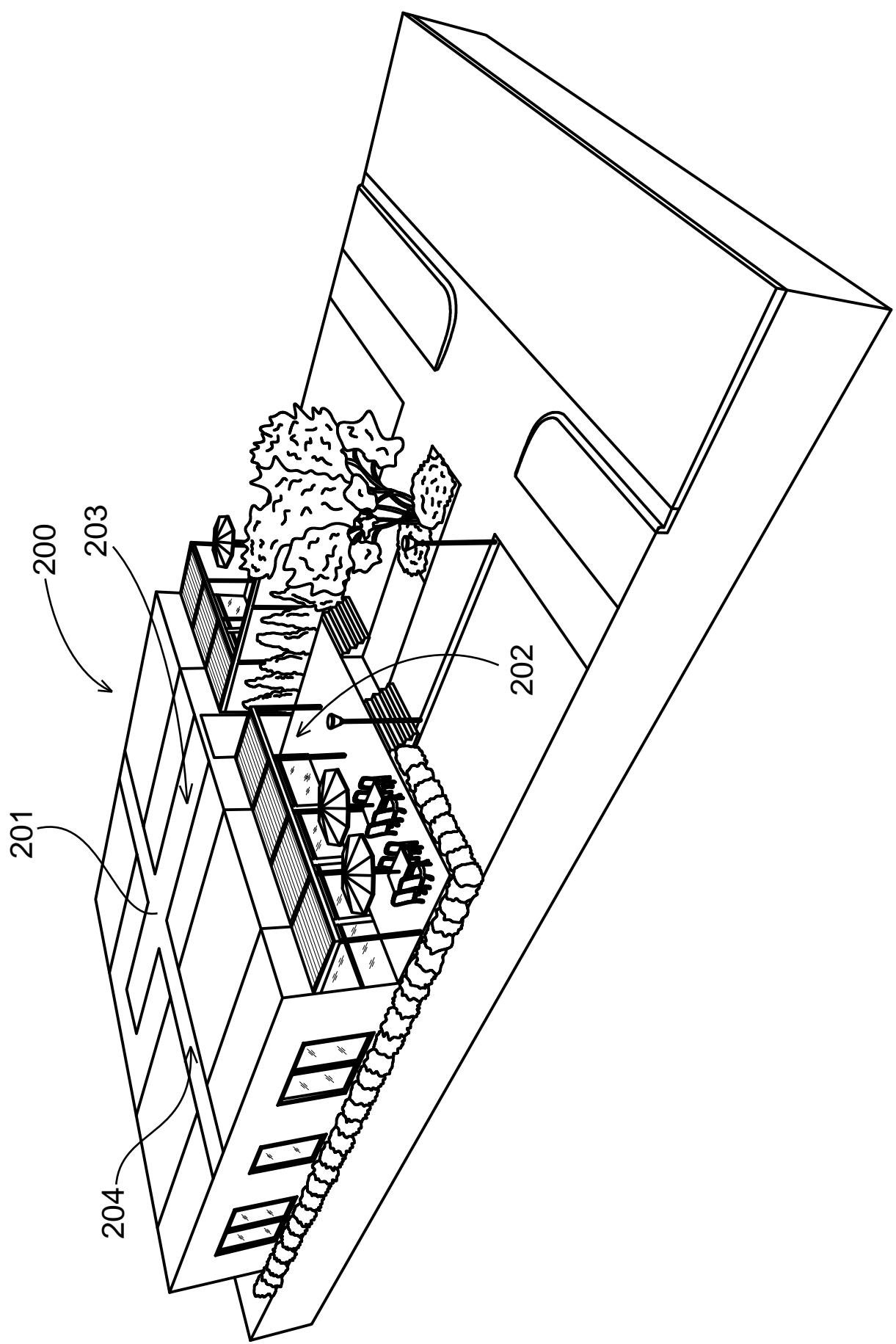


FIG. 5

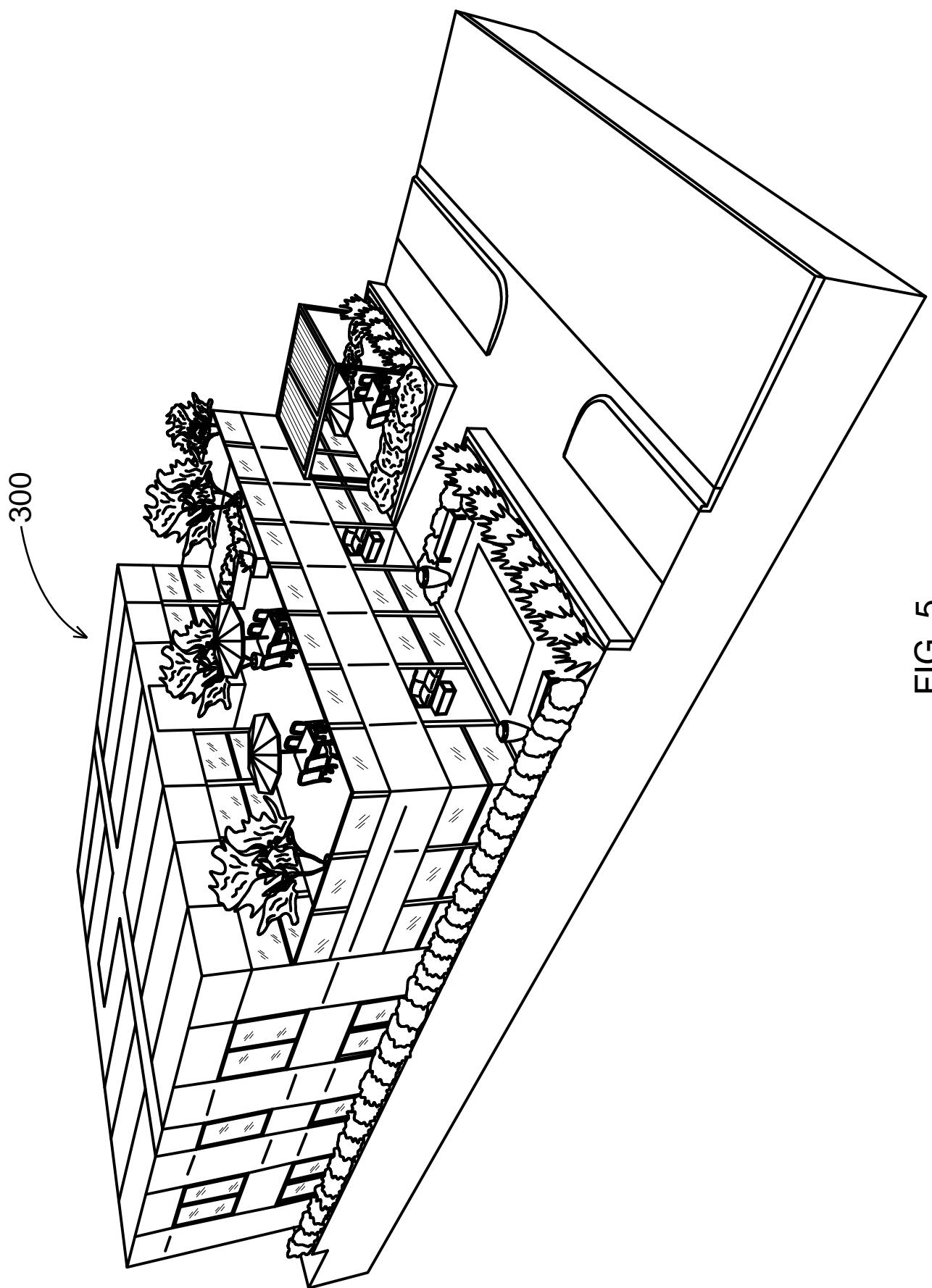


FIG. 6

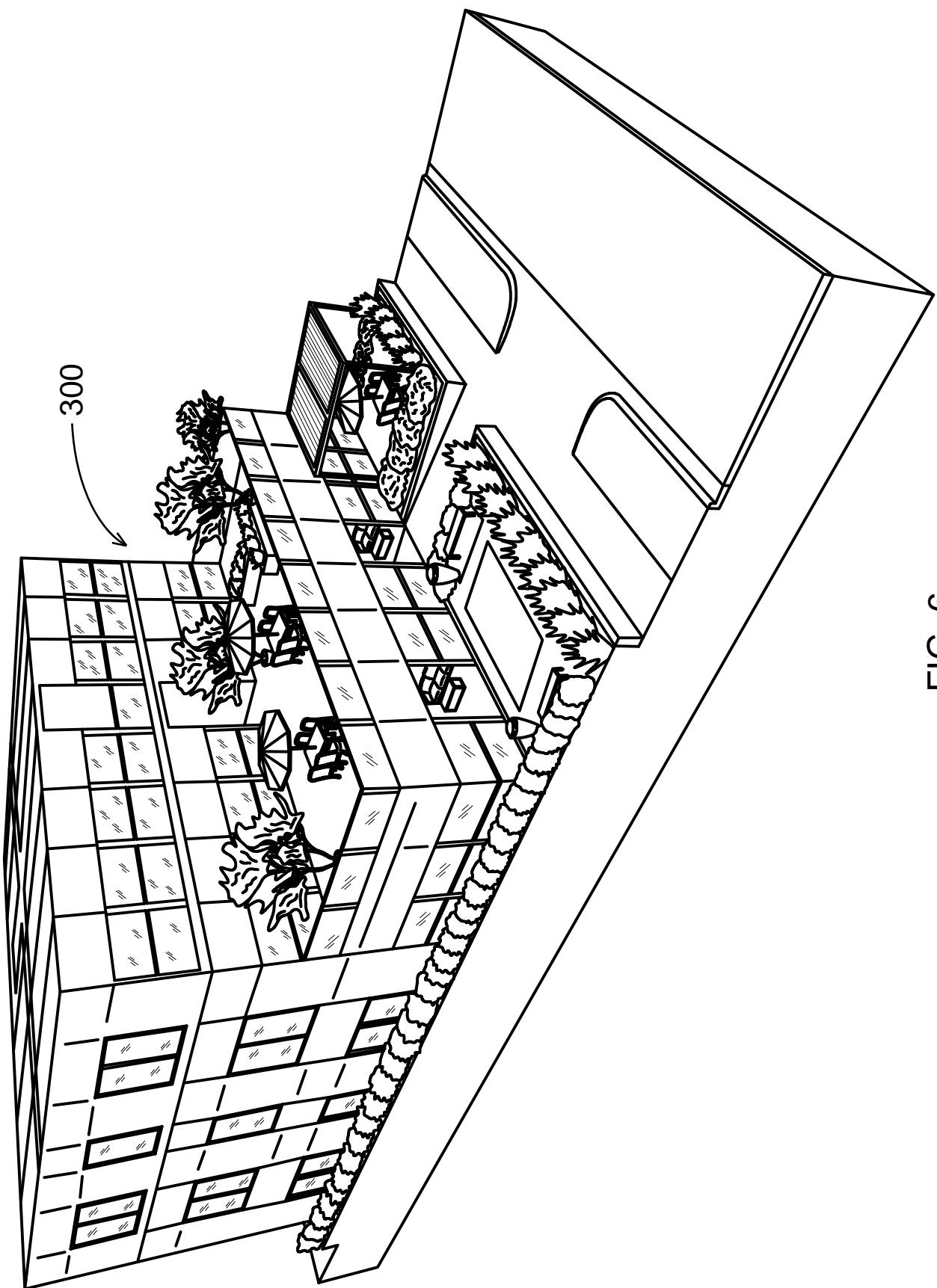
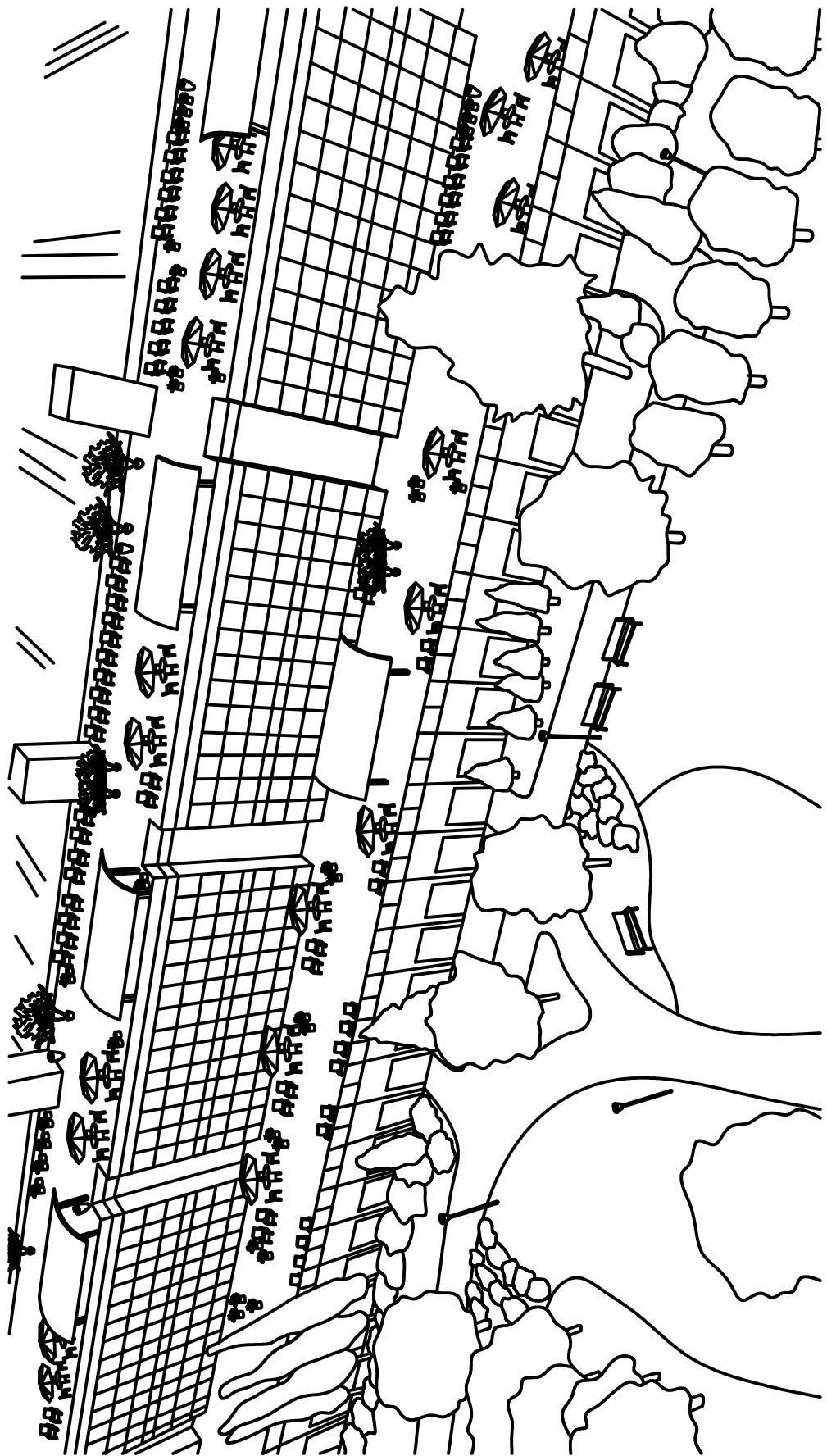


FIG. 6A



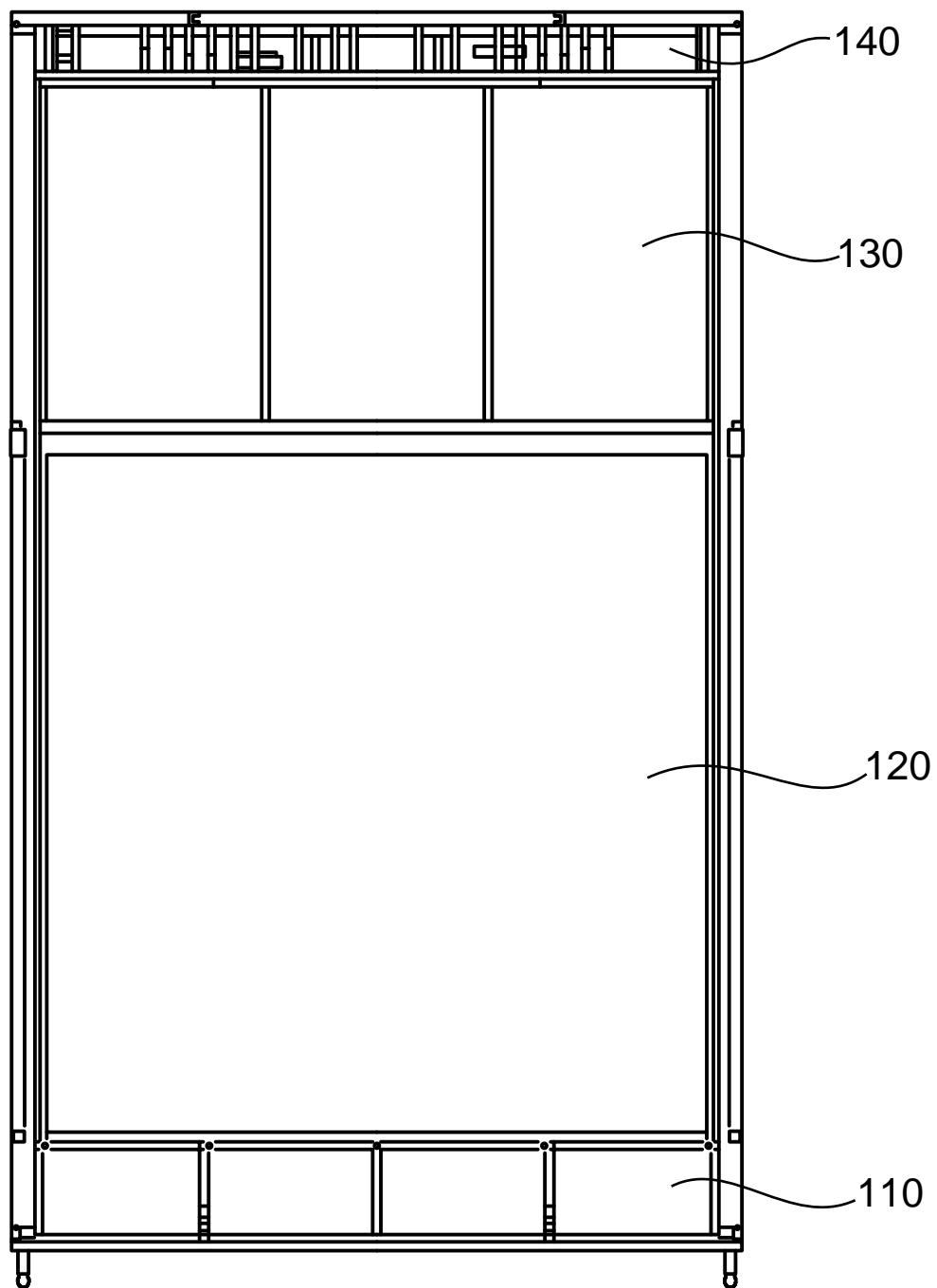
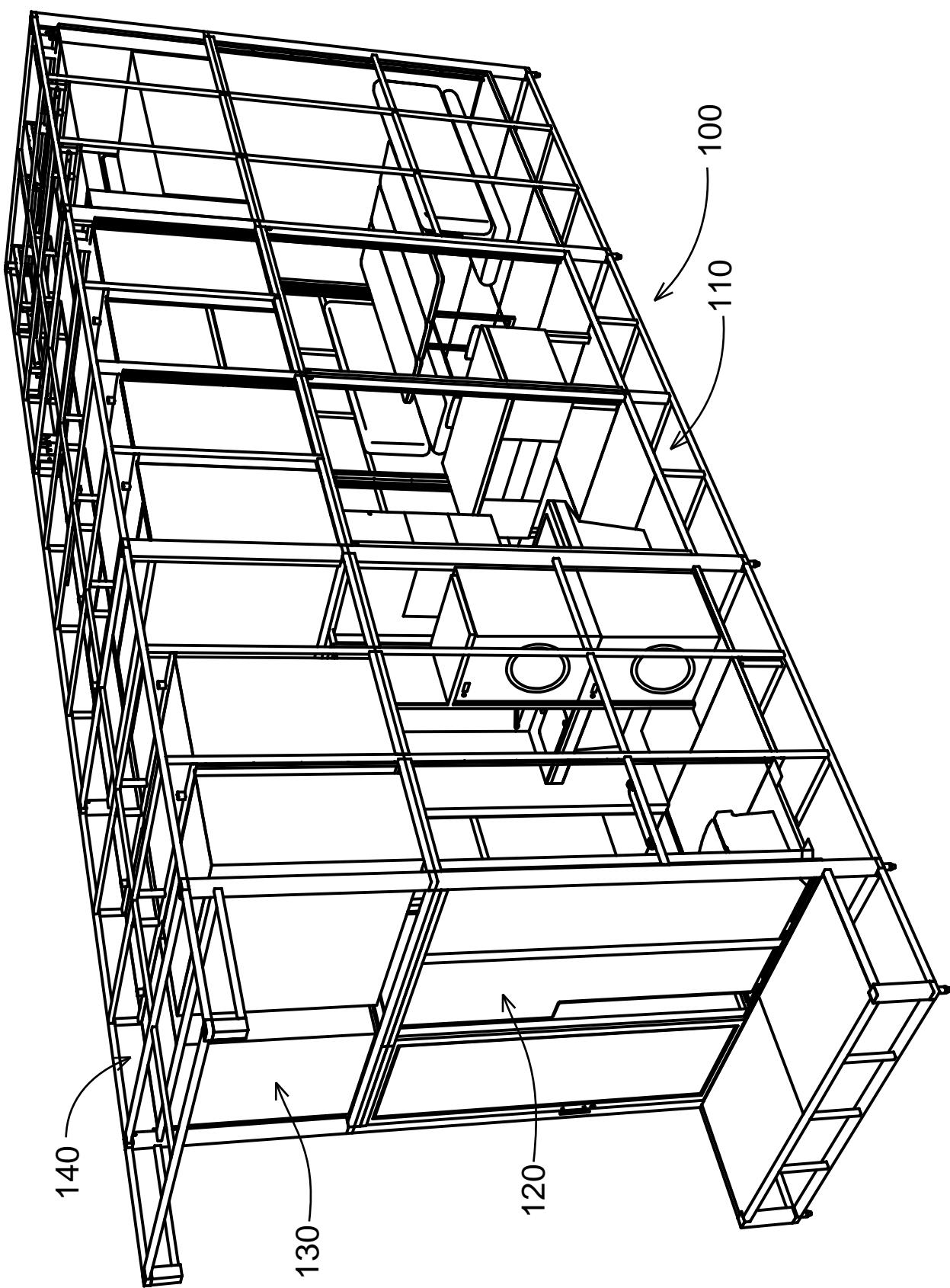


FIG. 7

FIG. 8



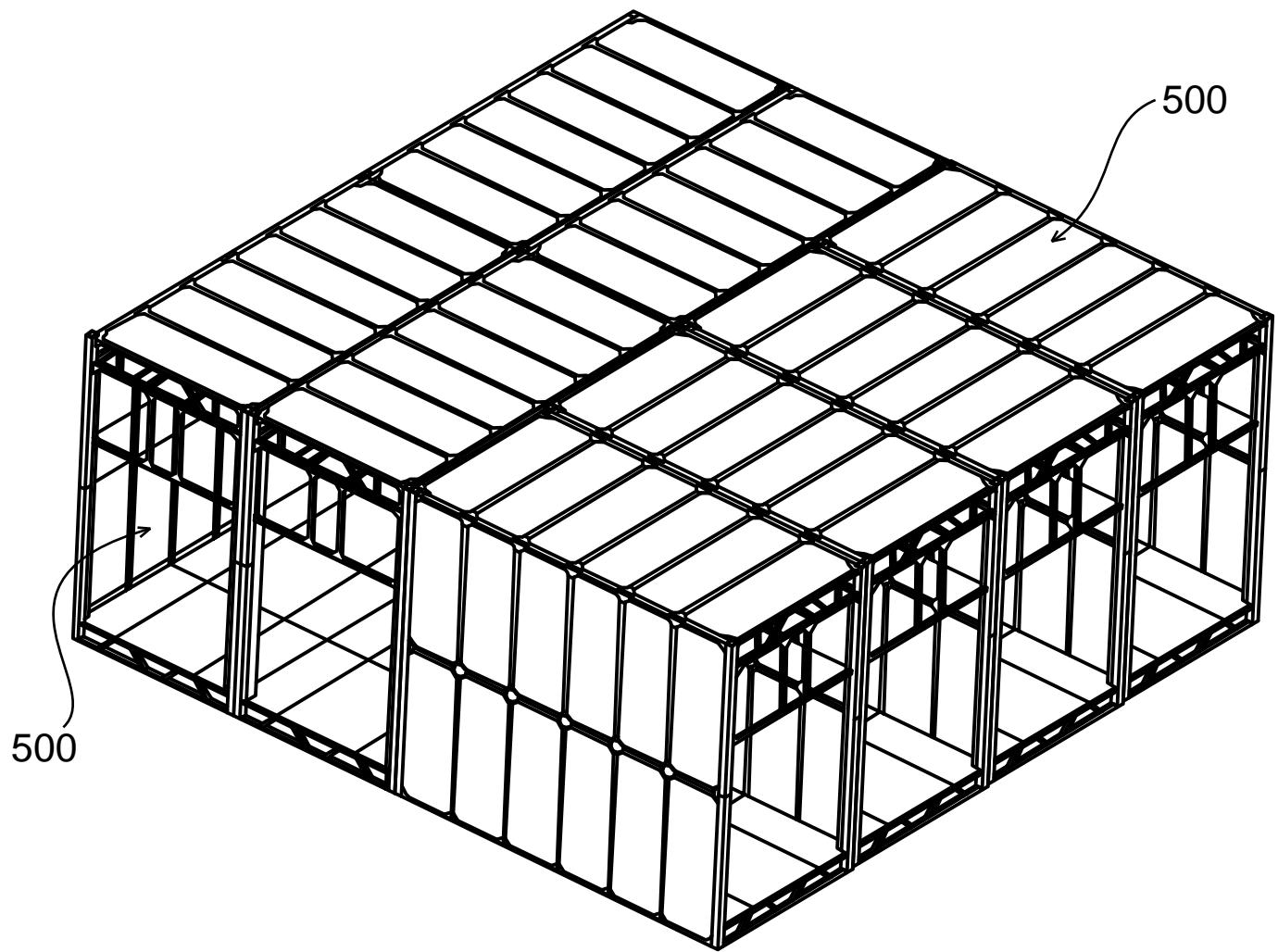


FIG. 8A

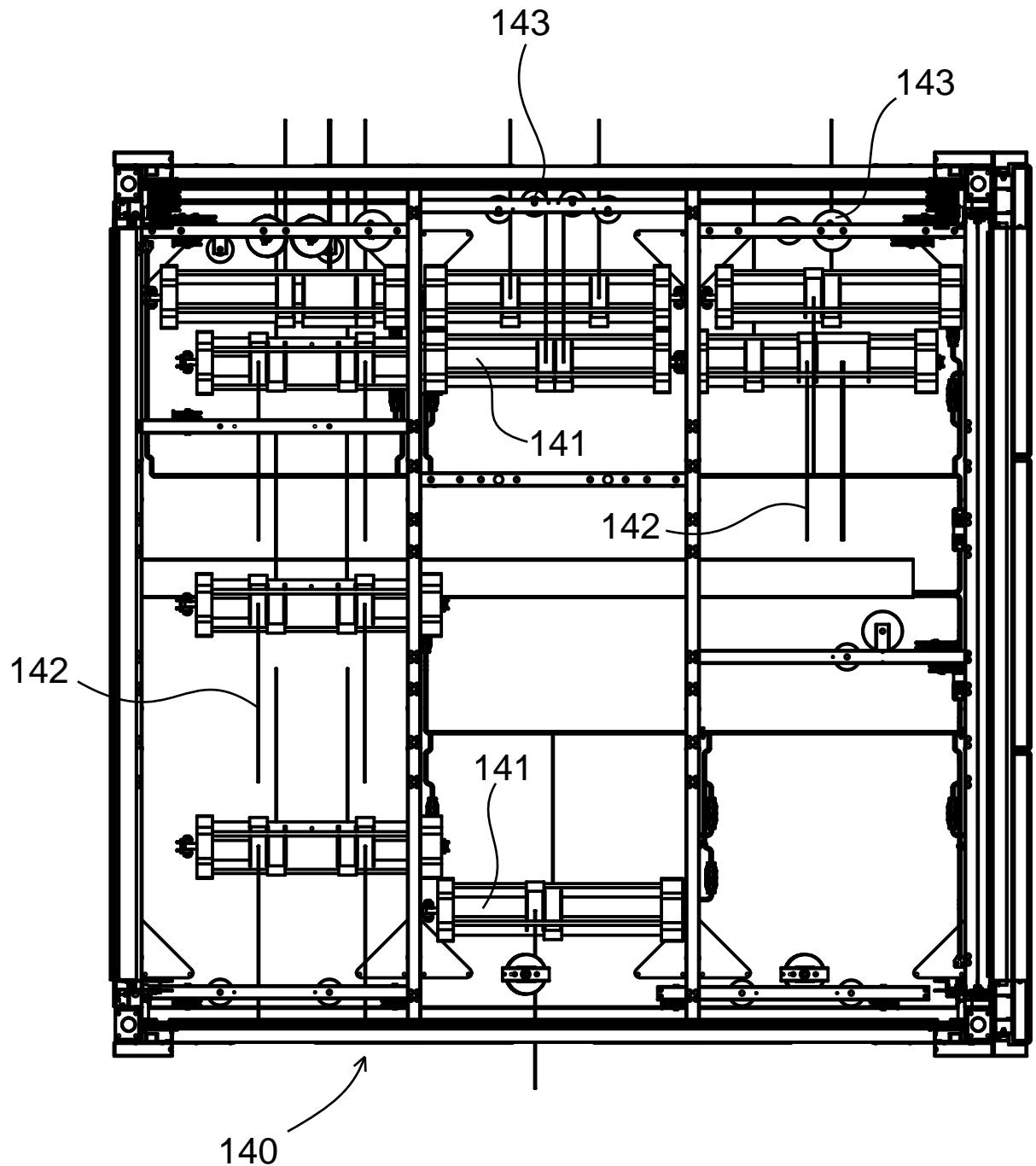


FIG. 9

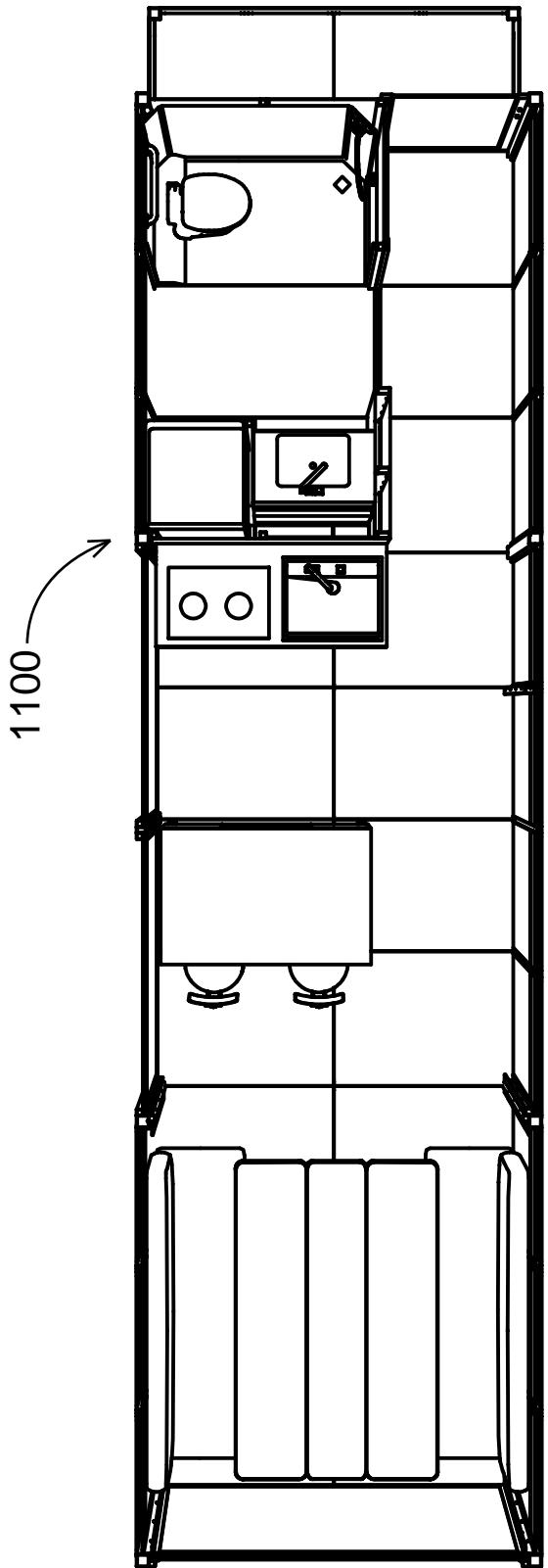


FIG. 10A

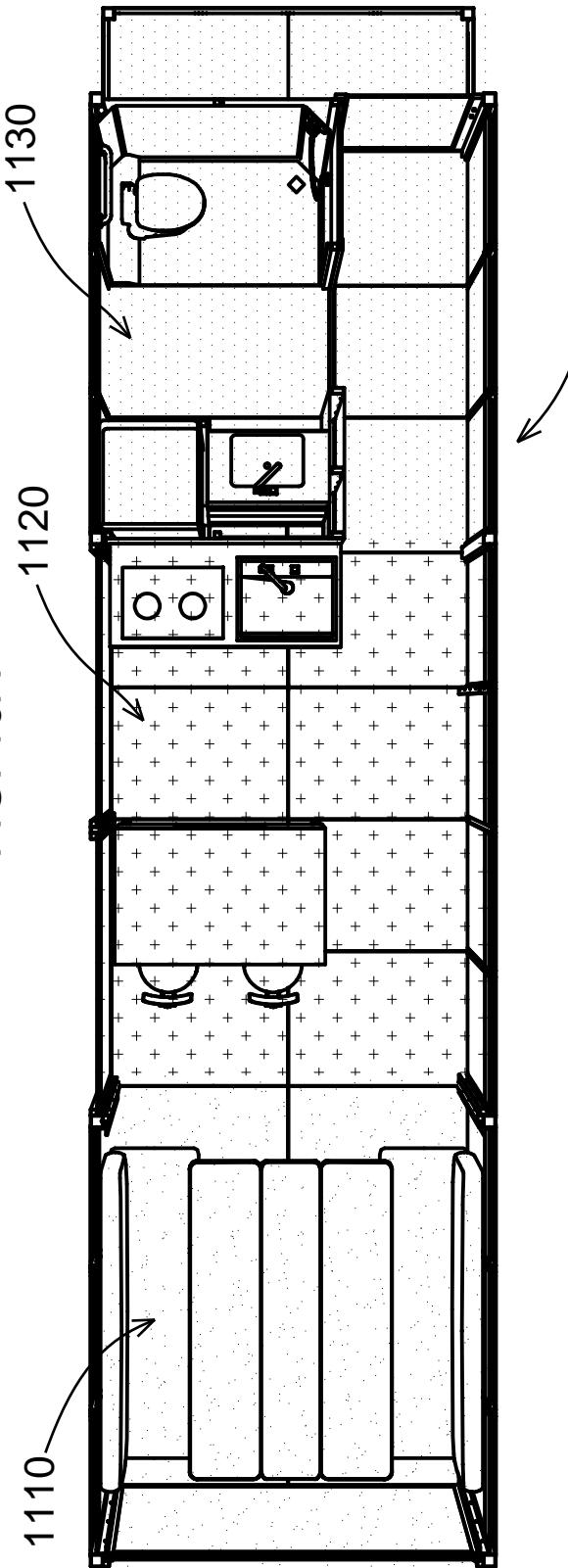


FIG. 10B

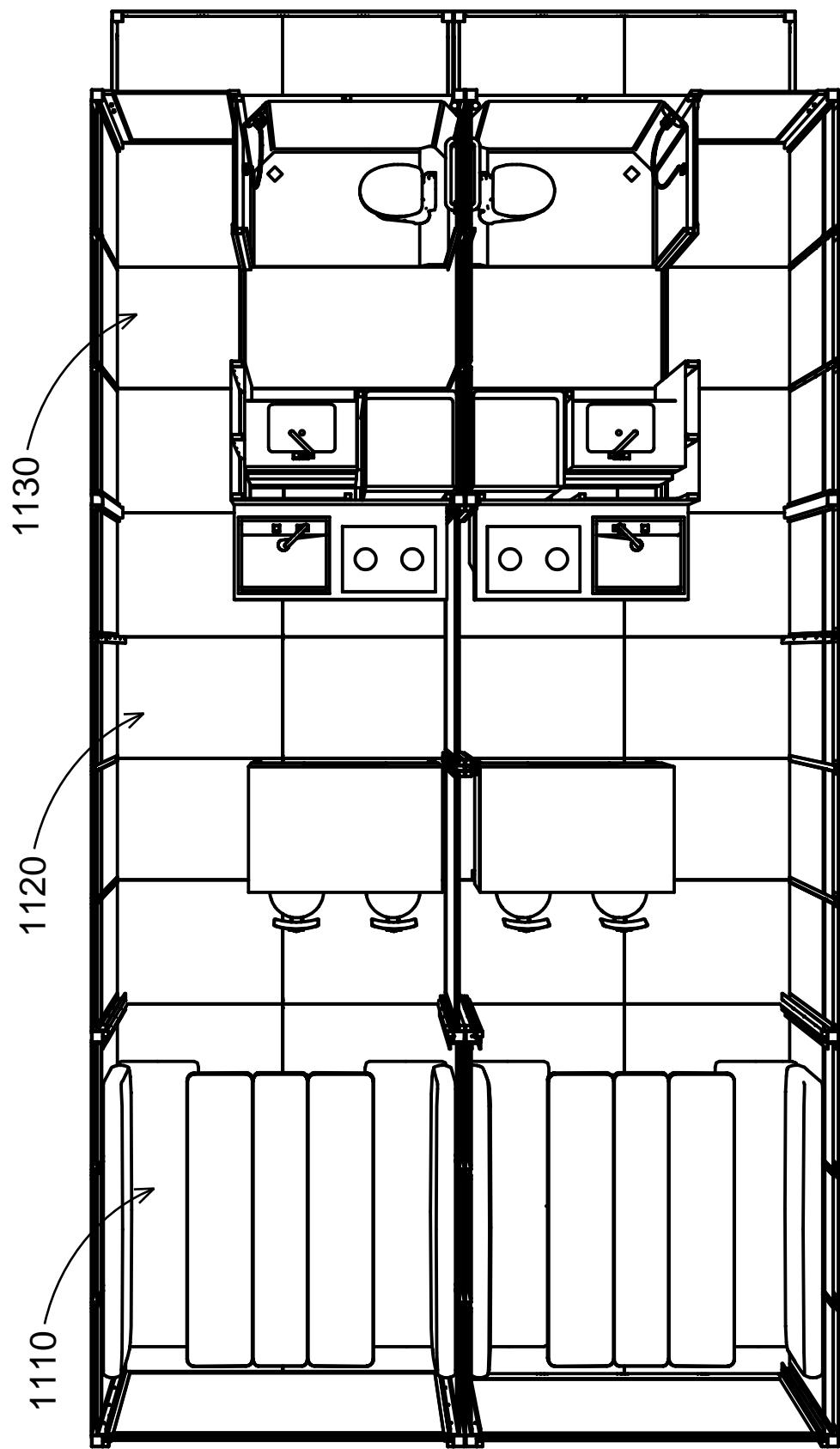


FIG. 11

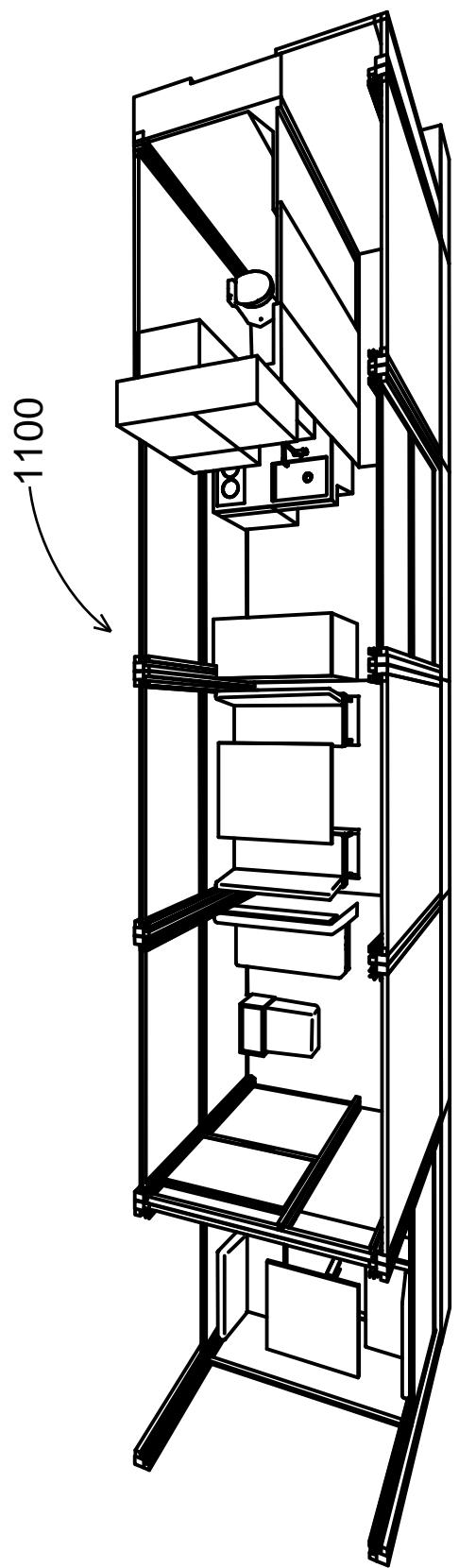


FIG. 12A
1100

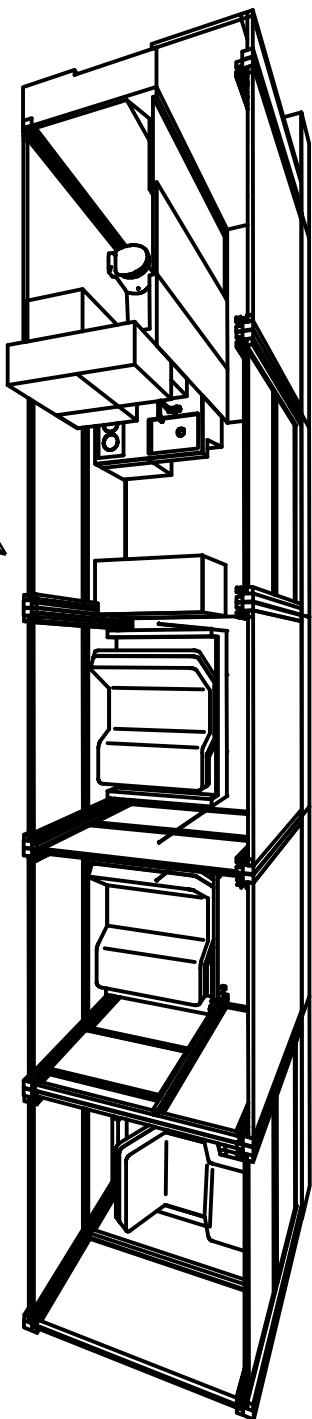
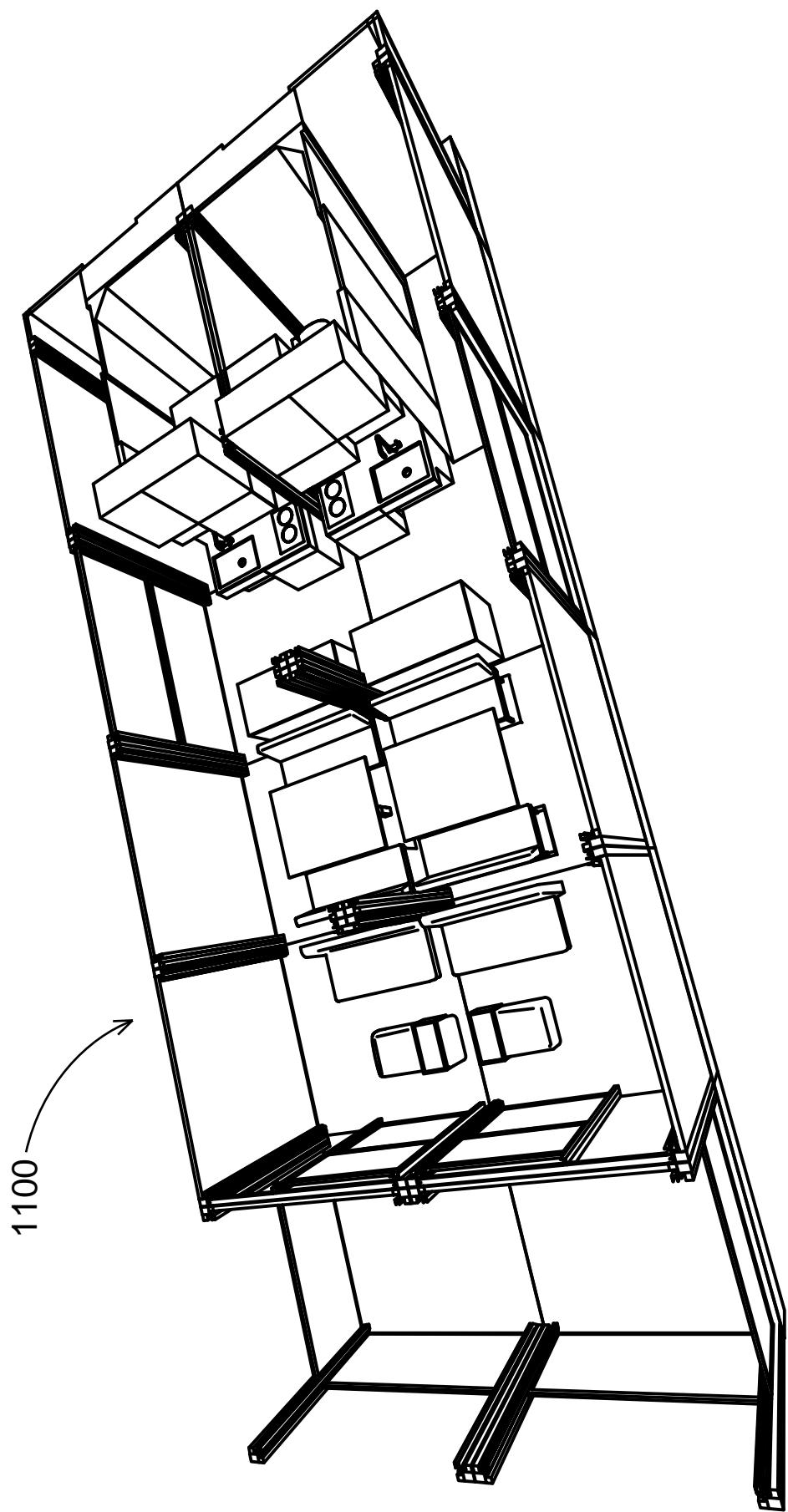


FIG. 12B

FIG. 12C



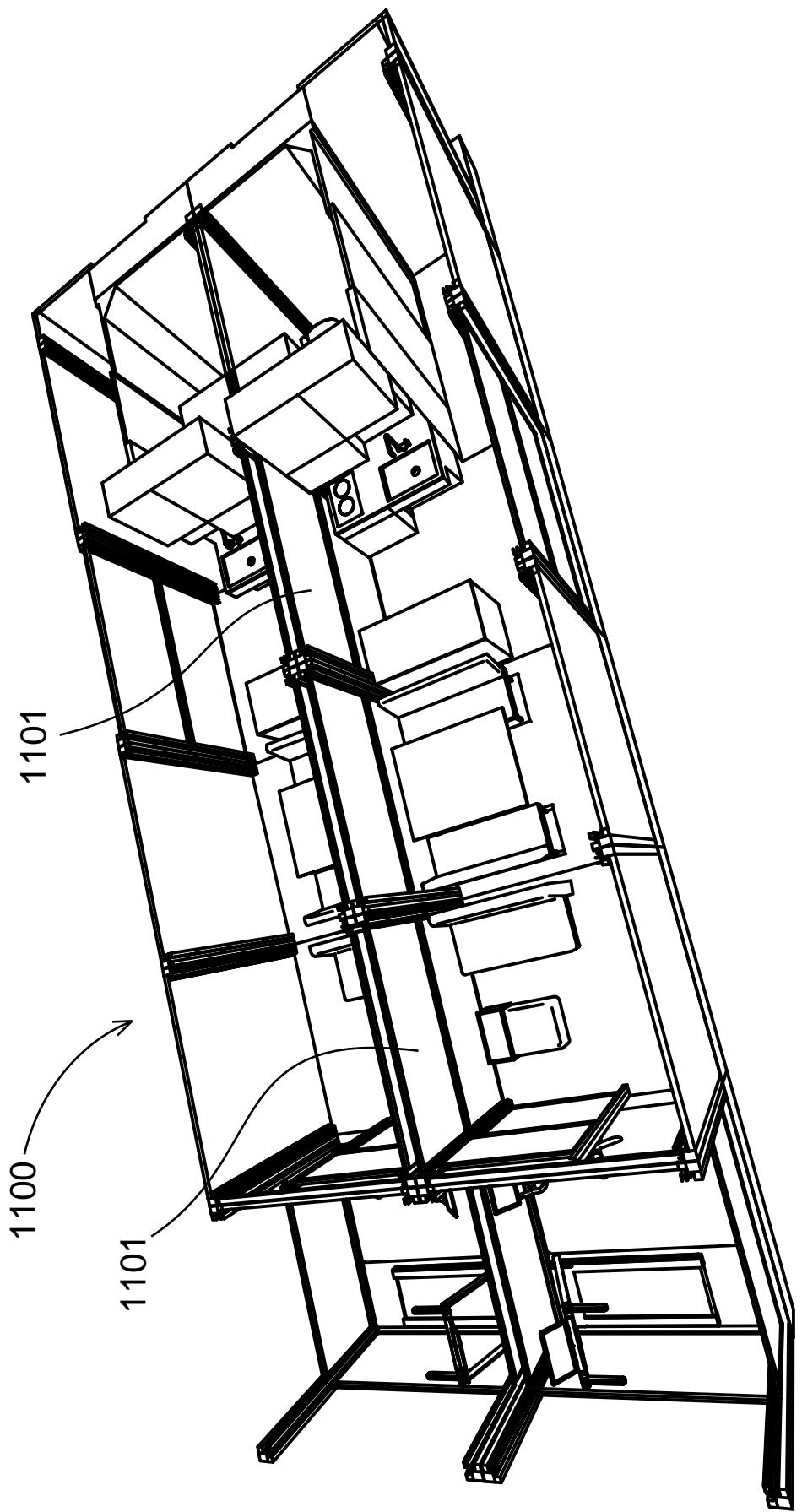


FIG. 12D

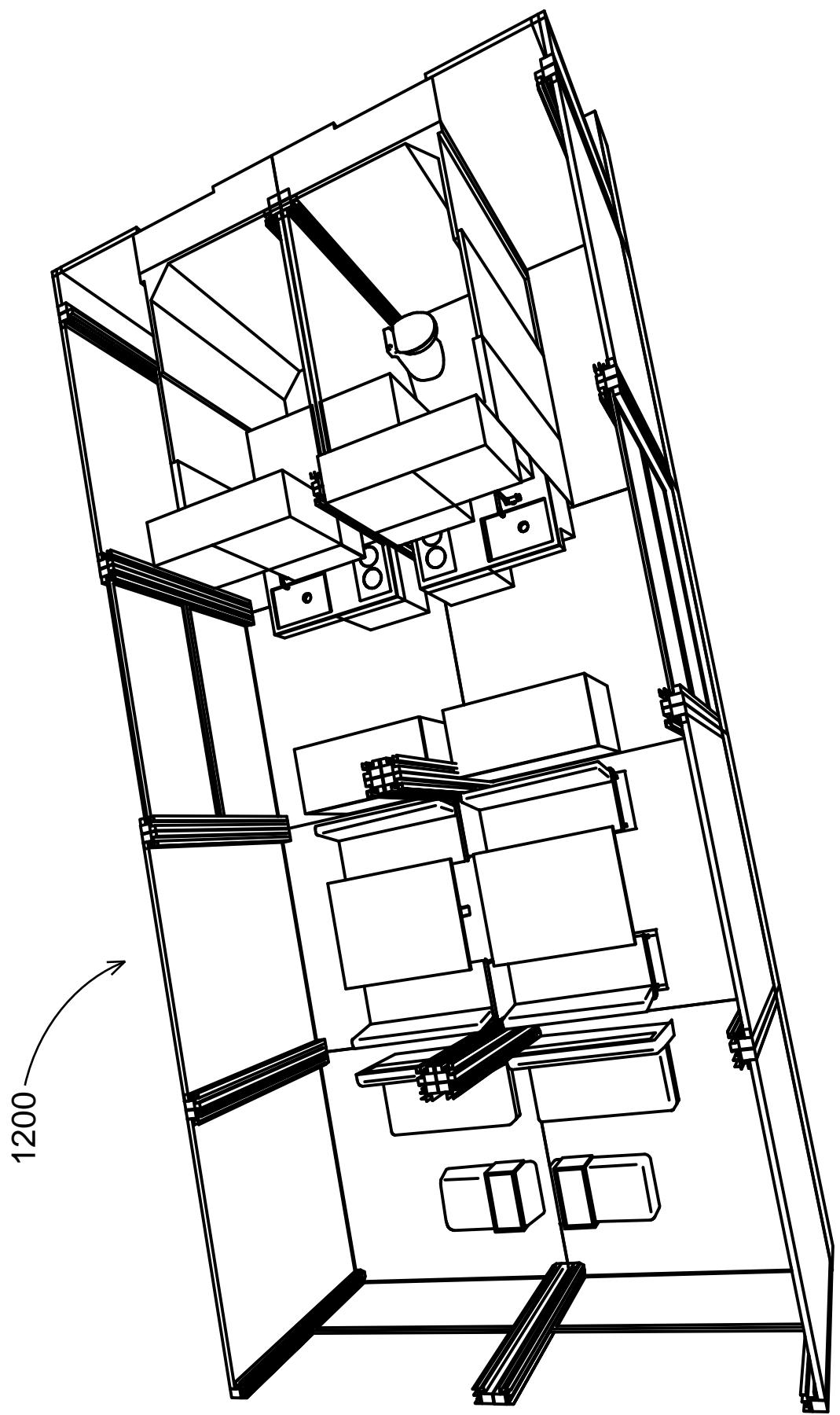
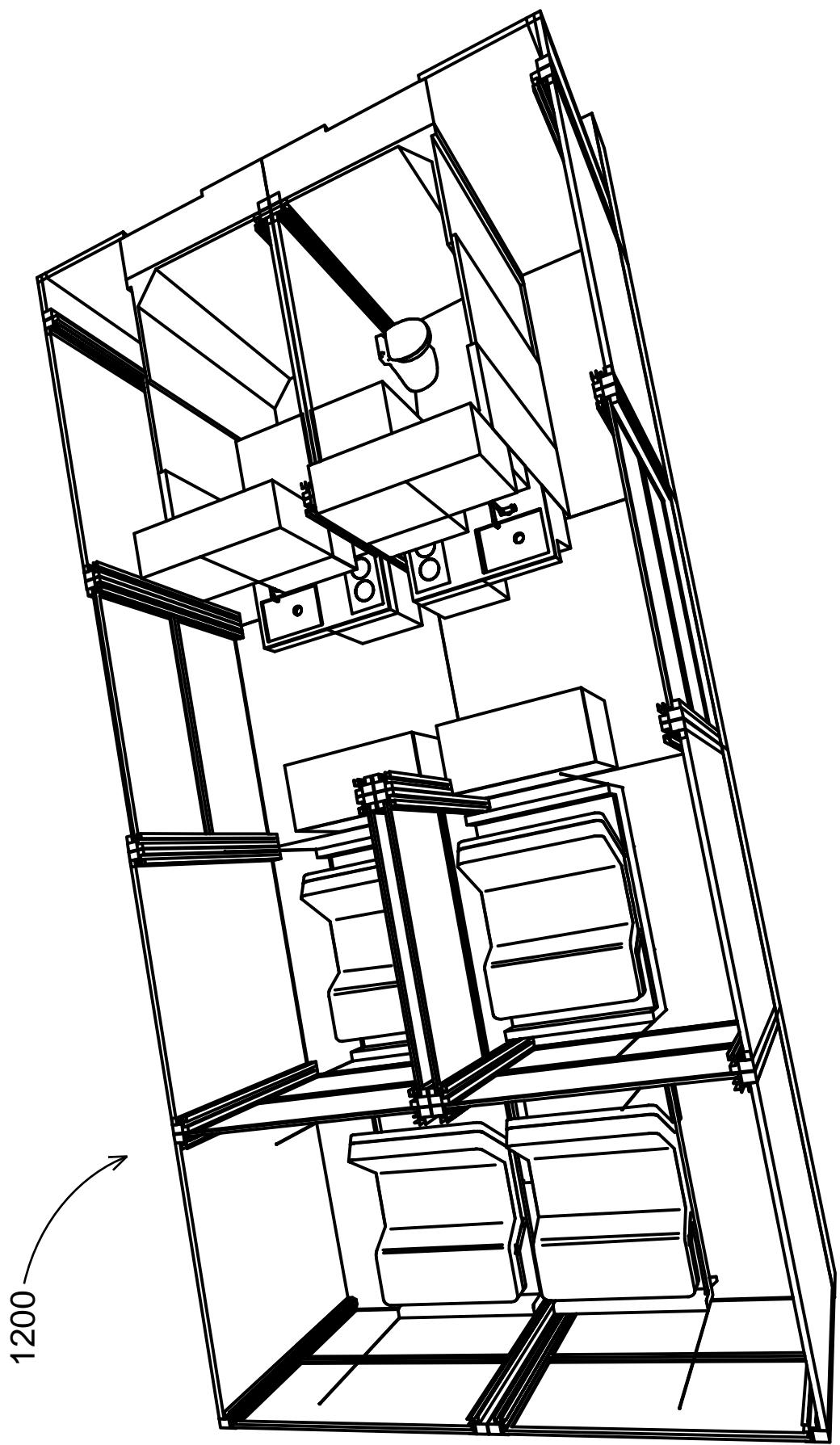


FIG. 13A

FIG. 13B



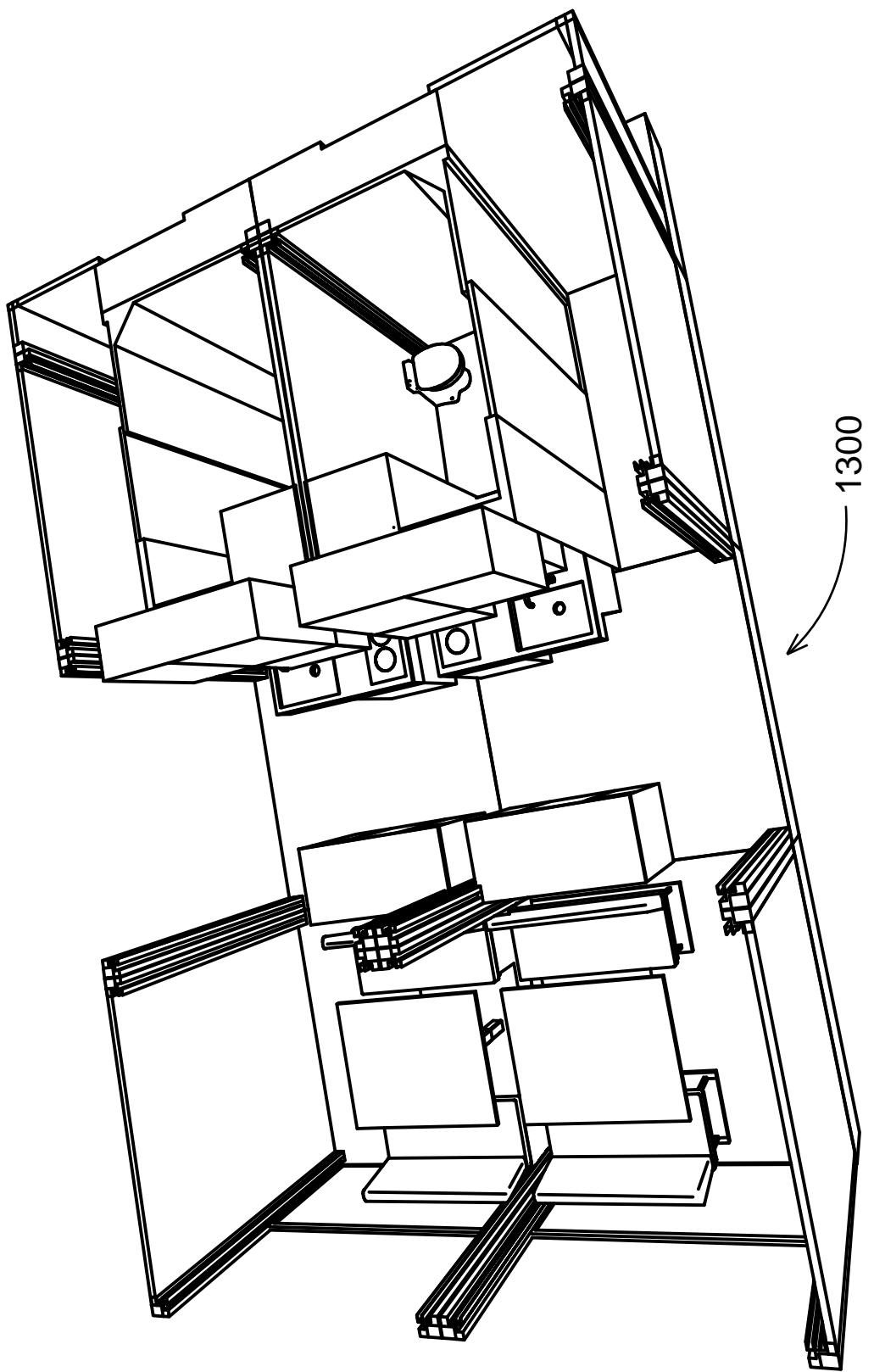


FIG. 14A

FIG. 14B

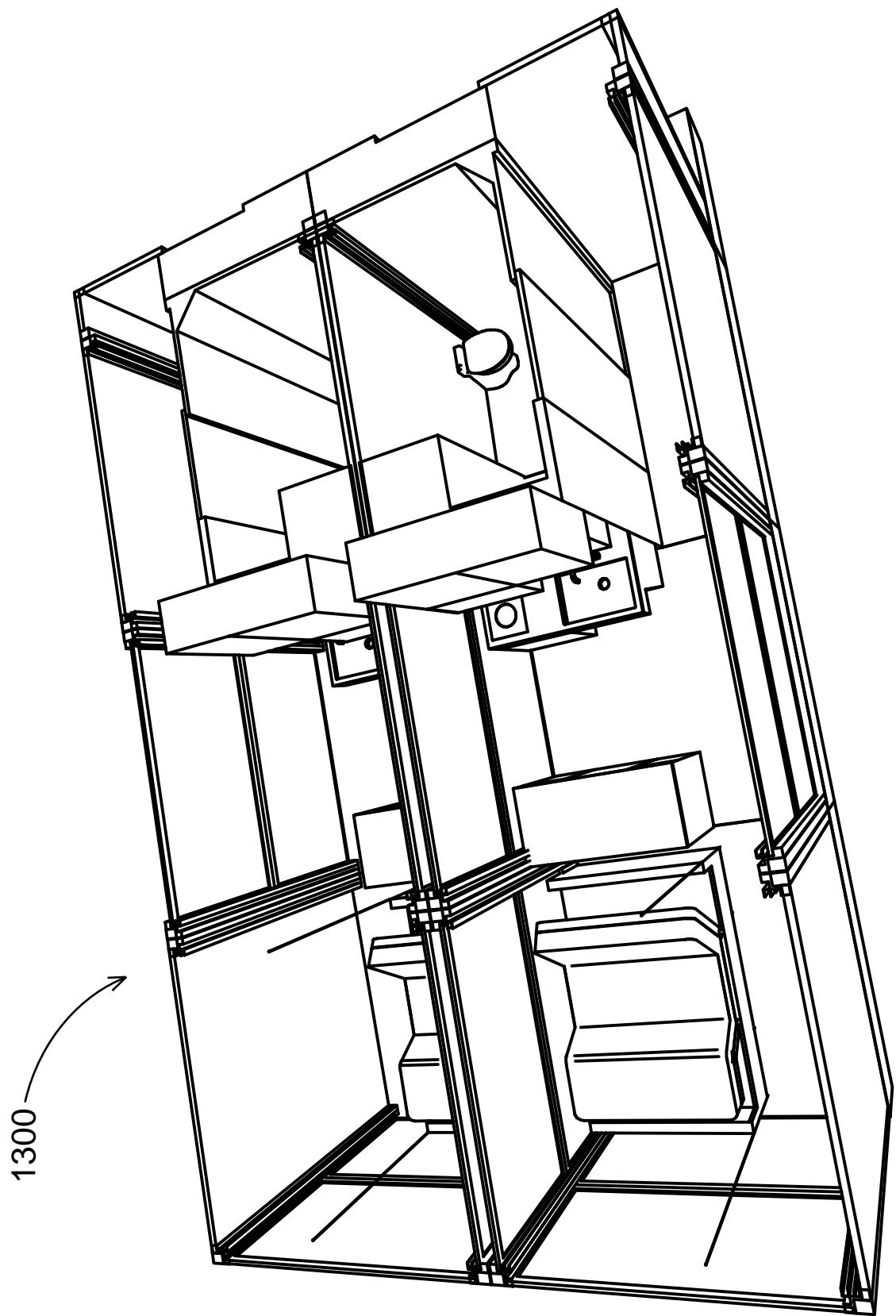


FIG. 15A

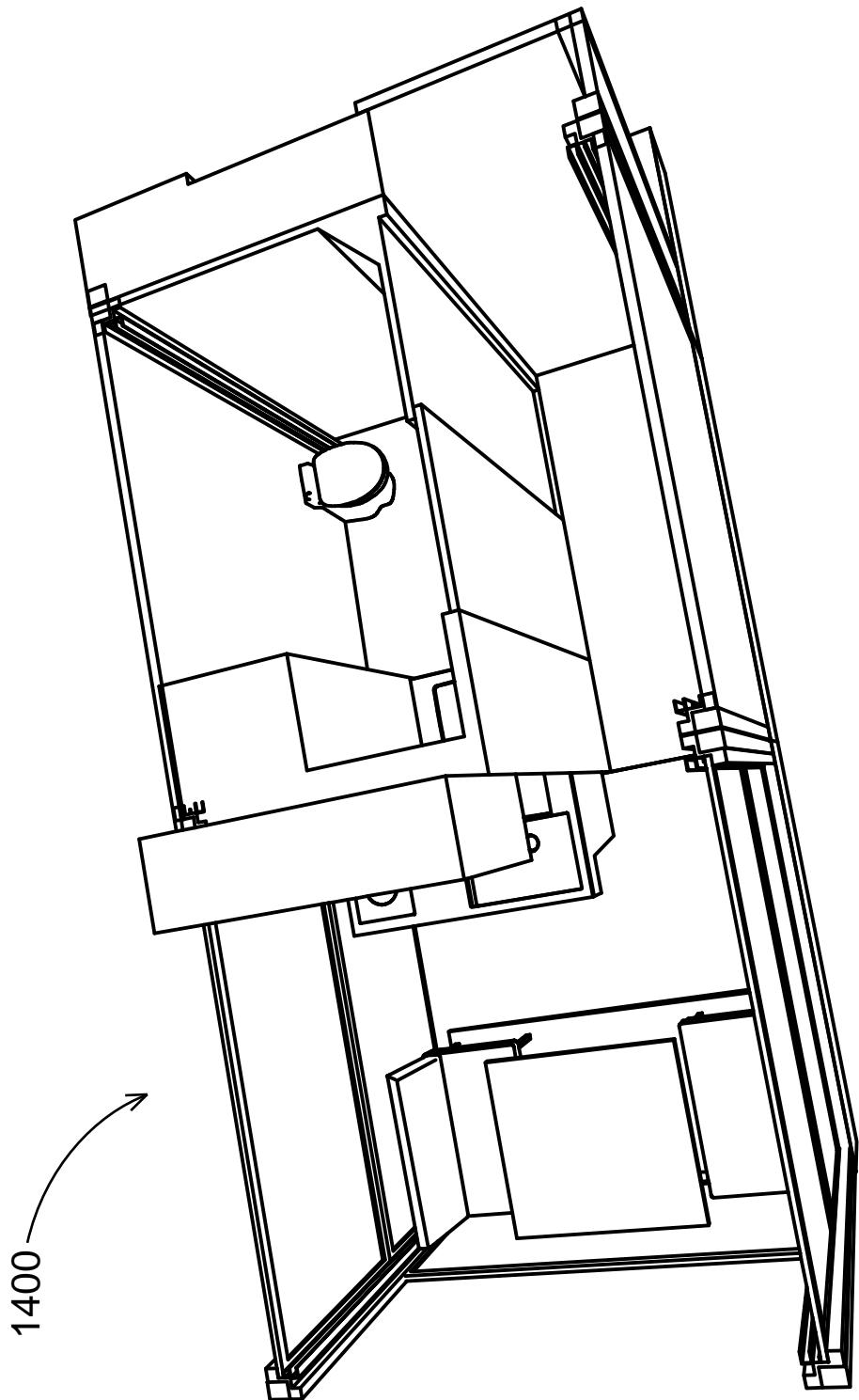
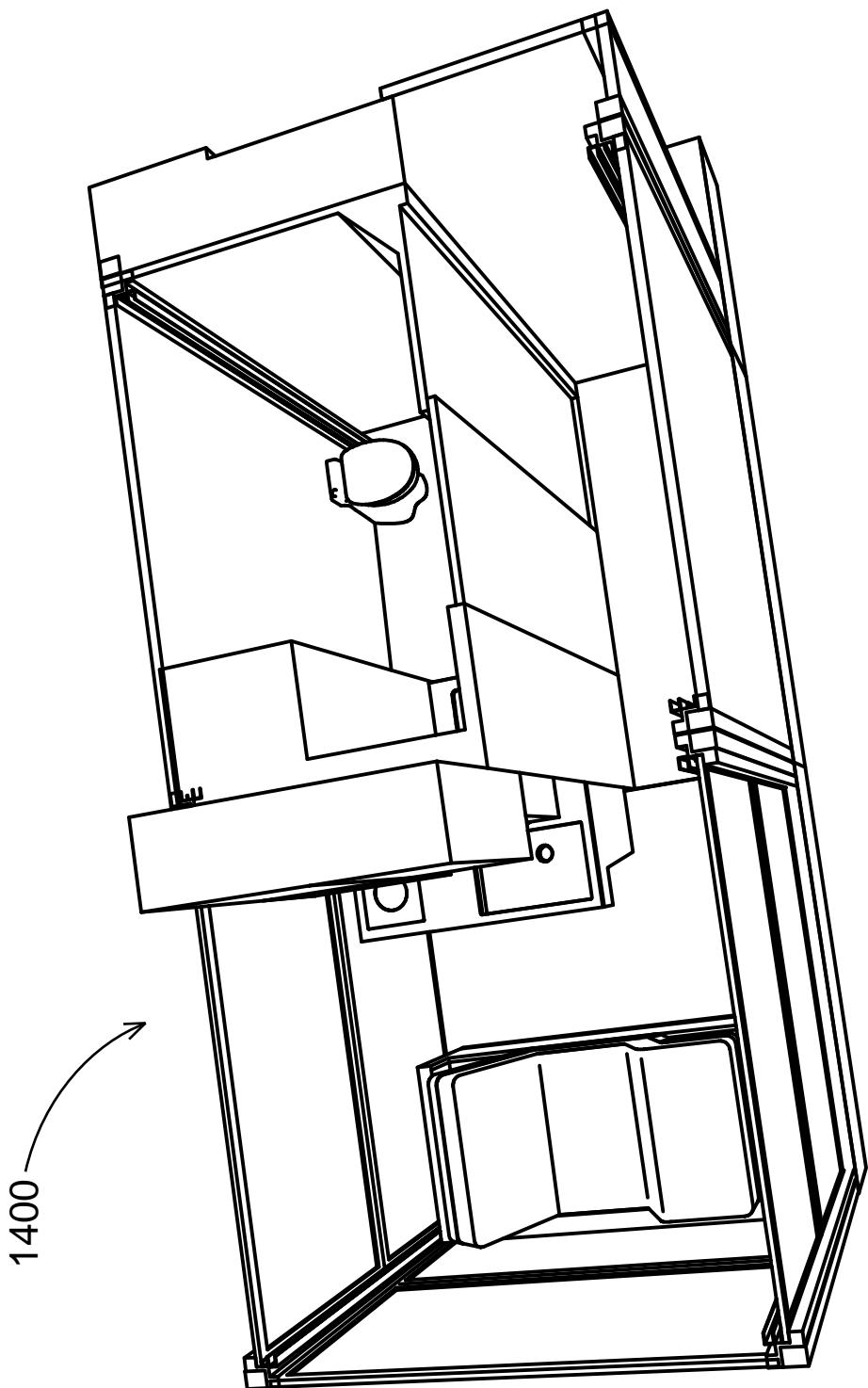
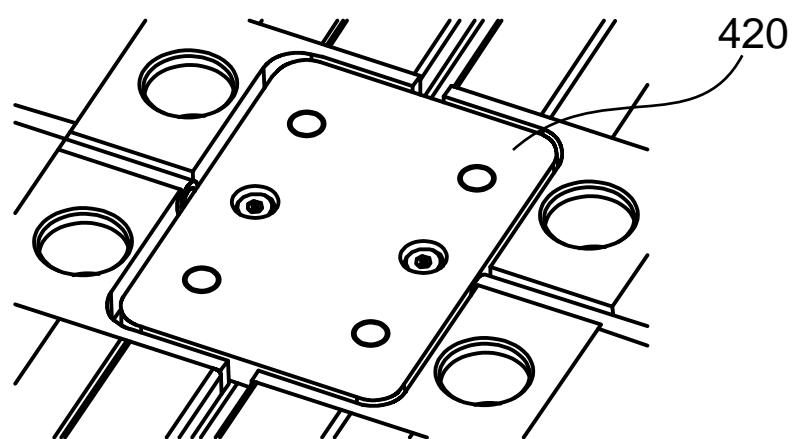
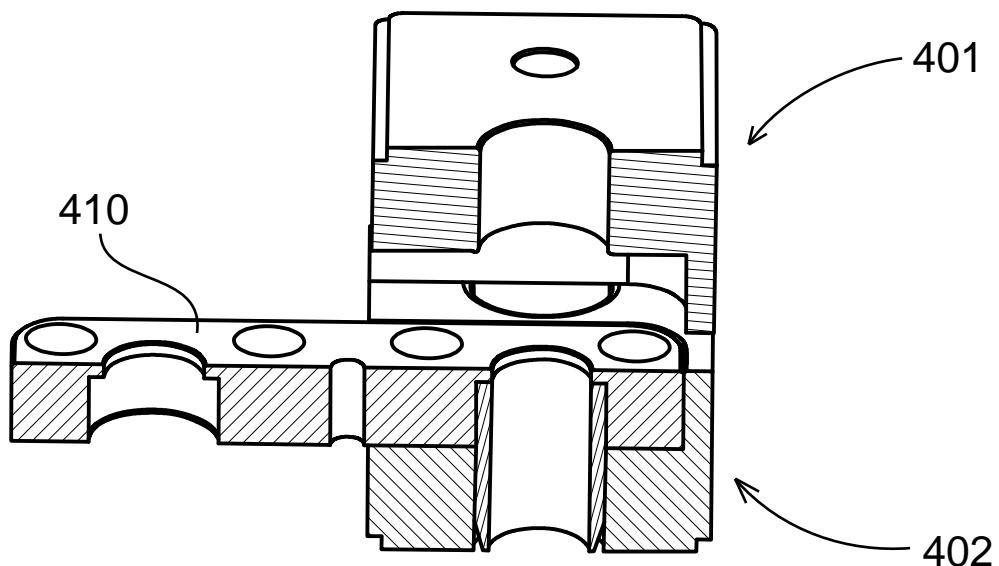
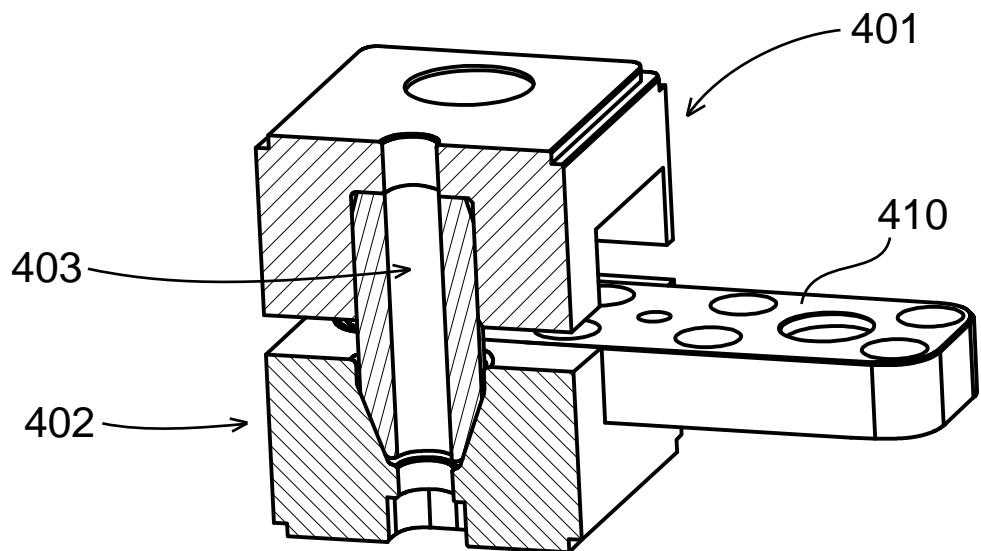


FIG. 15B





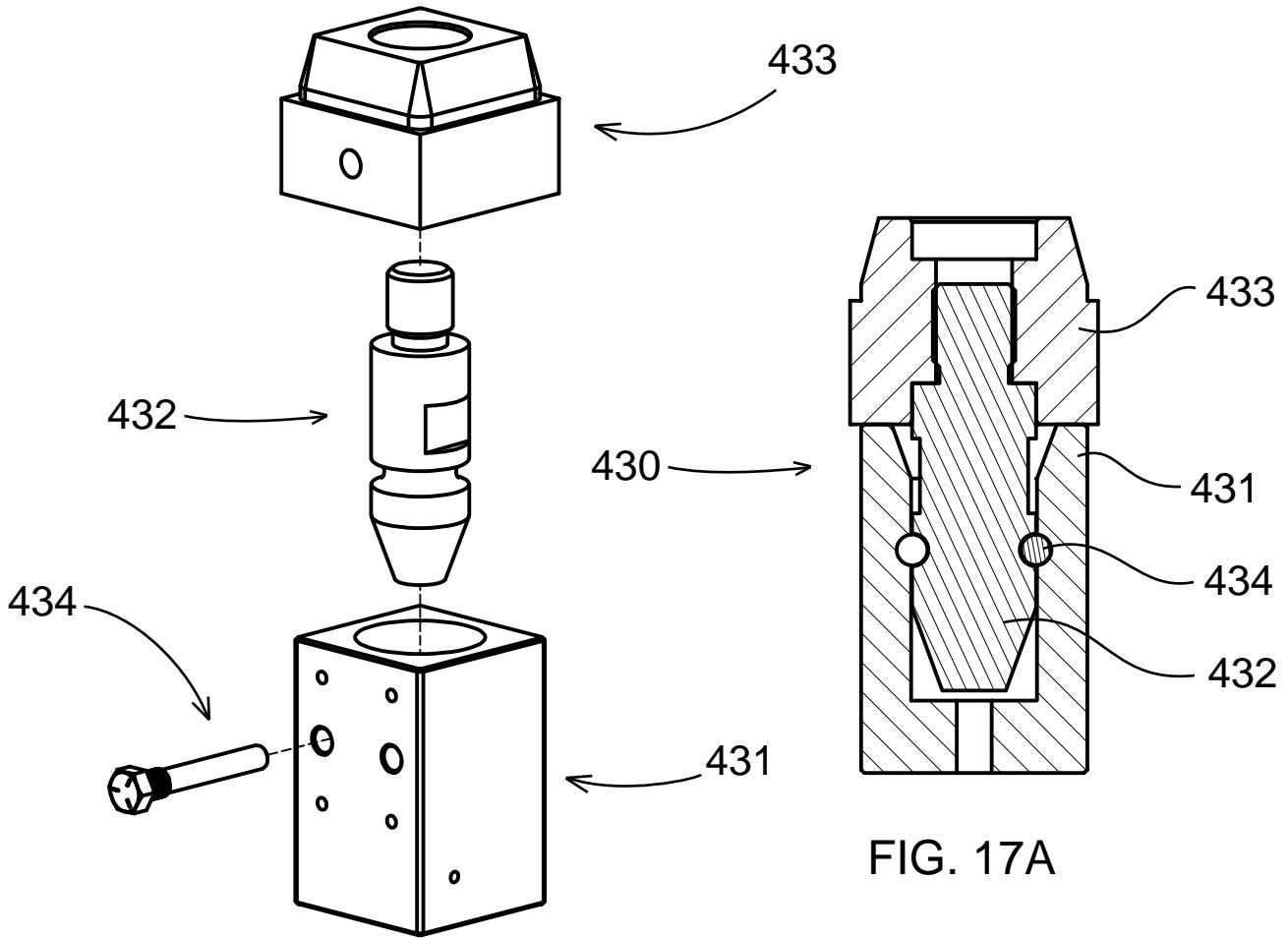


FIG. 17

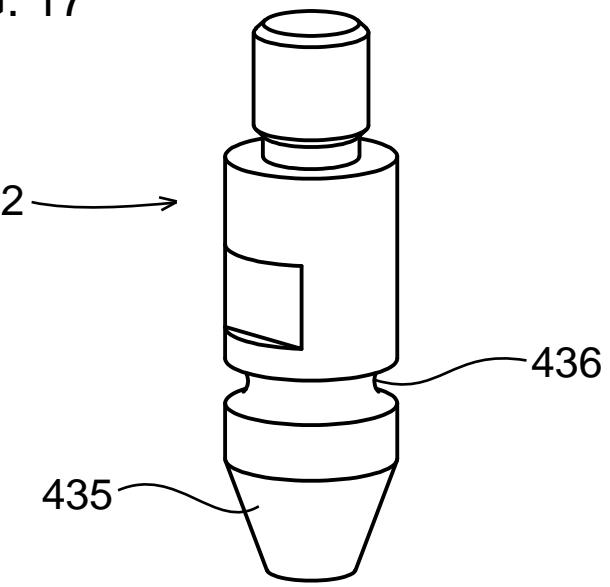


FIG. 18

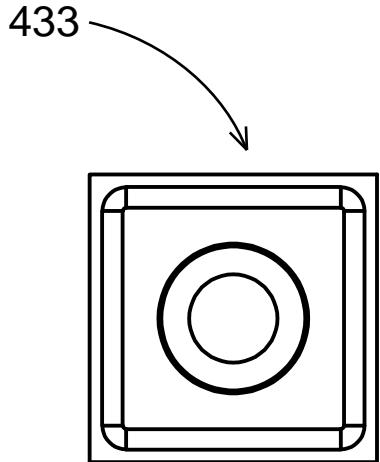


FIG. 19A

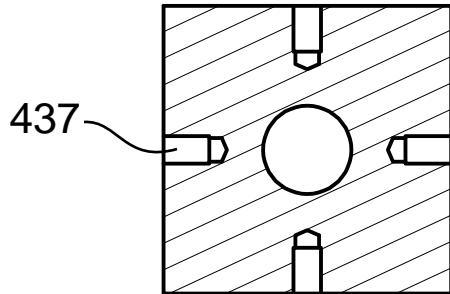


FIG. 19E

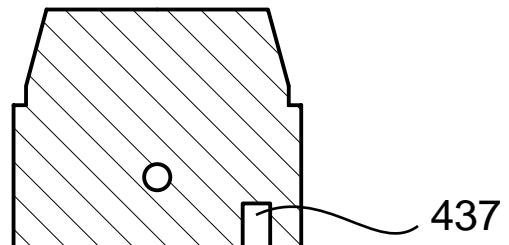


FIG. 19D

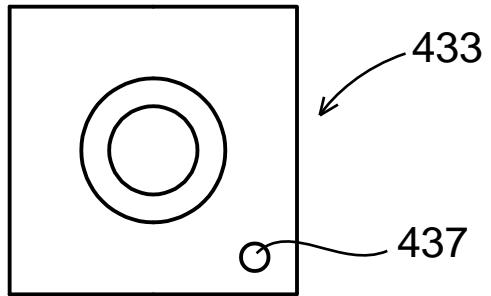


FIG. 19B

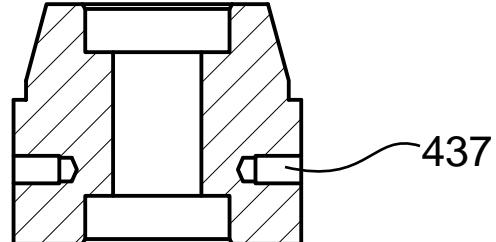


FIG. 19C

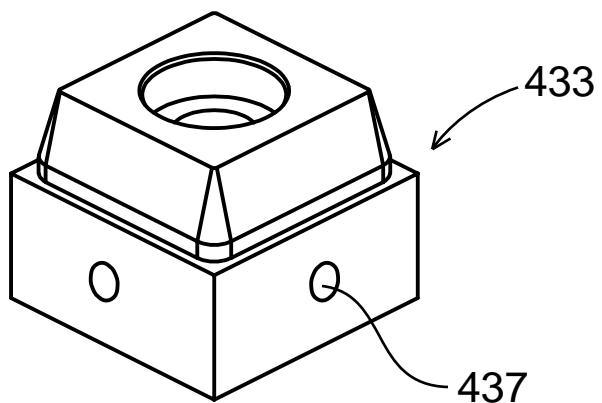


FIG. 19

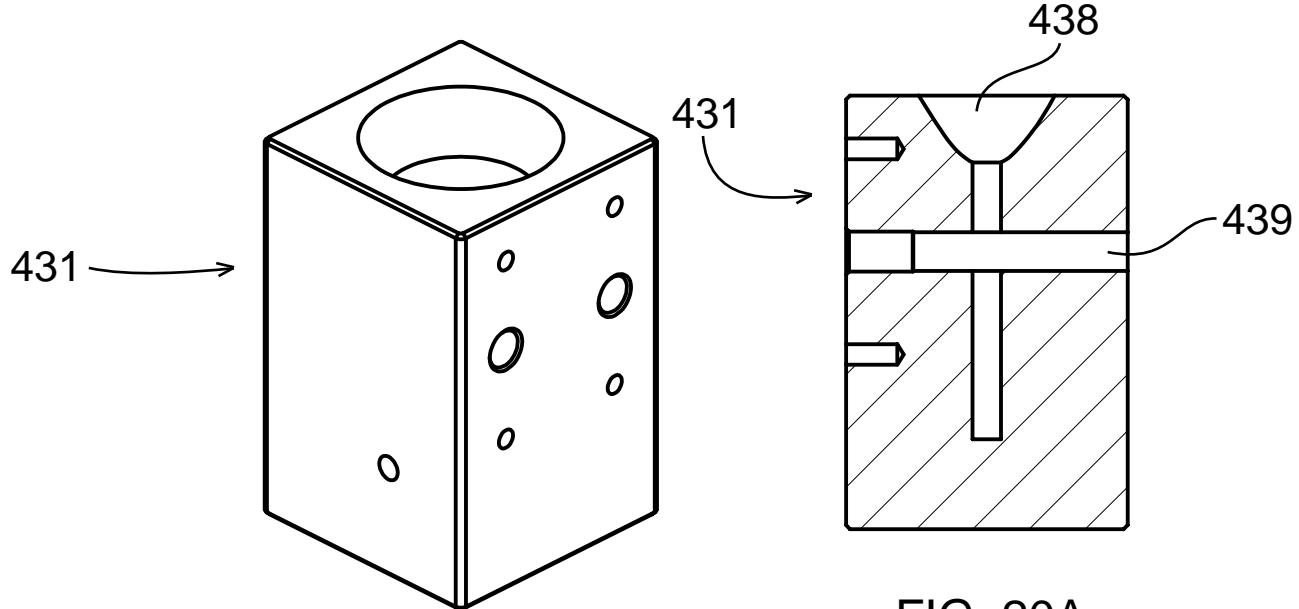


FIG. 20

FIG. 20A

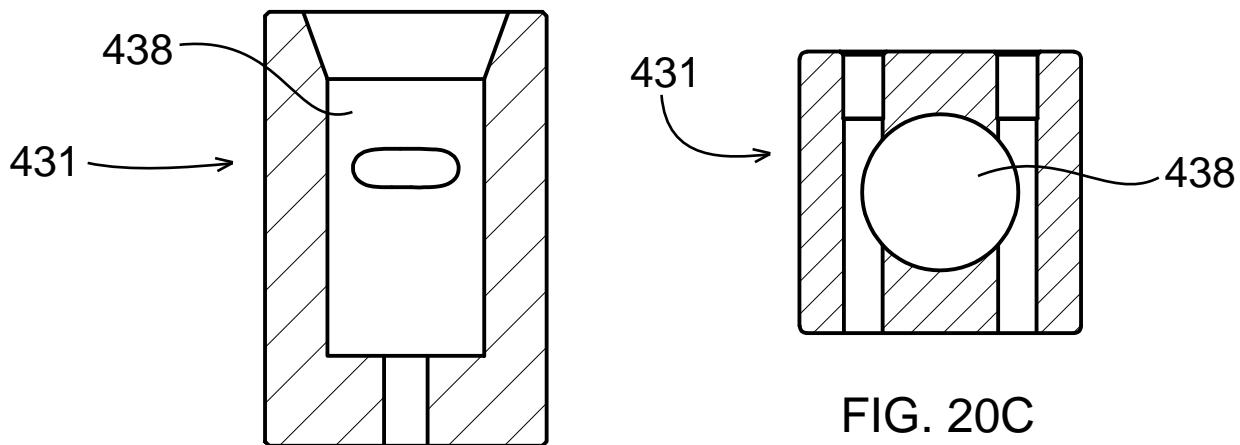


FIG. 20B

FIG. 20C

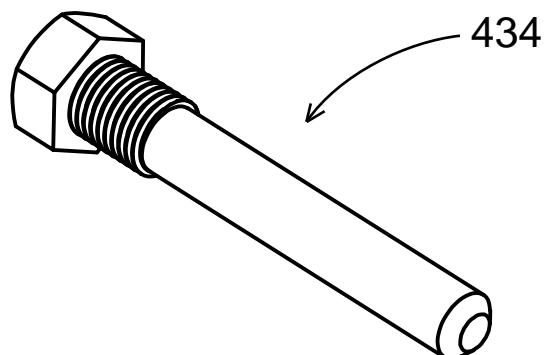


FIG. 21

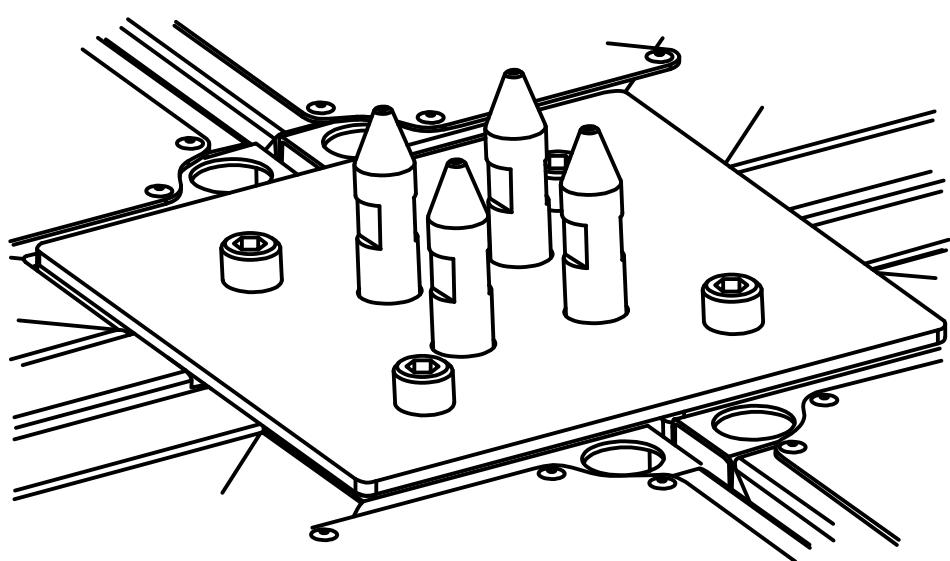
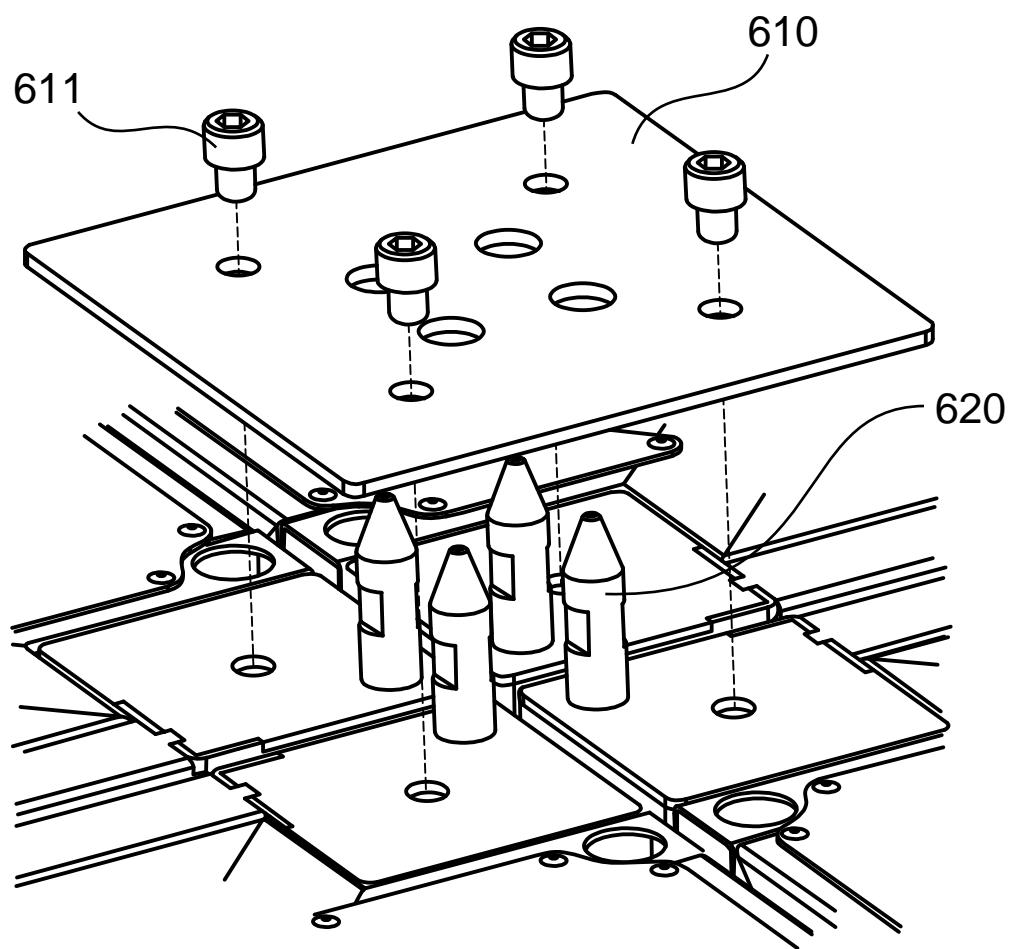


FIG. 23

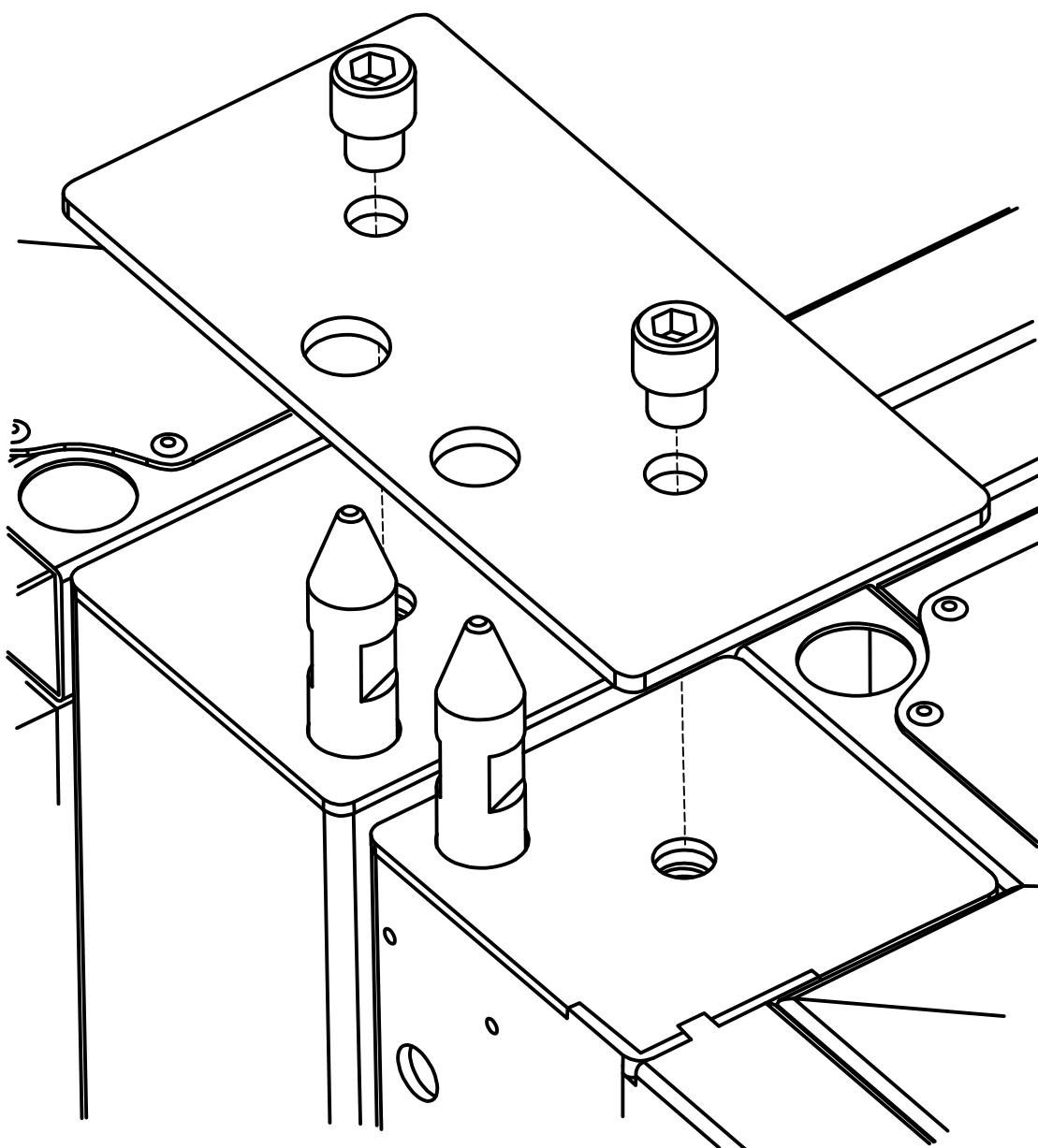


FIG. 24

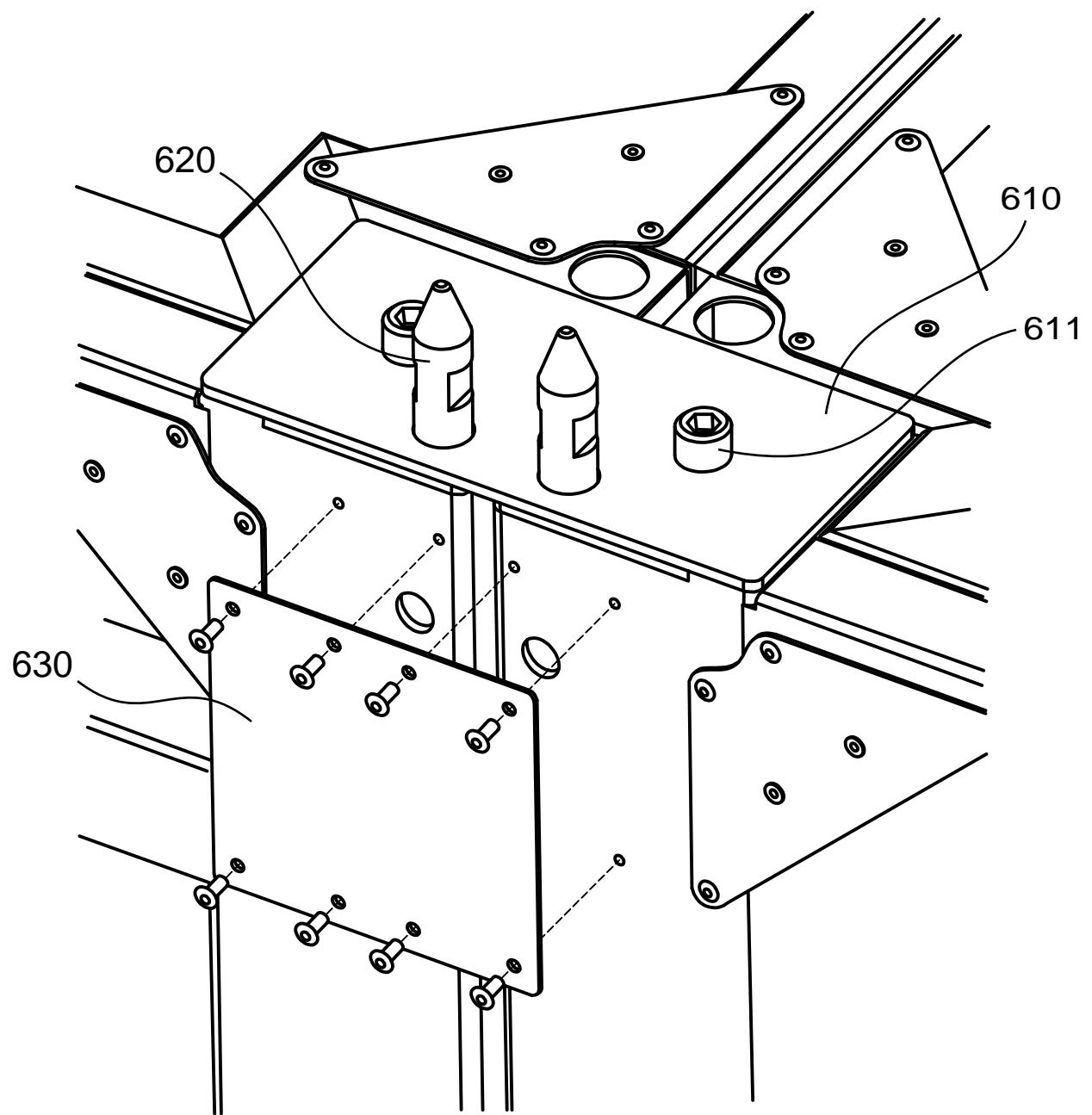


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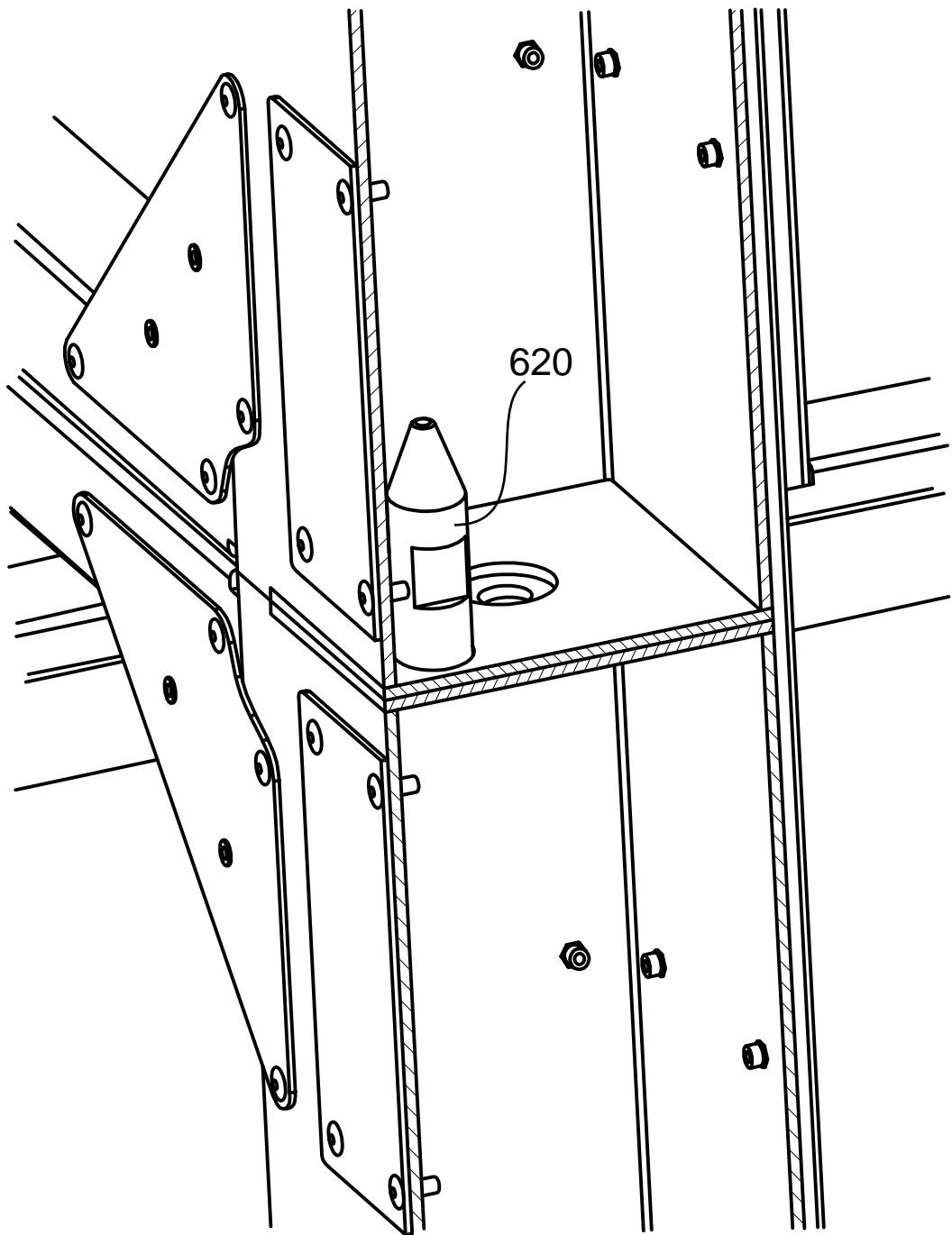


FIG. 26

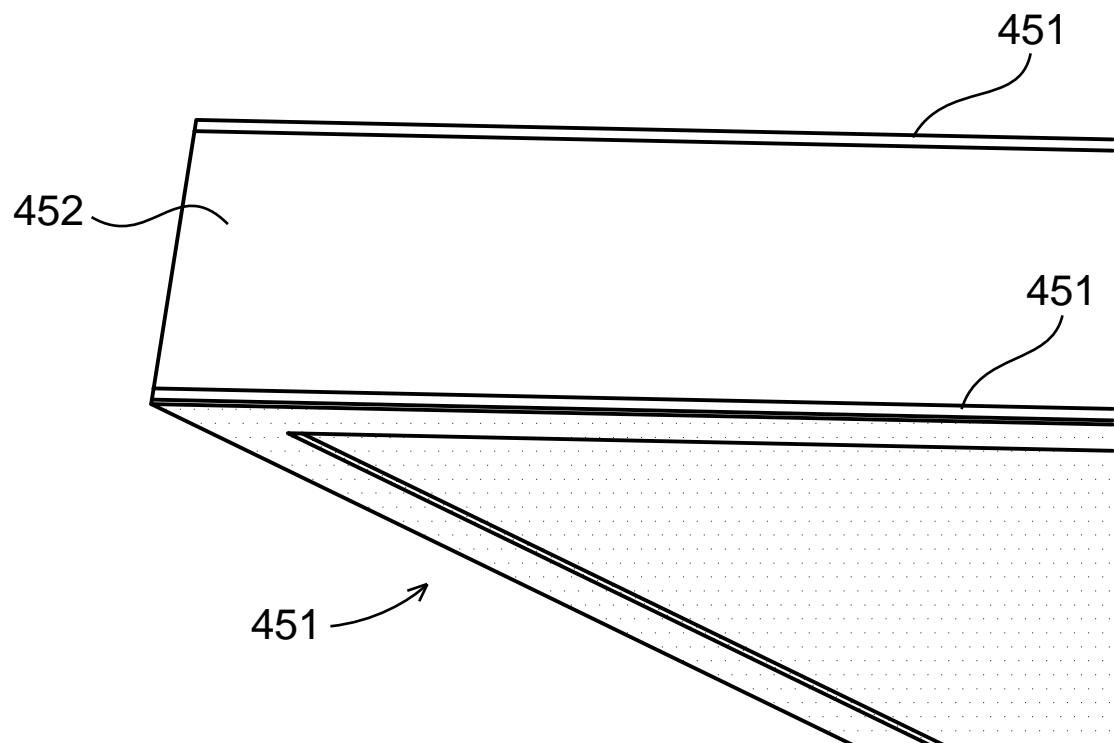
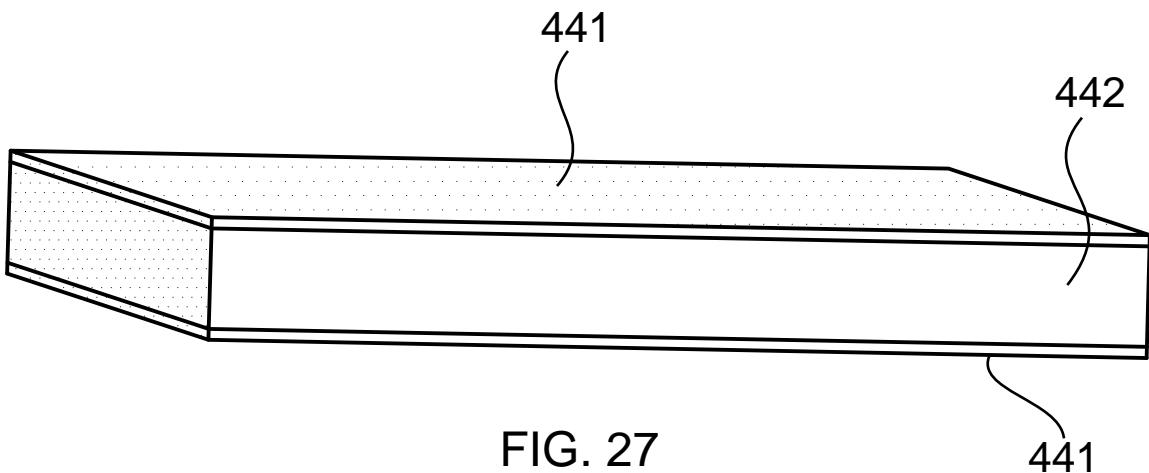


FIG. 28

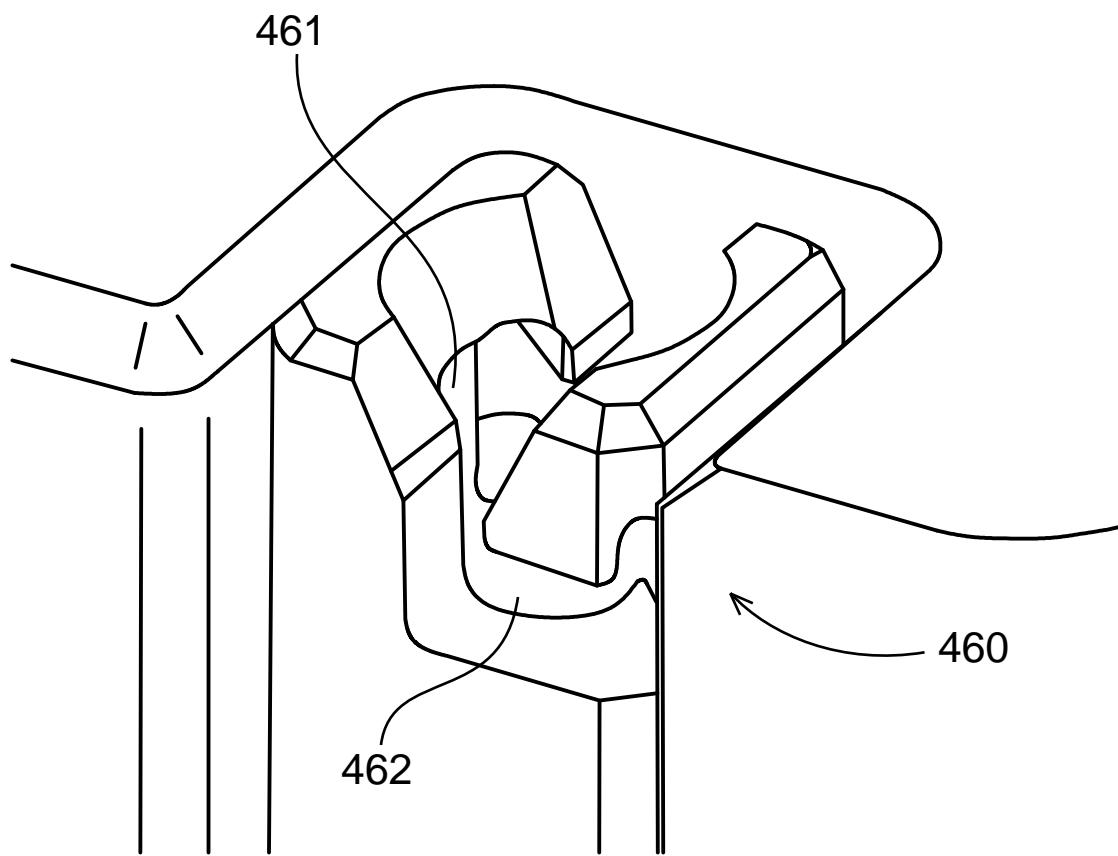


FIG. 29

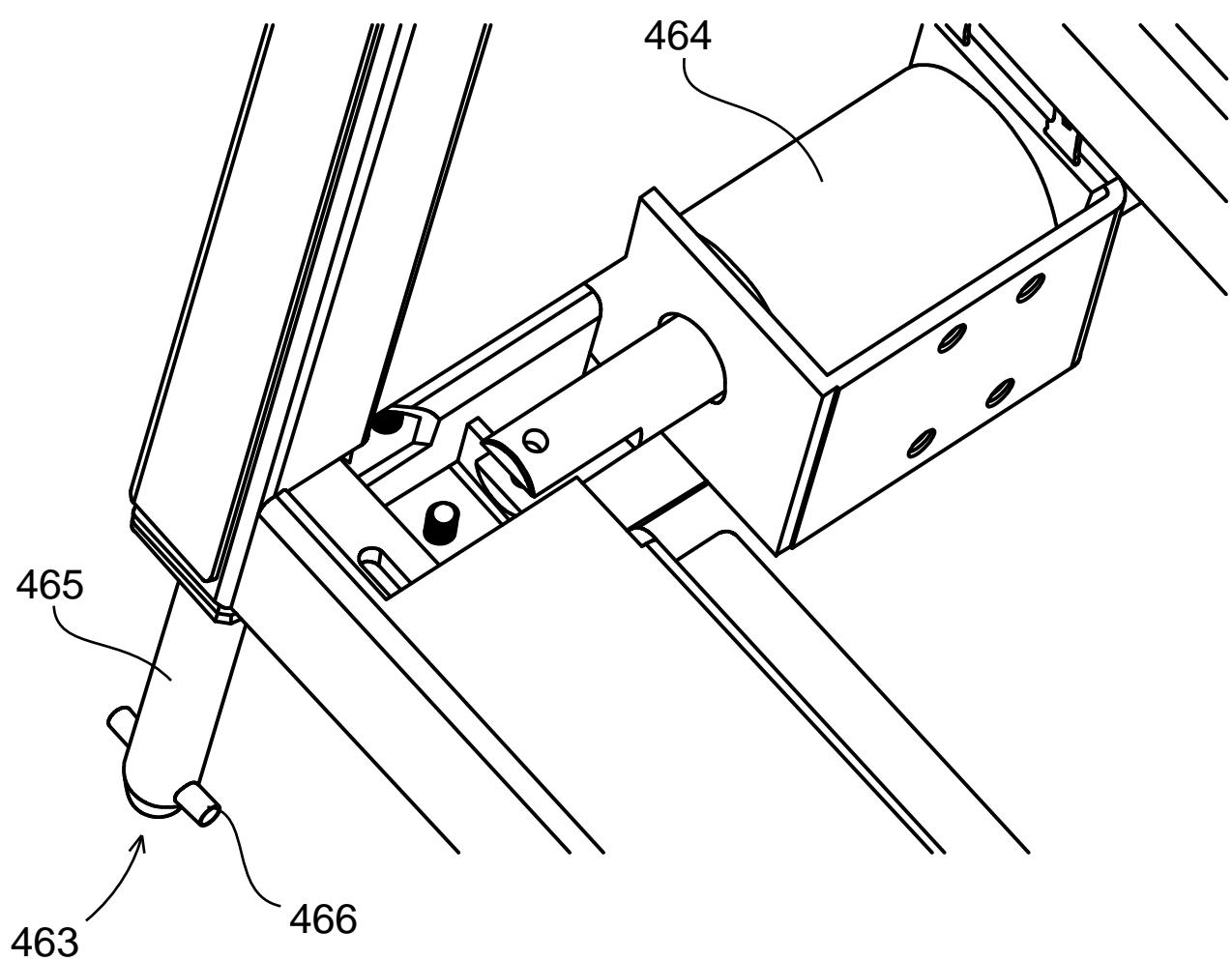


FIG. 30

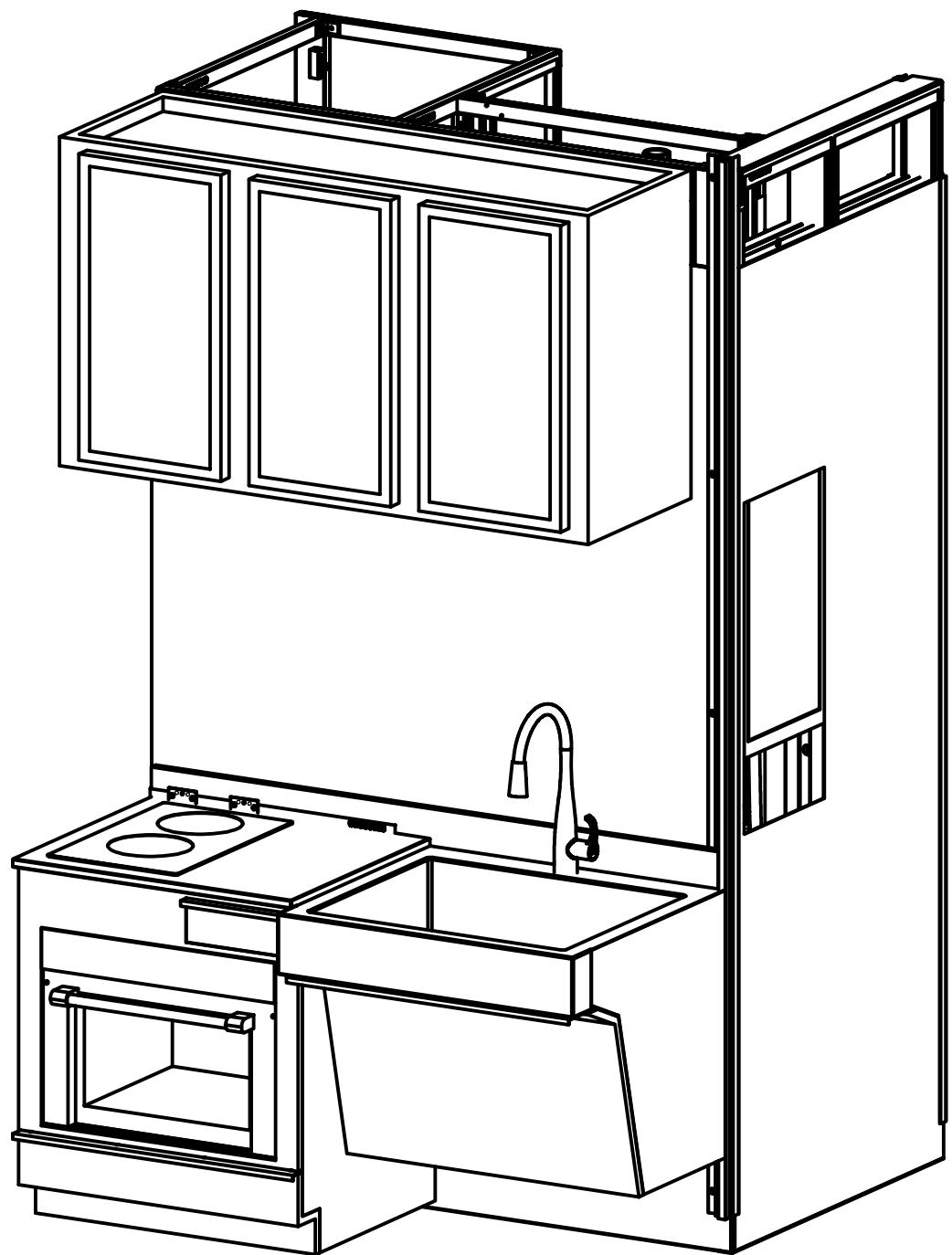


FIG. 31

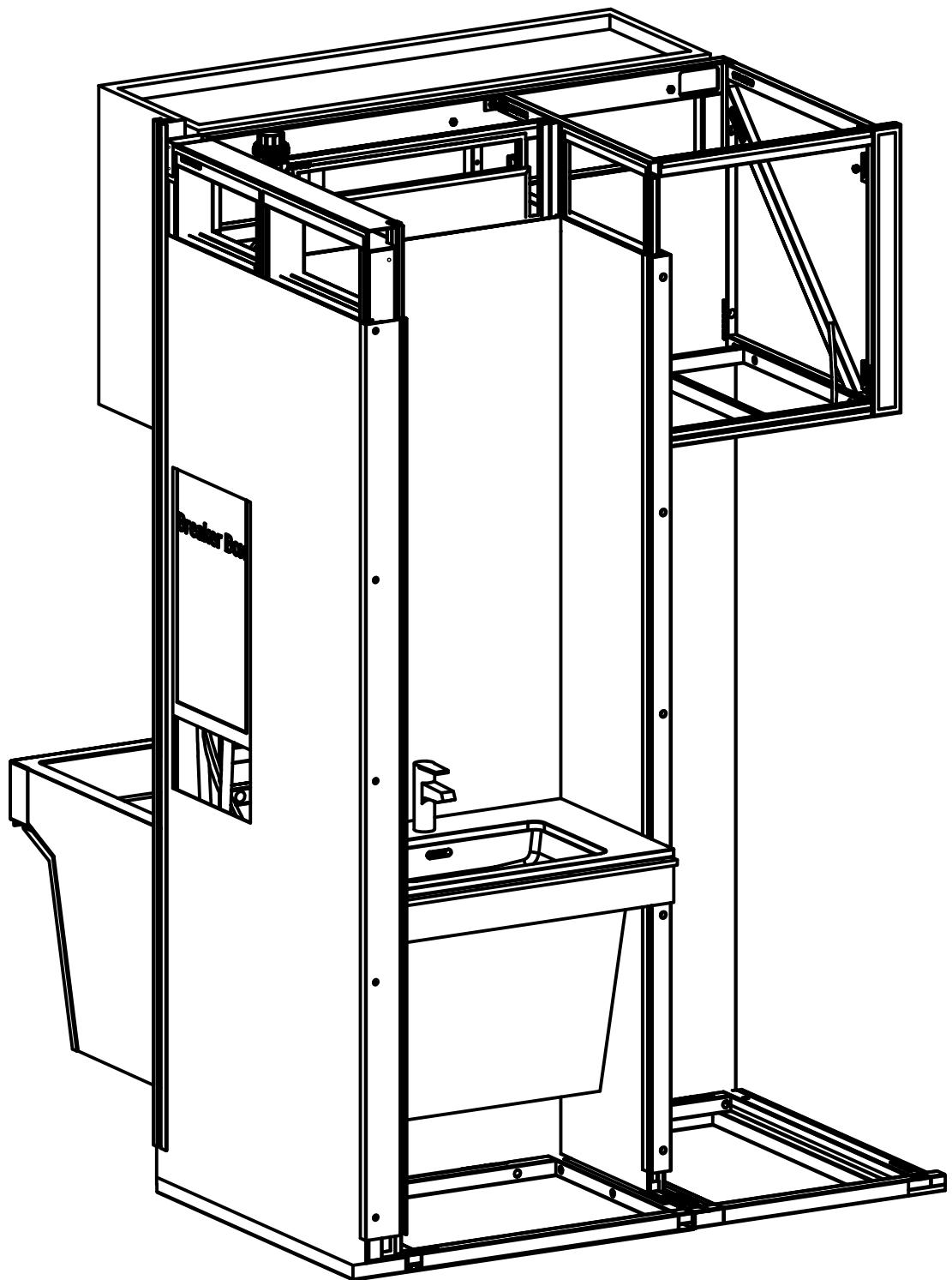


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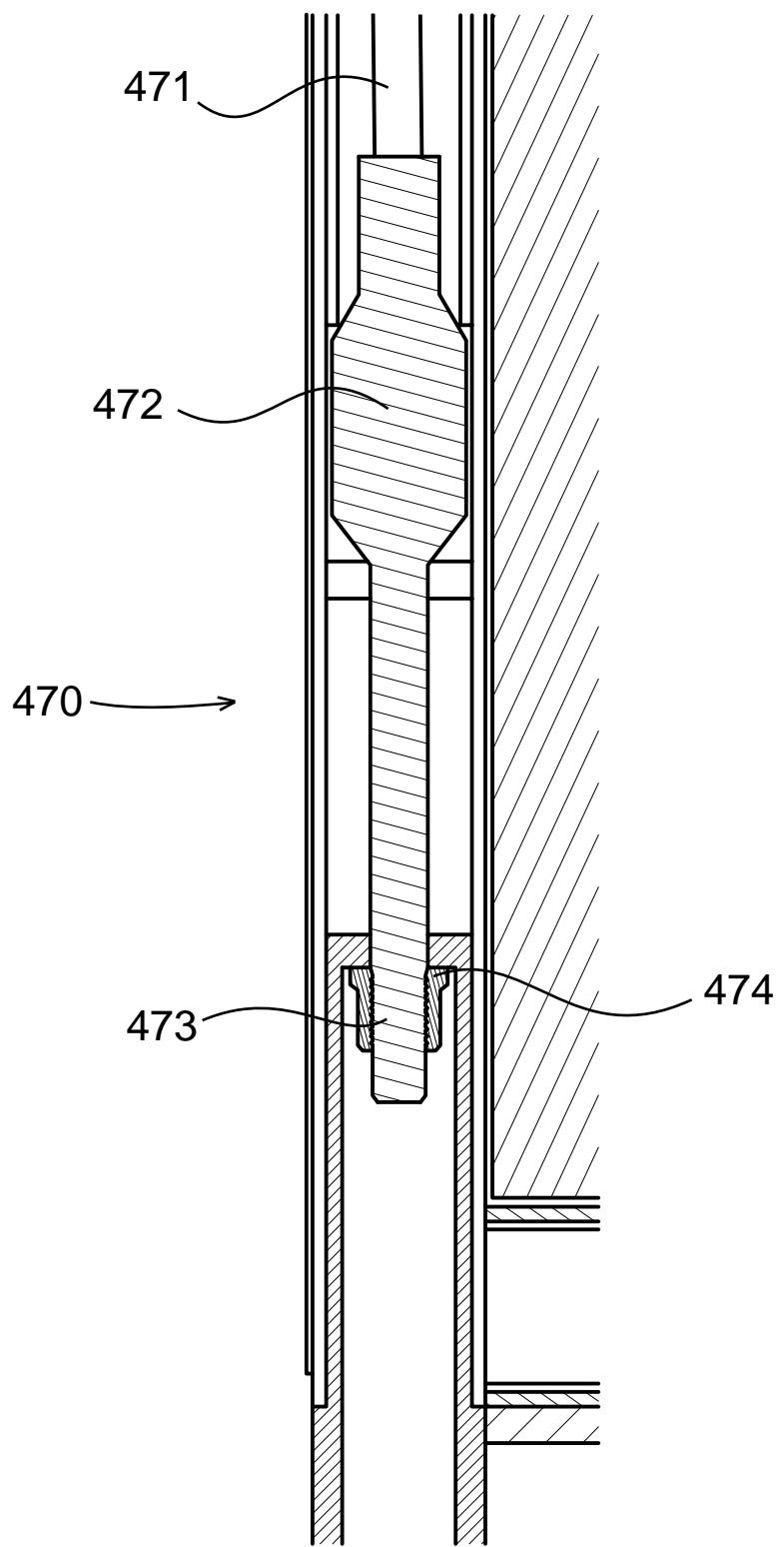


FIG. 33



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(19) **United States**

(12) **Patent Application Publication**

Hall et al.

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(43) **Pub. Date:** **Feb. 29, 2024**

(54) **GROW SYSTEM STACK**

(71) Applicant: **Hall Labs LLC**, Provo, UT (US)

(72) Inventors: **David R. Hall**, Provo, UT (US);
Jerome Miles, Spanish Fork, UT (US);
Quinn Riley, Provo, UT (US)

(73) Assignee: **Hall Labs LLC**, Provo, UT (US)

(21) Appl. No.: **18/454,763**

(22) Filed: **Aug. 23, 2023**

Related U.S. Application Data

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Publication Classification

(51) **Int. Cl.**

A01G 9/26 (2006.01)
A01G 9/02 (2006.01)
A01G 9/24 (2006.01)

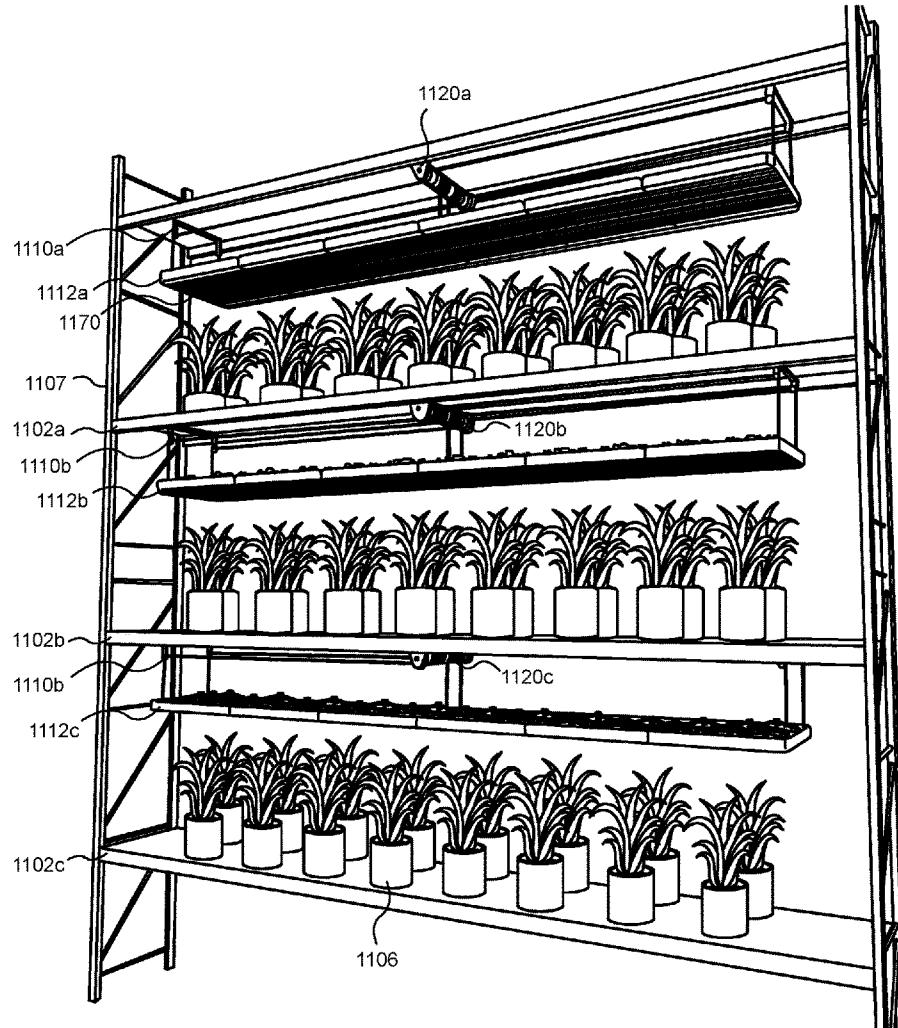
(52) **U.S. Cl.**

CPC *A01G 9/26* (2013.01); *A01G 9/023* (2013.01); *A01G 9/246* (2013.01); *A01G 9/247* (2013.01); *A01G 9/249* (2019.05)

(57)

ABSTRACT

A system for growing plants is described which includes a first platform, configured to support a first set of plants thereon. The system also includes a second platform, spaced above the first platform a sufficient distance to allow for full growth of the plants thereunder, and configured to support a second set of plants thereon. A first movable frame is suspended above the first platform and below the second platform. The first movable frame has a first array of grow lights mounted thereon. A second movable frame is suspended above the second platform and has a second array of grow lights mounted thereon. The system also includes a lift system configured to raise and lower the movable frames so as to maintain each array of grow lights within a predetermined distance above each set of plants as it grows.



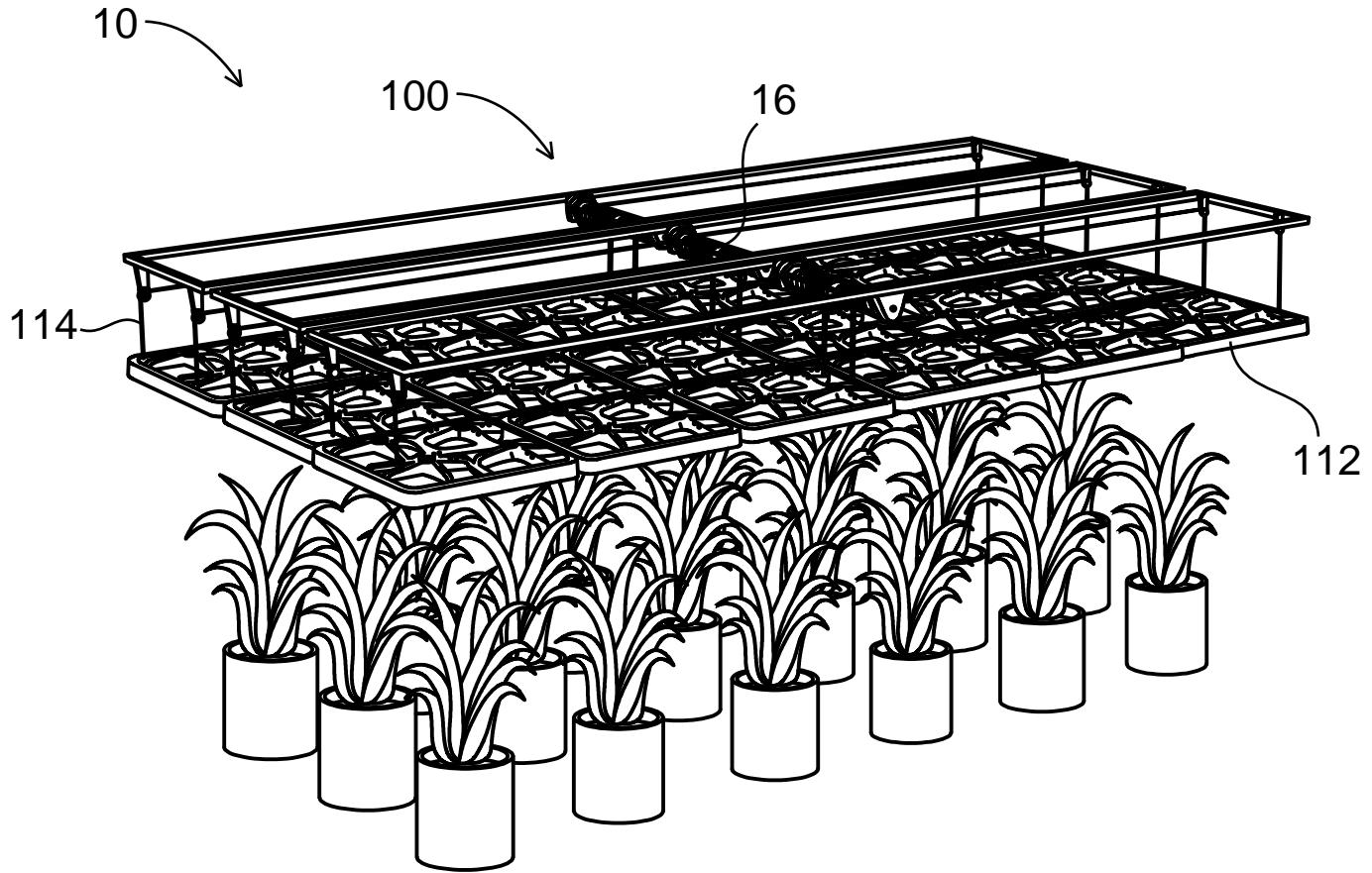


FIG. 1A

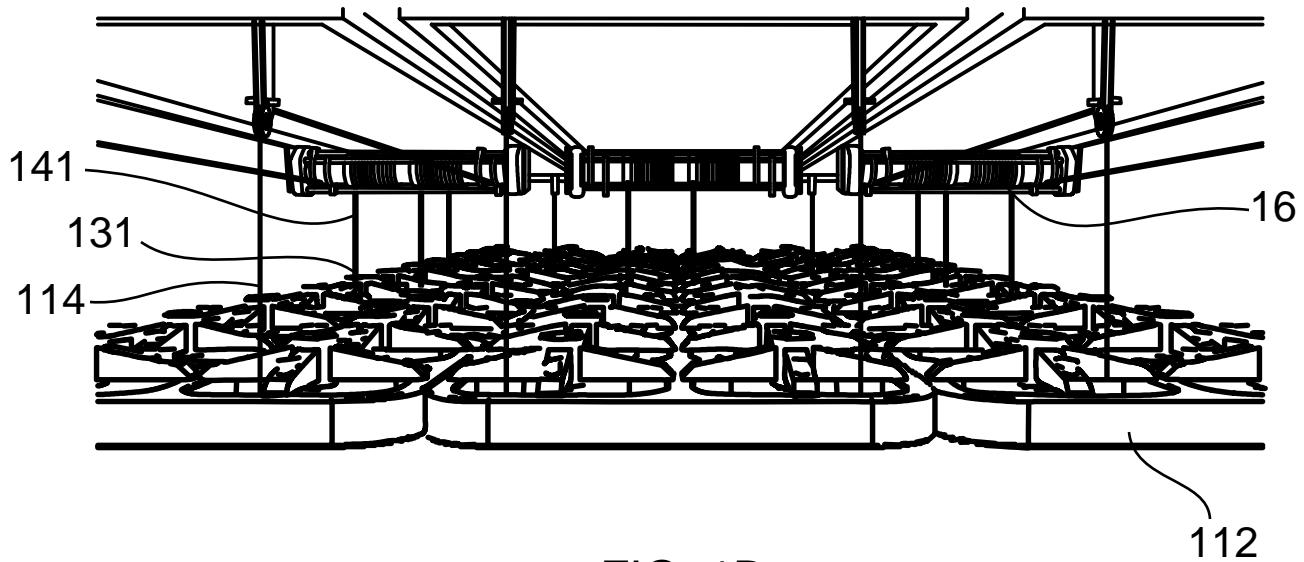


FIG. 1B

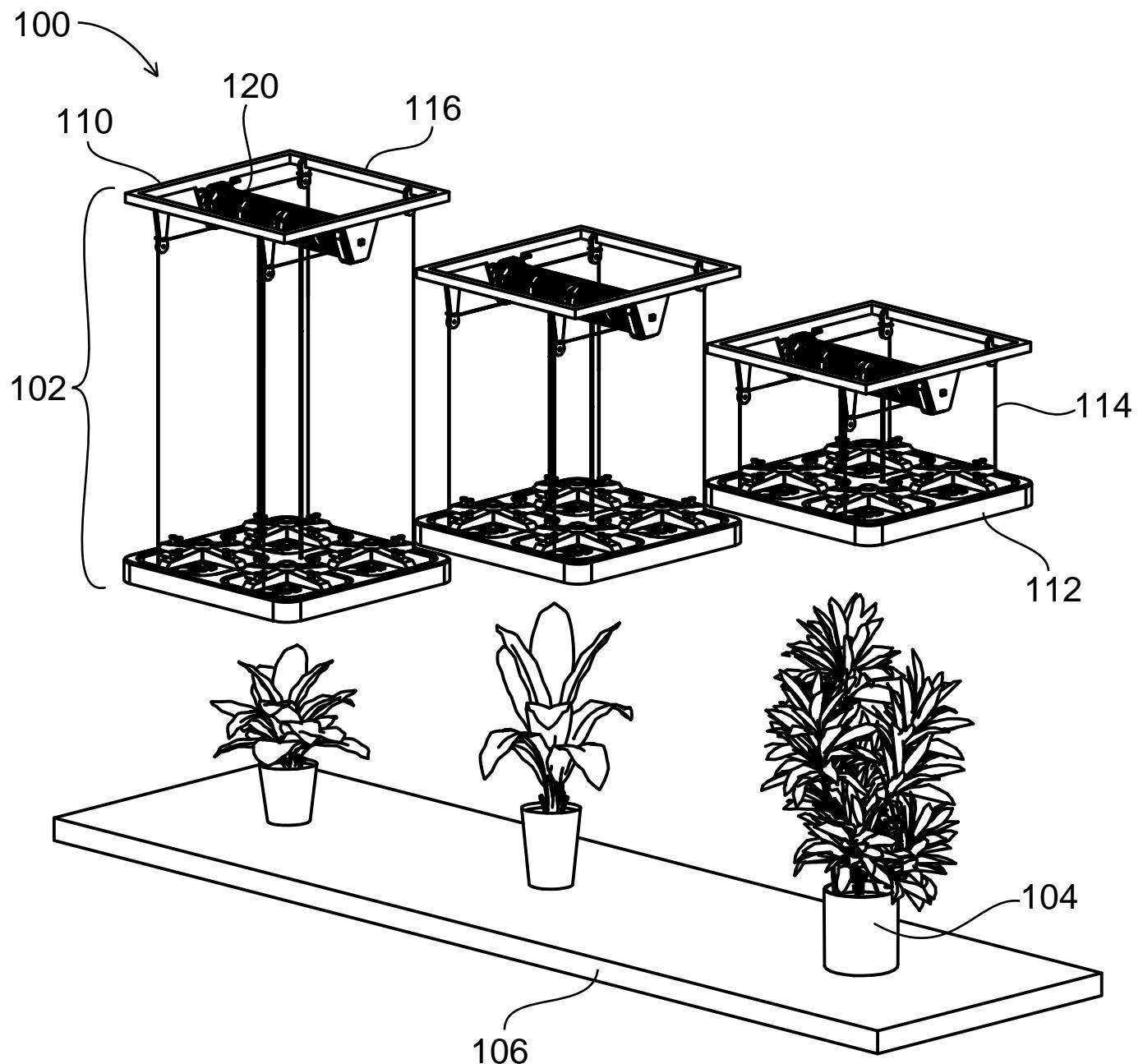


FIG. 1C

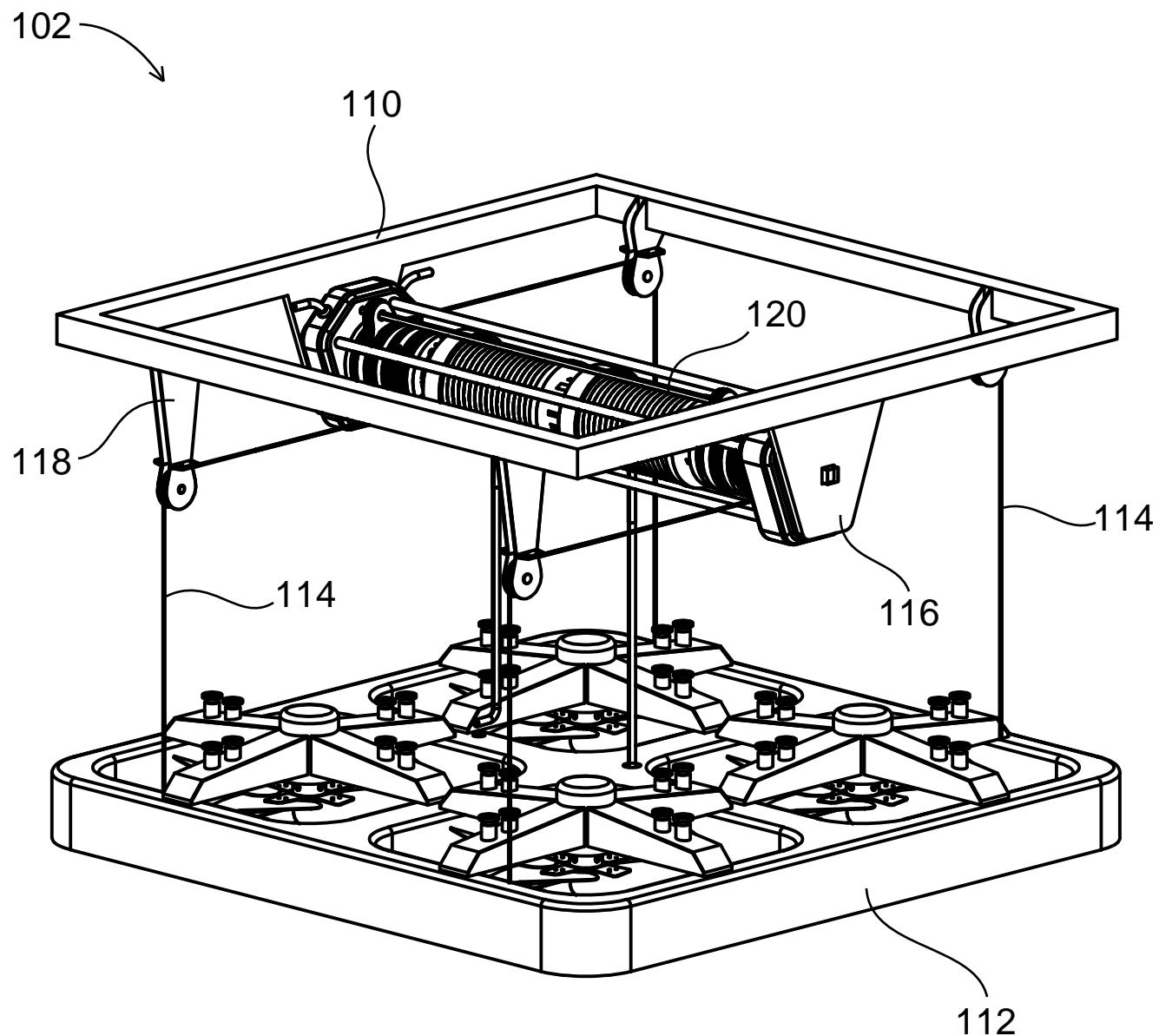


FIG. 2

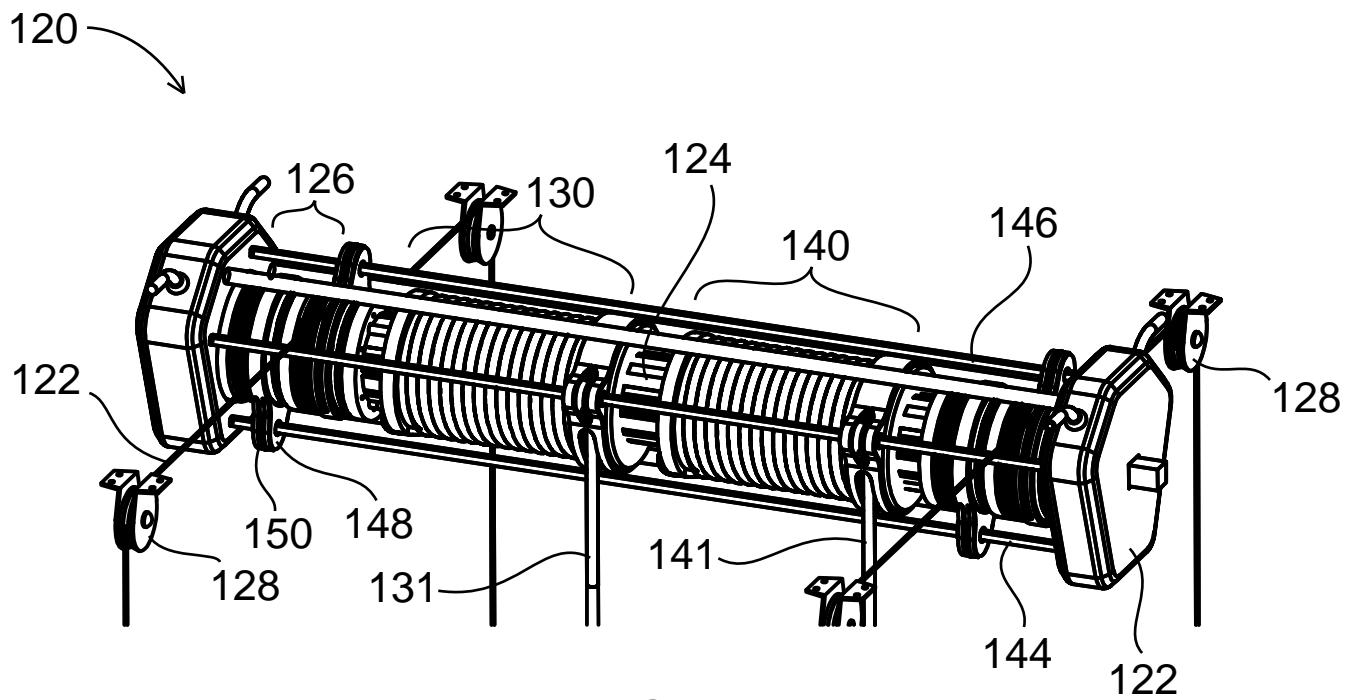


FIG. 3

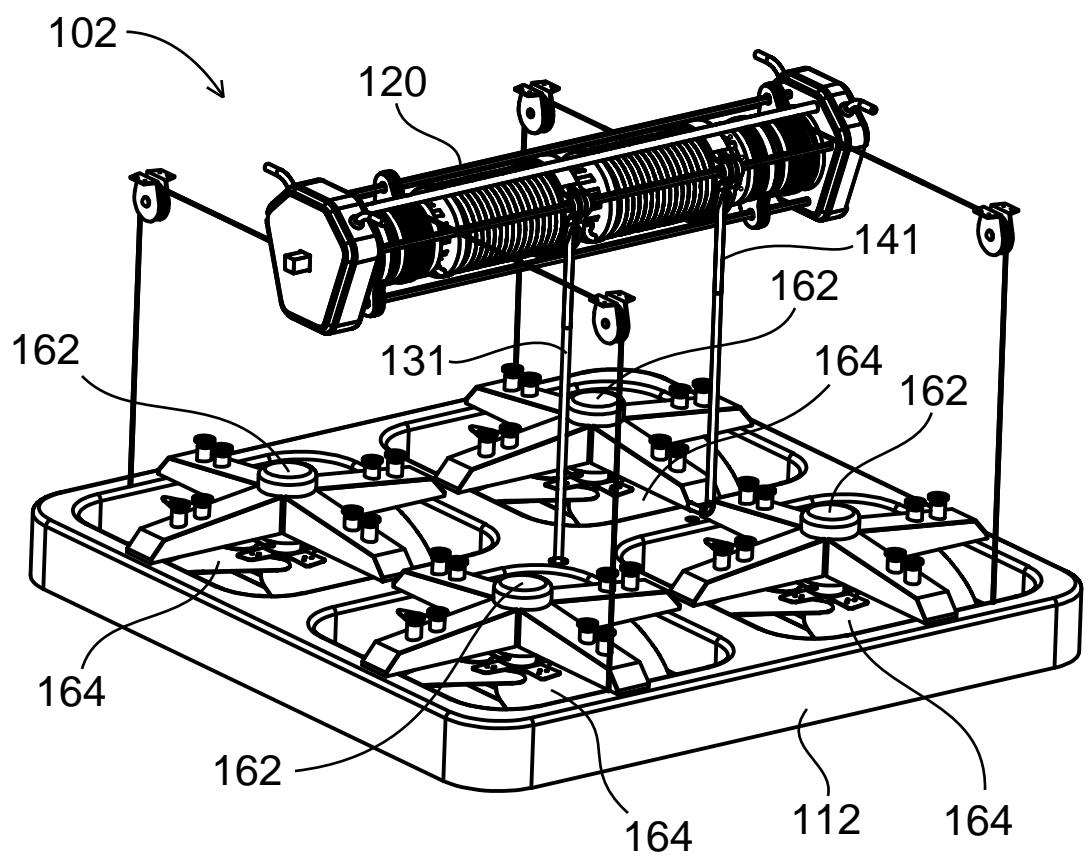


FIG. 4

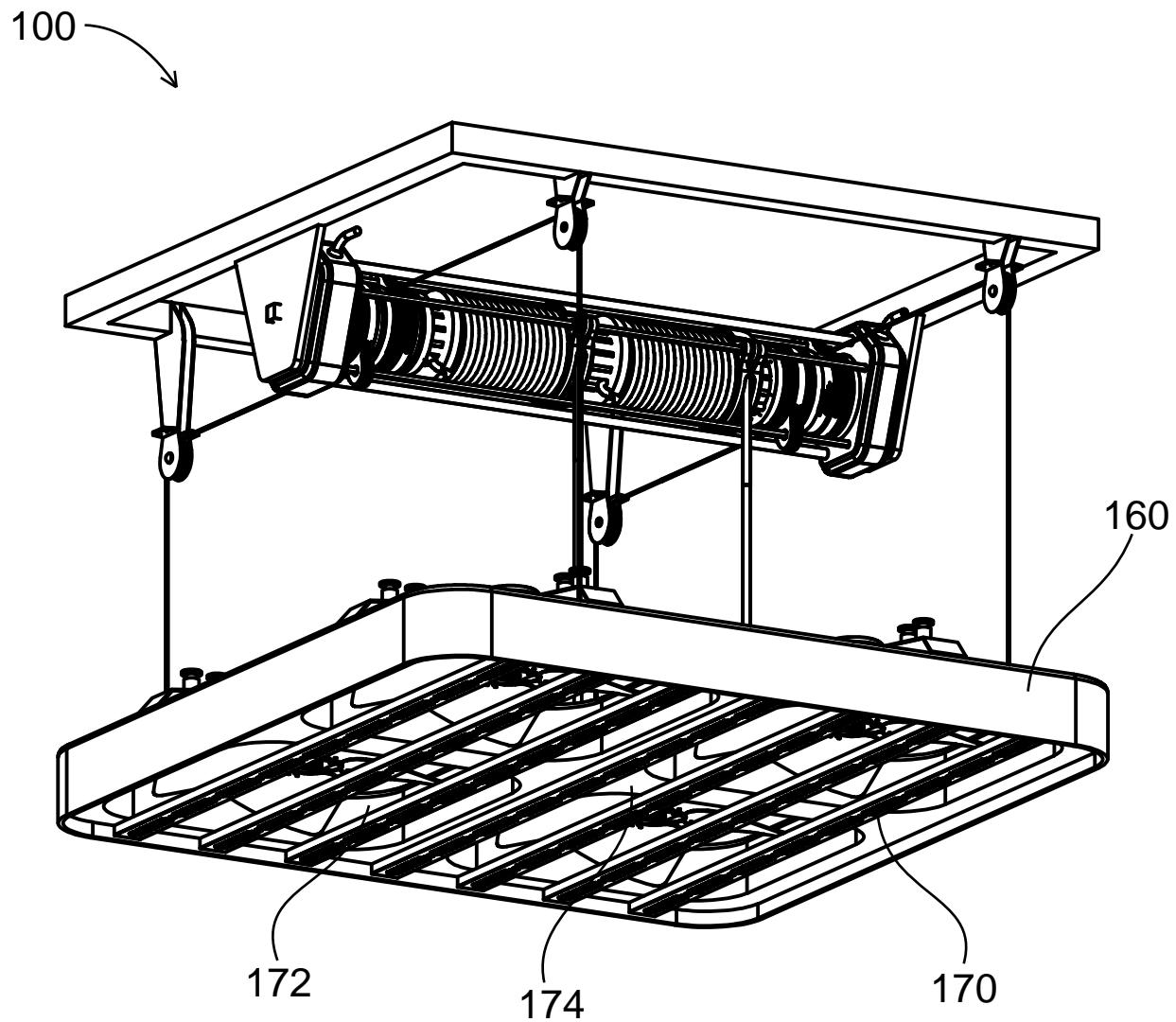
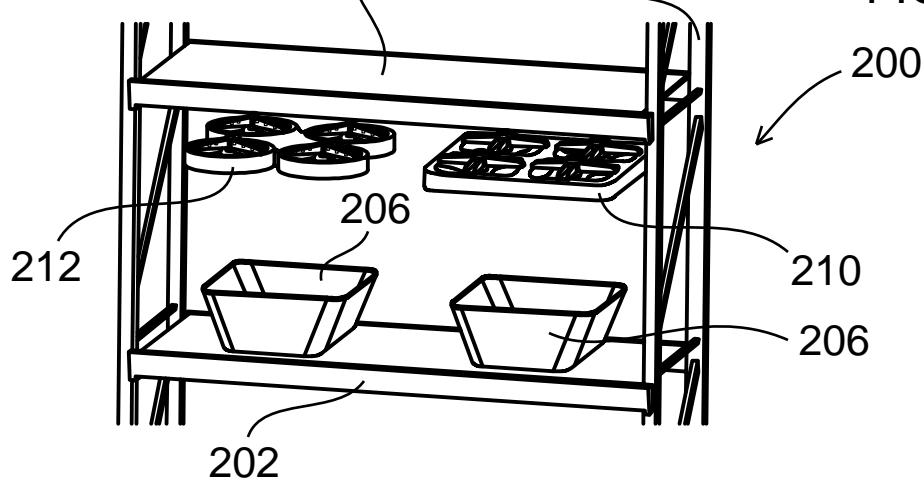
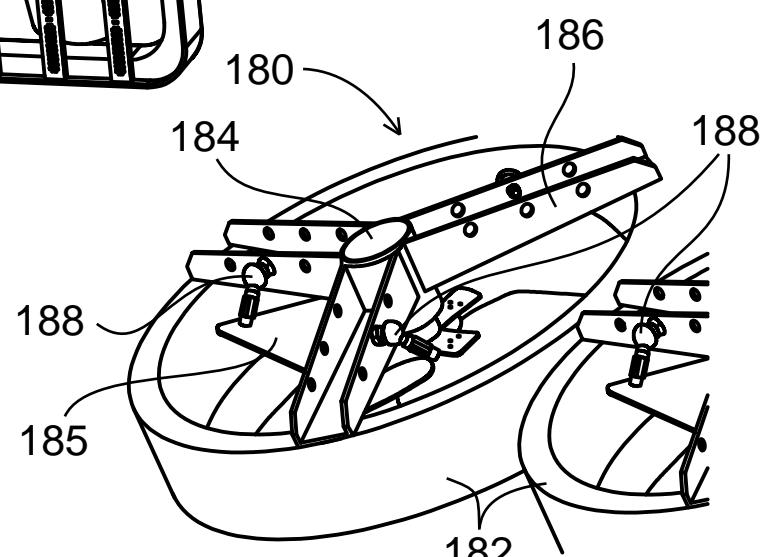
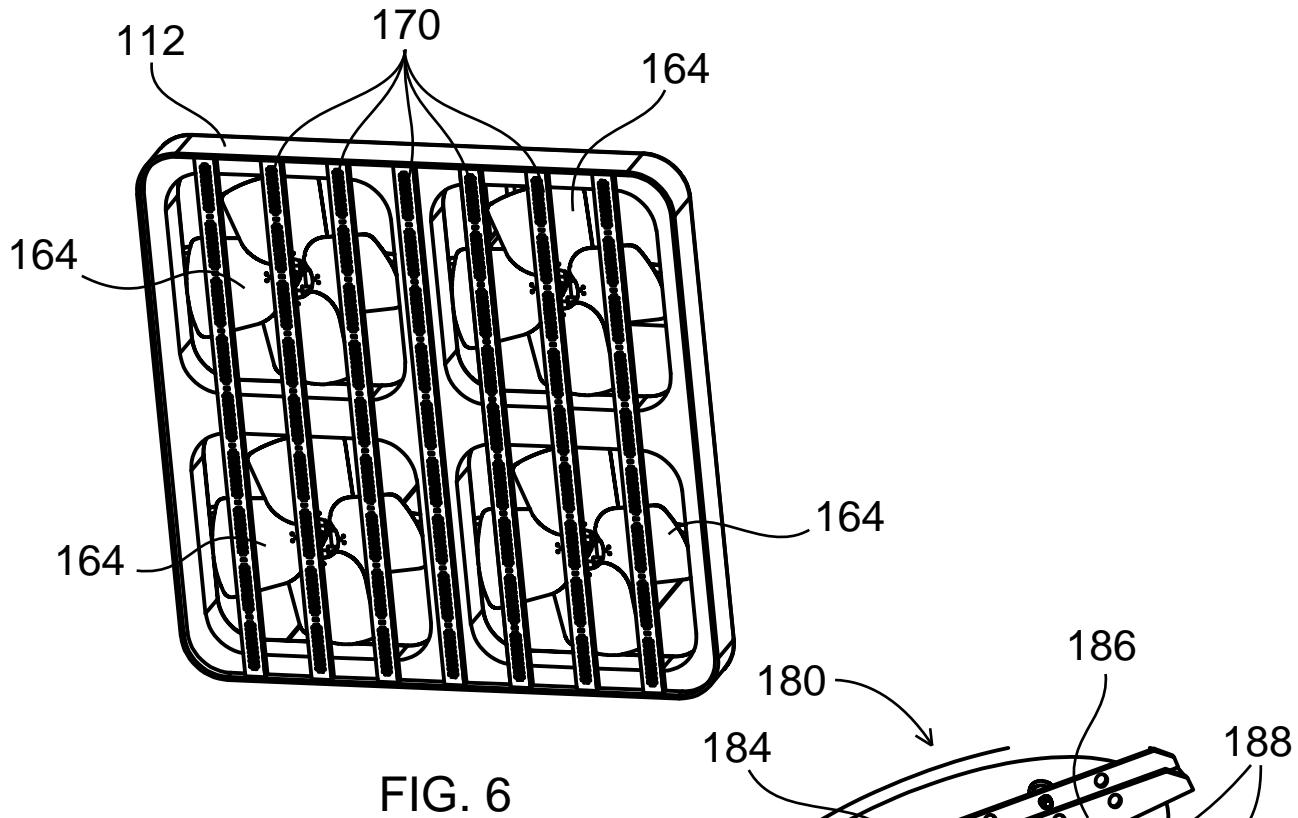
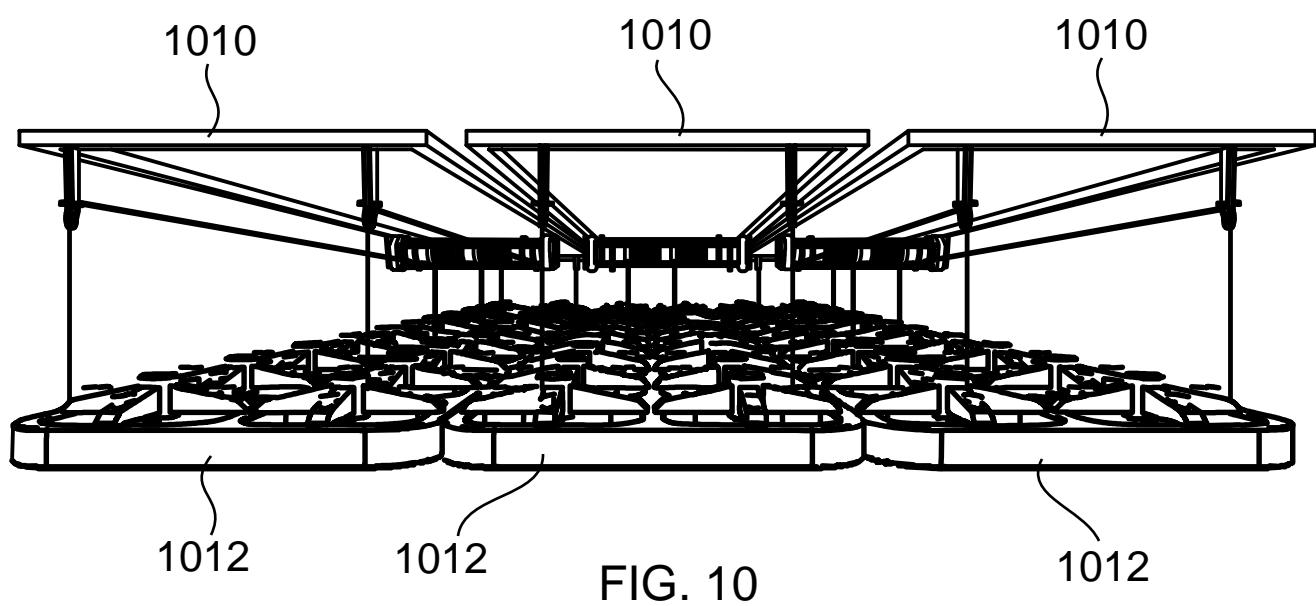
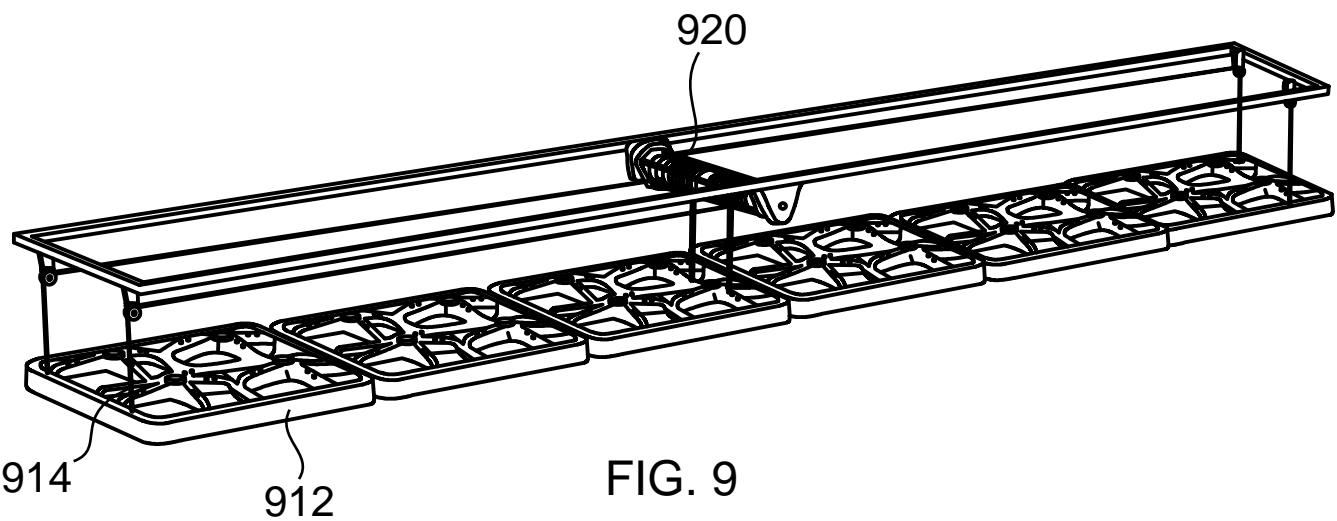


FIG. 5





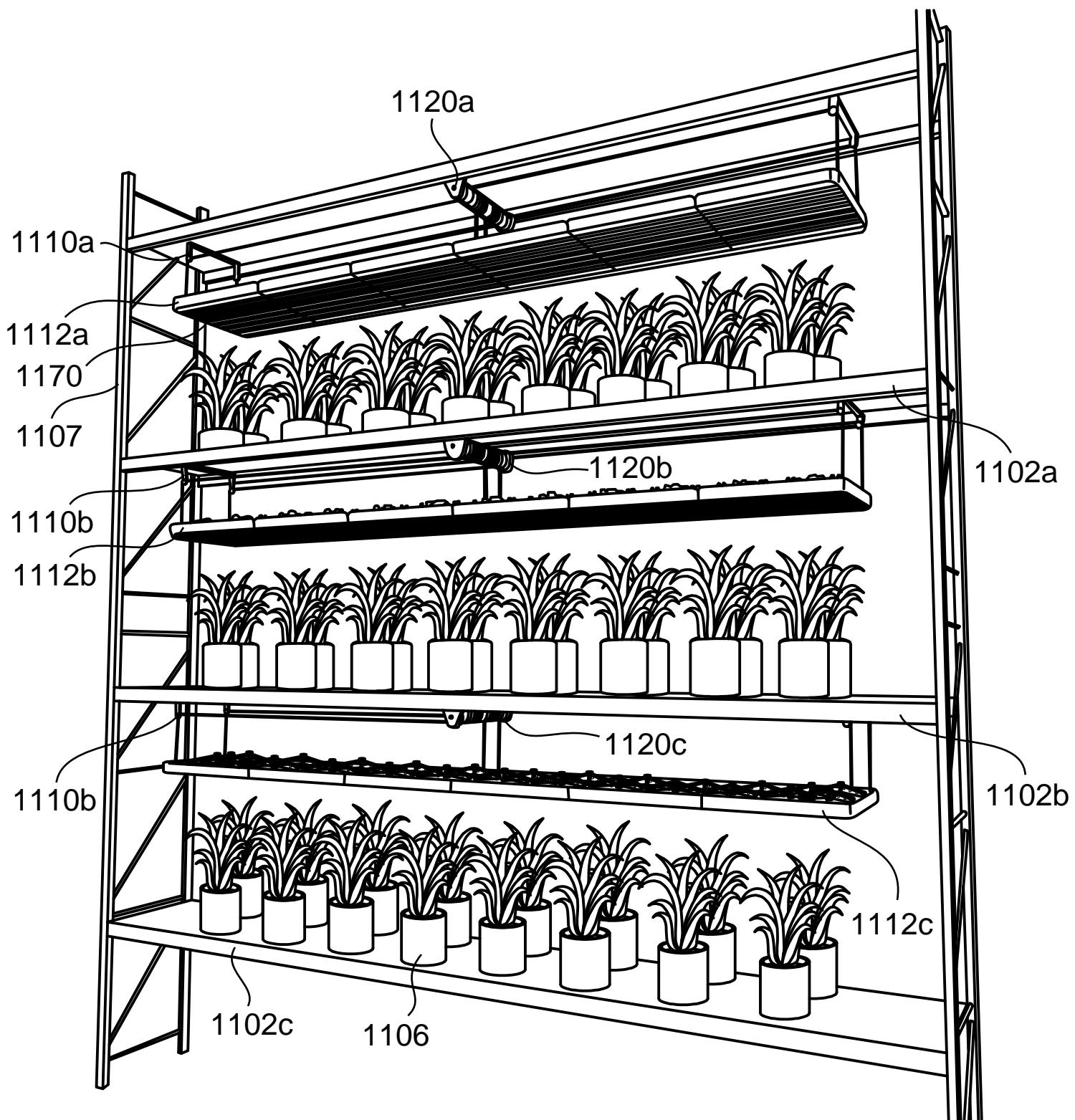


FIG. 11

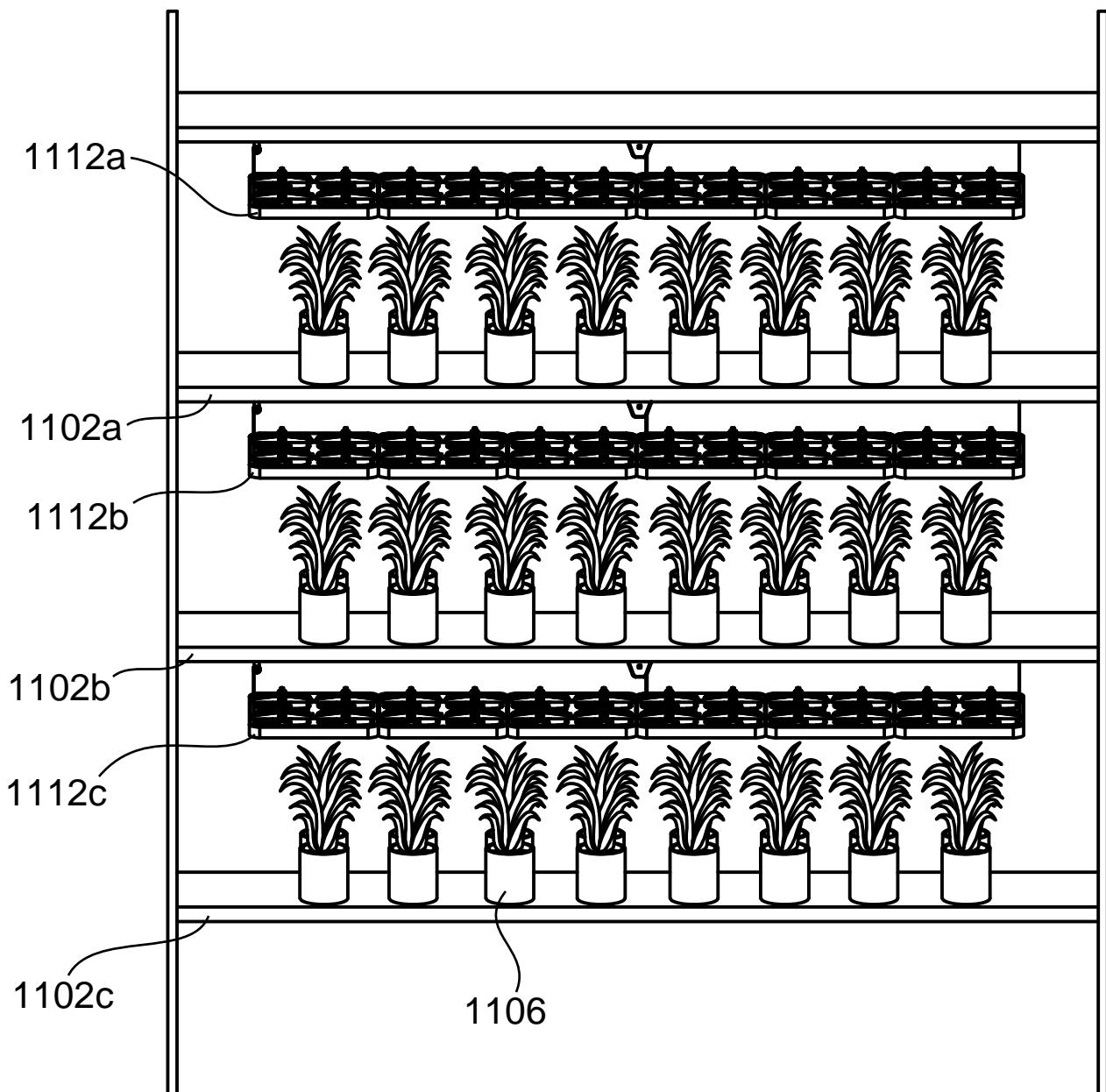


FIG. 12



US 20240151010A1

(19) **United States**

(12) **Patent Application Publication**

Hall et al.

(10) **Pub. No.: US 2024/0151010 A1**

(43) **Pub. Date:** **May 9, 2024**

(54) **RECIRCULATING SHOWER SYSTEM**

(71) Applicant: **Hall Labs LLC**, Provo, UT (US)

(72) Inventors: **Michael Hall**, Provo, UT (US); **David R. Hall**, Provo, UT (US); **Prabhakar Ramaraj**, Provo, UT (US); **Benjamin Shinedling**, Provo, UT (US); **Ryan Gunn**, Provo, UT (US)

(73) Assignee: **Hall Labs LLC**, Provo, UT (US)

(21) Appl. No.: **18/505,676**

(22) Filed: **Nov. 9, 2023**

Related U.S. Application Data

(60) Provisional application No. 63/383,060, filed on Nov. 9, 2022.

Publication Classification

(51) **Int. Cl.**

E03B 1/04 (2006.01)
E03C 1/04 (2006.01)

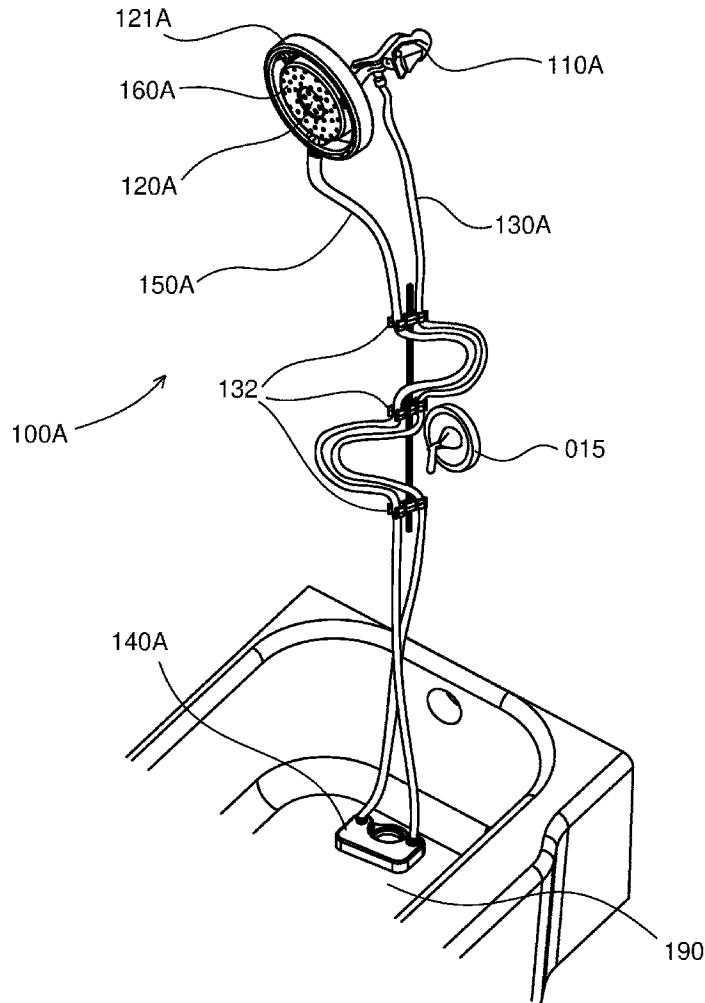
(52) **U.S. Cl.**

CPC **E03B 1/042** (2013.01); **E03C 1/0408** (2013.01); **E03B 2001/045** (2013.01)

(57)

ABSTRACT

There is described a shower system that includes a showerhead fixture and a base connected by conduits. The showerhead fixture includes an inlet for receiving pressurized water. A diverter is configured to divert at least a portion of the pressurized water to the base. The showerhead fixture also includes a second inlet fluidly connected to a recirculating showerhead portion with a plurality of showerhead jets for expelling mixed water received from the base. The base is configured to create a reservoir of water on a shower floor and includes a venturi pump capable of using pressurized water from the showerhead fixture to draw in water from the reservoir into the stream of pressurized water. The mixed water is sent from the base to the jets in the showerhead fixture to thereby increase the volume of water expelled from the showerhead.



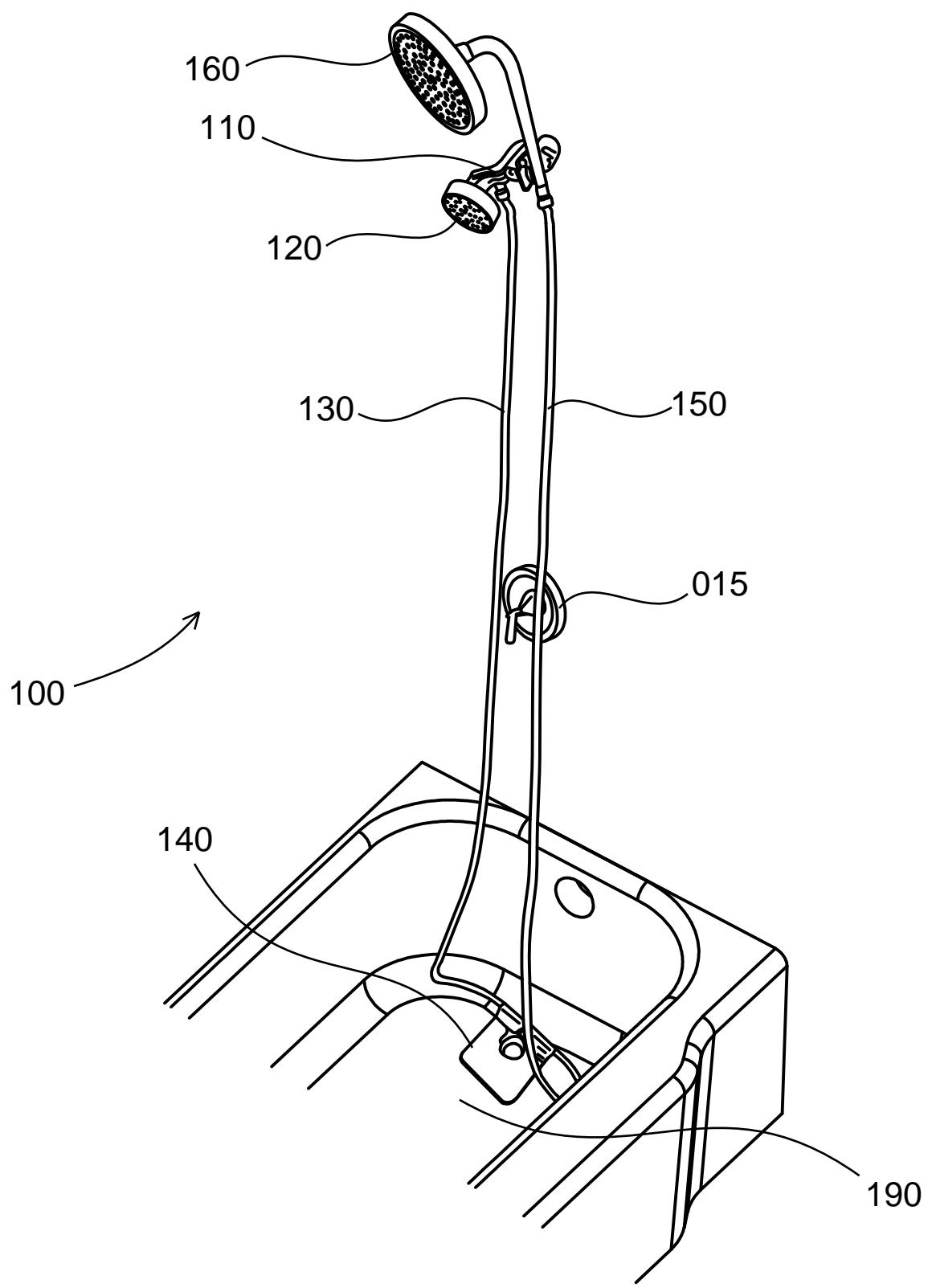


FIG. 1

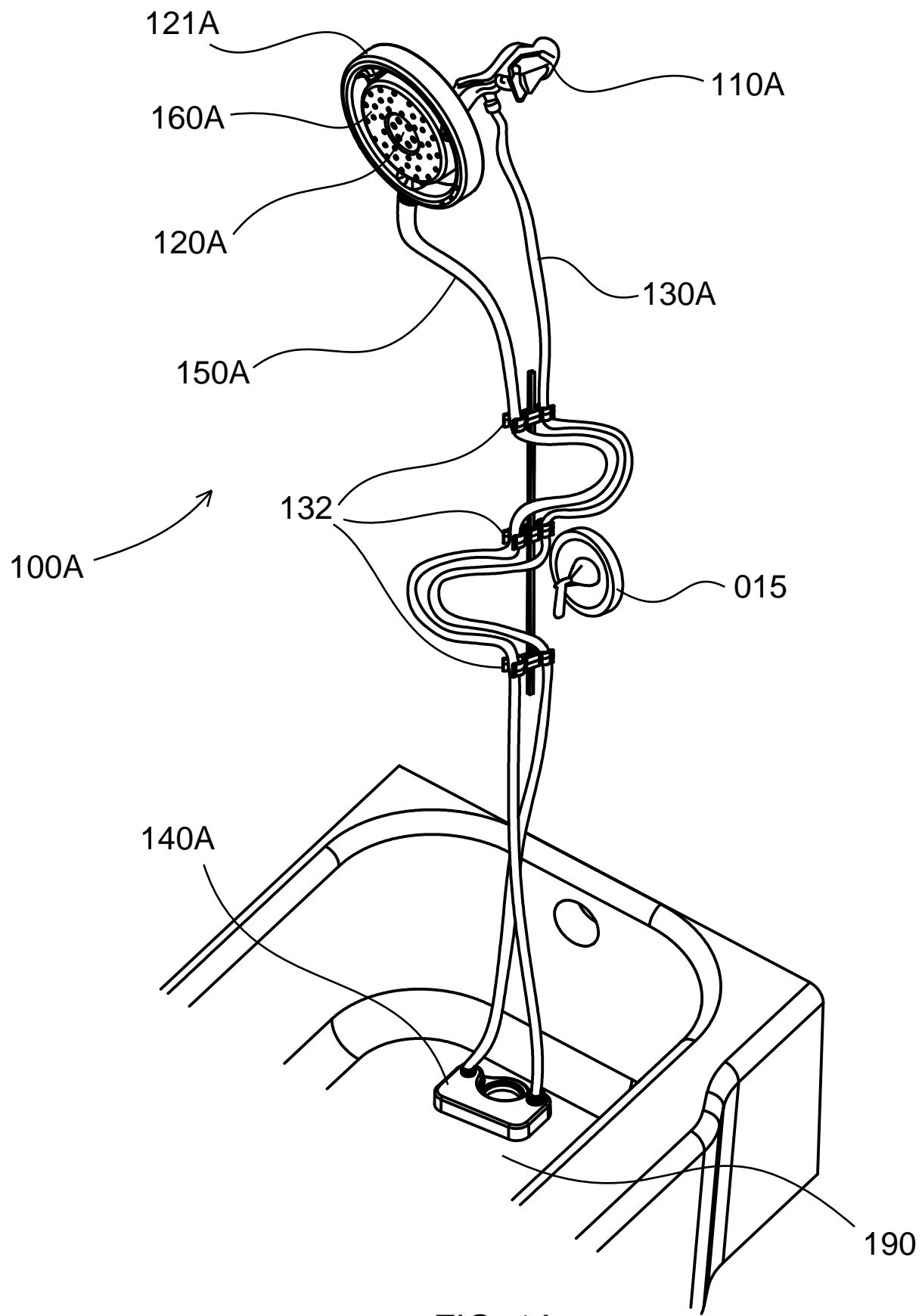
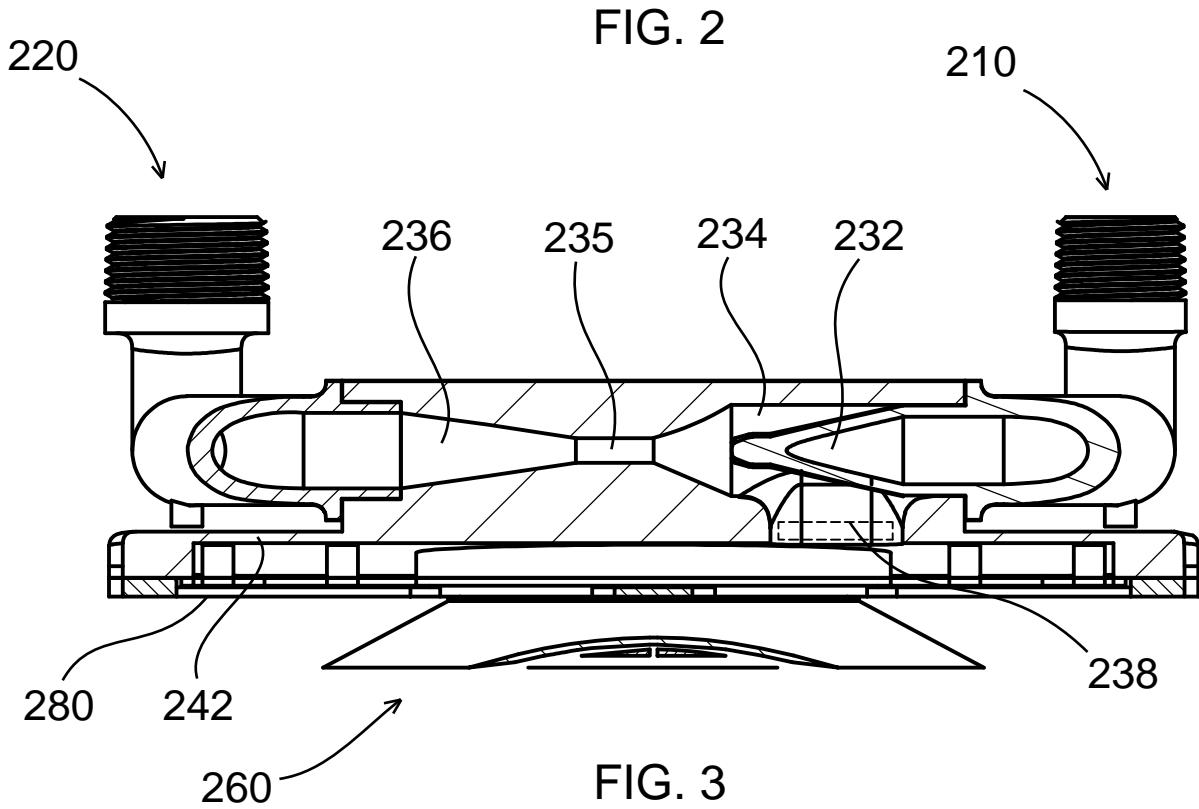
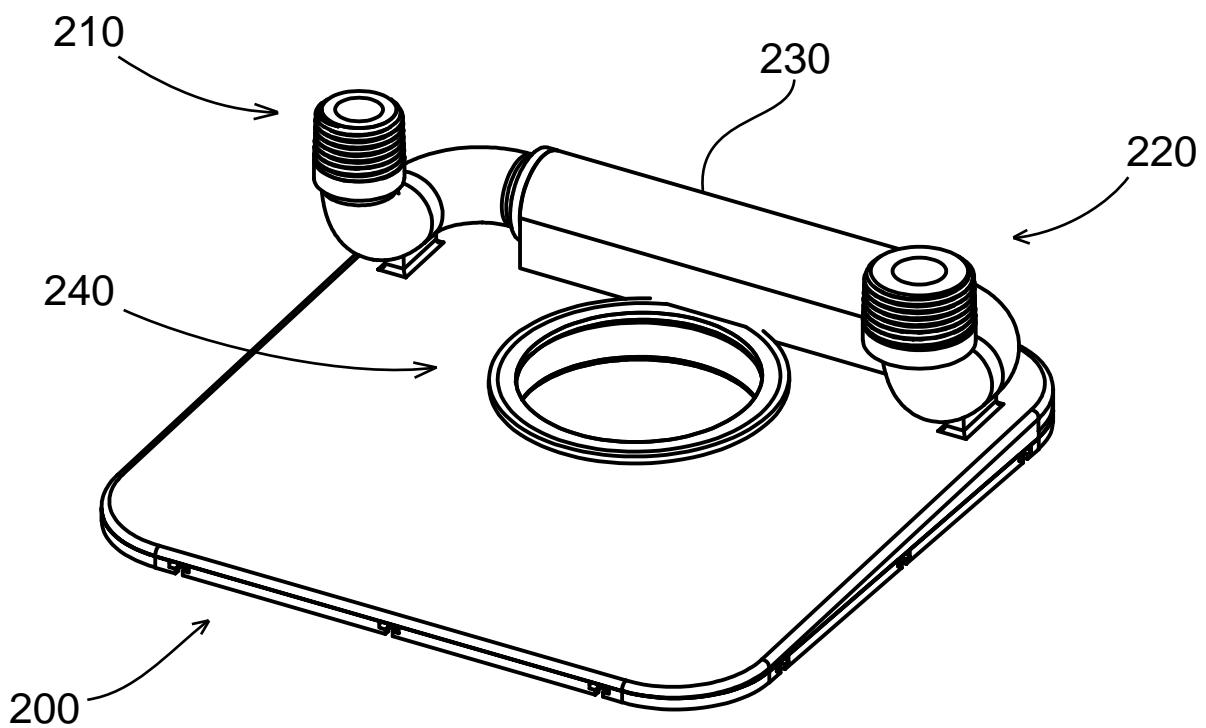


FIG. 1A



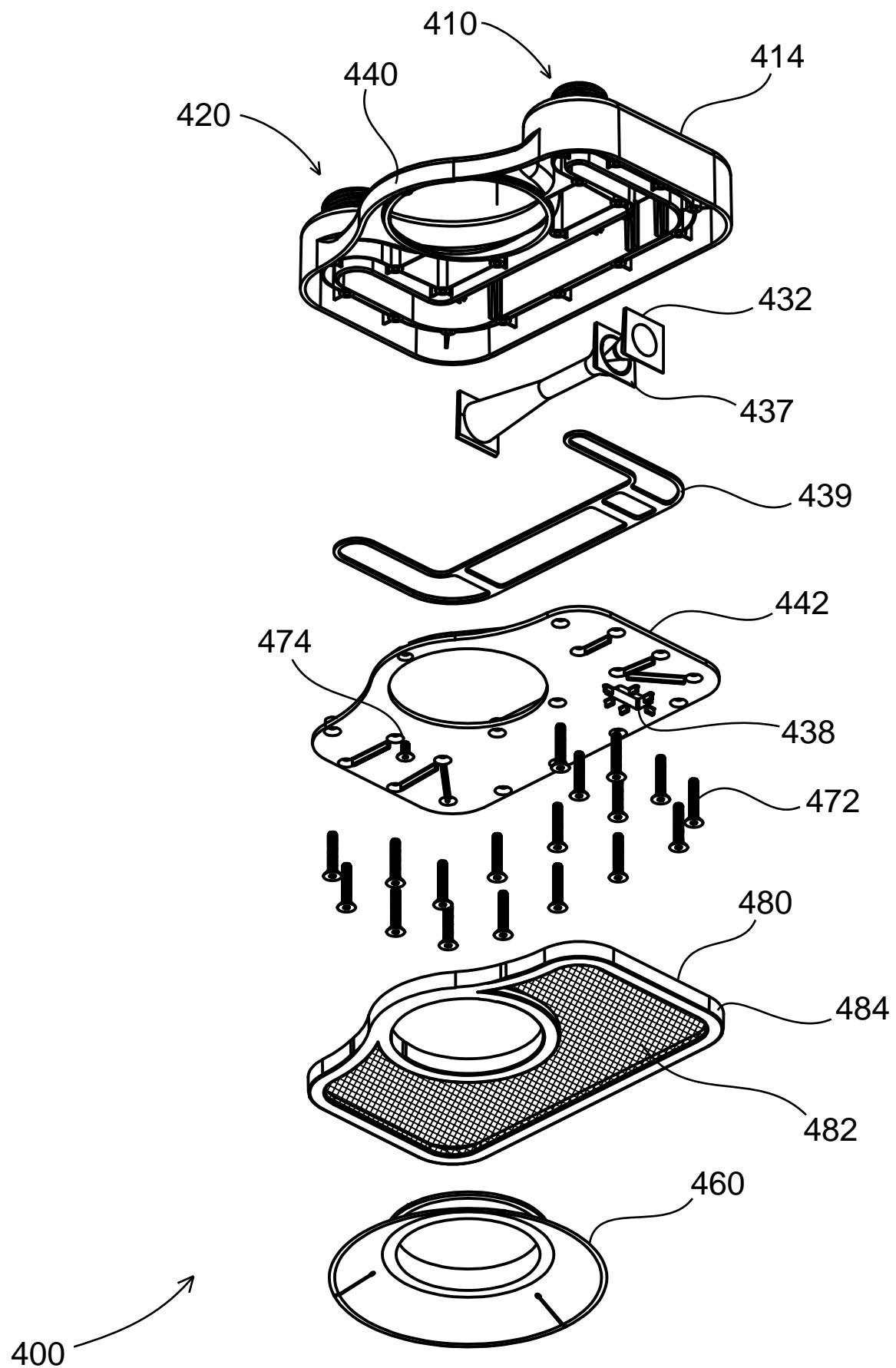


FIG. 4

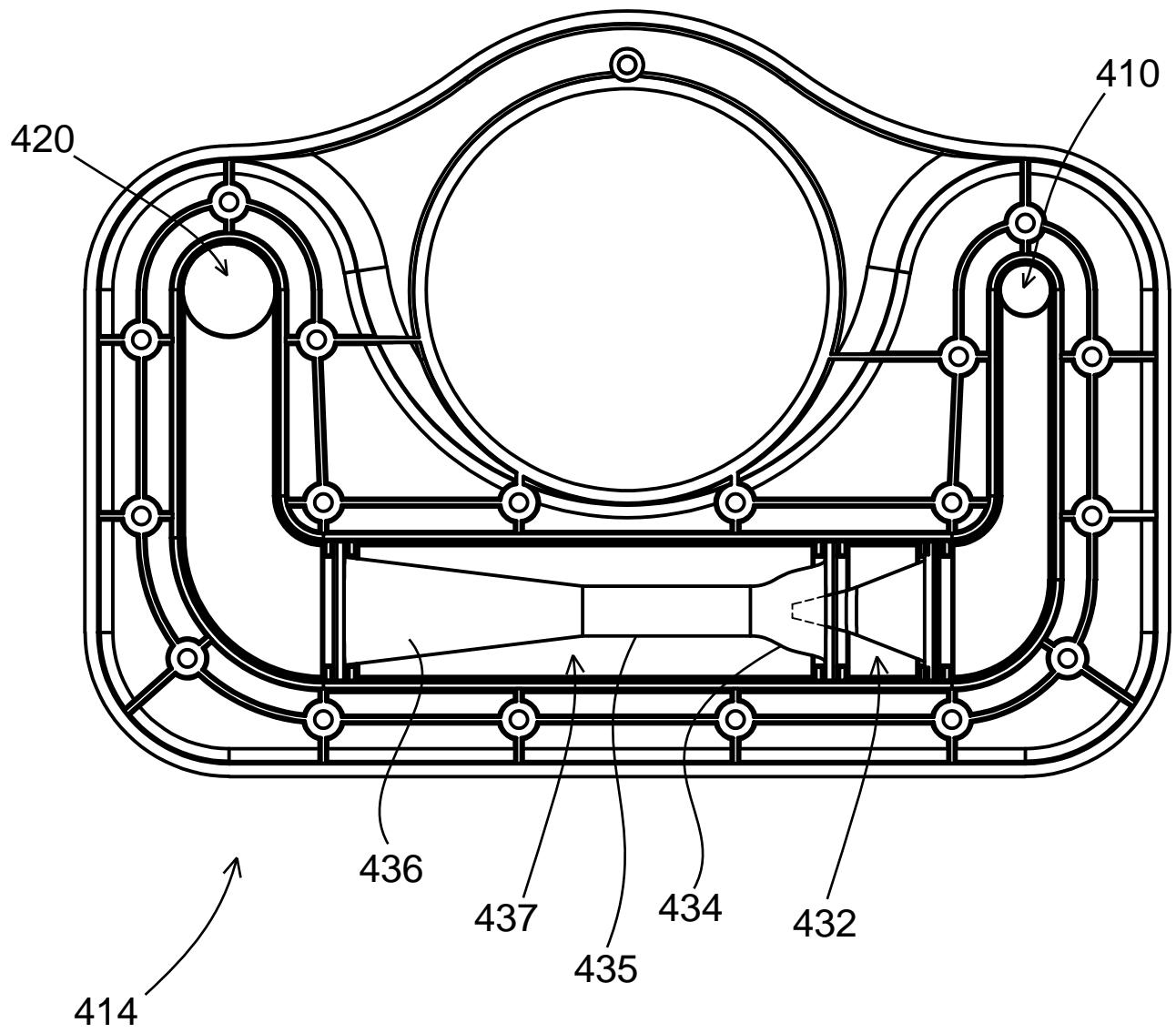


FIG. 5

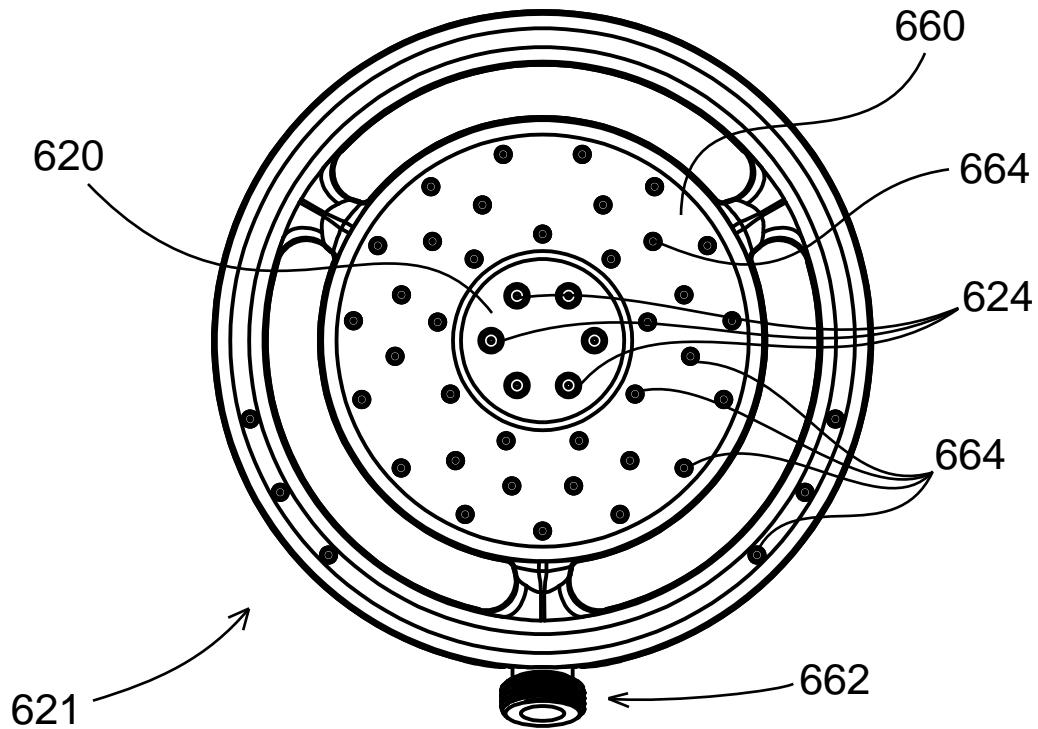
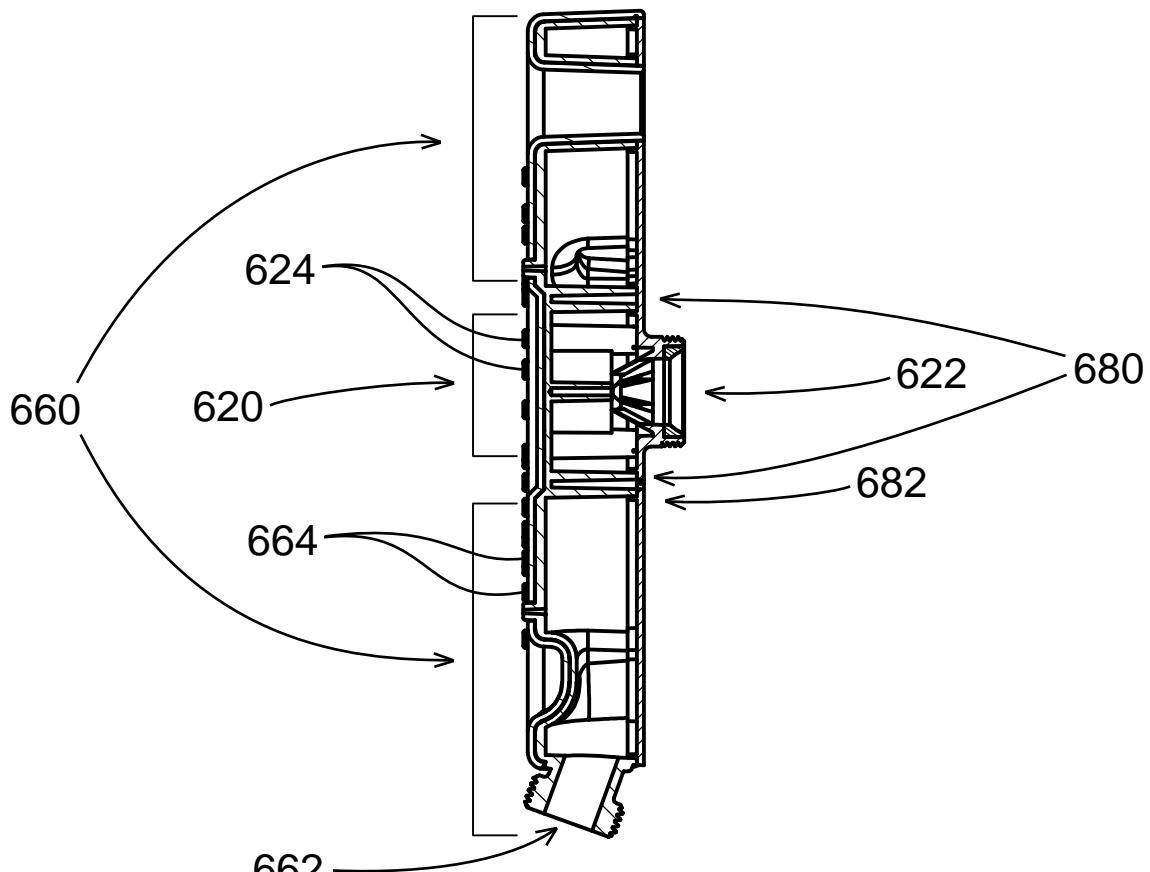


FIG. 6



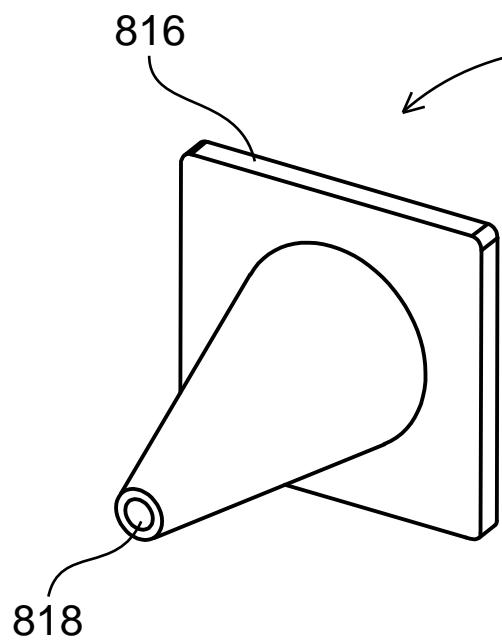


FIG. 8A

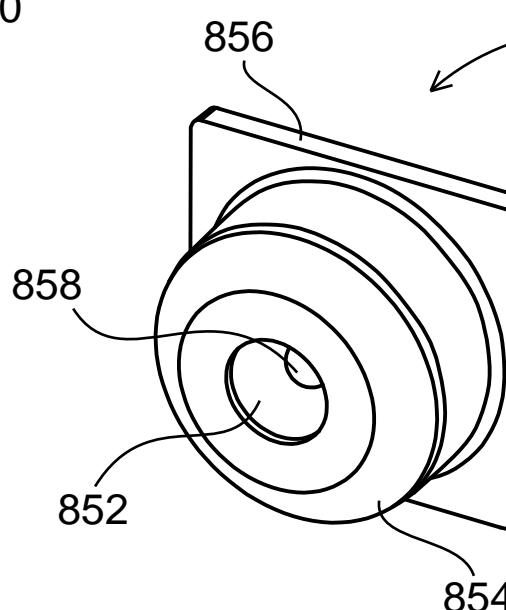


FIG. 8B

FIG. 8

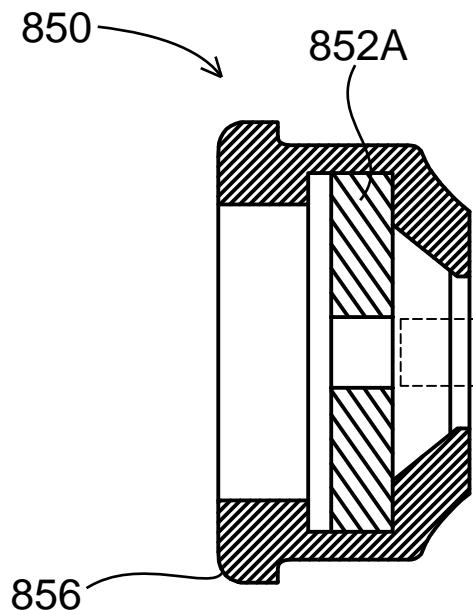


FIG. 9A

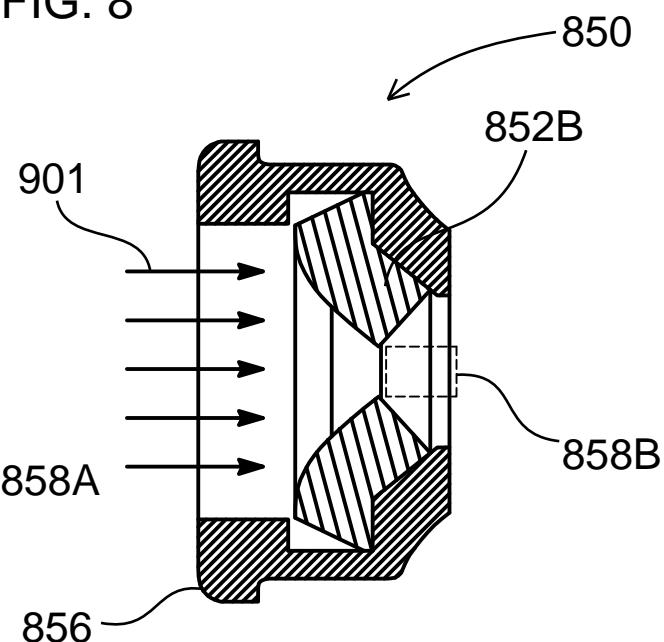


FIG. 9B

FIG. 9

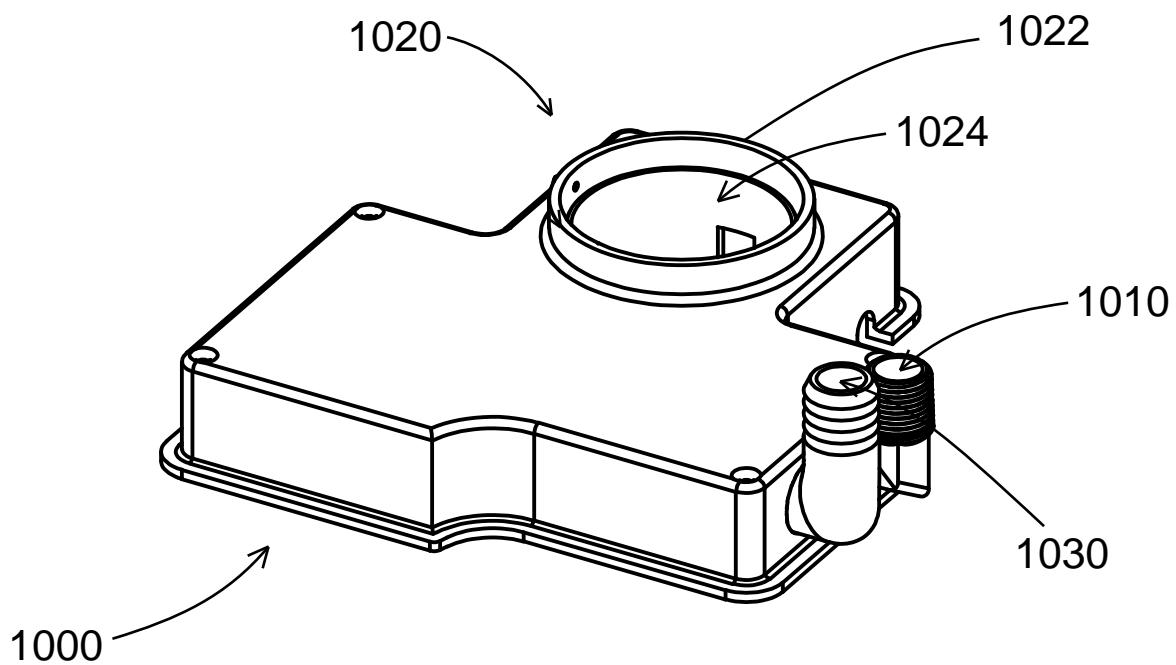


FIG. 10

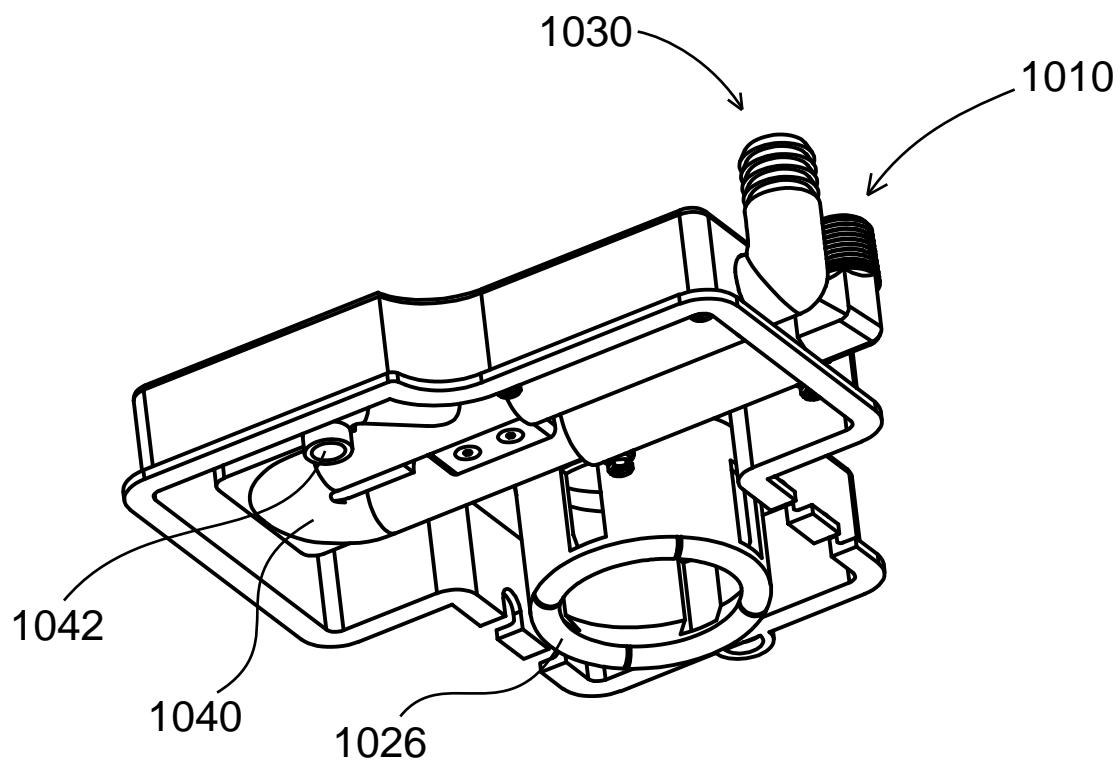


FIG. 11



US 20230029404A1

(19) **United States**

(12) **Patent Application Publication**

Hall et al.

(10) **Pub. No.: US 2023/0029404 A1**

(43) **Pub. Date:** **Jan. 26, 2023**

(54) **BALANCED DEVICE PROVIDING
FILTERED AIR FOR A USER**

(71) Applicant: **Hall Labs LLC**, (US)

(72) Inventors: **Michael Hall**, Provo, UT (US); **David R. Hall**, Provo, UT (US); **Jacob Dean**, Provo, UT (US); **Miguel Lazaro**, Provo, UT (US)

(73) Assignee: **Hall Labs LLC**

(21) Appl. No.: **17/815,210**

(22) Filed: **Jul. 26, 2022**

Related U.S. Application Data

(60) Provisional application No. 63/225,864, filed on Jul. 26, 2021.

Publication Classification

(51) **Int. Cl.**

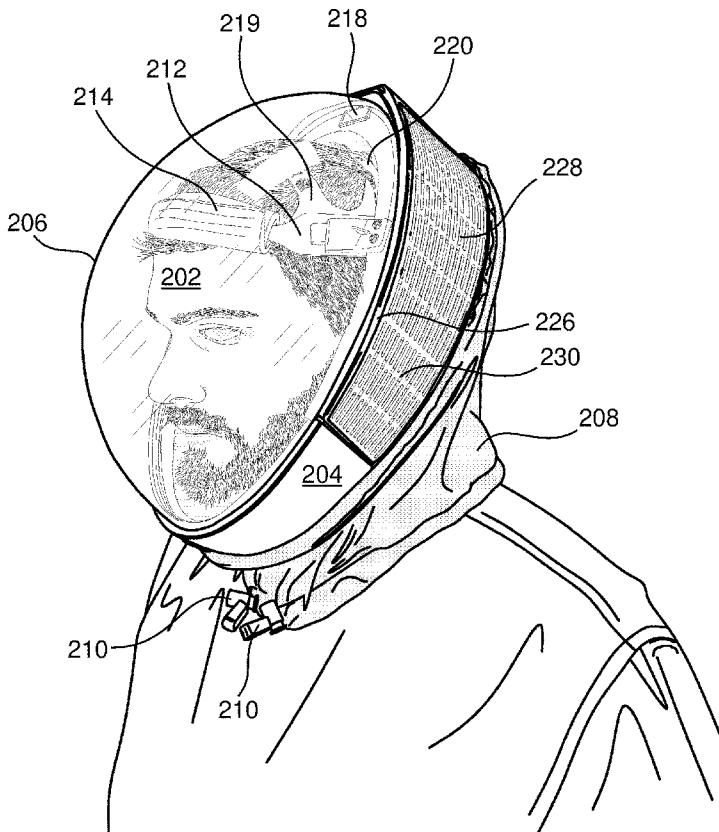
A62B 18/04 (2006.01)
A62B 18/08 (2006.01)
A62B 23/02 (2006.01)

(52) **U.S. Cl.**

CPC *A62B 18/045* (2013.01); *A62B 18/084* (2013.01); *A62B 23/02* (2013.01)

(57) **ABSTRACT**

A device for filtering air for a user comprising a frame formed in a generally oval-shaped band, the band encircling the user's head, with an upper portion extending above and behind the user's ears and a lower portion extending below and in front of the user's ears. The device includes components mounted to the frame, comprising an air intake filter mounted on the frame and communicating on one side with ambient air outside the device and on the other side with an inlet duct and an air outlet filter mounted on the frame and communicating on one side with air inside the device and on the other side with ambient air outside the device. The device also includes a battery-powered air mover mounted on the frame and operable to pull air through the air intake filter and through the inlet duct and push air out into the inside of the device and a rechargeable battery mounted on the frame to power the air mover. The device further includes a transparent face shield mounted on one side of the frame in such a way as to create an airtight seal between the face shield and the one side of the frame, a fabric component made from an air impermeable fabric and mounted on the other side of the frame in such a way as to create an airtight seal between the fabric component and the other side of the frame, and to encircle the user's neck, a head harness configured to rest on the user's head and support the frame with its components mounted thereon, and wherein the components are mounted on the upper portion of the frame and on the lower portion of the frame so as to achieve a weight distribution ratio between the upper portion of the frame with components mounted thereon and the lower portion of the frame with components mounted thereon, the ratio being between 1 to 1.5 and 1.5 to 1.



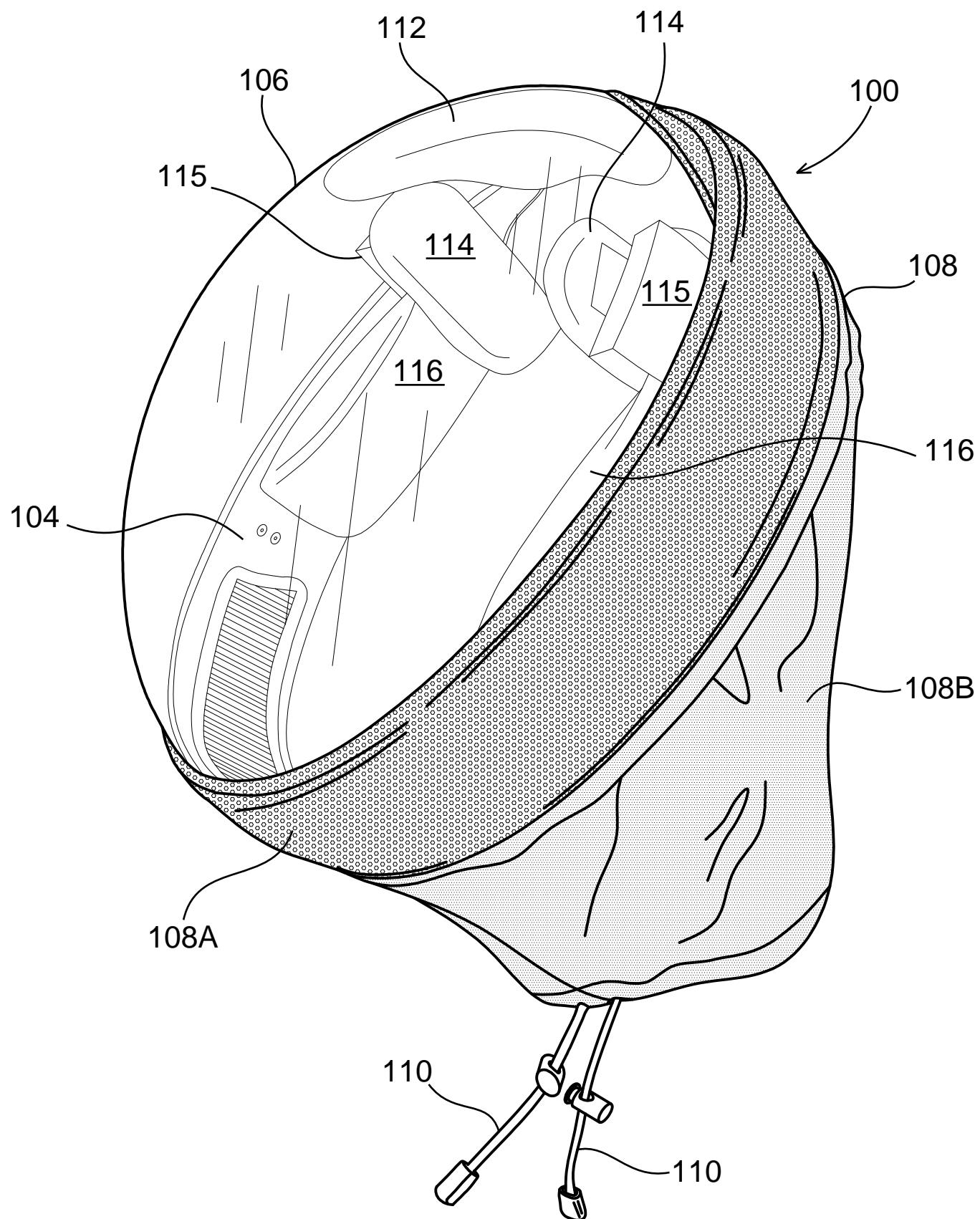


FIG. 1

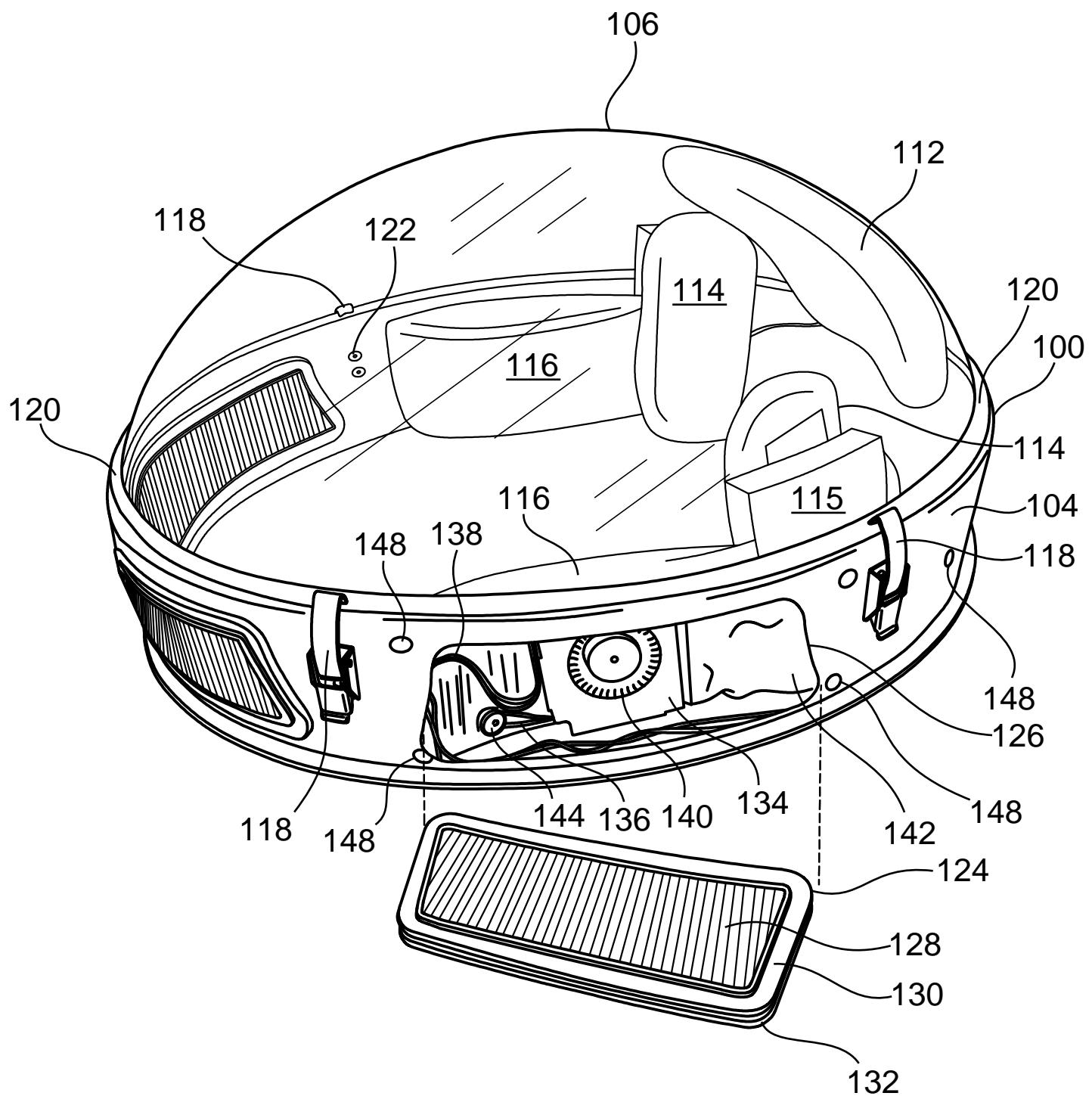


FIG. 2

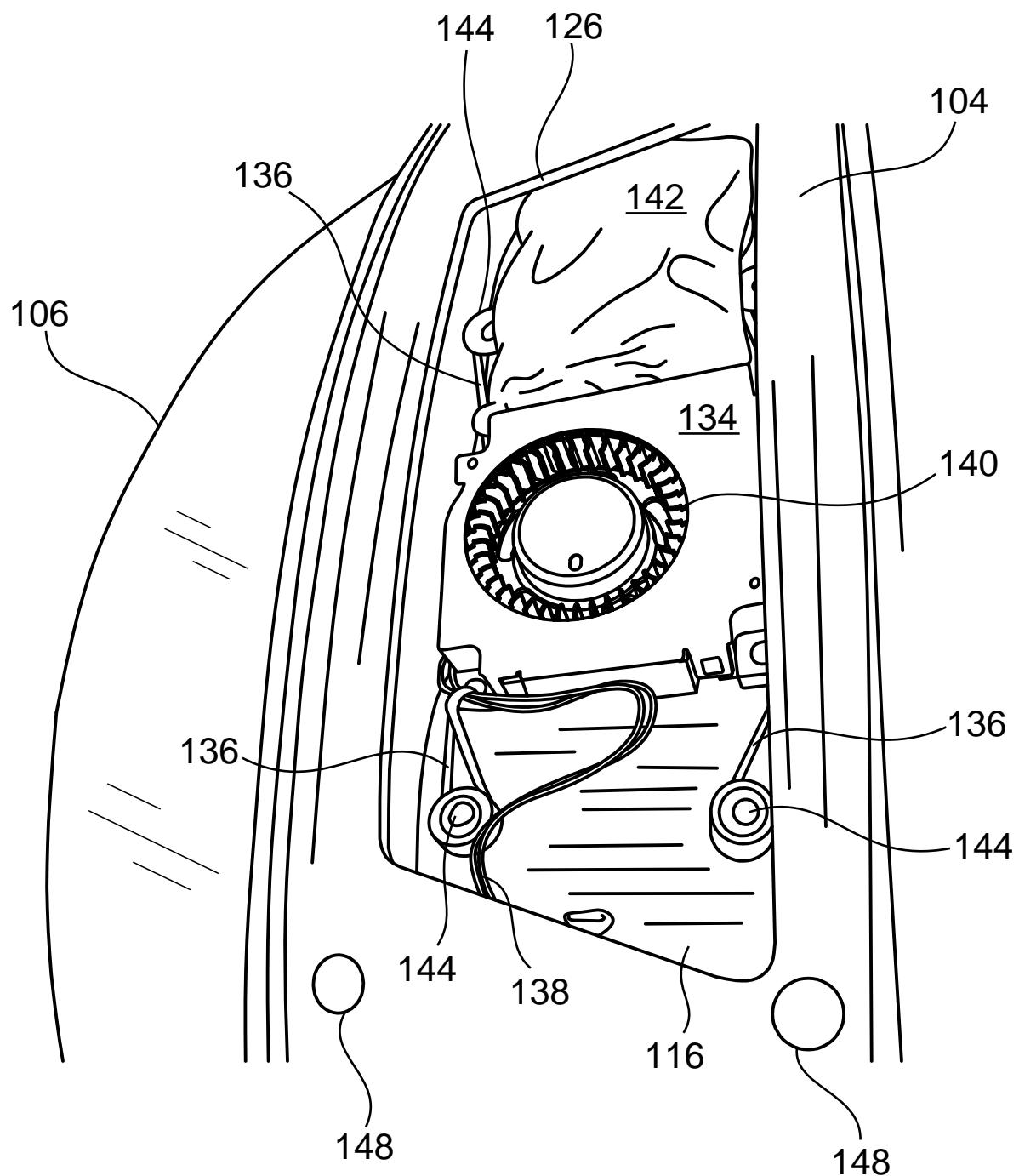


FIG. 3

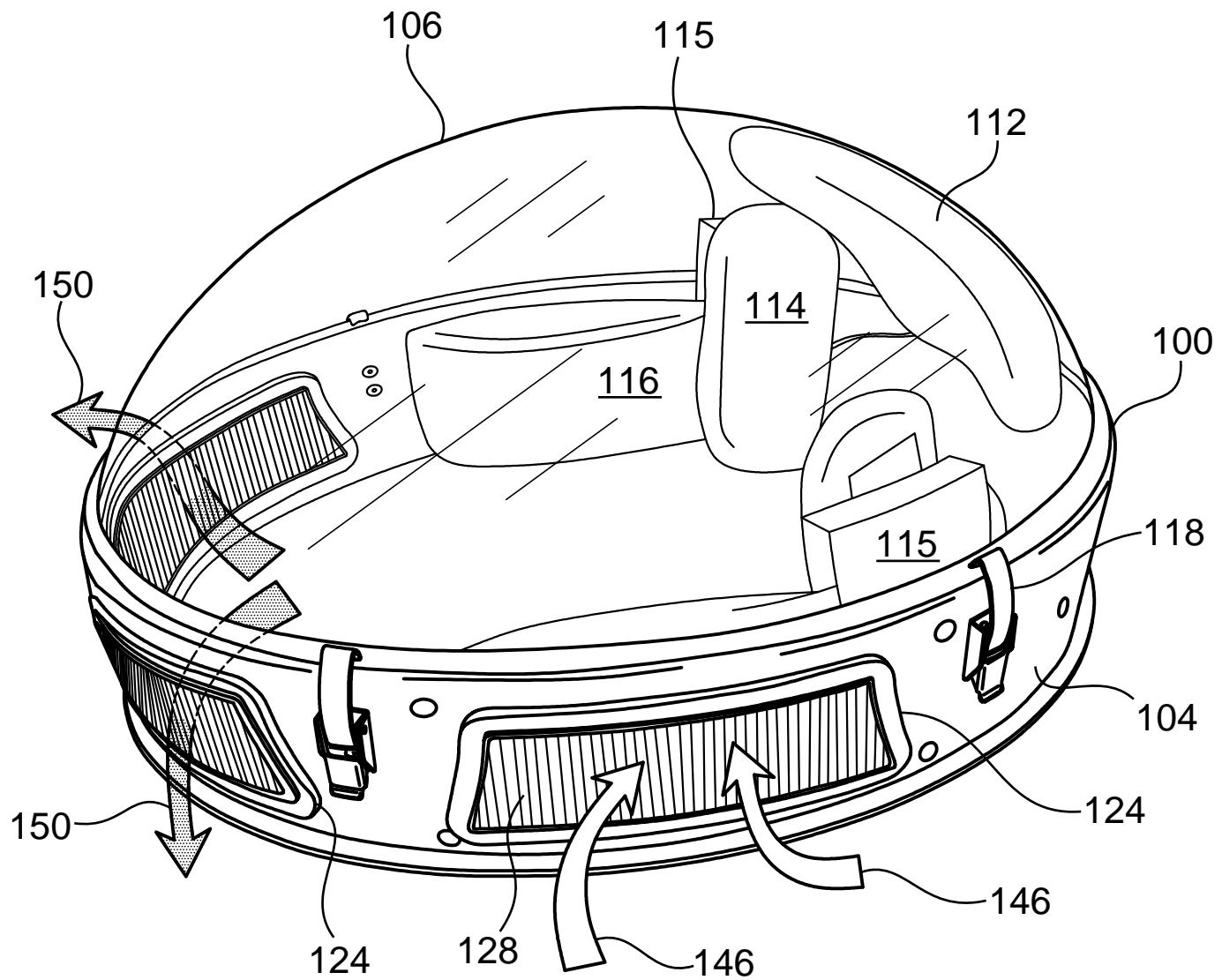


FIG. 4

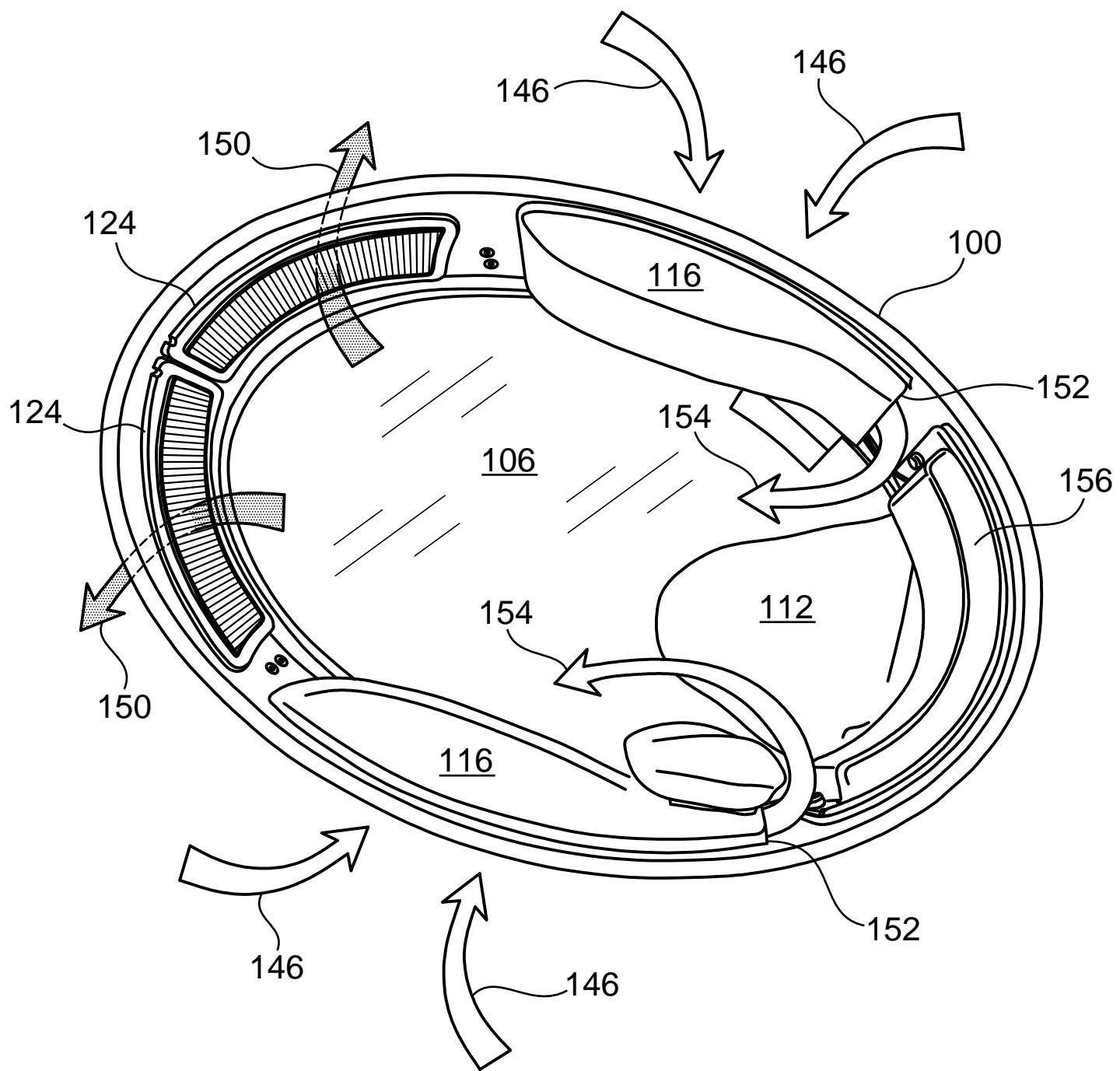


FIG. 5

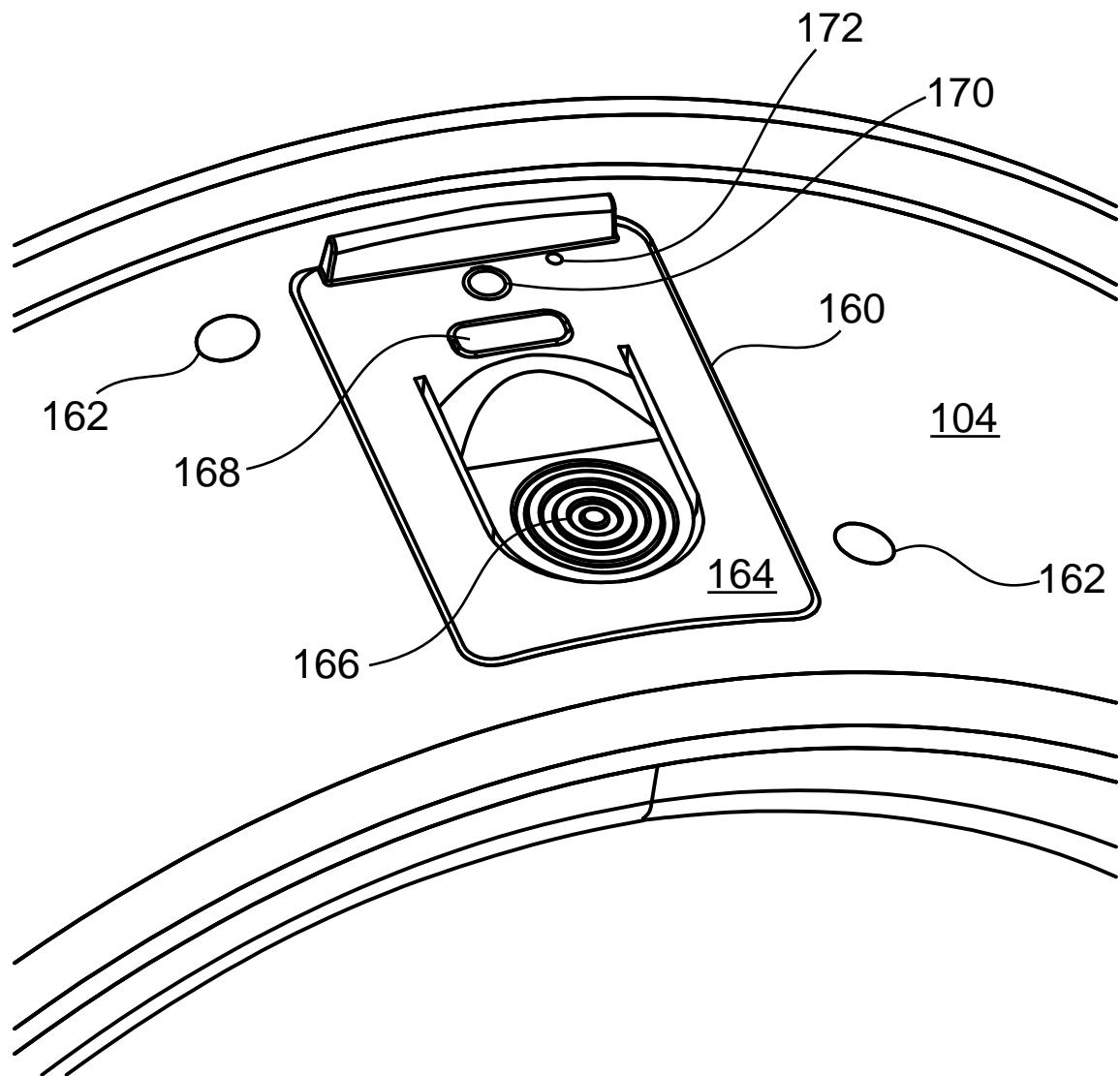


FIG. 6

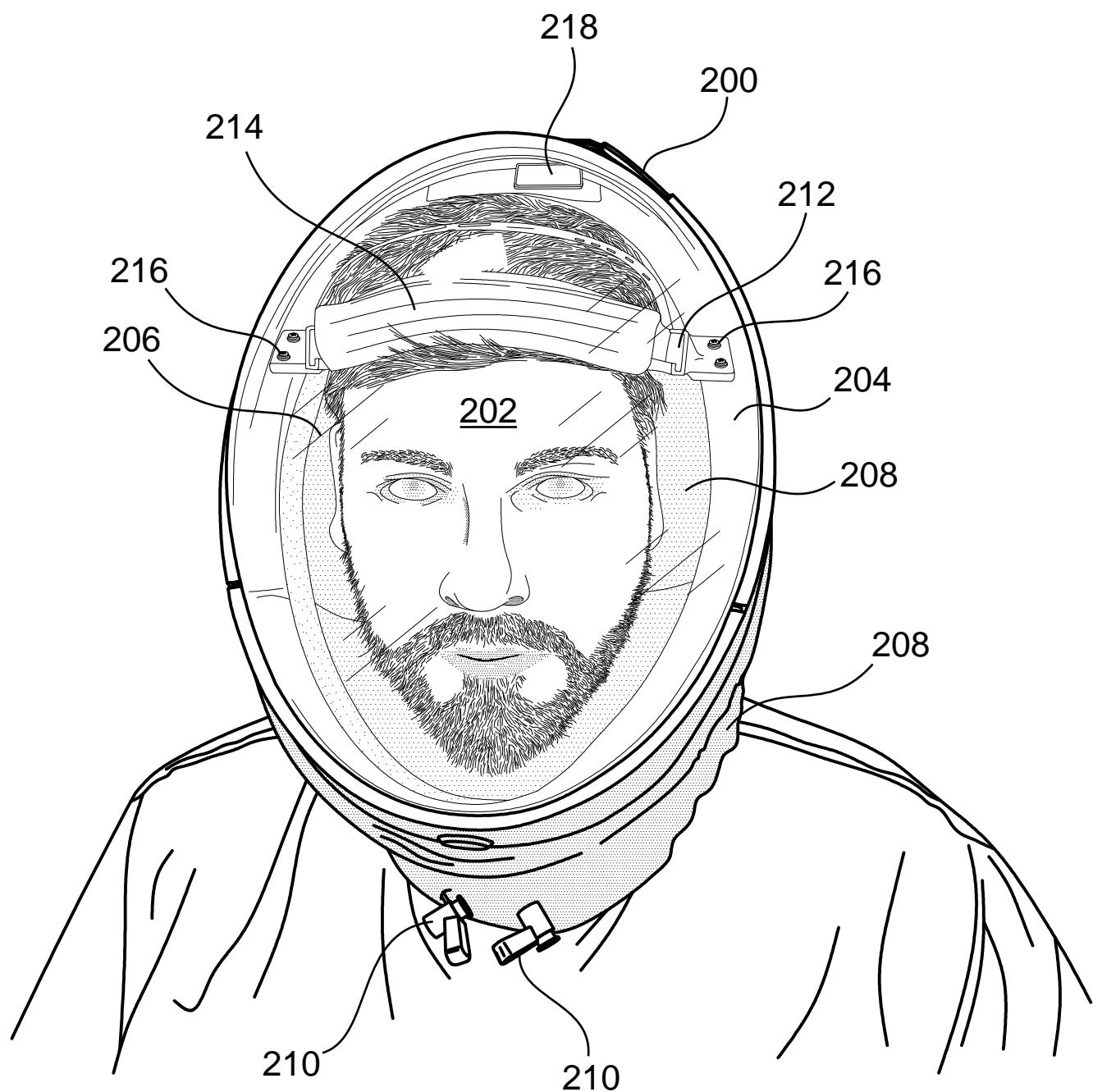


FIG. 7

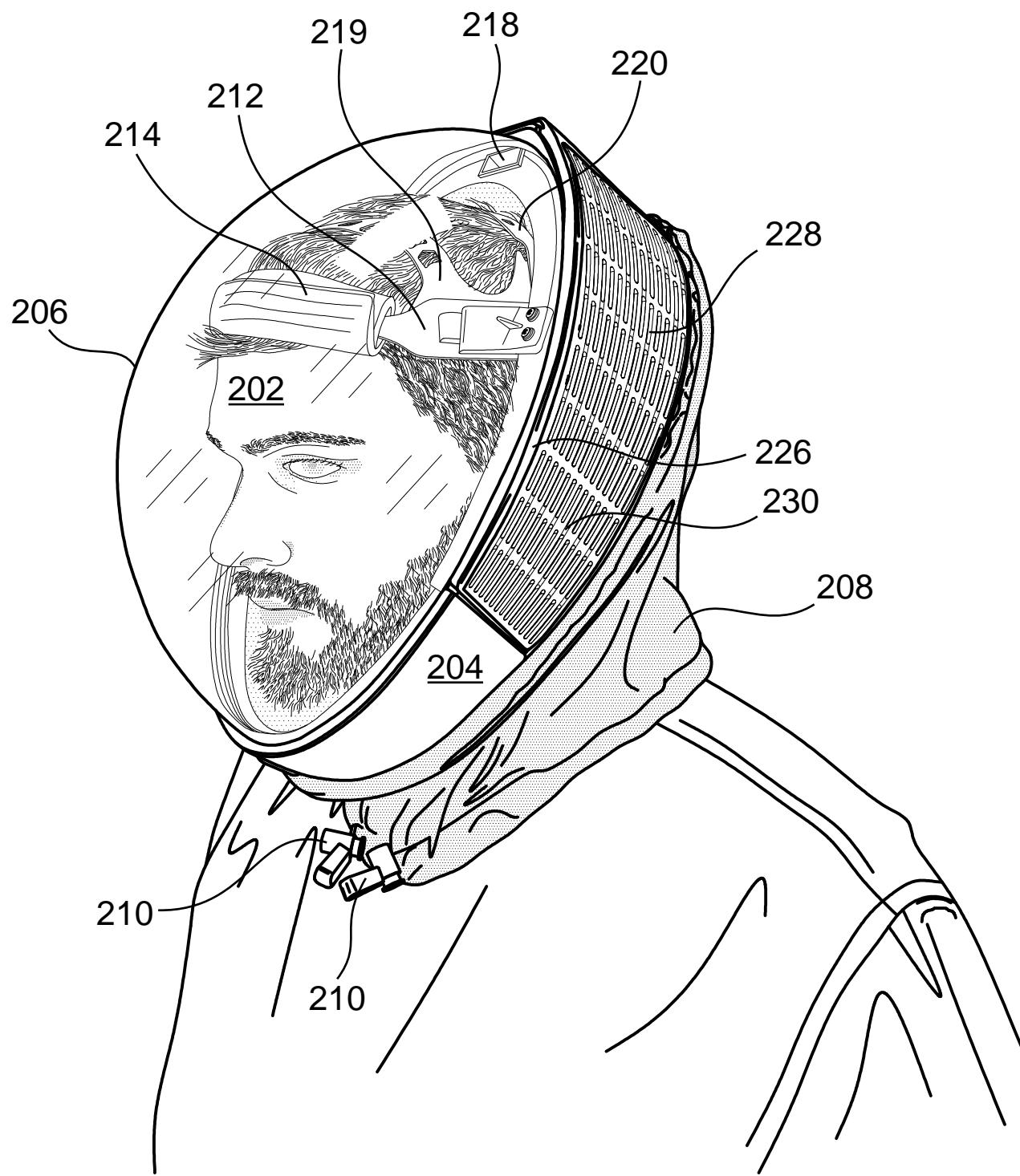


FIG. 8

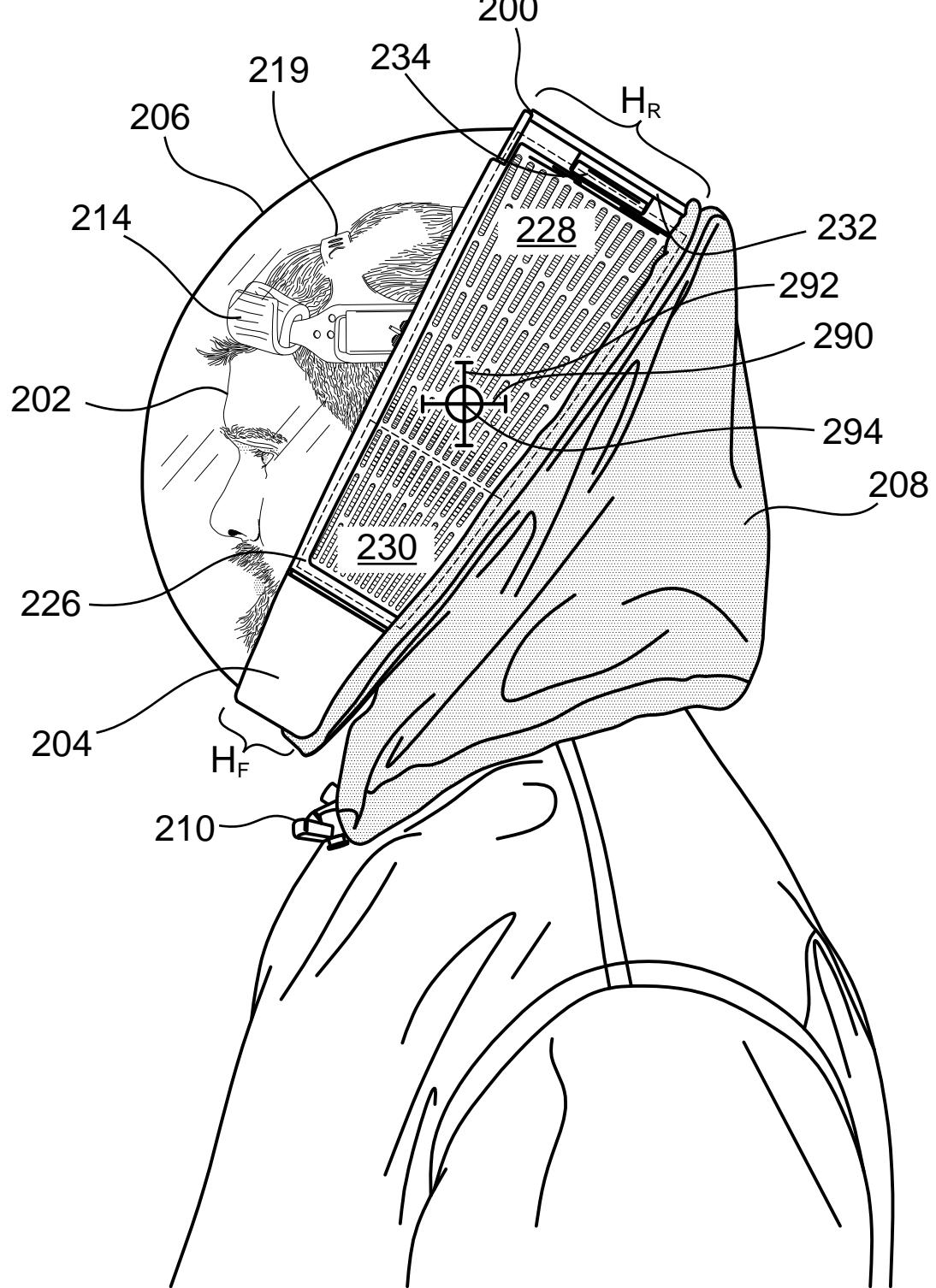


FIG. 9

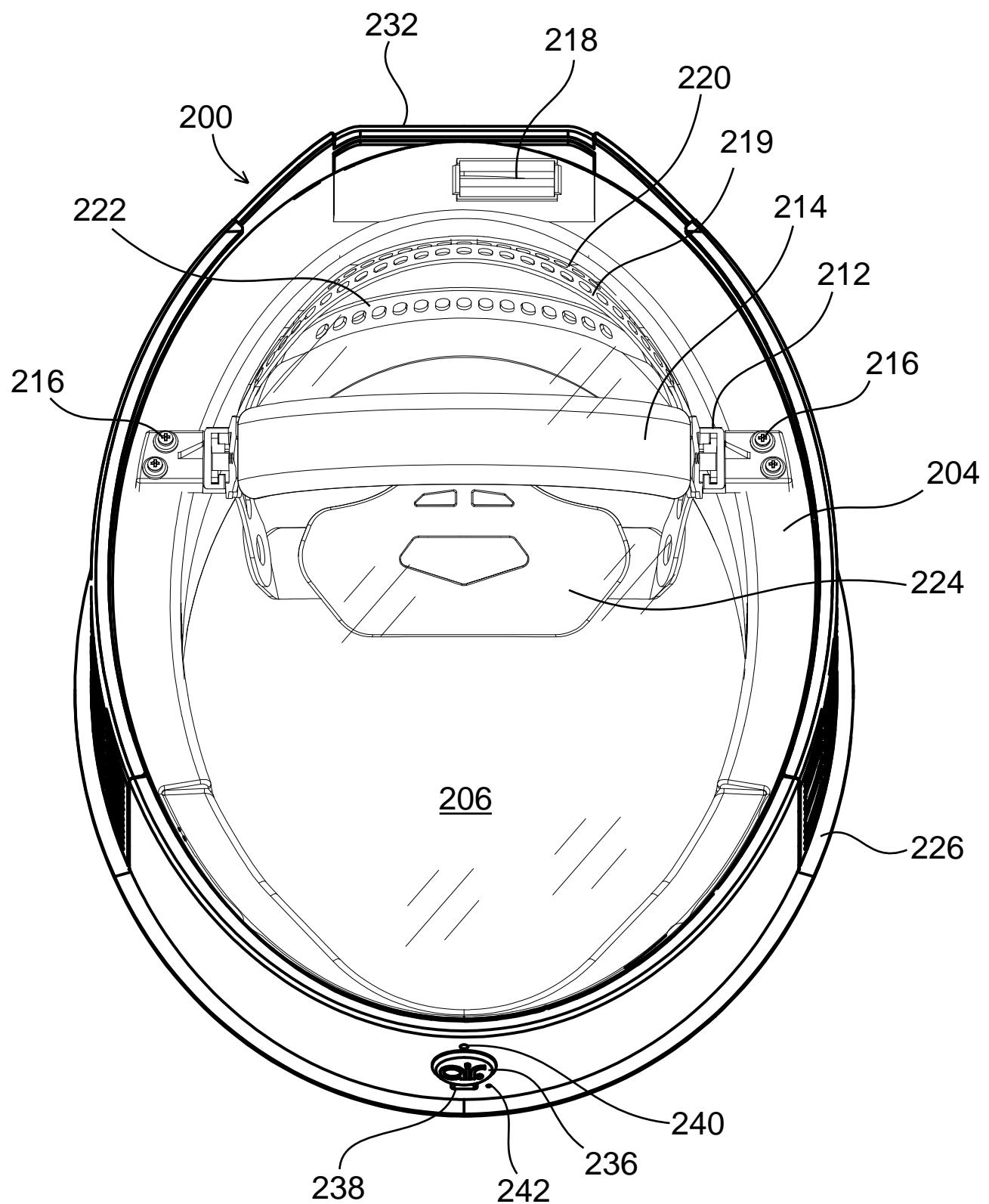


FIG. 10

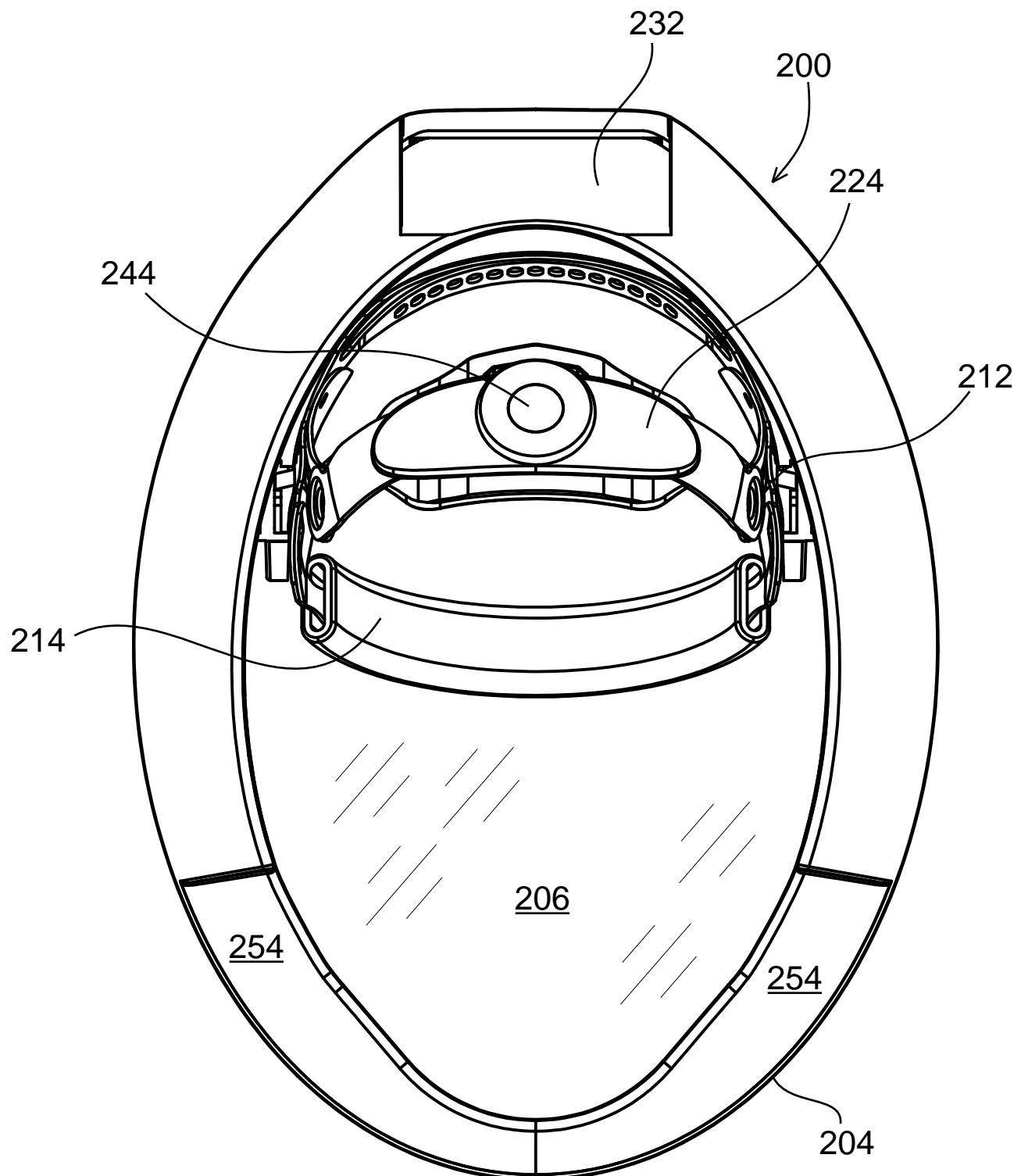


FIG. 11

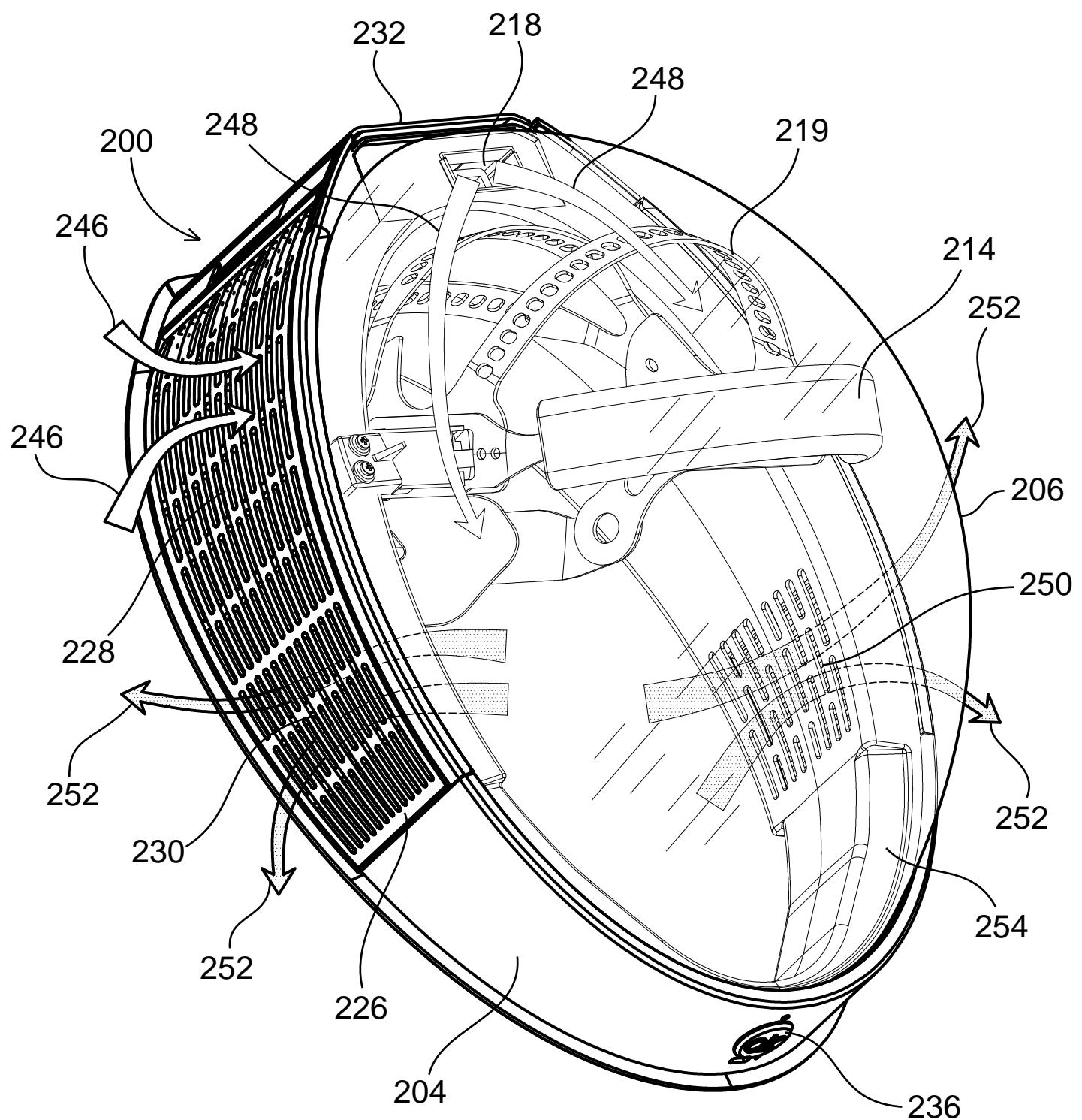


FIG. 12

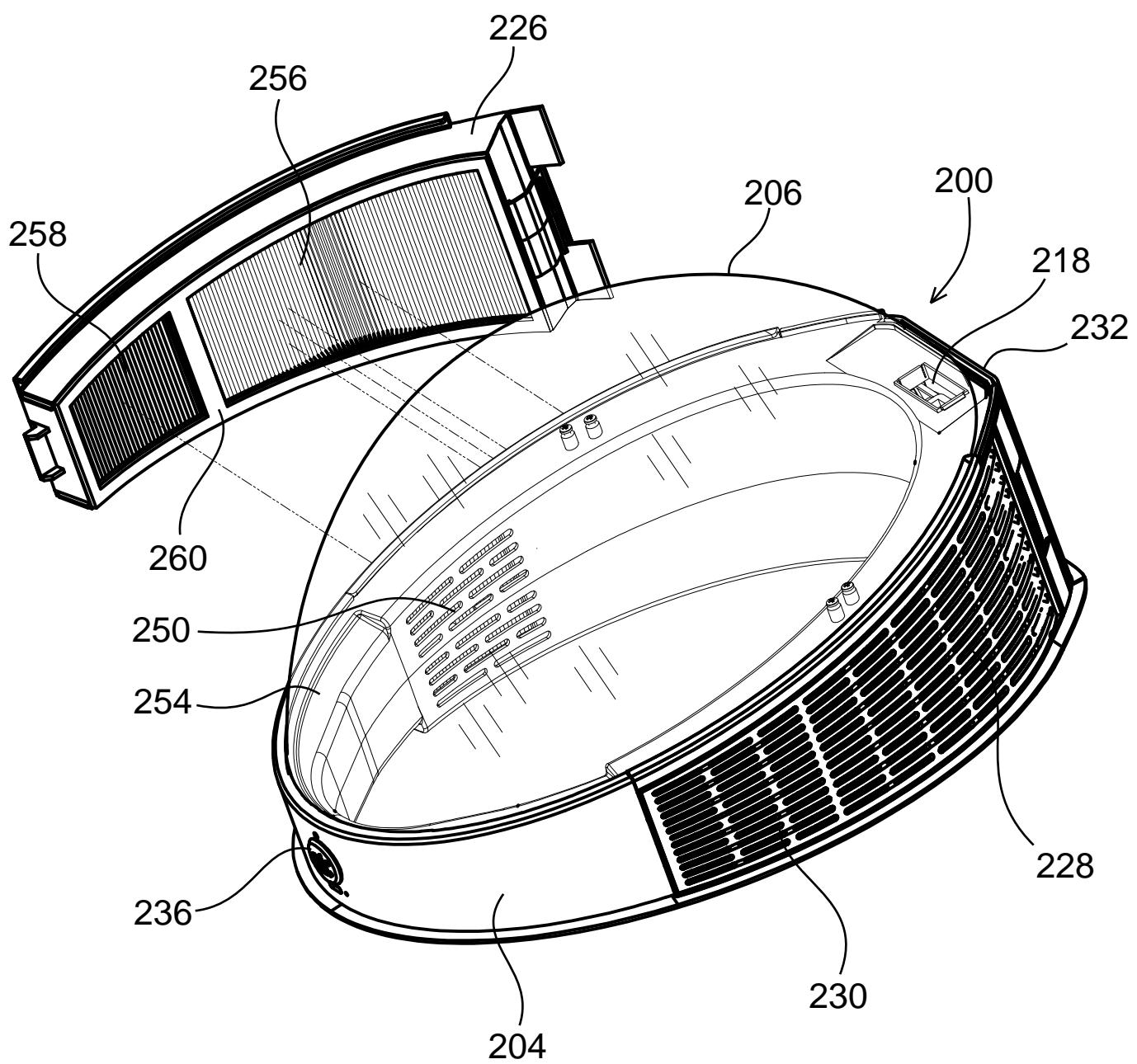


FIG. 13

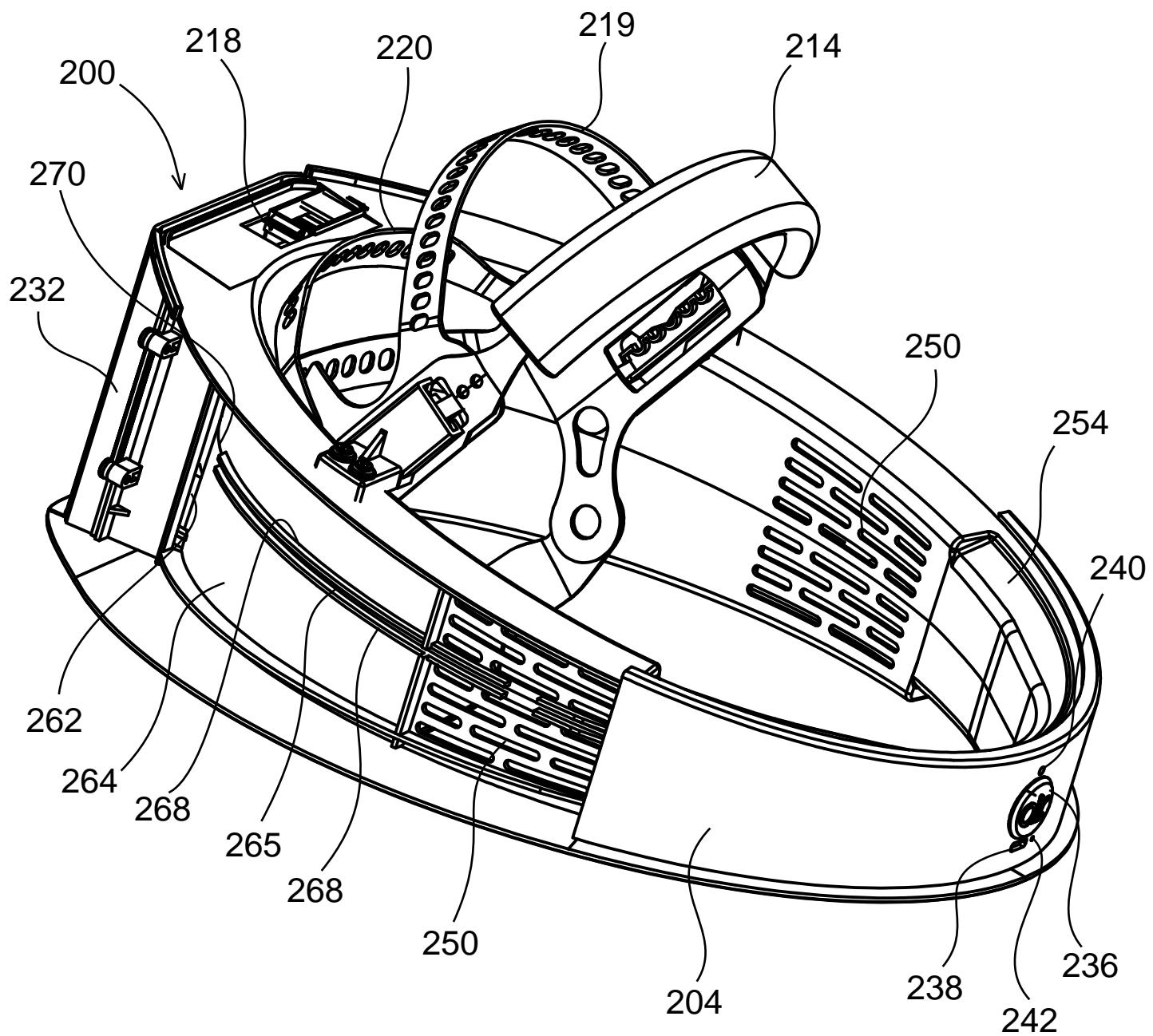


FIG. 14

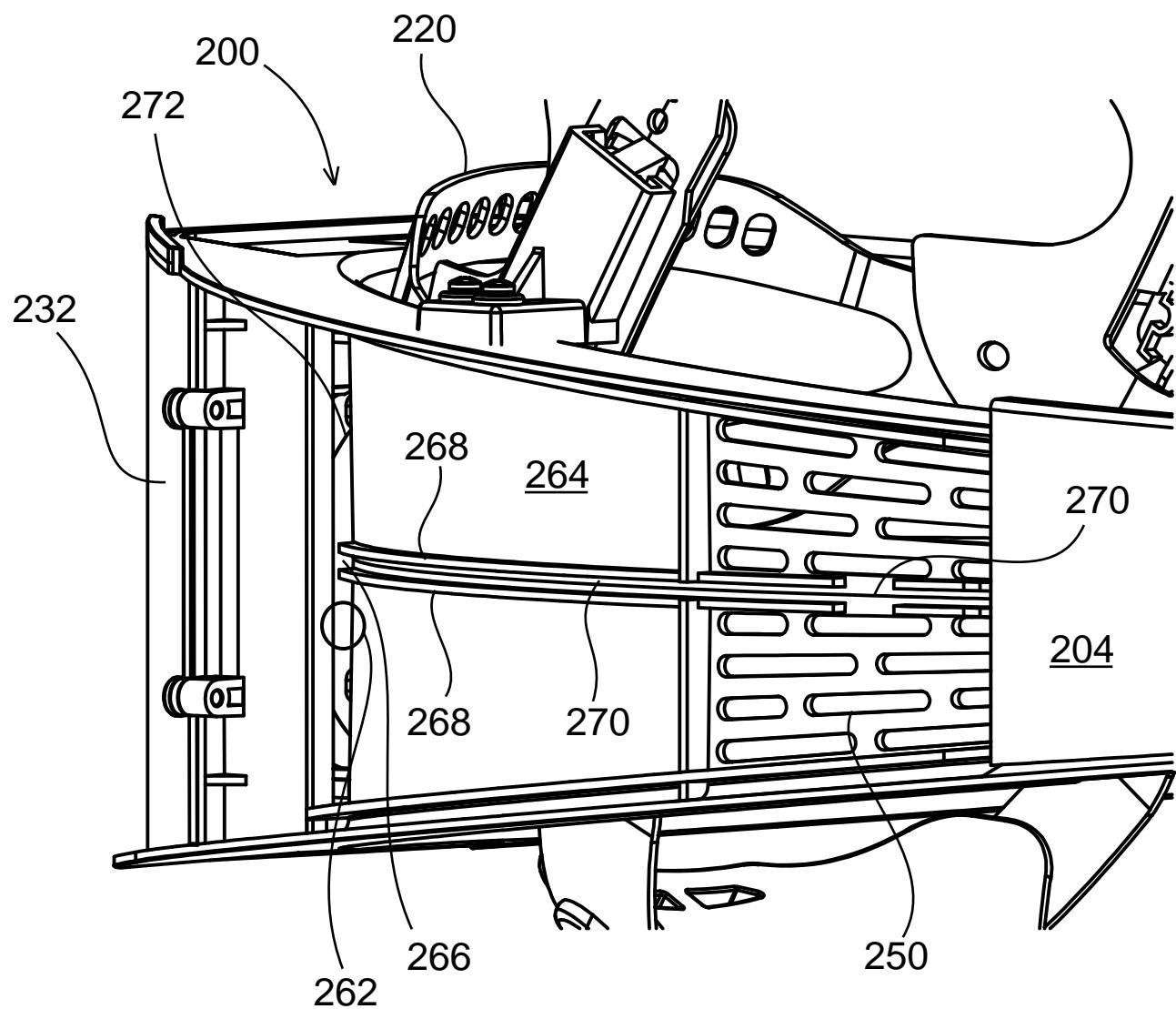


FIG. 15

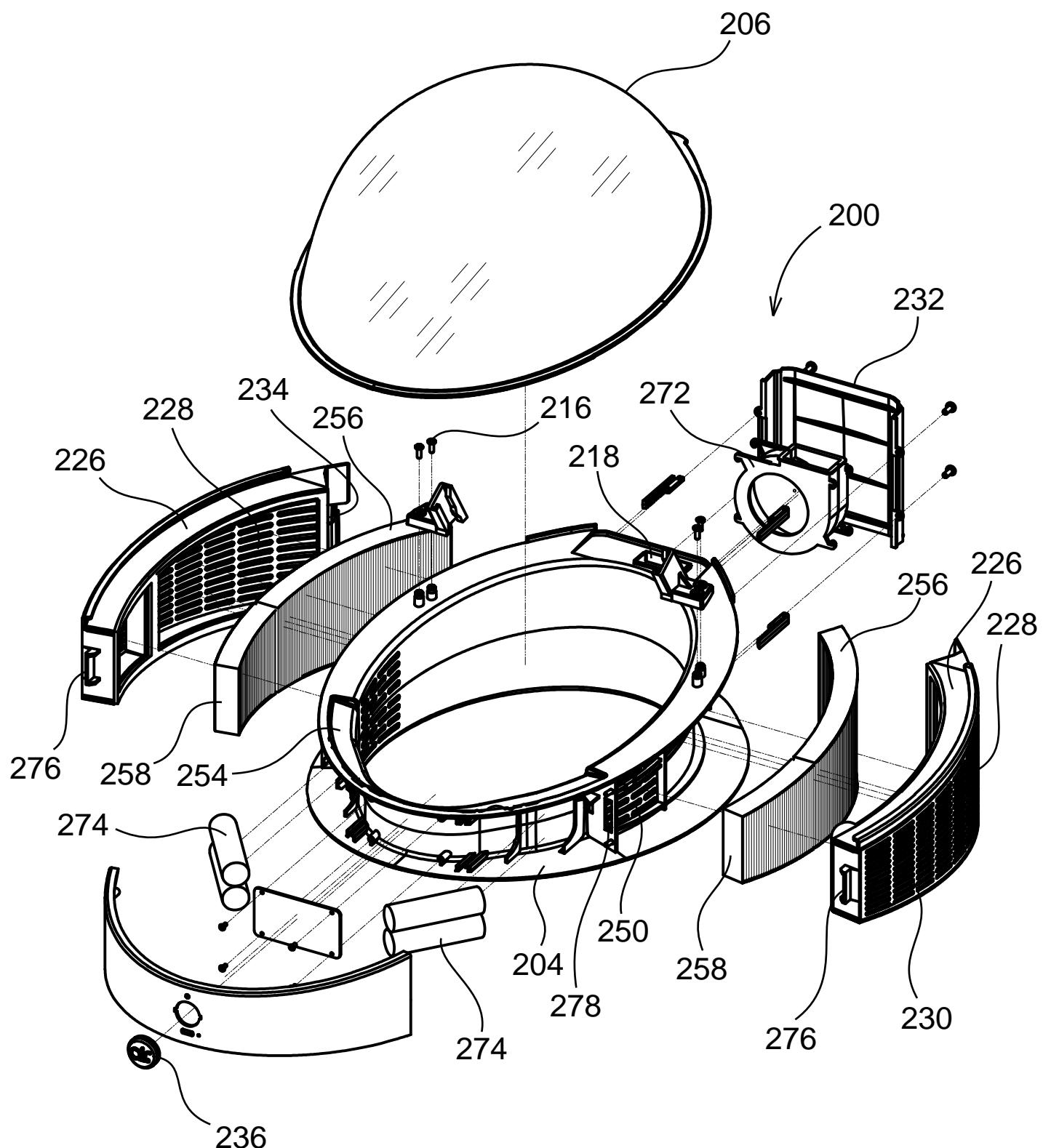


FIG. 16

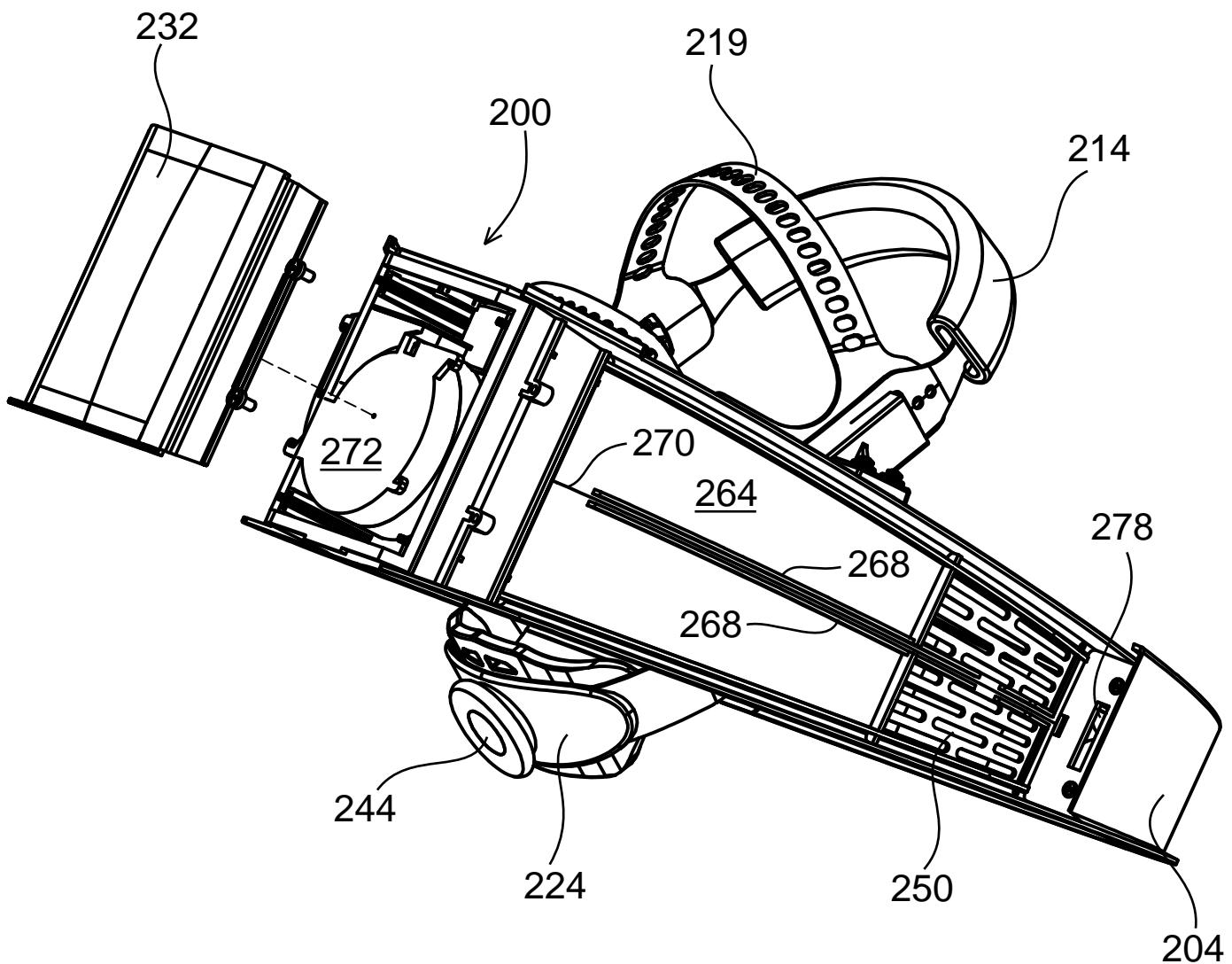


FIG. 17

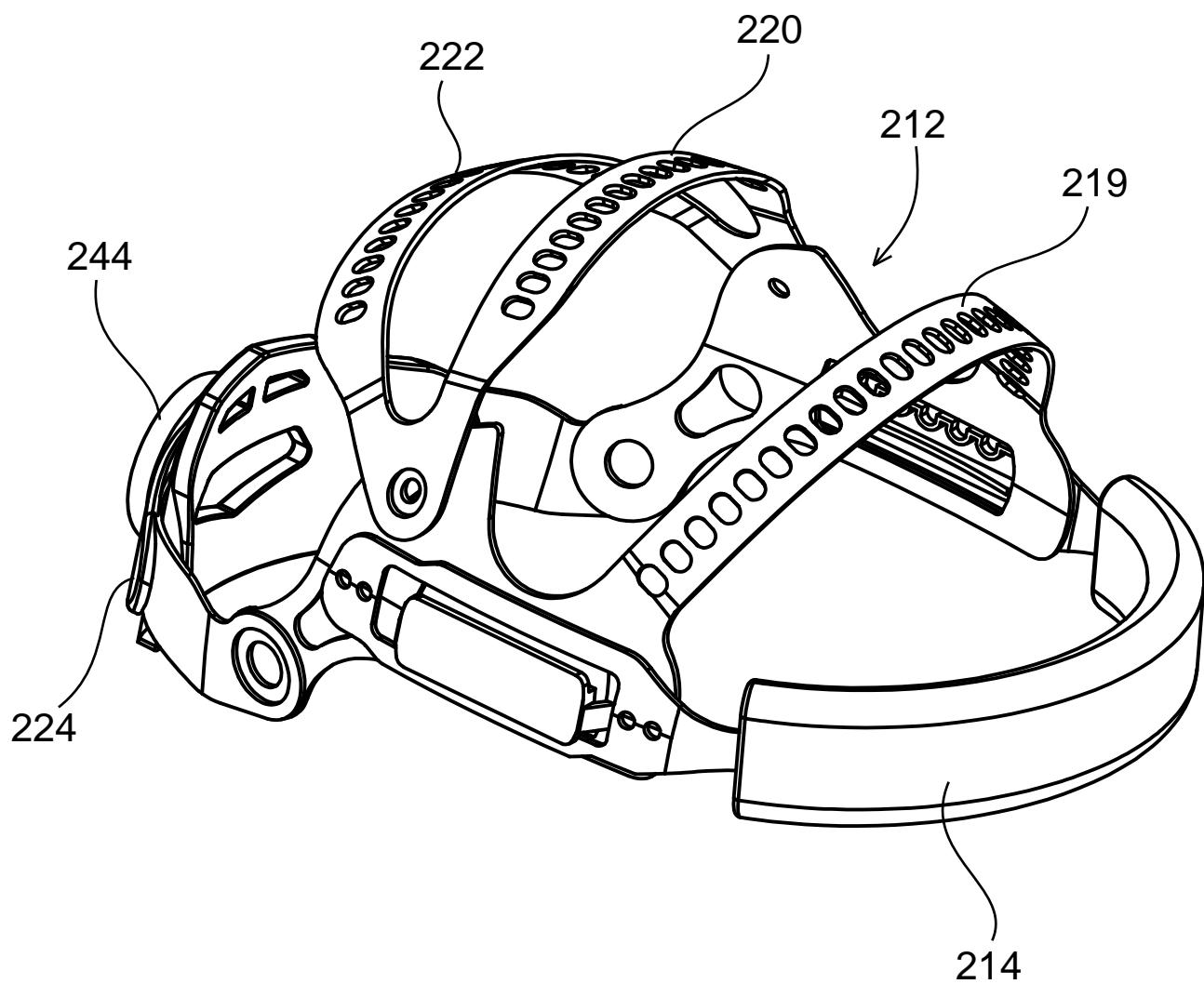


FIG. 18

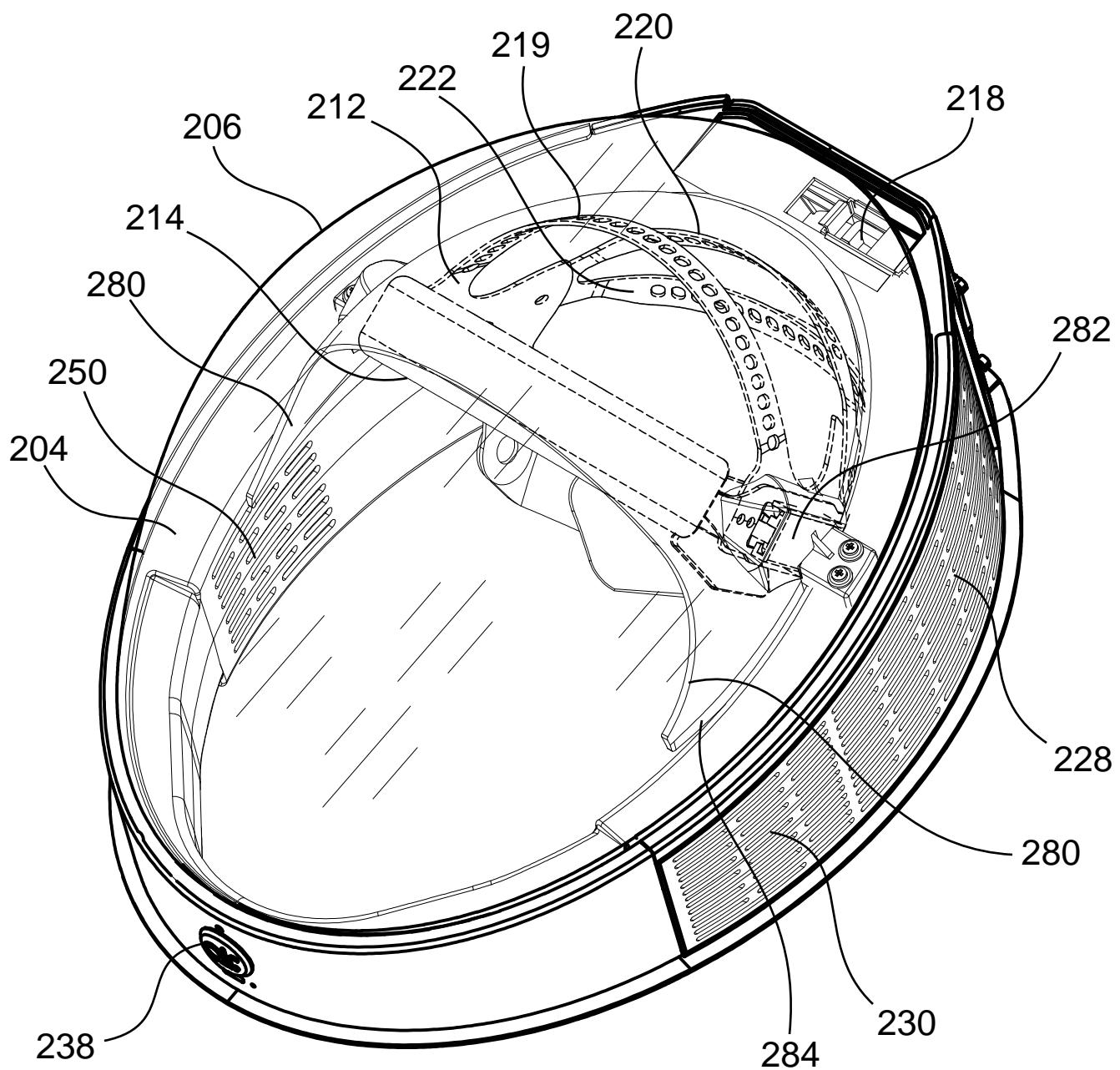


FIG. 19

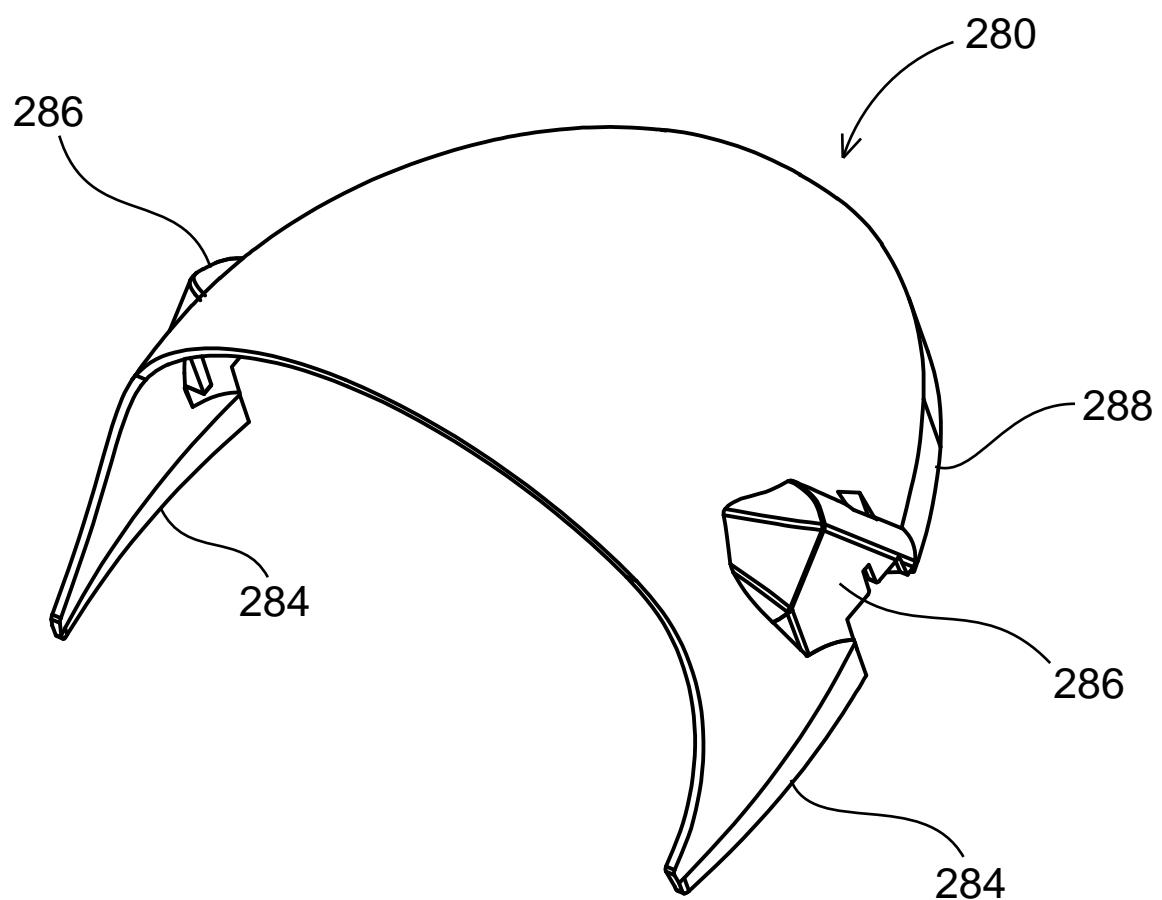


FIG. 20



US011883204B2

(12) **United States Patent**
Larsen et al.(10) **Patent No.:** US 11,883,204 B2
(45) **Date of Patent:** Jan. 30, 2024(54) **ANALYTICAL TOILET WITH ACCESS PANEL**(71) Applicant: **Medic, Inc.**, Provo, UT (US)(72) Inventors: **Joshua Larsen**, Spanish Fork, UT (US); **John W. Christiansen**, American Fork, UT (US)(73) Assignee: **Hall Labs LLC**, Provo, UT (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/661,219**(22) Filed: **Apr. 28, 2022**(65) **Prior Publication Data**

US 2022/0346719 A1 Nov. 3, 2022

Related U.S. Application Data

(60) Provisional application No. 63/181,095, filed on Apr. 28, 2021.

(51) **Int. Cl.**

A61B 5/00 (2006.01)
E03D 9/00 (2006.01)
A61B 10/00 (2006.01)
G01N 33/493 (2006.01)
E03D 11/13 (2006.01)

(52) **U.S. Cl.**

CPC *A61B 5/6887* (2013.01); *A61B 10/007* (2013.01); *E03D 9/00* (2013.01); *E03D 11/13* (2013.01); *G01N 33/493* (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

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* cited by examiner

Primary Examiner — Christine J Skubinna**ABSTRACT**

An analytical toilet is disclosed having at least one health and wellness sensor and a base supporting a bowl. A removable access panel is removably attached to the base. A space is provided between the base and the toilet, which is adapted to contain the at least one health and wellness sensor.

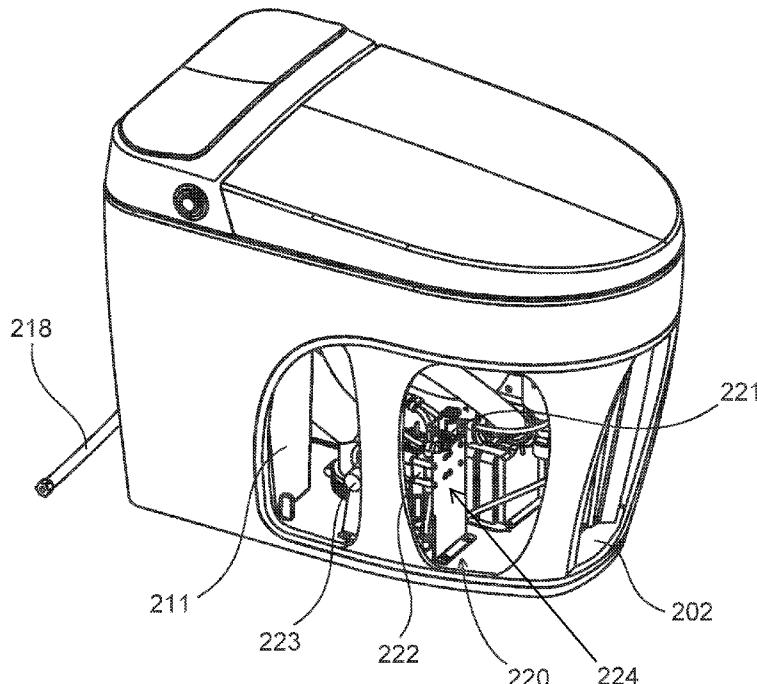
20 Claims, 5 Drawing Sheets

FIG. 1C (Prior Art)

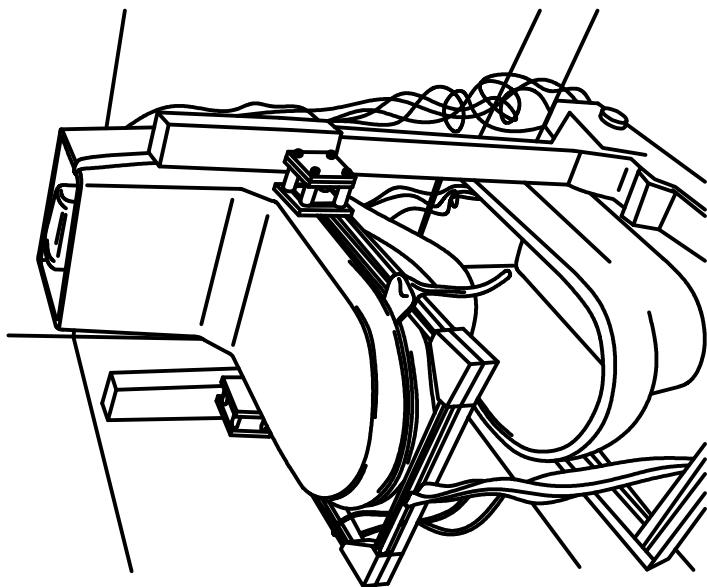


FIG. 1B (Prior Art)

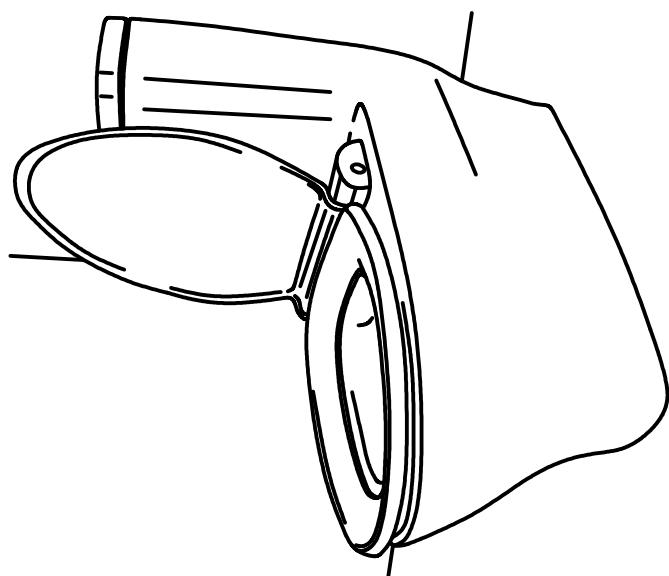
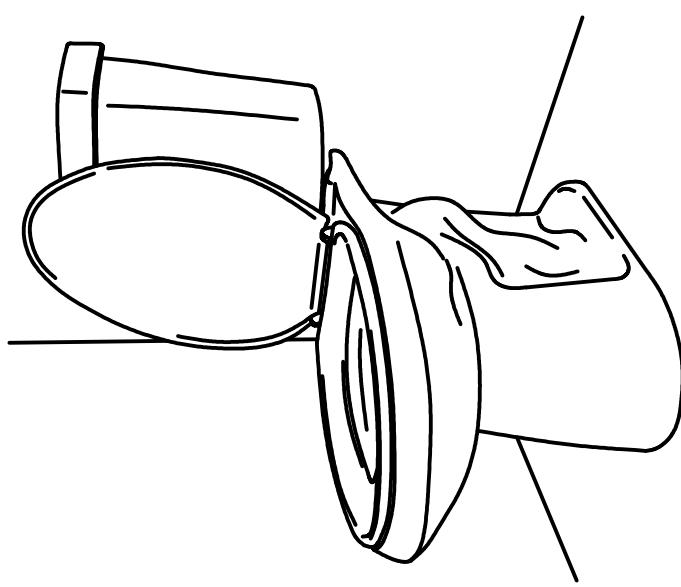


FIG. 1A (Prior Art)



200

200

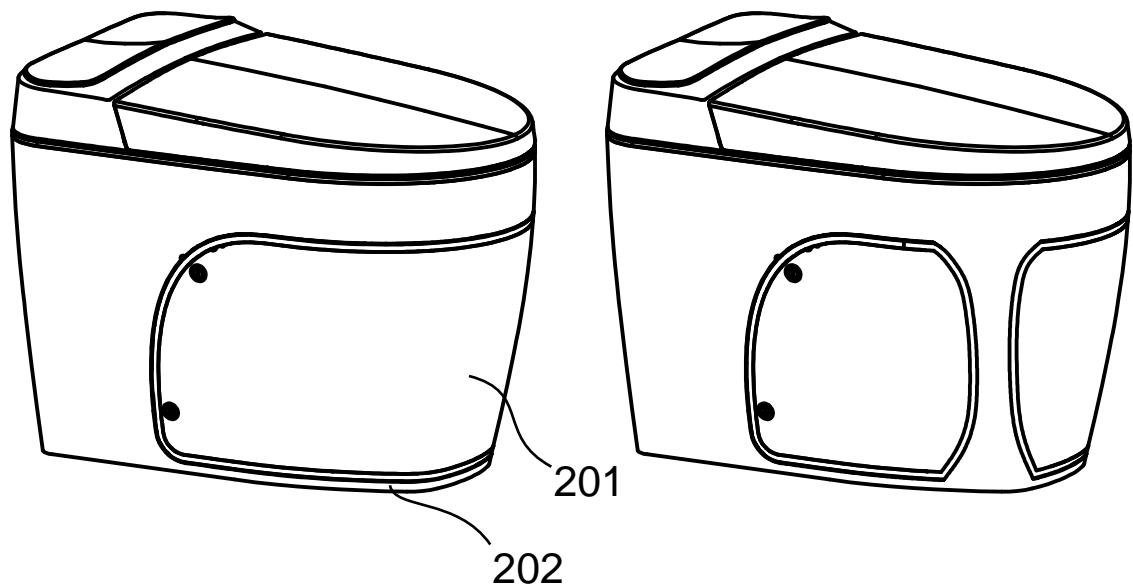


FIG. 2A

FIG. 2B

201

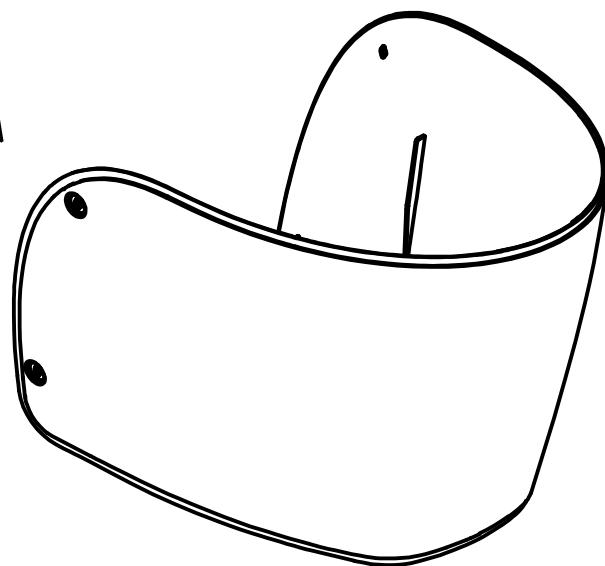


FIG. 3

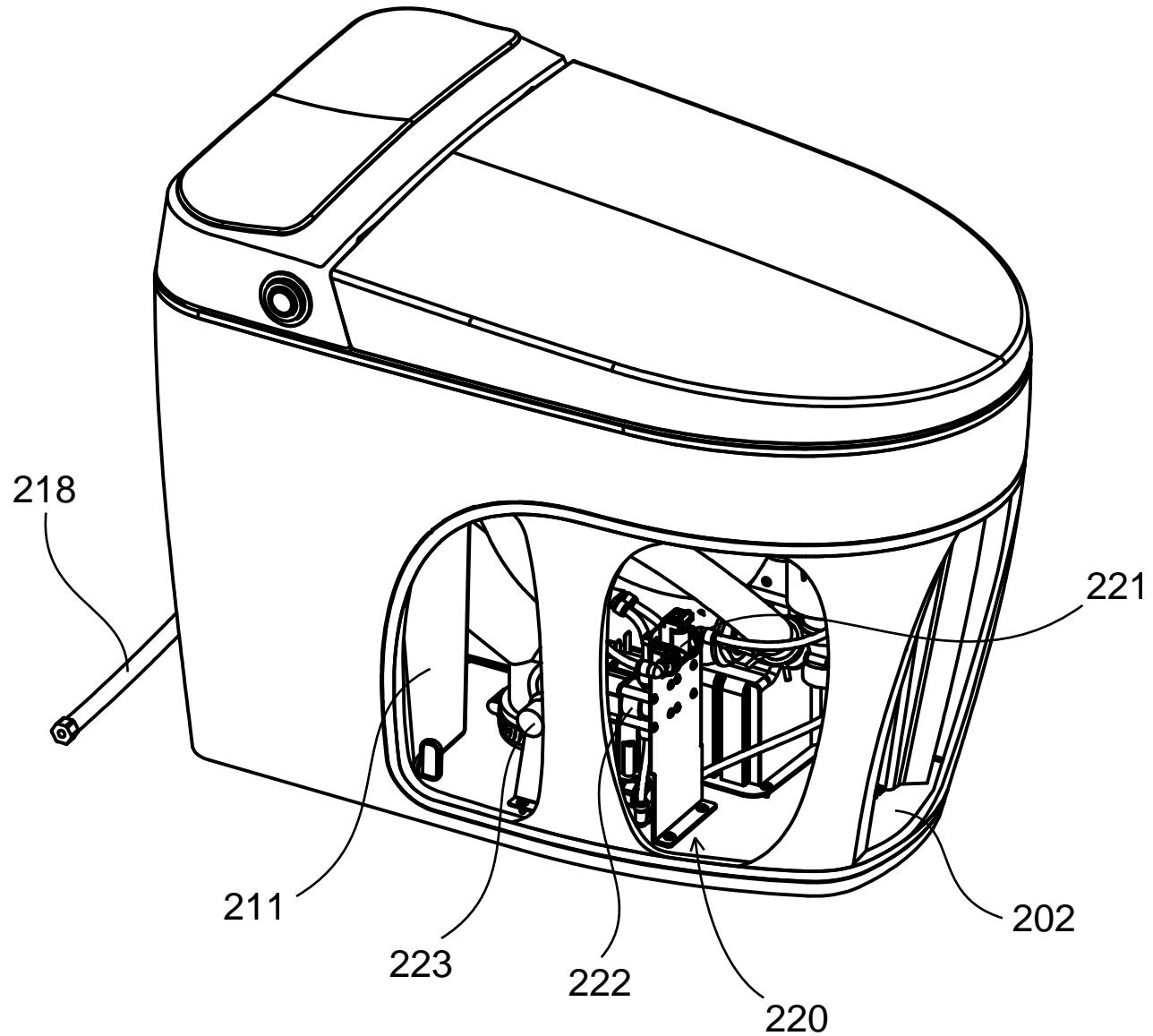


FIG. 4

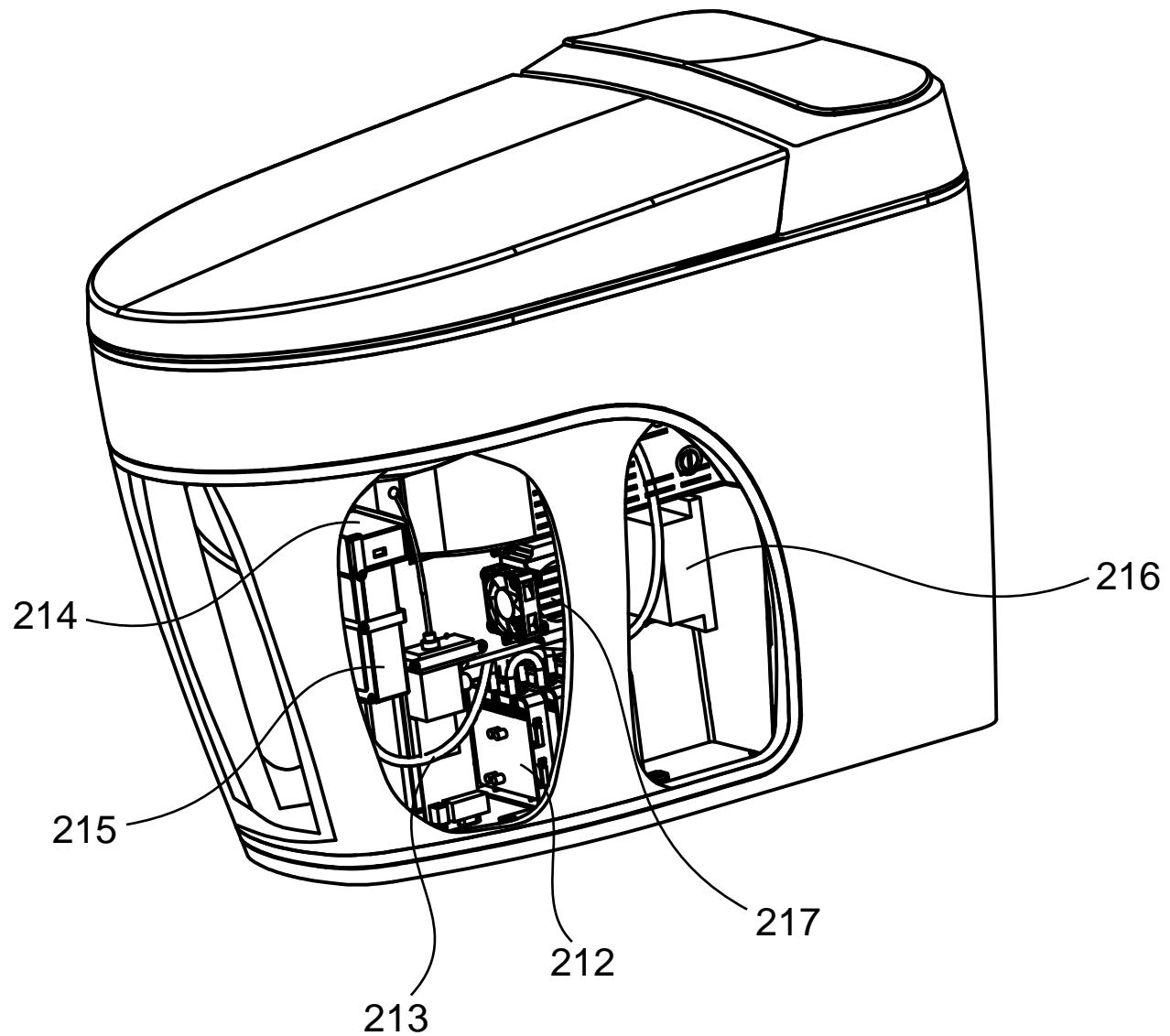


FIG. 5

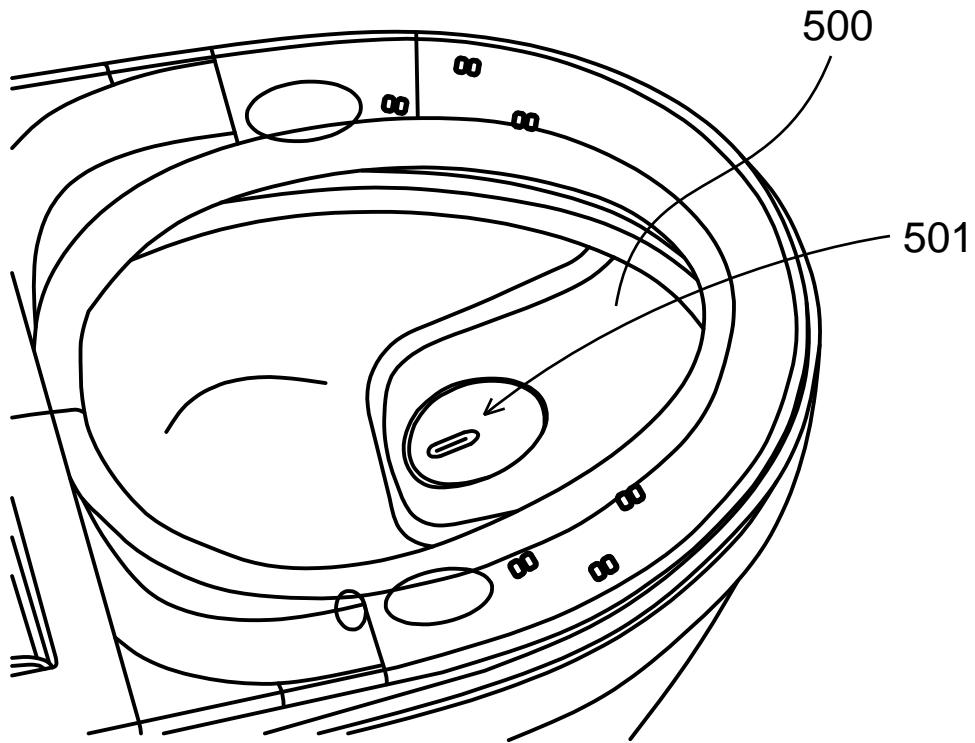


FIG. 6

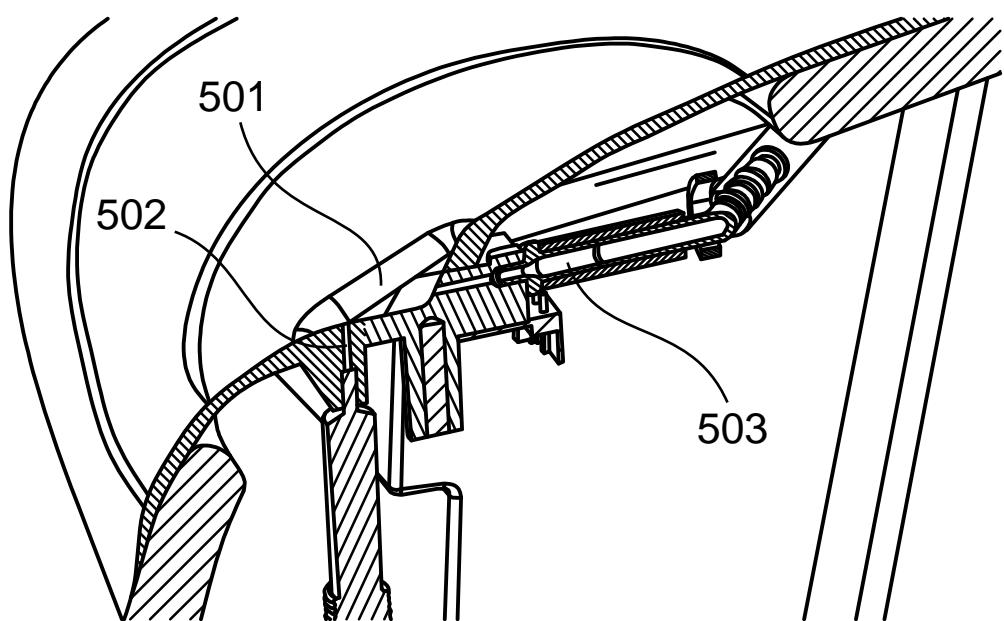


FIG. 7



US 20240090695A1

(19) **United States**

(12) **Patent Application Publication**

Hall et al.

(10) **Pub. No.: US 2024/0090695 A1**

(43) **Pub. Date:** **Mar. 21, 2024**

(54) **MOTORIZED DEVICE FOR OPENING AND CLOSING CURTAINS**

(71) Applicant: **Hall Labs LLC**, Provo, UT (US)

(72) Inventors: **David R. Hall**, Provo, UT (US);
Jerome Miles, Spanish Fork, UT (US)

(73) Assignee: **Hall Labs LLC**, Provo, UT (US)

(21) Appl. No.: **18/471,119**

(22) Filed: **Sep. 20, 2023**

Related U.S. Application Data

(60) Provisional application No. 63/376,313, filed on Sep. 20, 2022.

Publication Classification

(51) **Int. Cl.**
A47H 5/06 (2006.01)

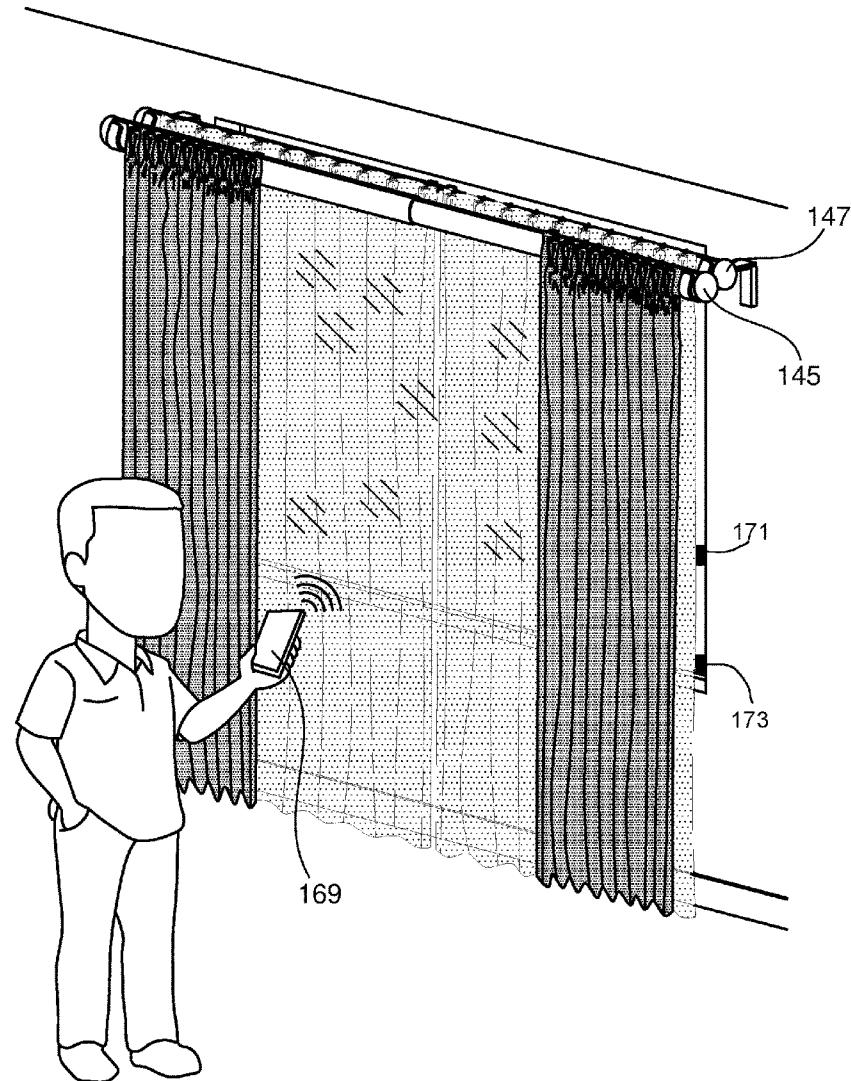
(52) **U.S. Cl.**

CPC **A47H 5/06** (2013.01); **A47H 2005/025**
(2013.01)

(57)

ABSTRACT

The disclosure provides a device for automatically opening and closing a pair of curtains that includes a rod with a longitudinal hollow space. The device also includes a first and second threaded shaft housed within the hollow space. First and second gears are attached to the first and second threaded shaft, respectively. The first and second gear intermesh, so that, when the first threaded shaft rotates in a first angular direction, the second threaded shaft rotates in an opposite second angular direction. The device also includes first and second threaded nuts, threaded onto the first and second threaded shafts. A motor is provided to rotate the first threaded shaft in the first angular direction and simultaneously rotate the second the shaft in the opposite second angular direction.



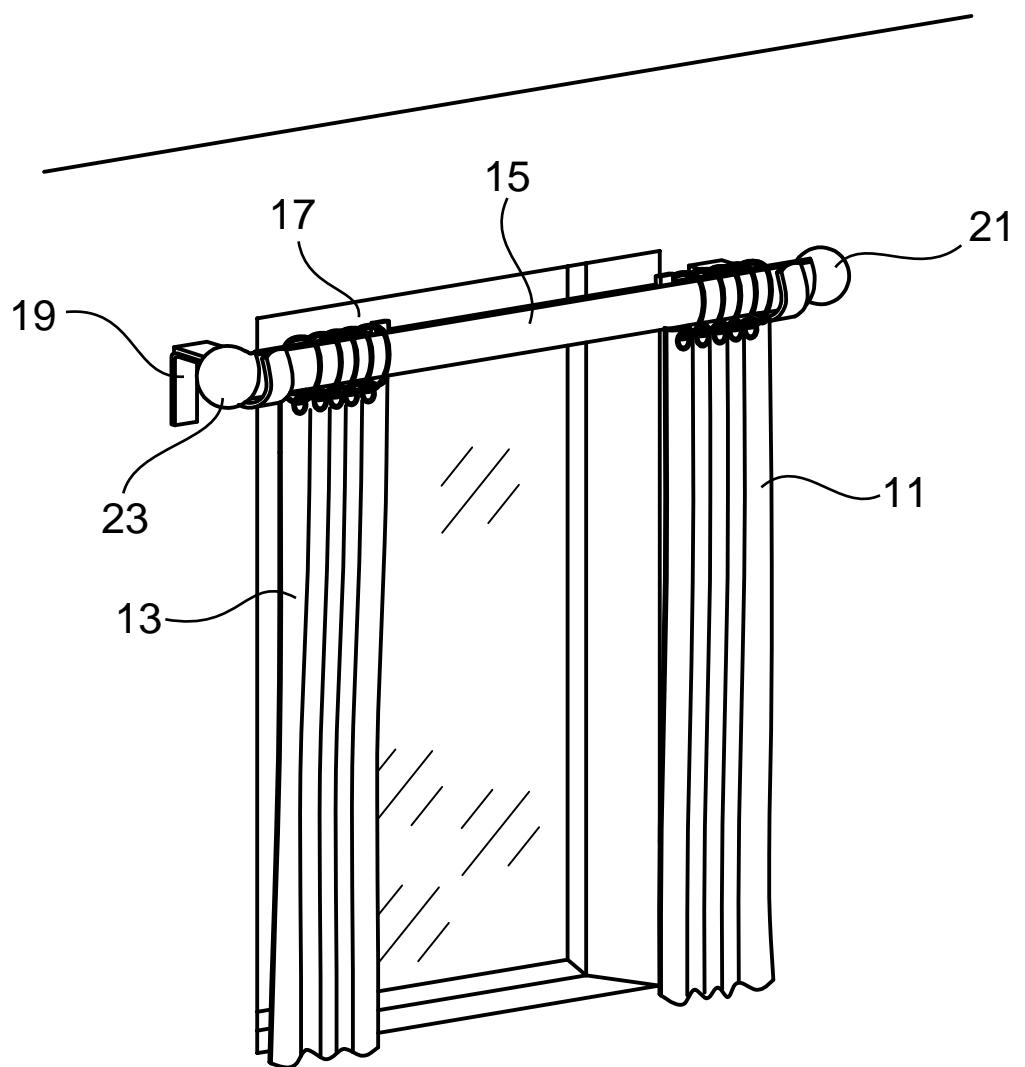


FIG. 1

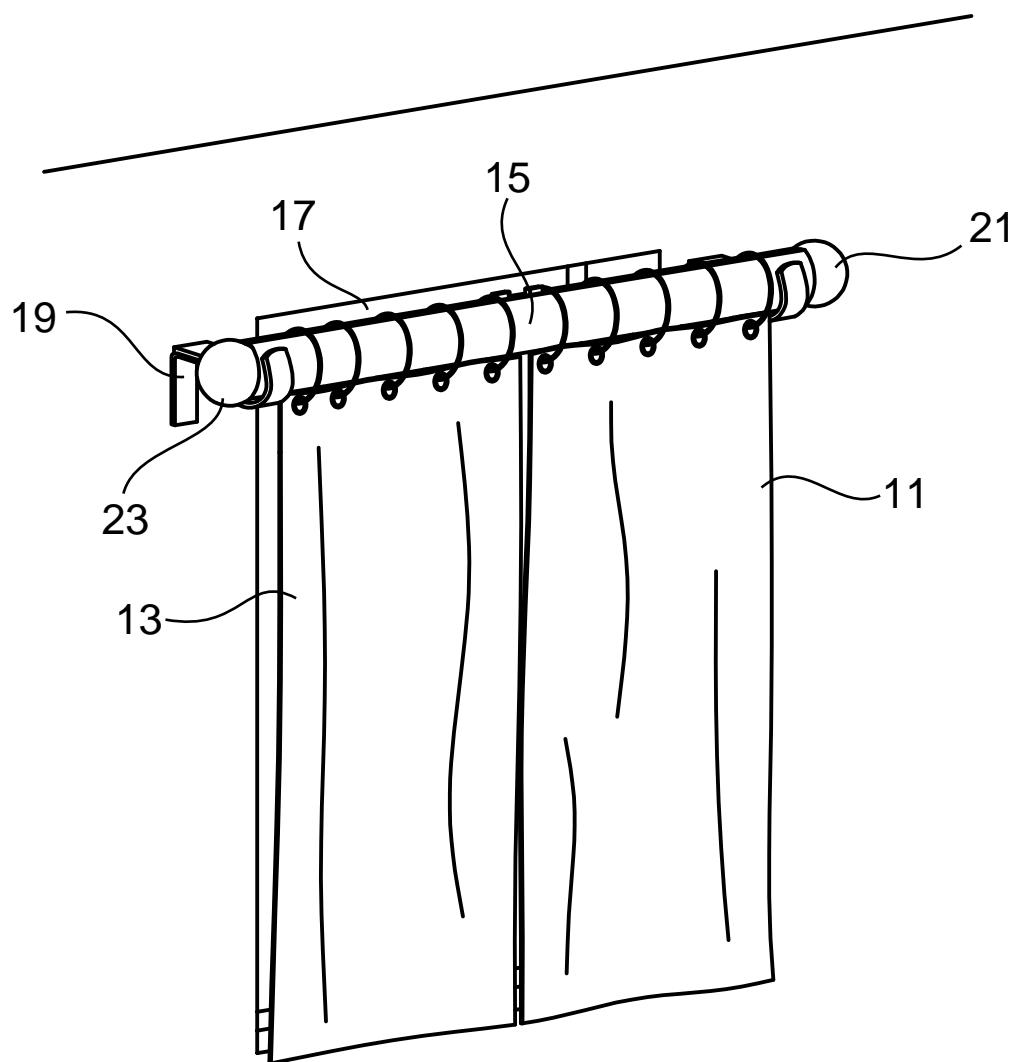


FIG. 2

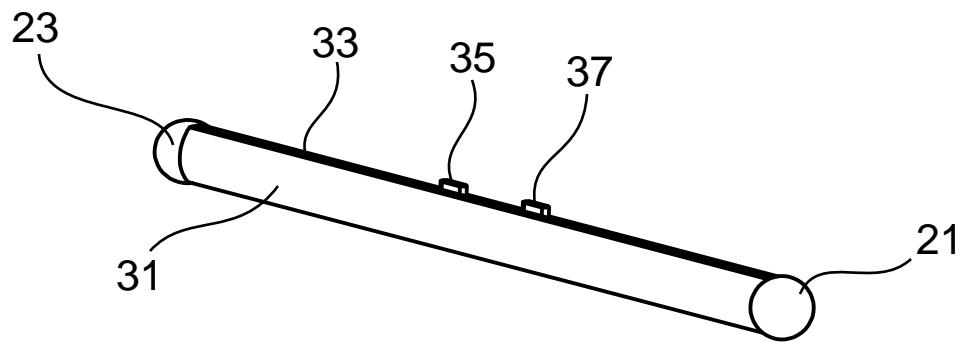


FIG. 3

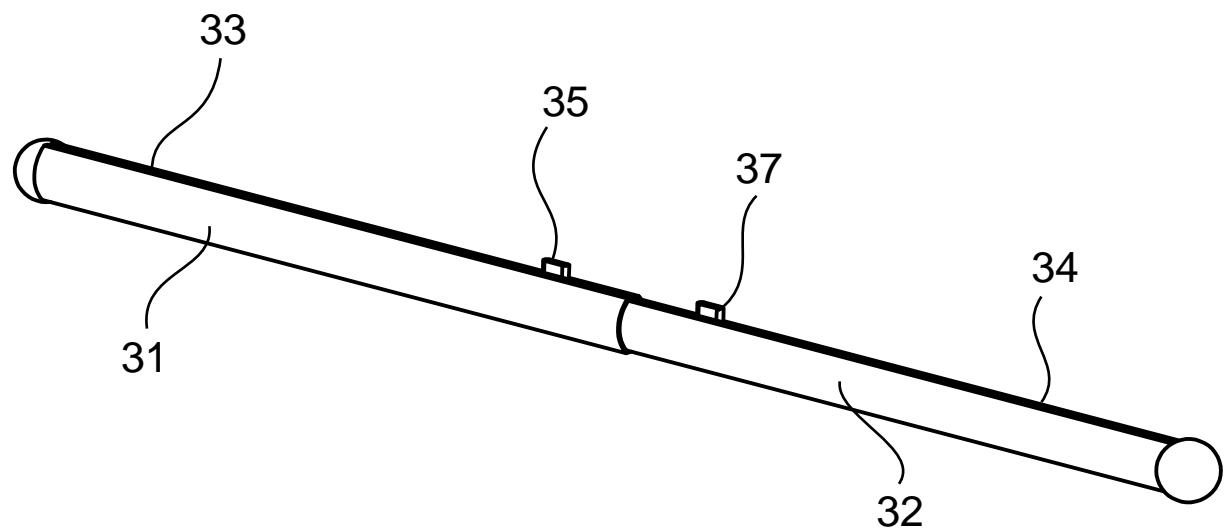


FIG. 4

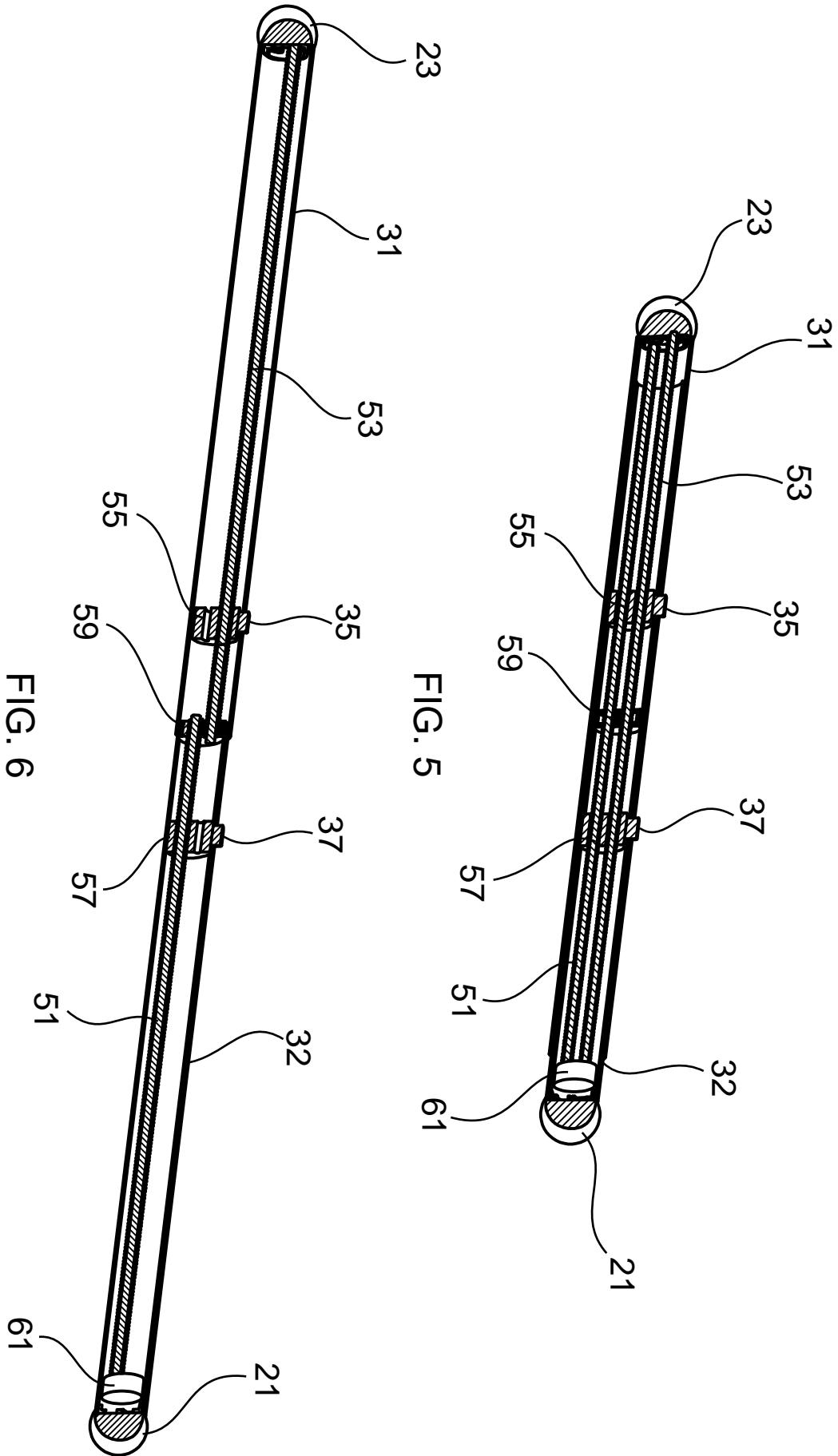


FIG. 8

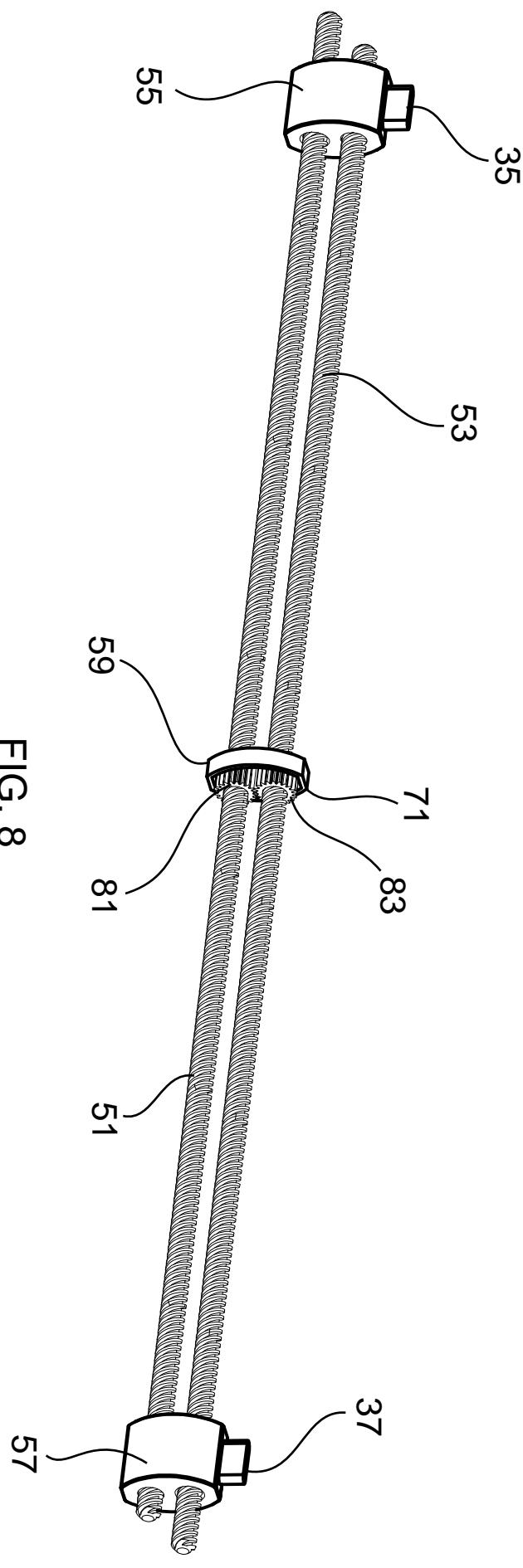
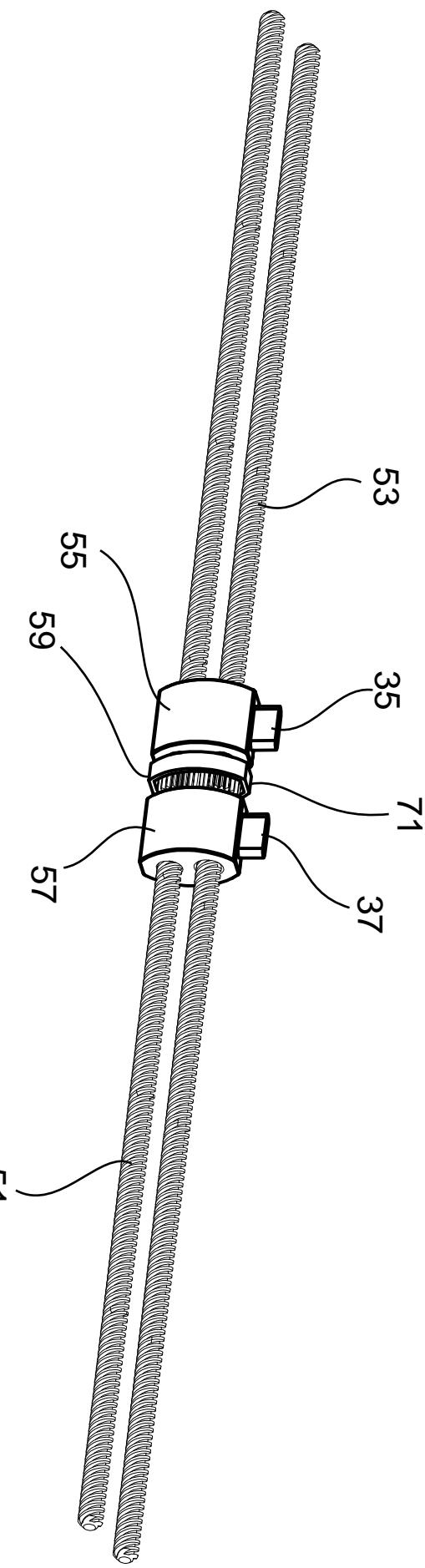
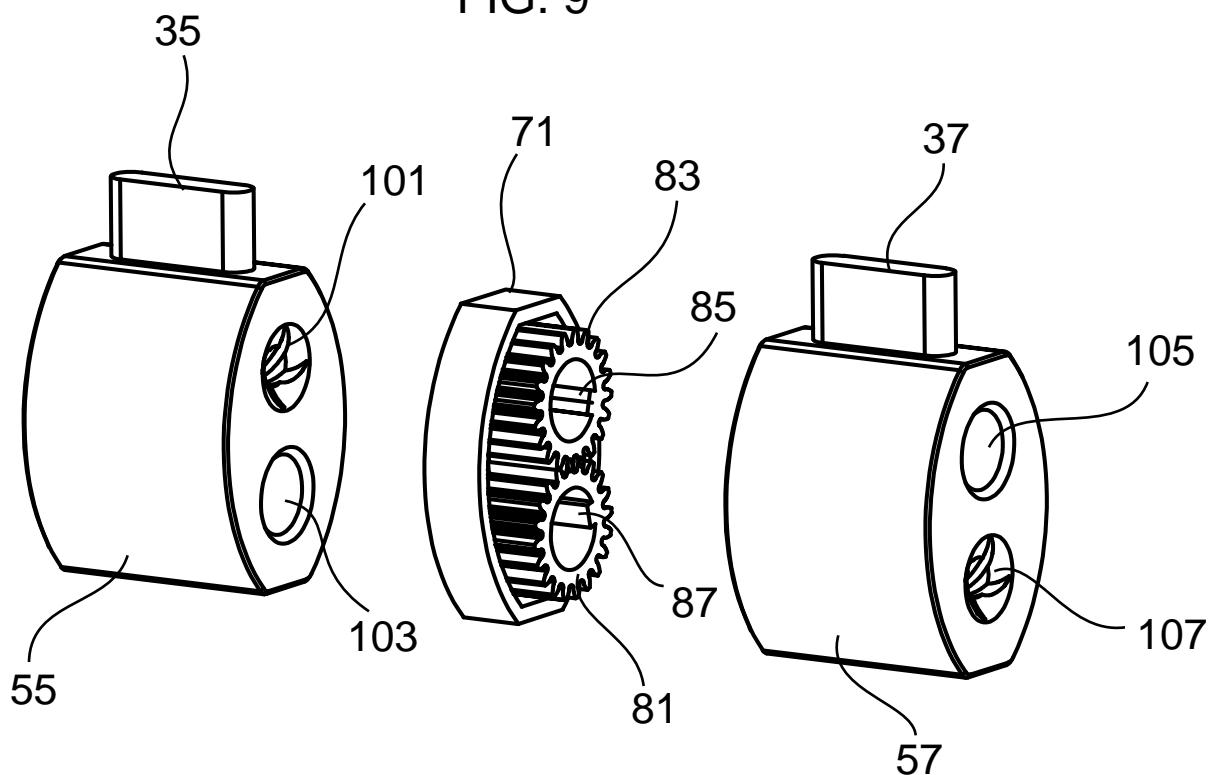
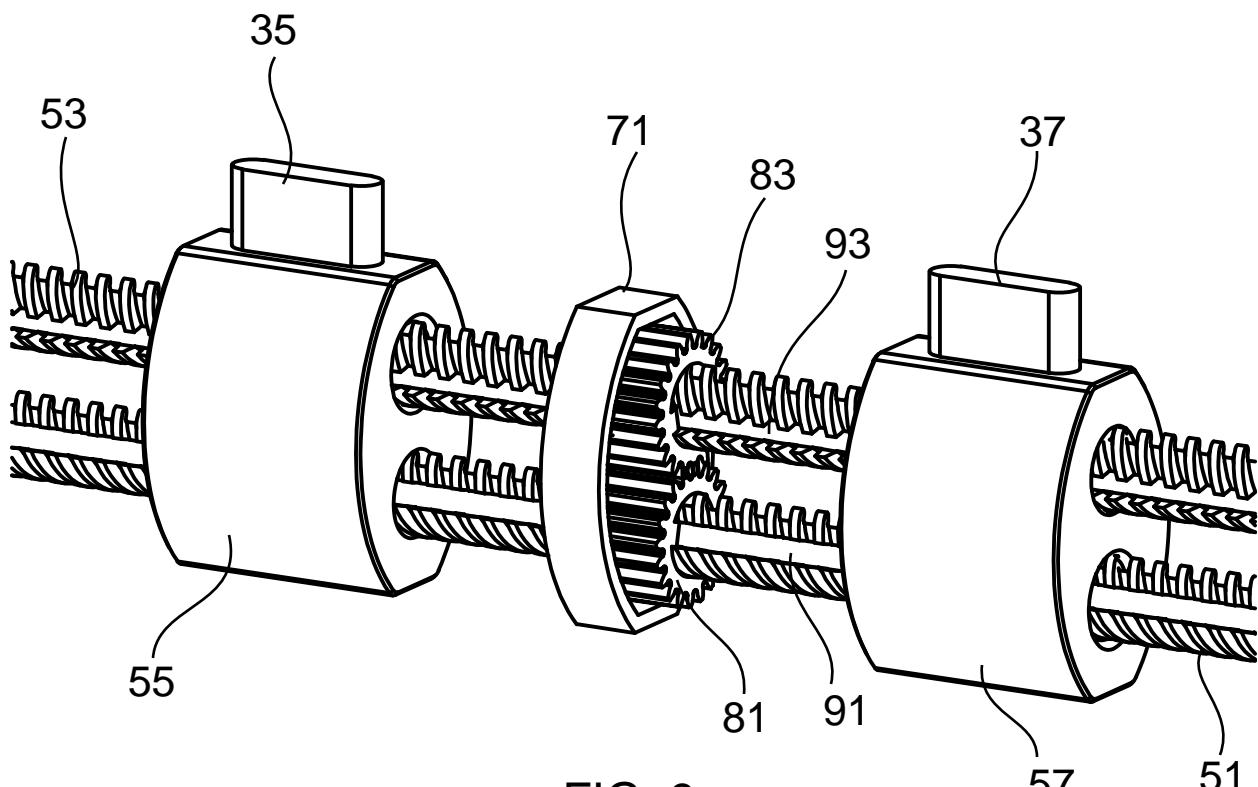


FIG. 7





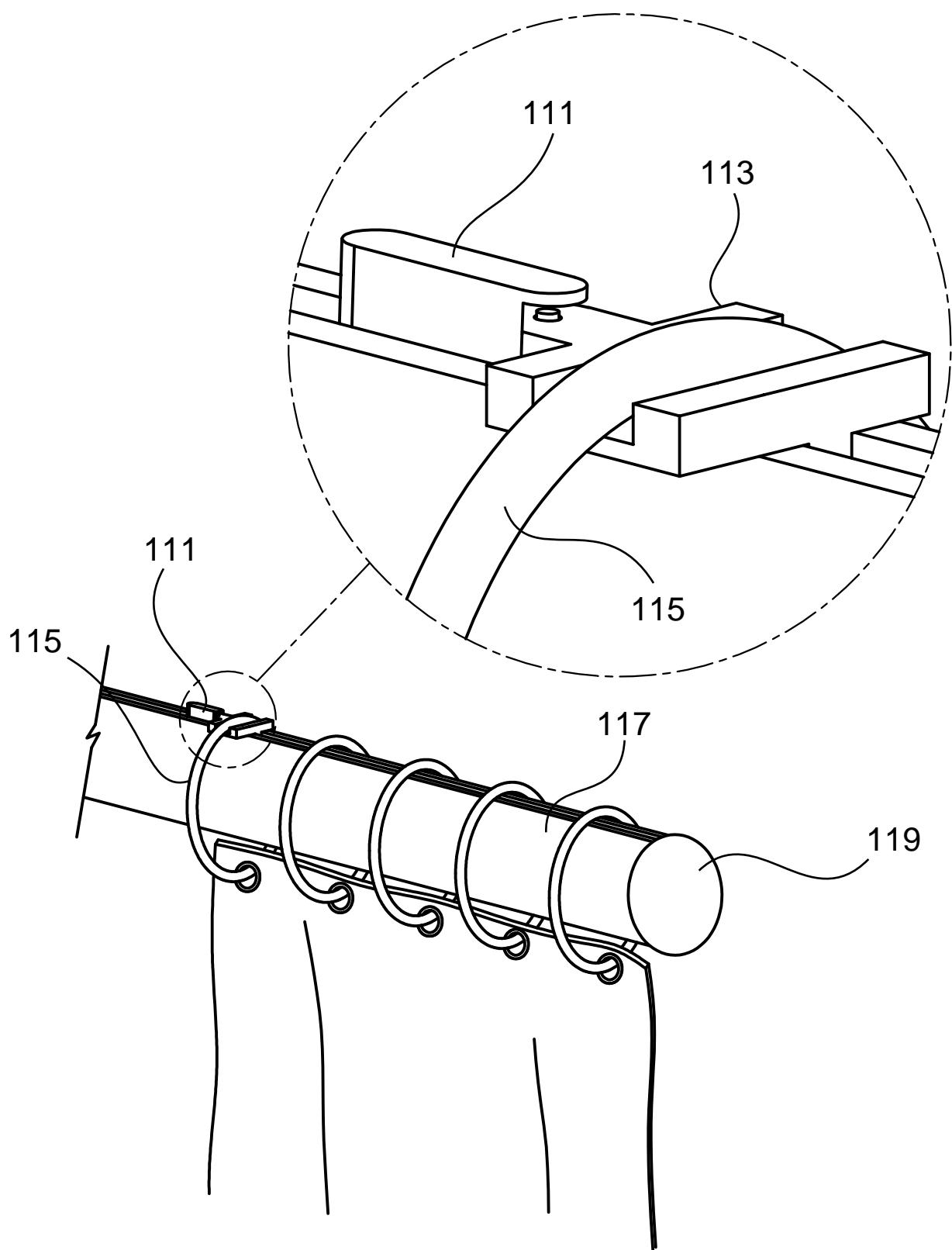


FIG. 11

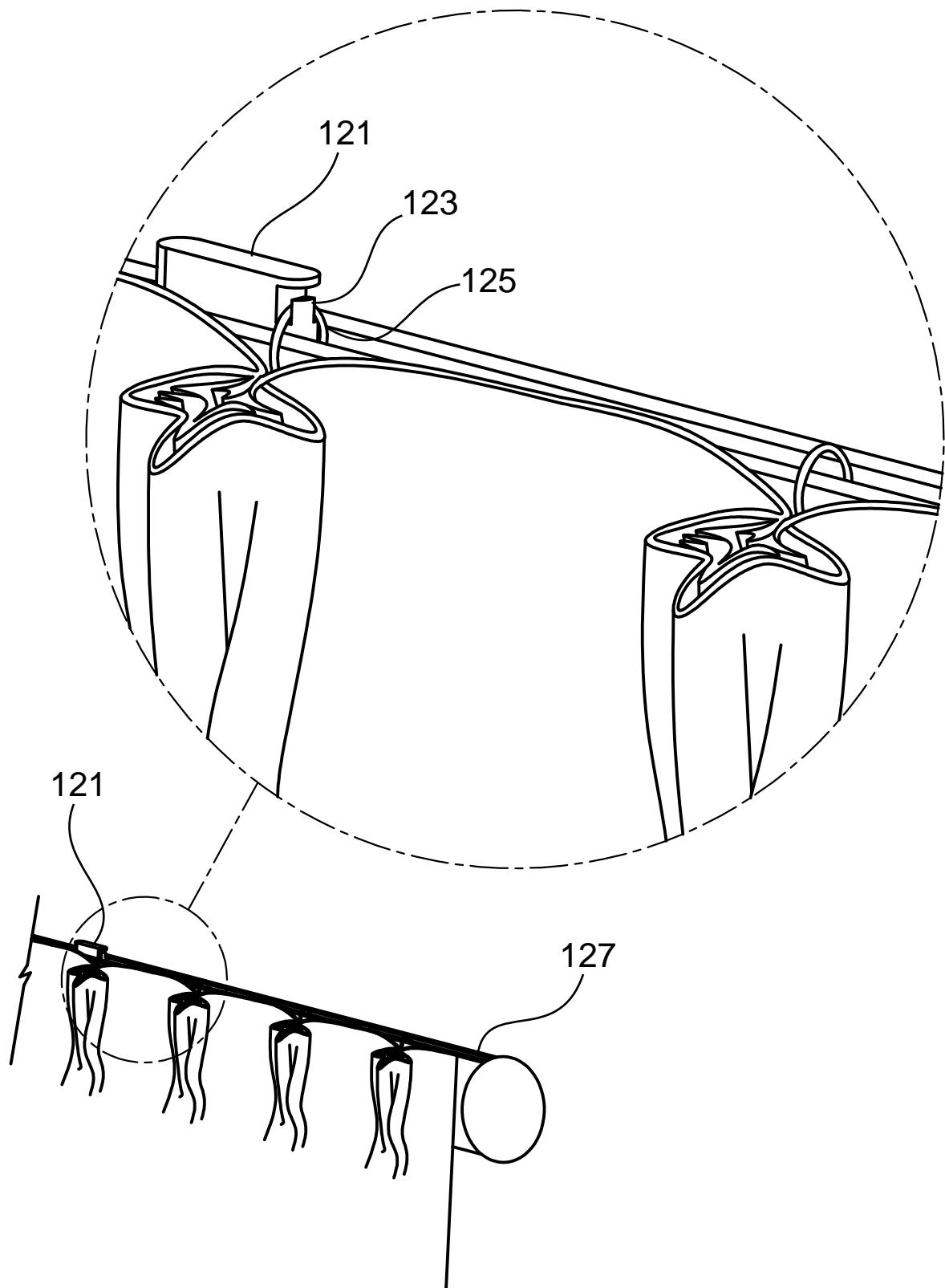


FIG. 12

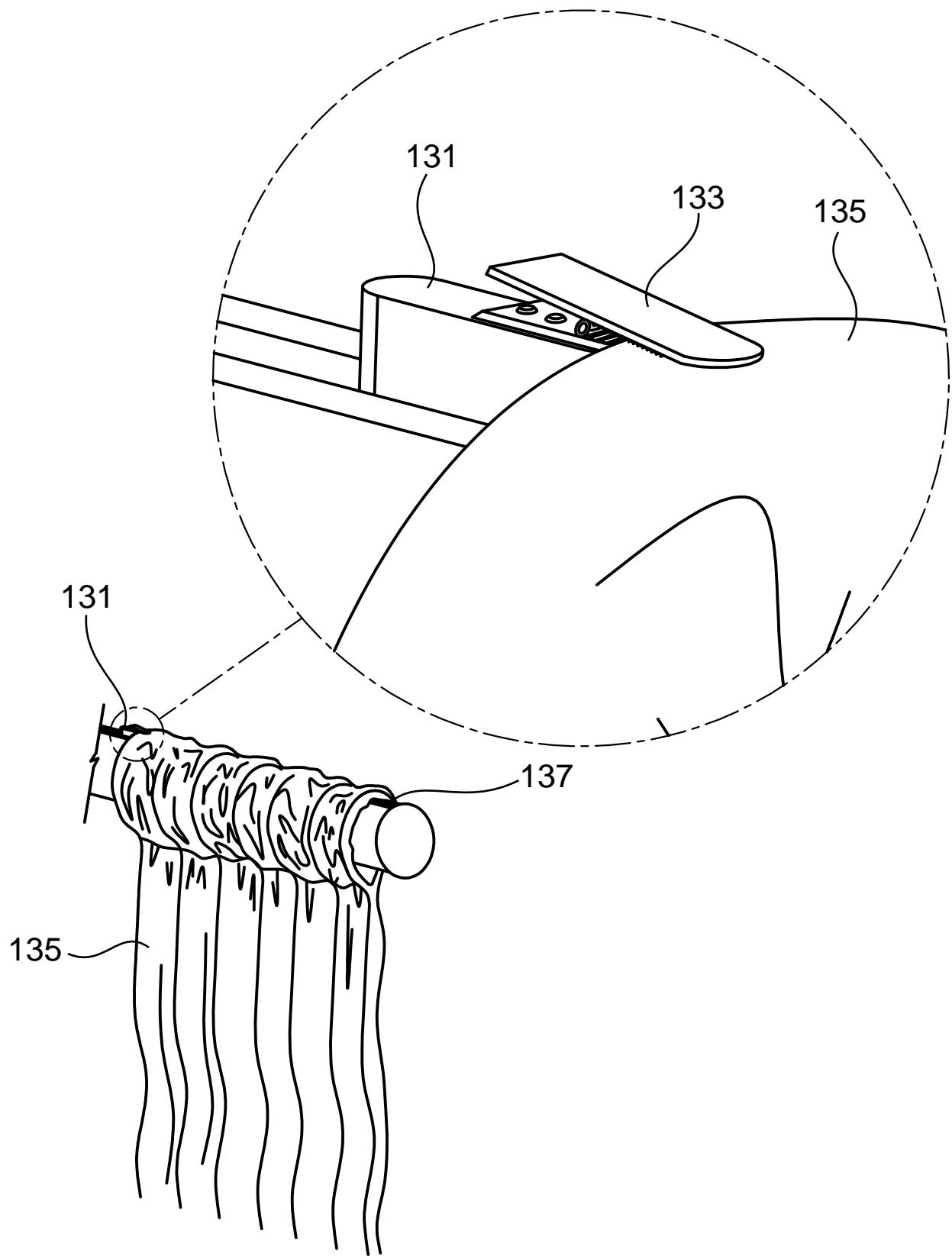


FIG. 13

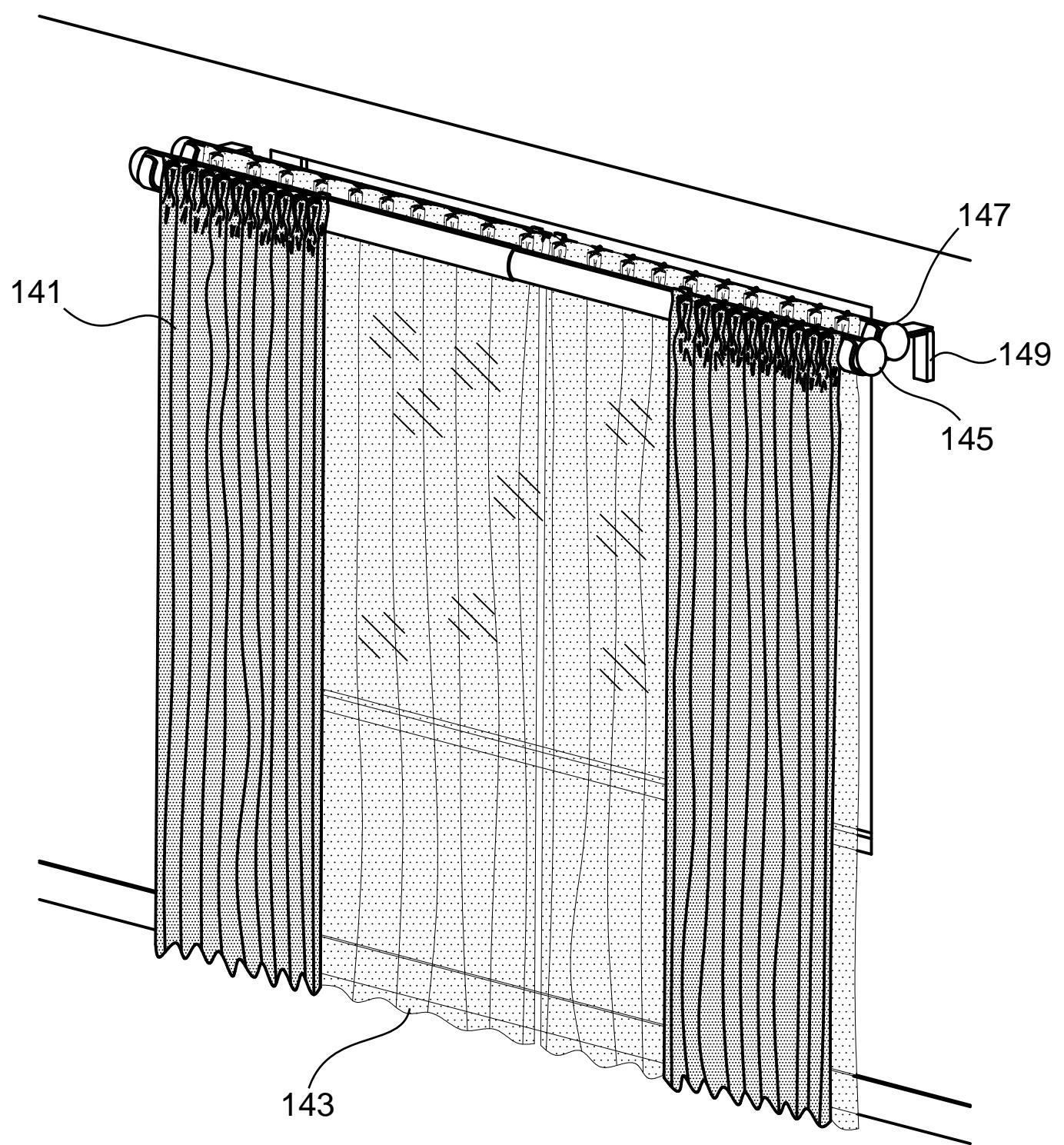


FIG. 14

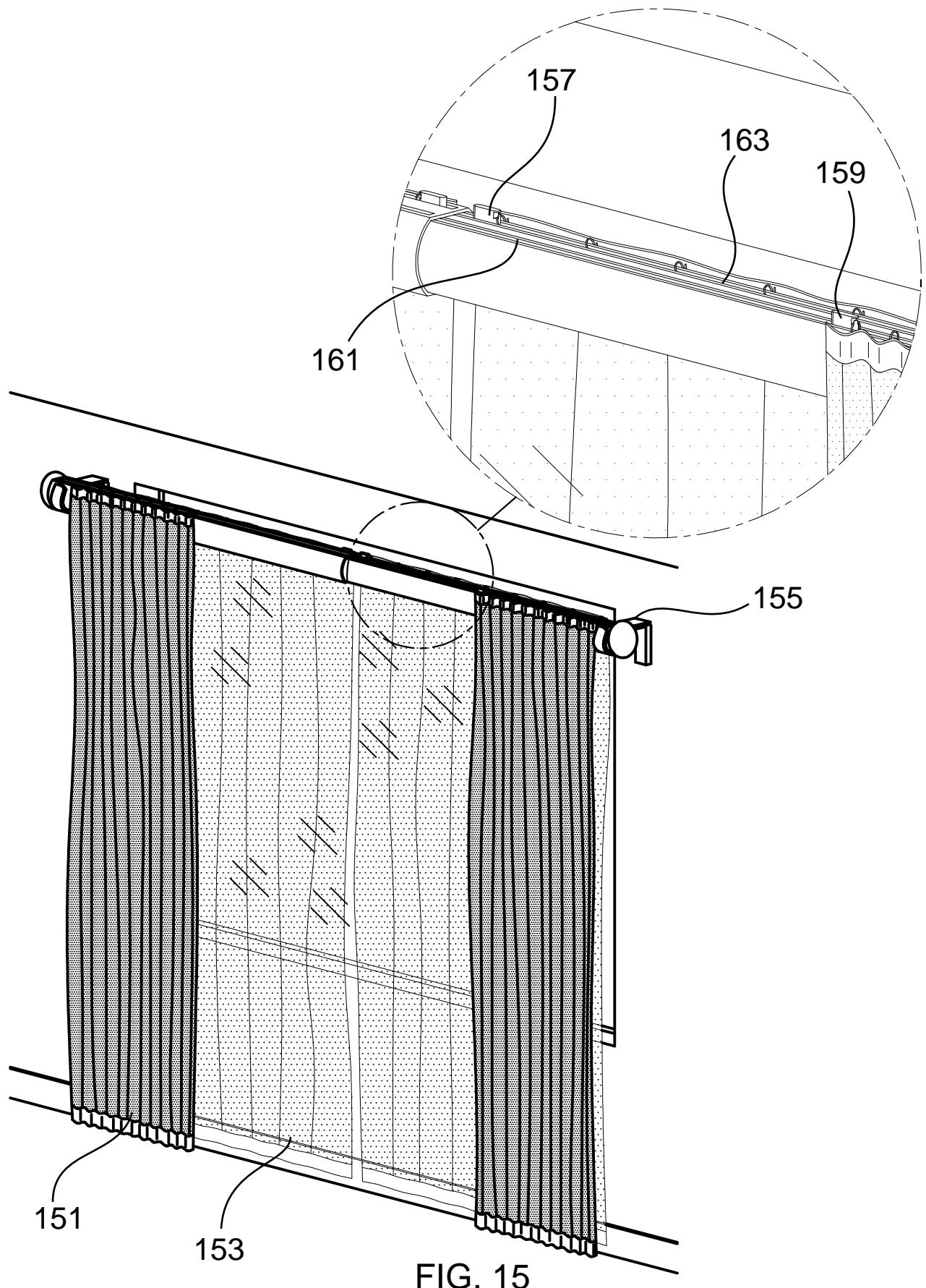


FIG. 15

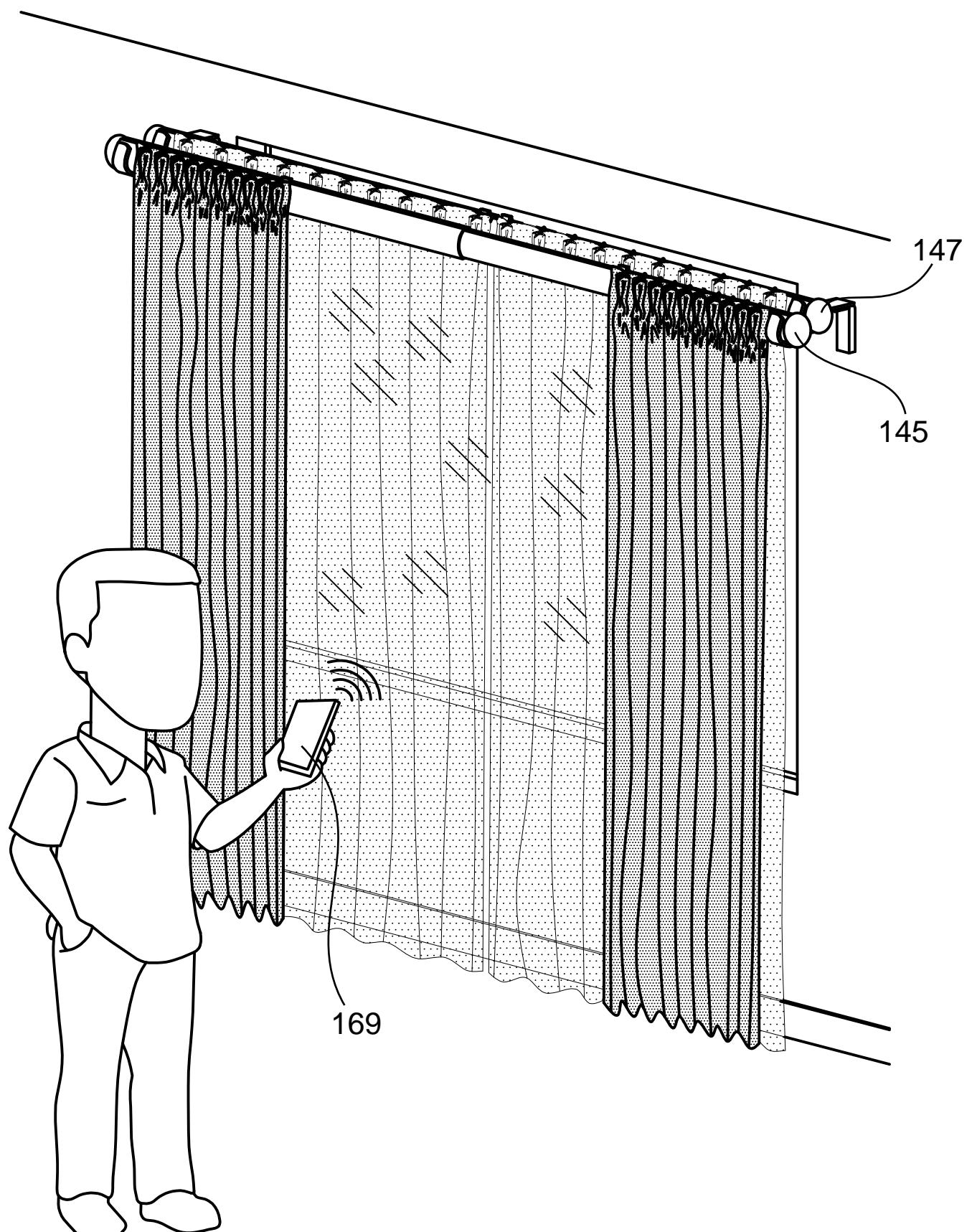


FIG. 16



US 20230123547A1

(19) **United States**

(12) **Patent Application Publication**

Hall et al.

(10) **Pub. No.: US 2023/0123547 A1**

(43) **Pub. Date:** **Apr. 20, 2023**

(54) **STORAGE SYSTEM WITH UNDER PLATFORM STORAGE**

(71) Applicant: **Hall Labs LLC**, Provo, UT (US)

(72) Inventors: **David R. Hall**, Provo, UT (US);
Douglas Mecham, Provo, UT (US);
Scott Skousen, Lehi, UT (US)

(73) Assignee: **Hall Labs LLC**, Provo, UT (US)

(21) Appl. No.: **17/503,948**

(22) Filed: **Oct. 18, 2021**

Publication Classification

(51) **Int. Cl.**

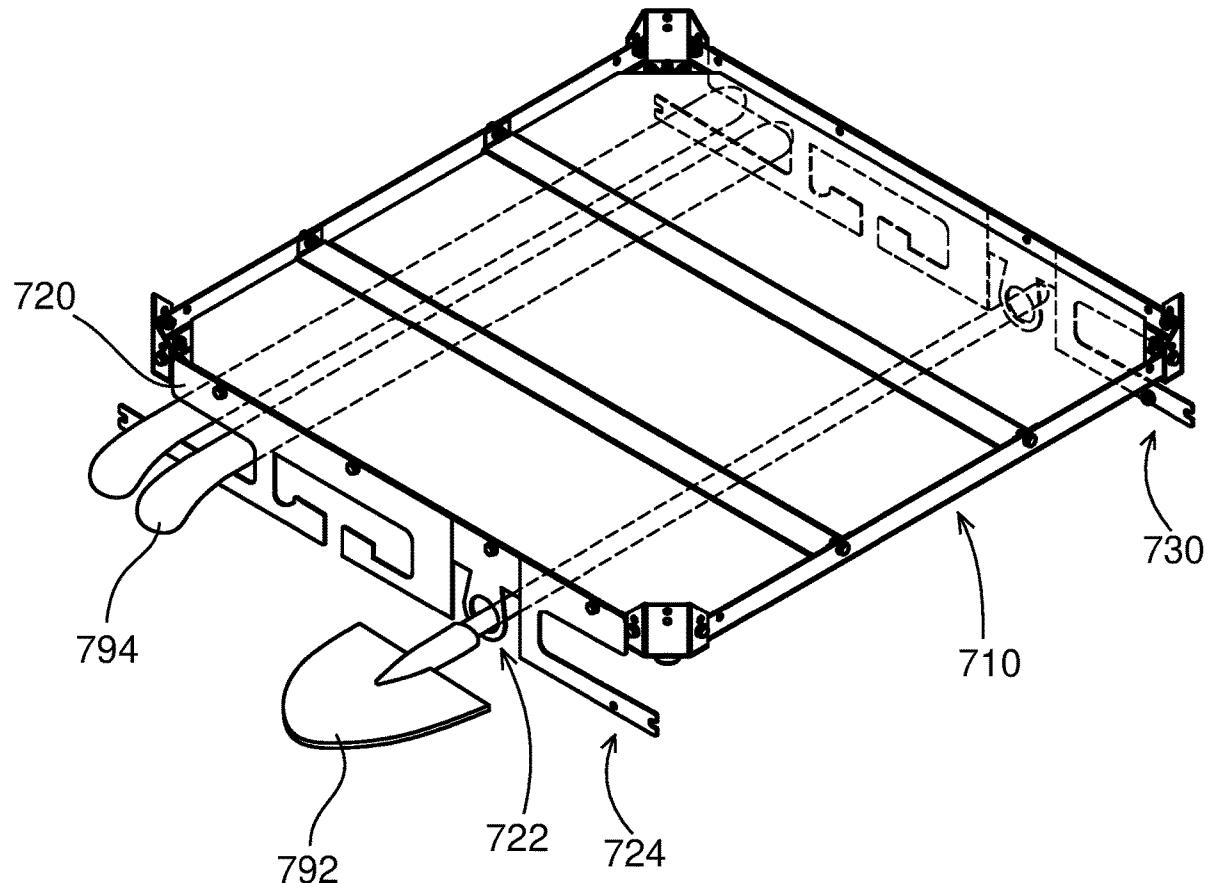
A47B 81/00 (2006.01)
A47B 51/00 (2006.01)

(52) **U.S. Cl.**

CPC **A47B 81/005** (2013.01); **A47B 51/00** (2013.01)

(57) **ABSTRACT**

A storage system is described, having a rectangular platform adapted to be raised and lowered. The platform includes a top surface configured to support one or more items to be stored, a bottom surface, a first side, and a second side opposite the first side. The system also includes a first bracket, with an upper portion attached to the first side of the platform and a lower portion extending below the bottom surface. The lower portion of this first bracket is shaped in such a way as to provide a first surface on which a portion of an additional item rests. The system also includes a second bracket, likewise with an upper portion attached to the second side of the platform and a lower portion extending below the bottom surface. The lower portion of the second bracket is also shaped in such a way as to provide a second surface on which a portion of the additional item rests. In this way, the first and second brackets cooperate to support the additional item below the platform. In another aspect, the second bracket is replaced with at least one clip.



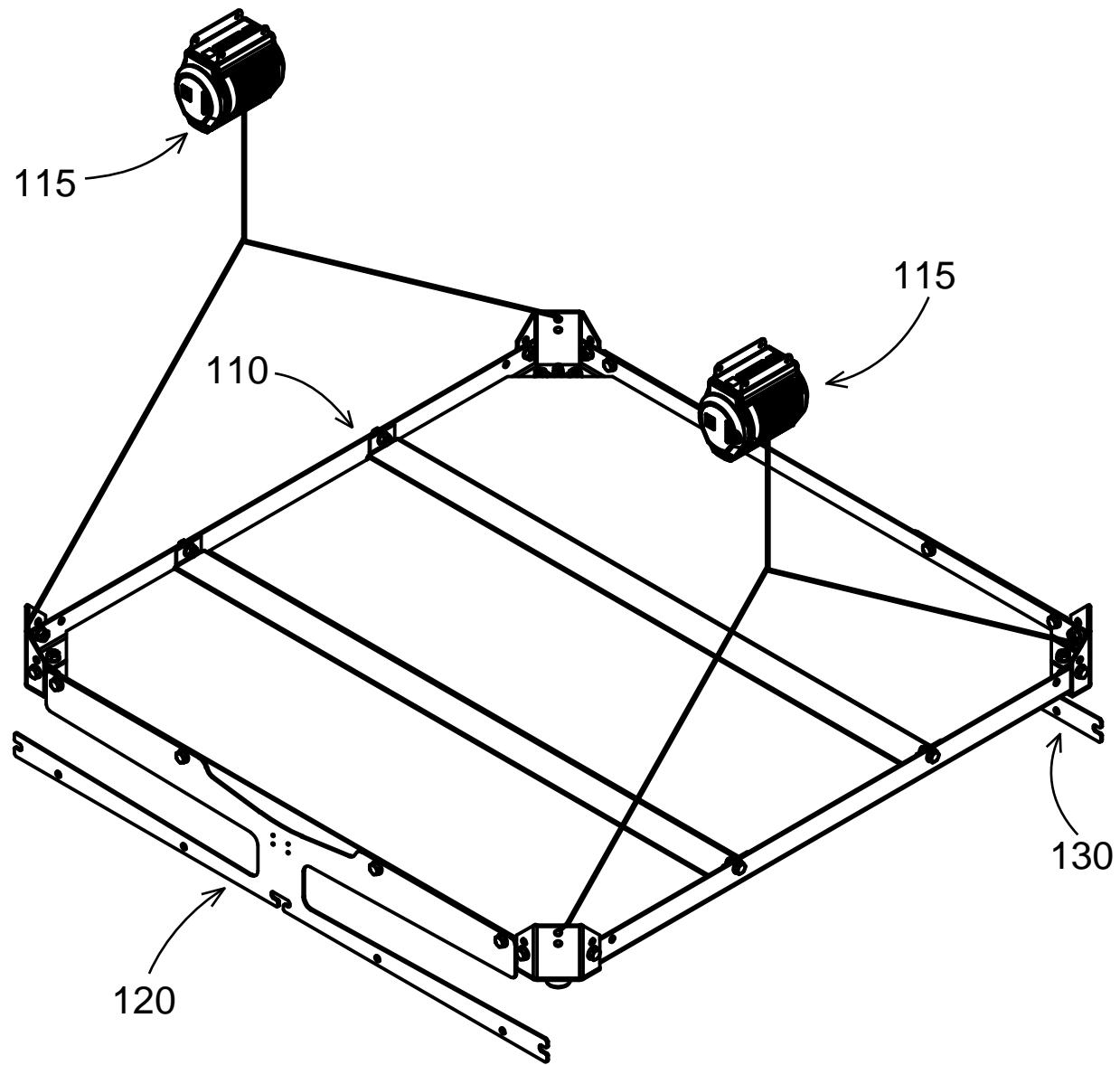


FIG. 1

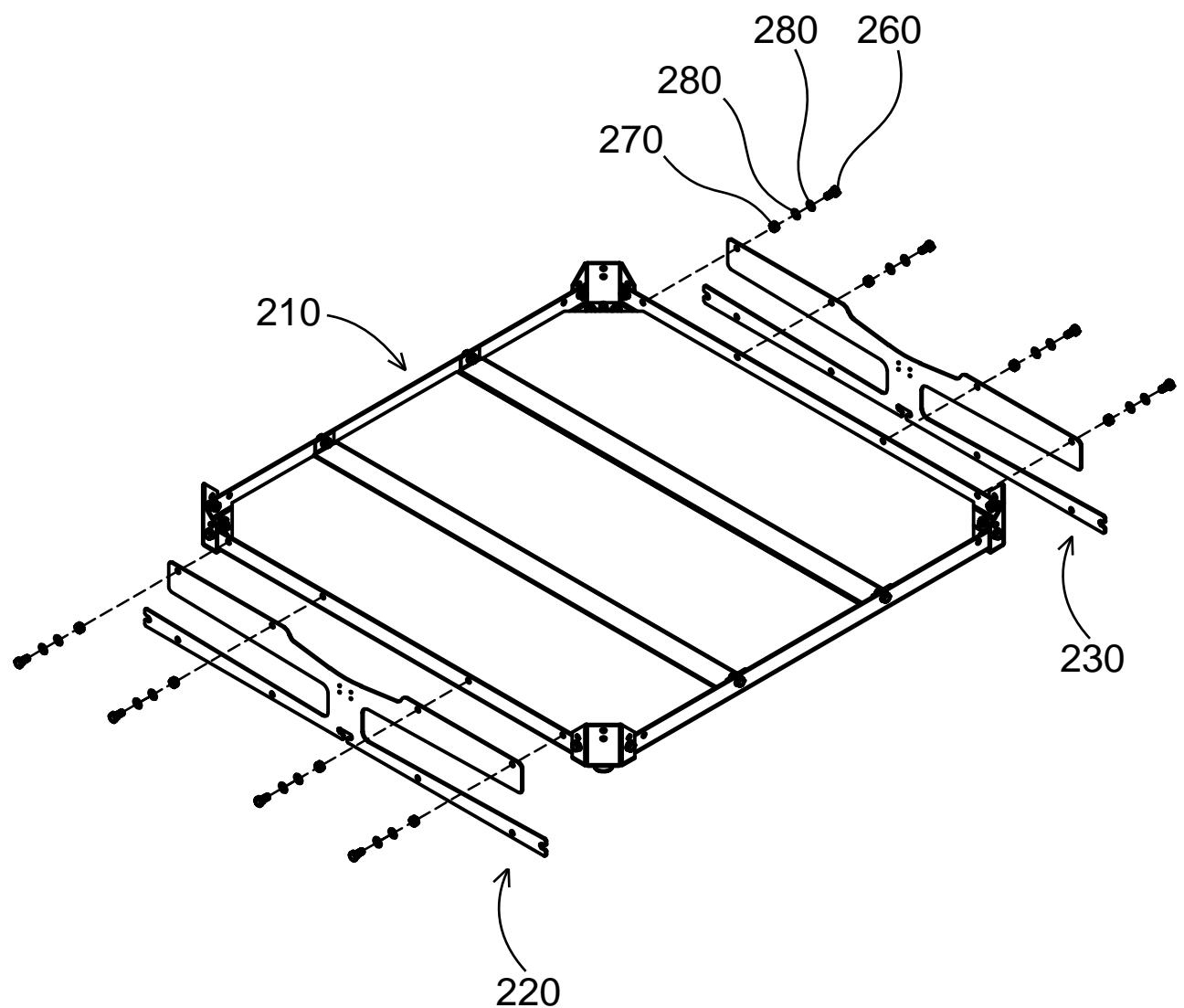


FIG. 2

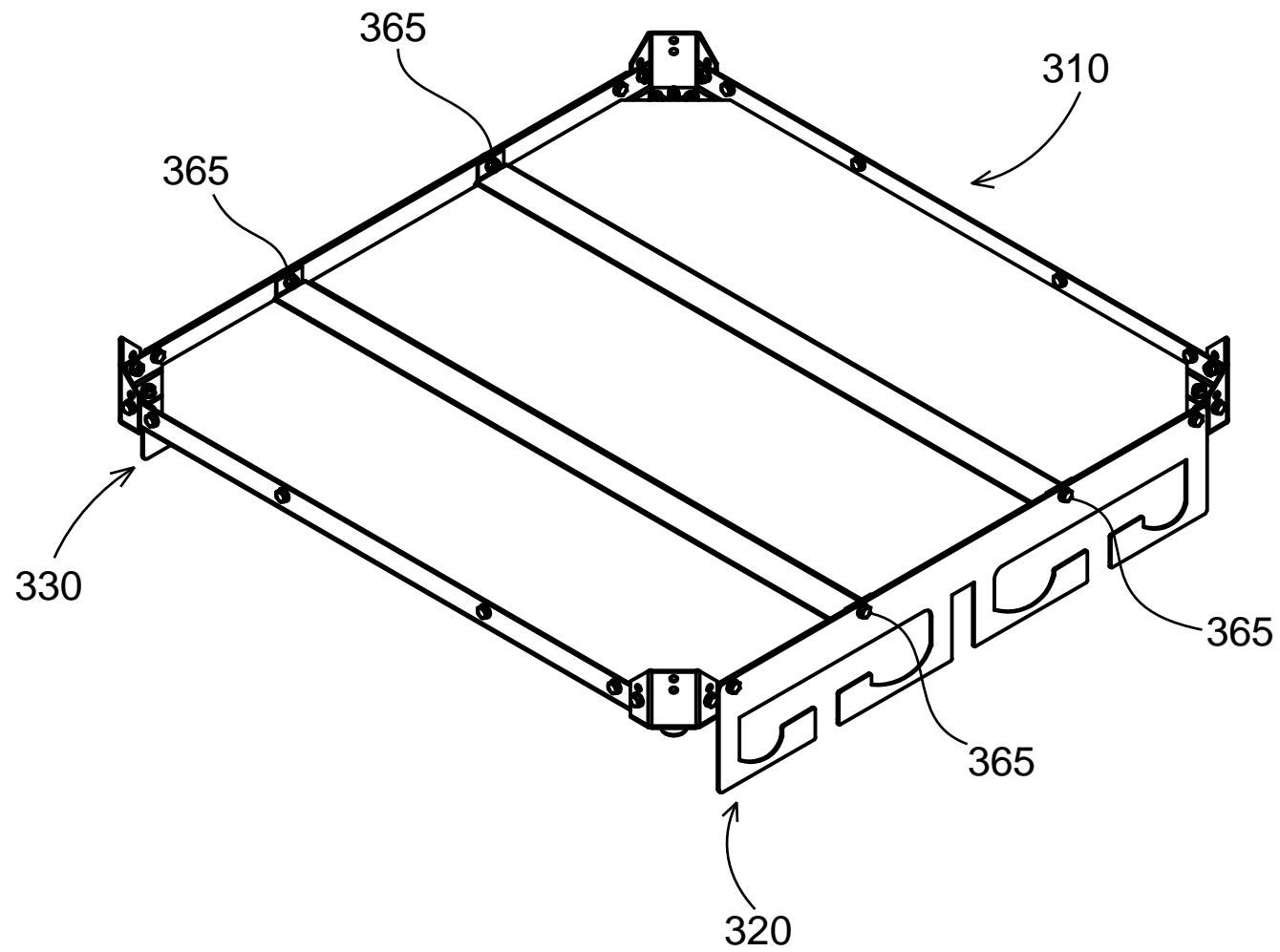


FIG. 3

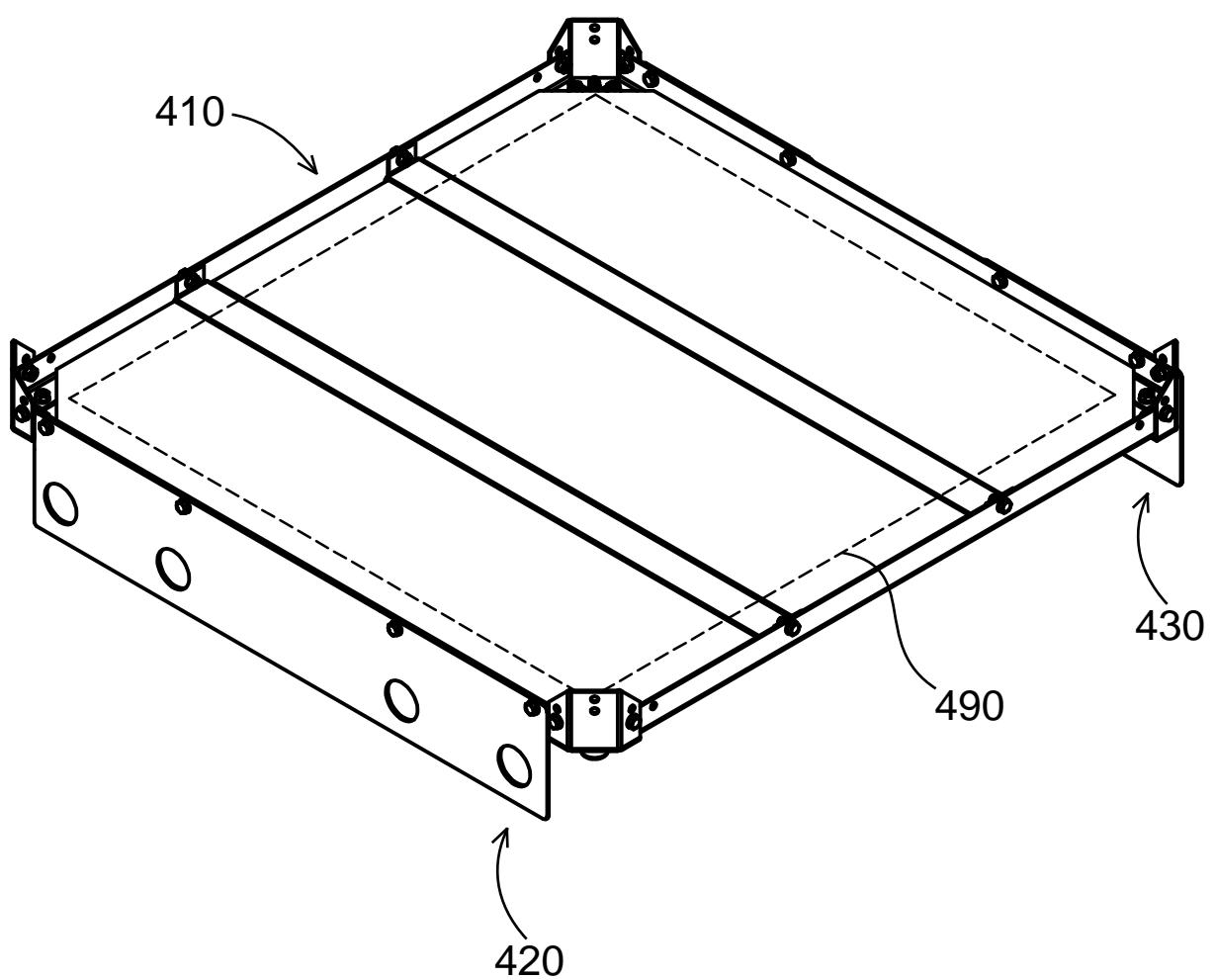


FIG. 4

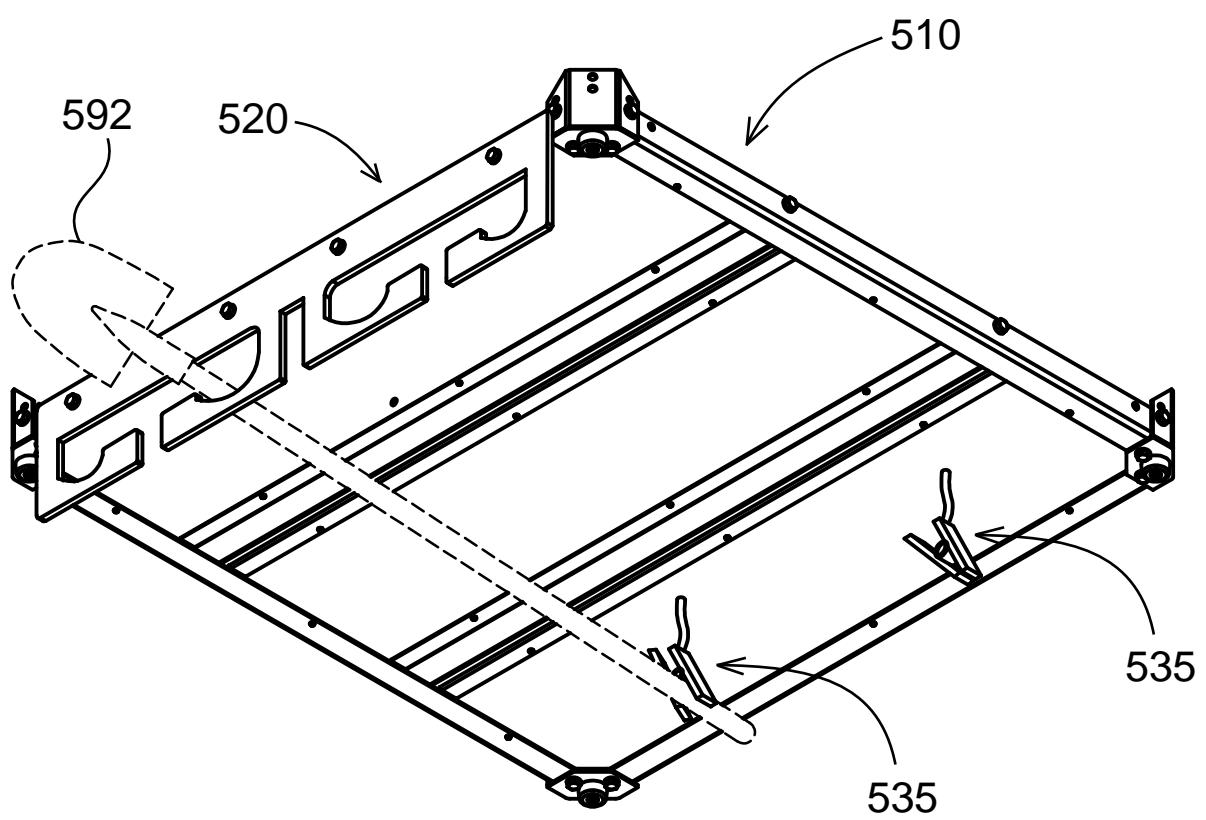


FIG. 5

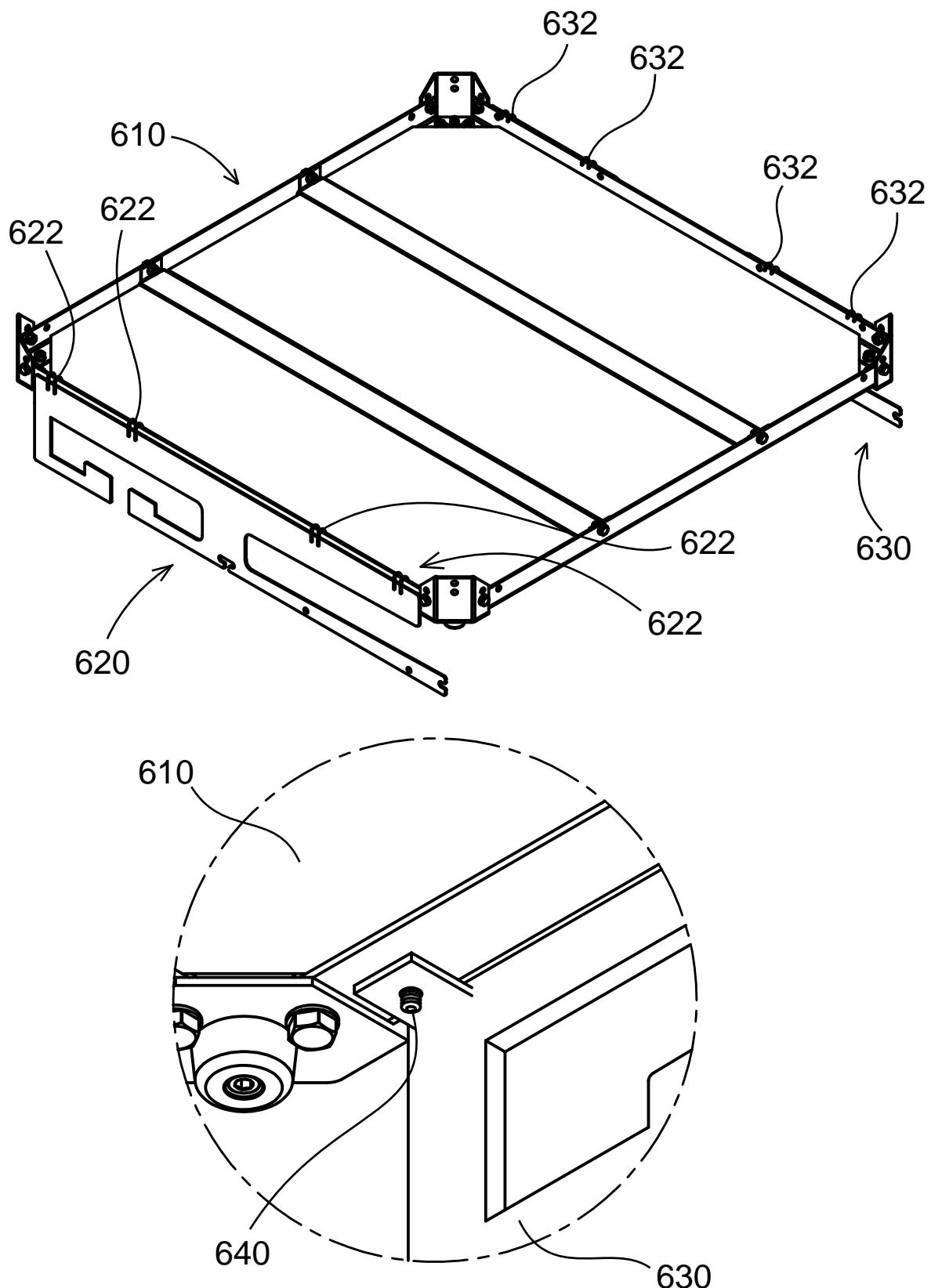


FIG. 6

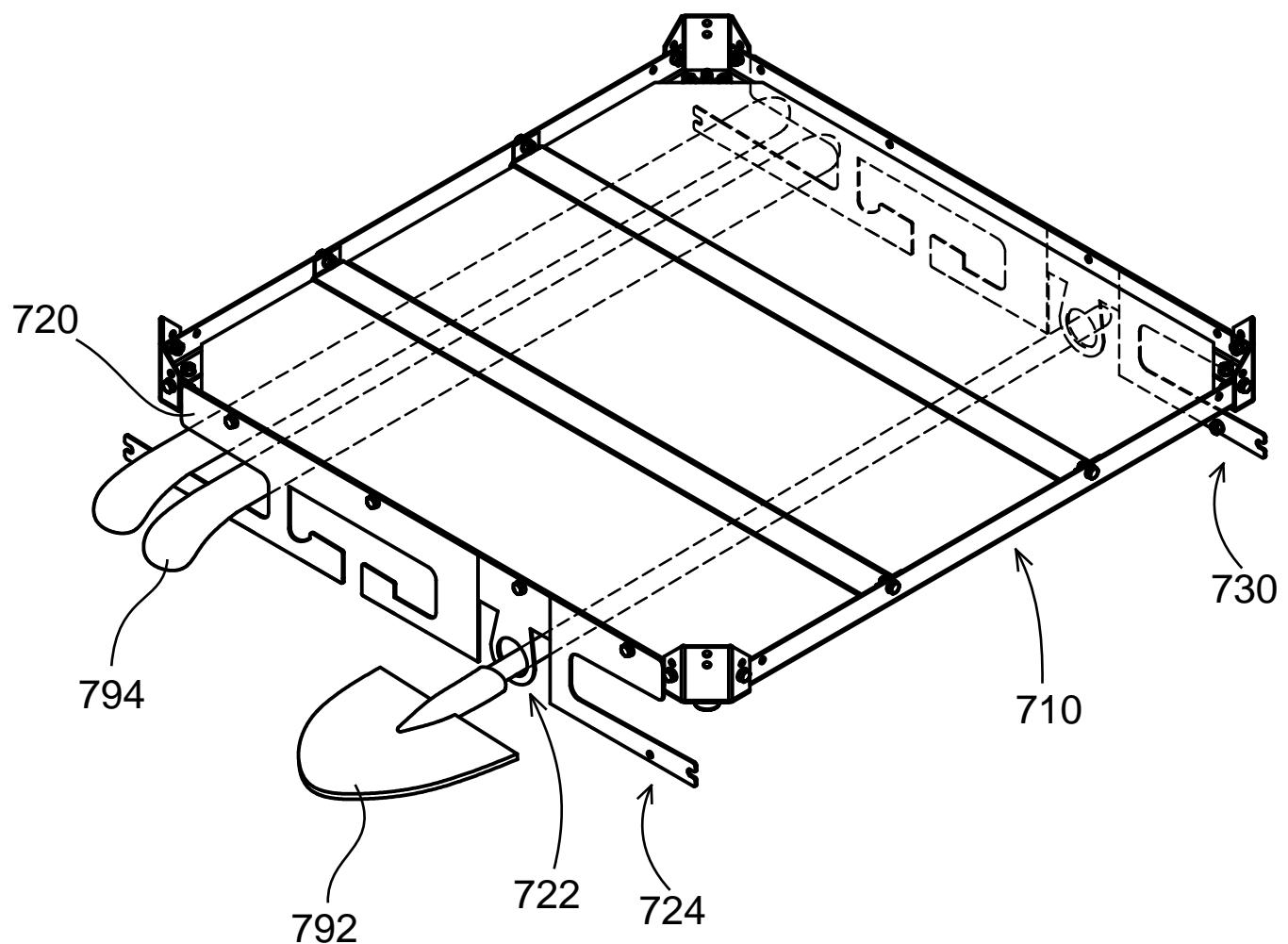


FIG. 7

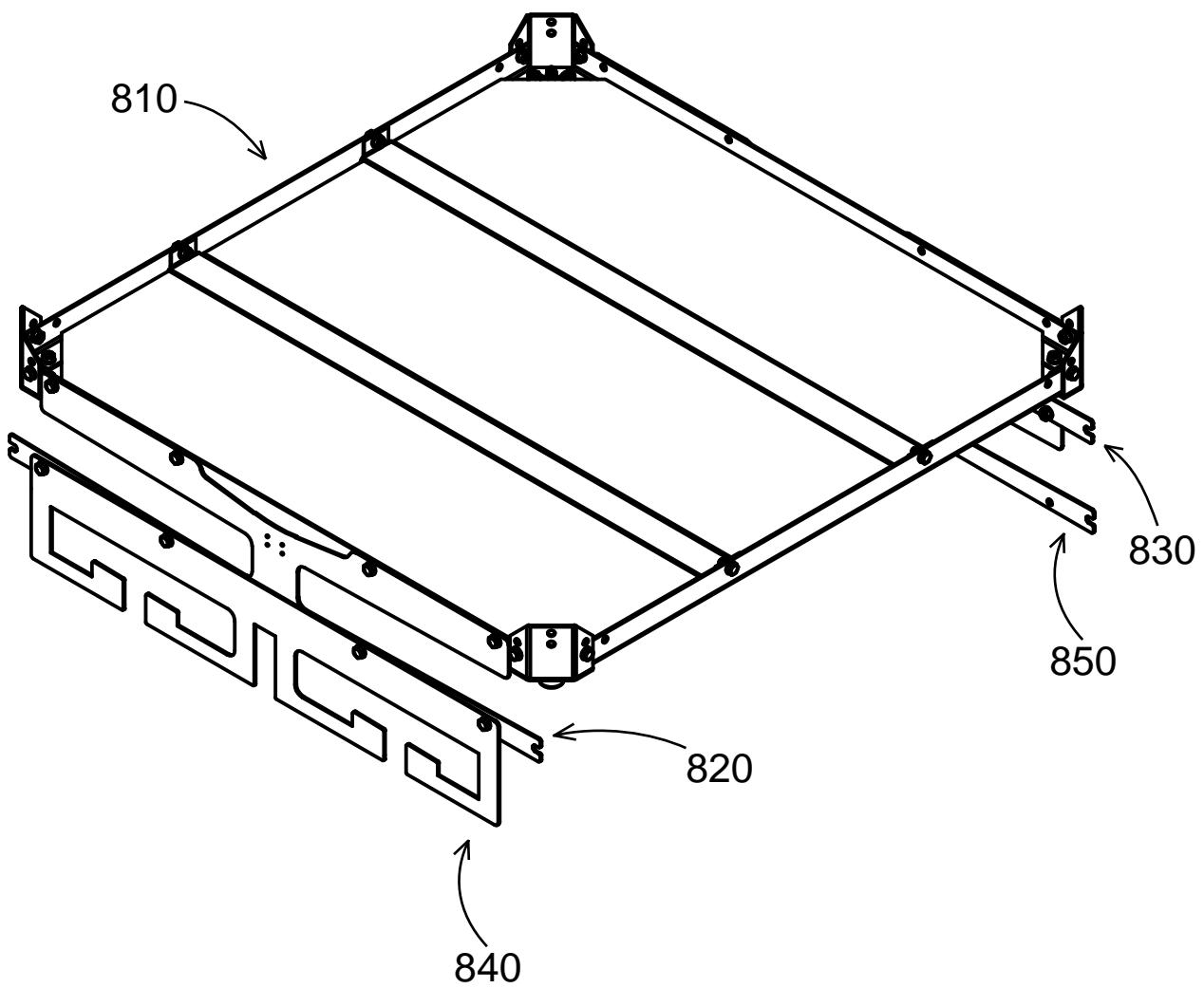


FIG. 8

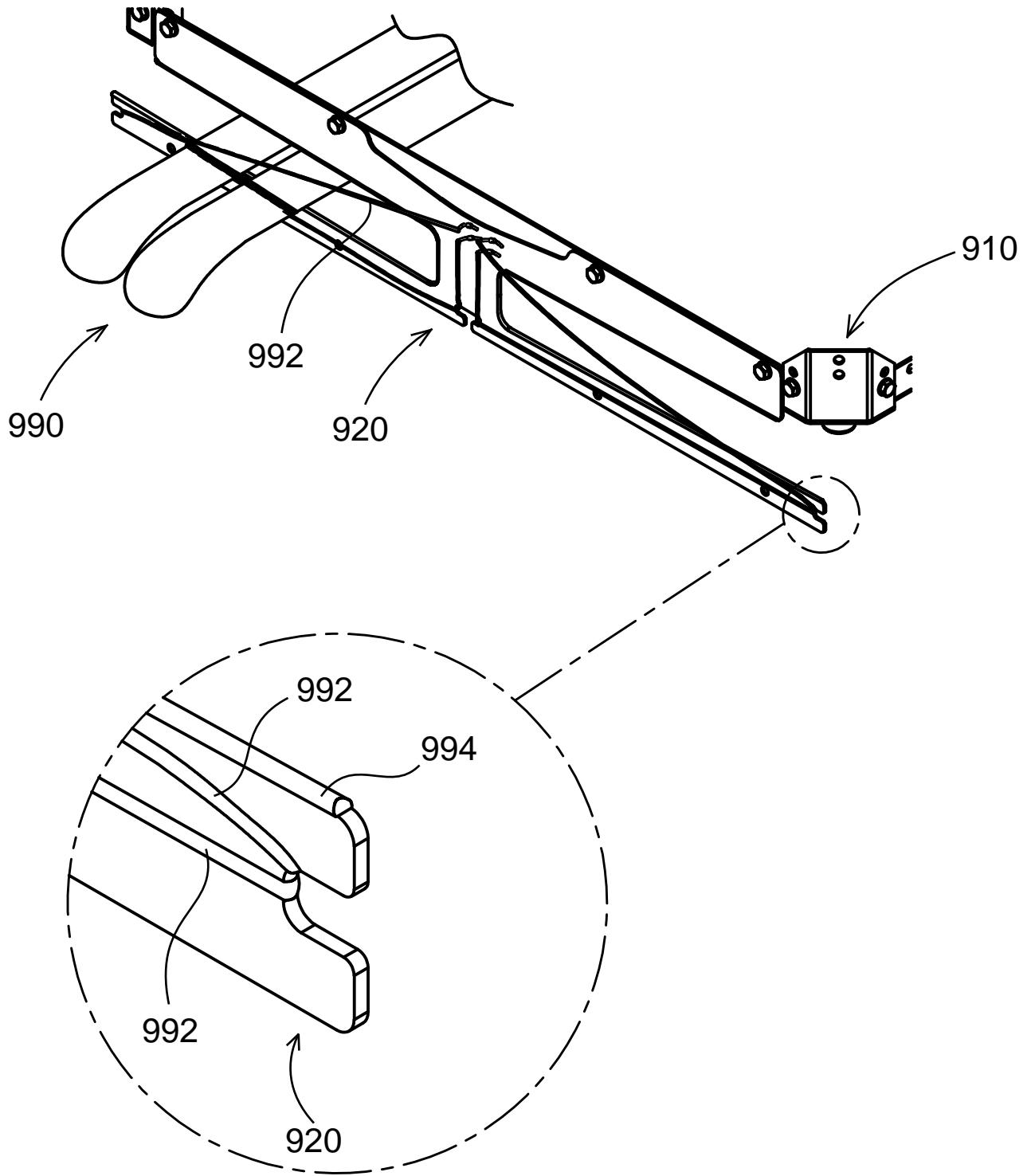


FIG. 9

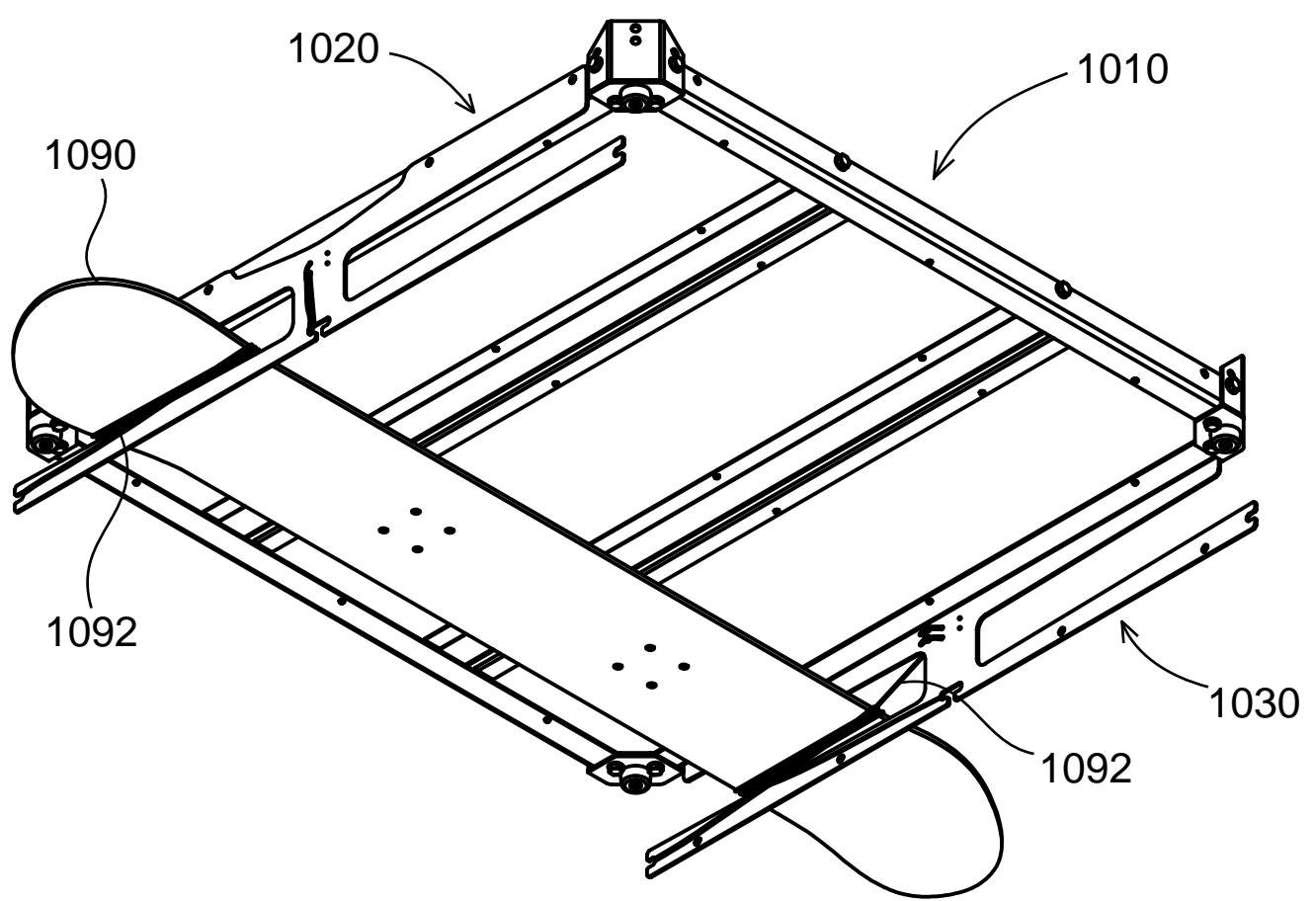


FIG. 10

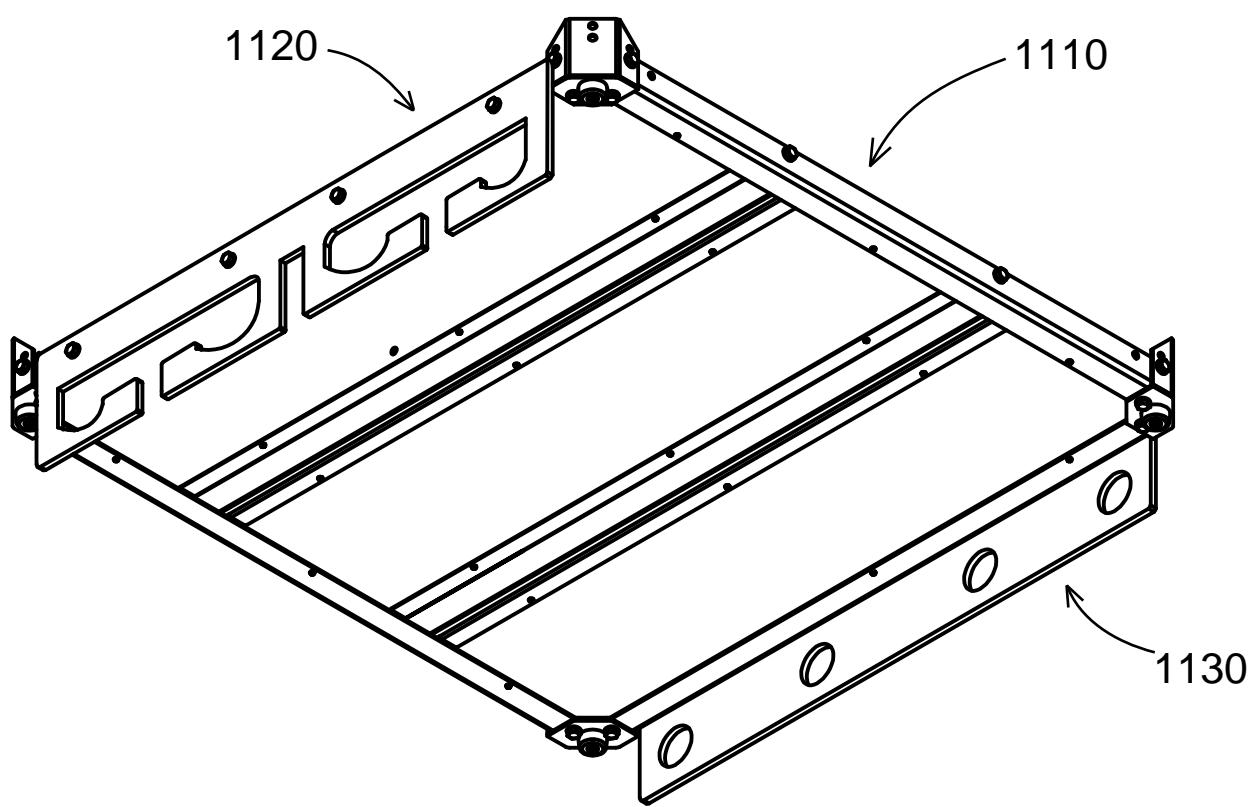


FIG. 11



US 20240096571A1

(19) **United States**

(12) **Patent Application Publication**

Hall et al.

(10) **Pub. No.: US 2024/0096571 A1**

(43) **Pub. Date:** **Mar. 21, 2024**

(54) **TAP IN SMART SWITCH**

(71) Applicant: **Hall Labs LLC**, Provo, UT (US)

(72) Inventors: **David R. Hall**, Provo, UT (US);
Jerome Miles, Spanish Fork, UT (US);
Seth Myer, Eagle Mountain, UT (US)

(73) Assignee: **Hall Labs LLC**, Provo, UT (US)

(21) Appl. No.: **17/932,381**

(22) Filed: **Sep. 15, 2022**

Publication Classification

(51) **Int. Cl.**

H01H 21/30 (2006.01)
H01H 21/12 (2006.01)
H01H 21/36 (2006.01)

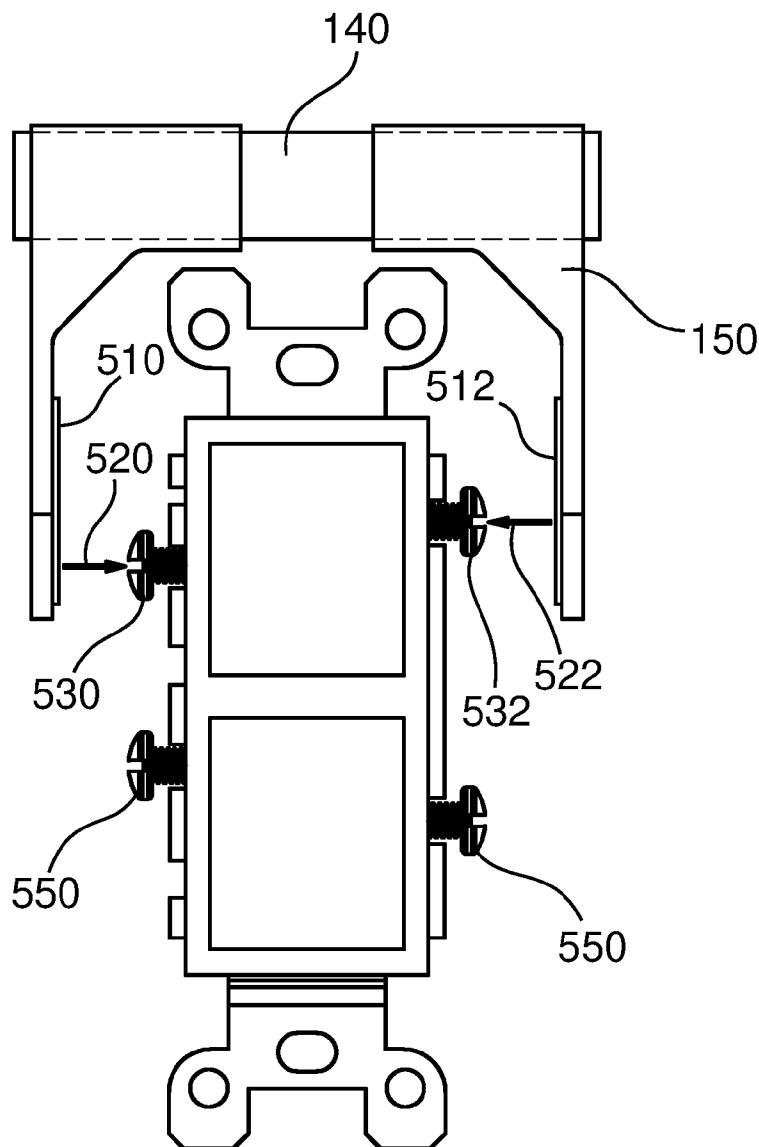
(52) **U.S. Cl.**

CPC **H01H 21/30** (2013.01); **H01H 21/12** (2013.01); **H01H 21/36** (2013.01)

(57)

ABSTRACT

The invention is a retrofit device for converting a standard switch to a smart switch. The retrofit device taps into an existing switch electrical terminal via one or more sliding arms with electrical contacts. The electrical contacts interface with the terminals, thus providing a control circuit to intervene or interrupt the existing switch function and allow a control system to control the electrical circuit the existing switch serves.



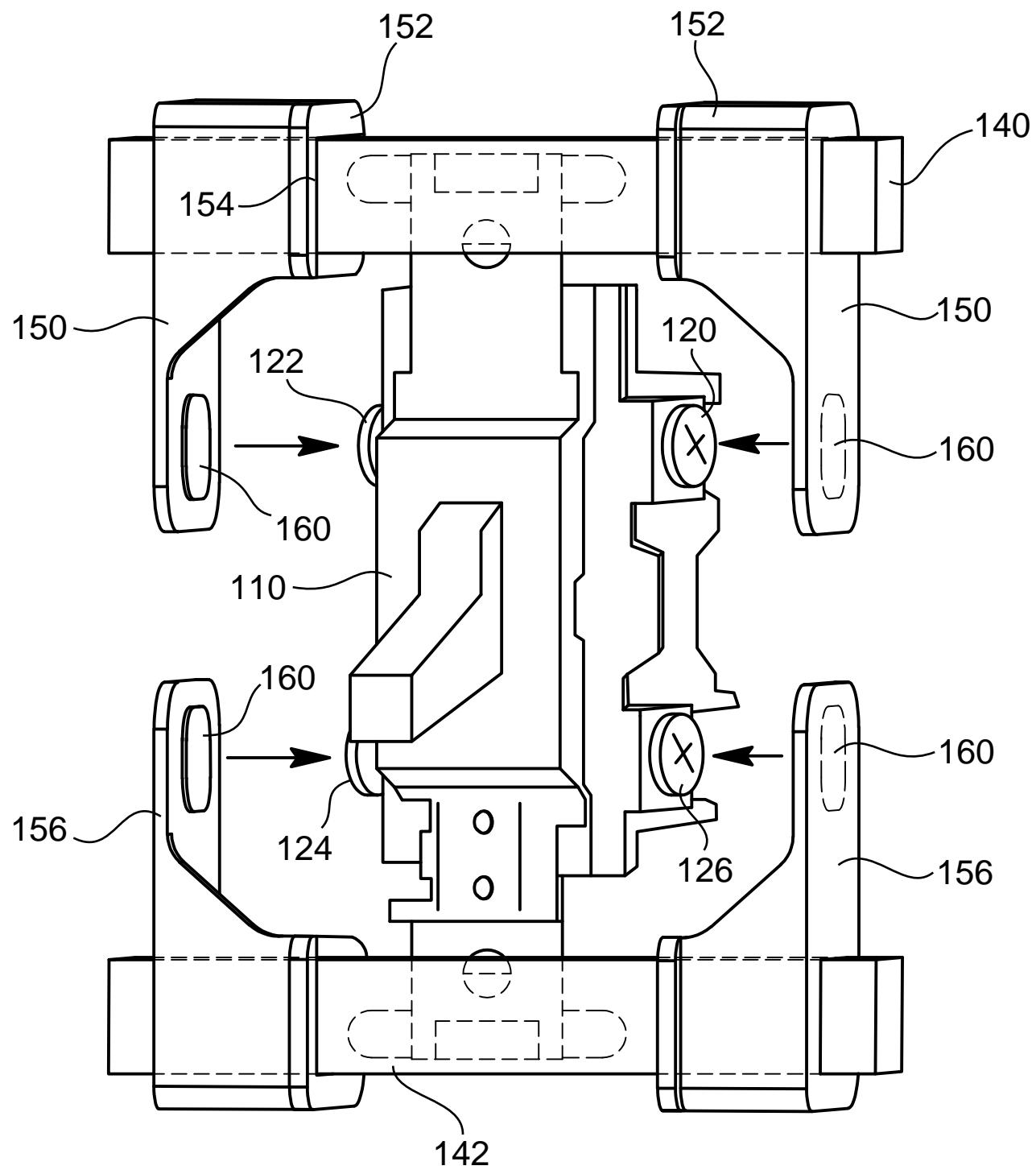


FIG. 1

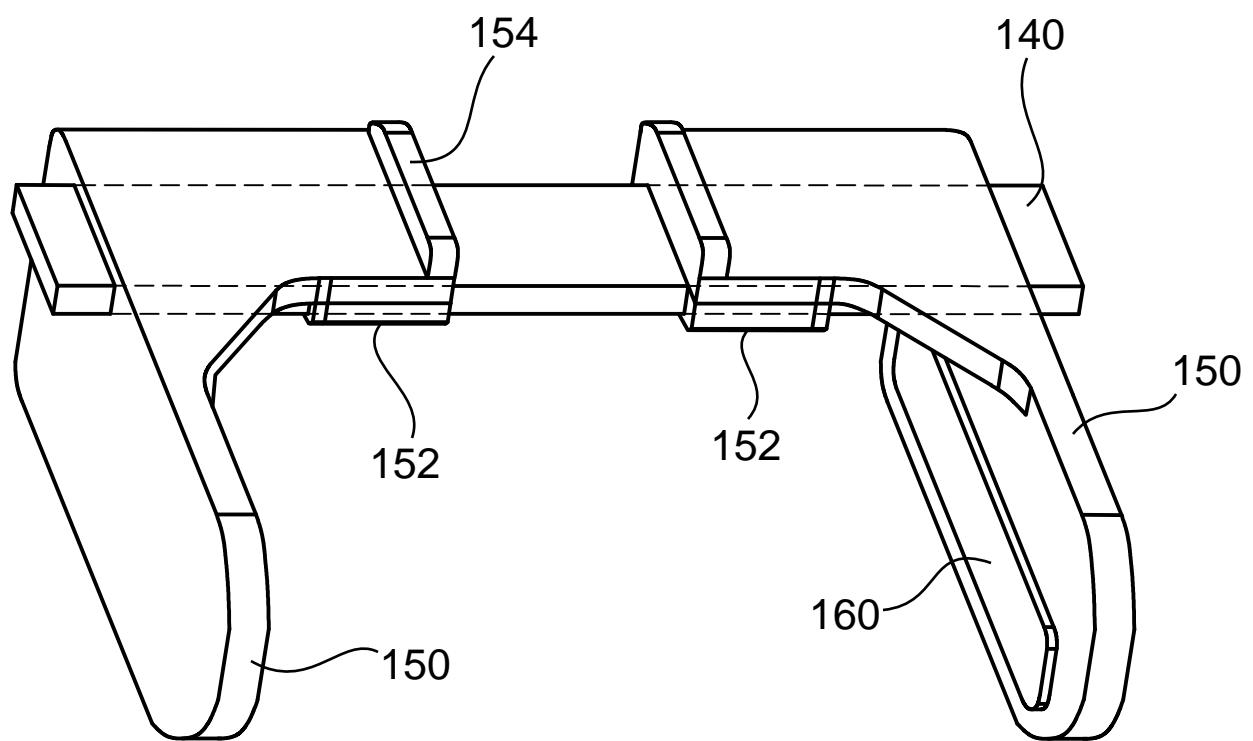
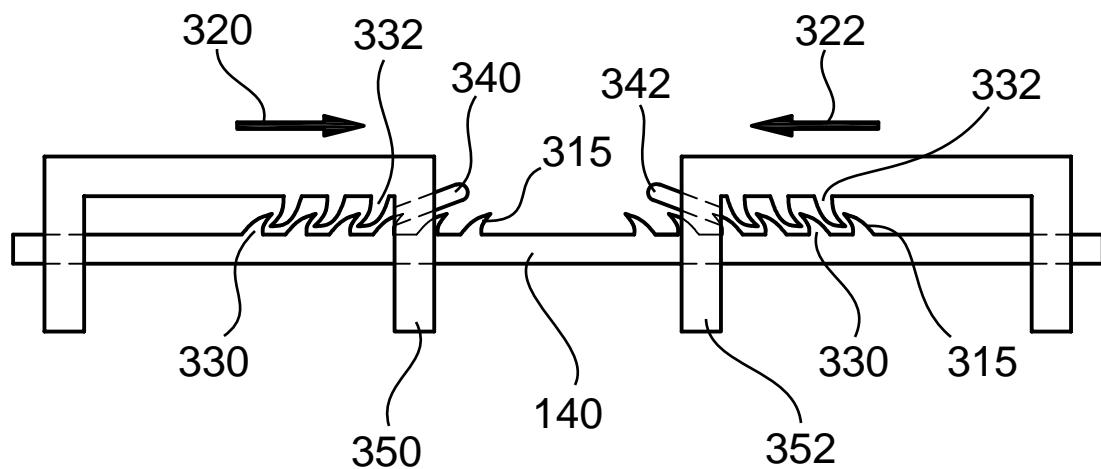
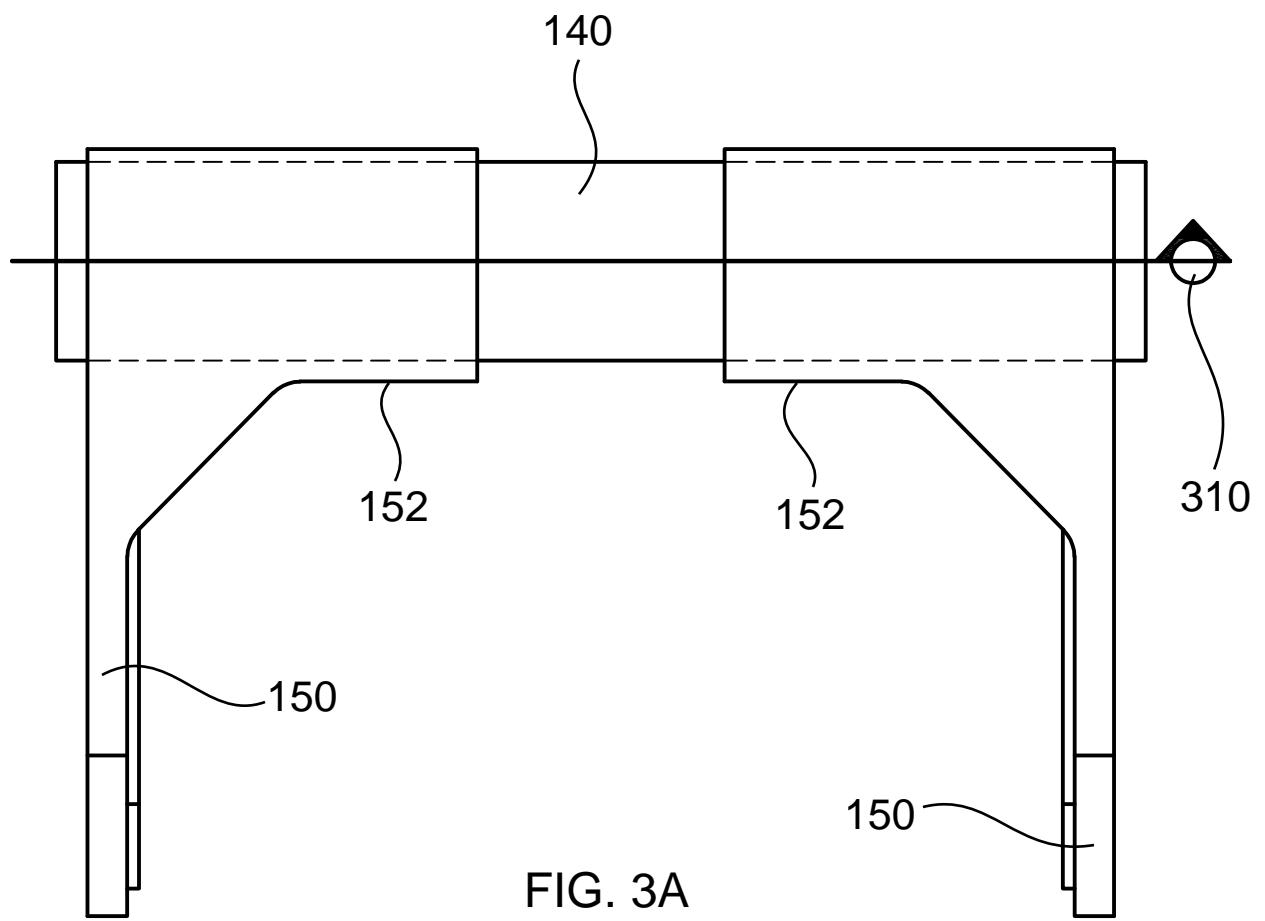


FIG. 2



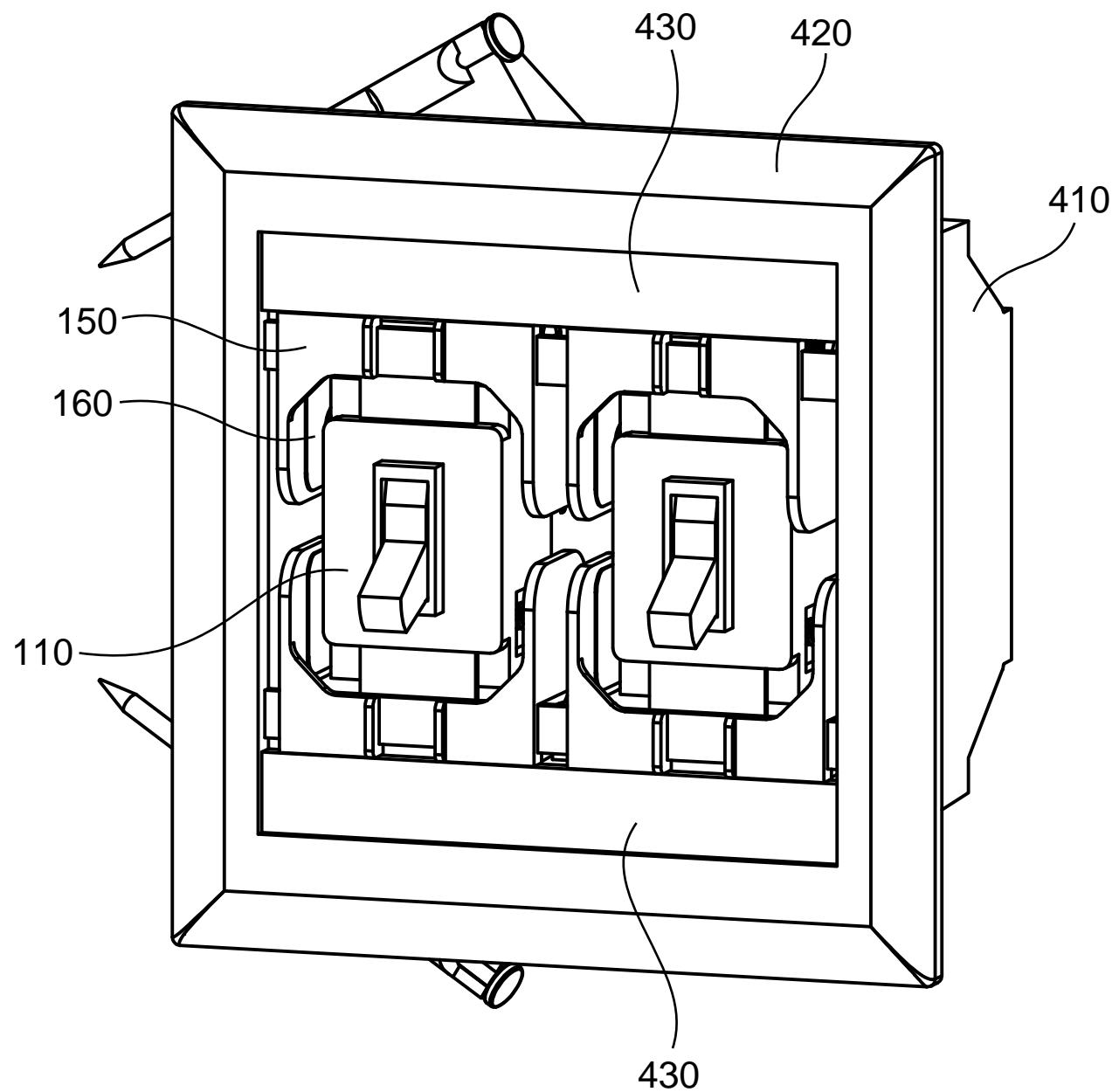


FIG. 4

FIG. 5B

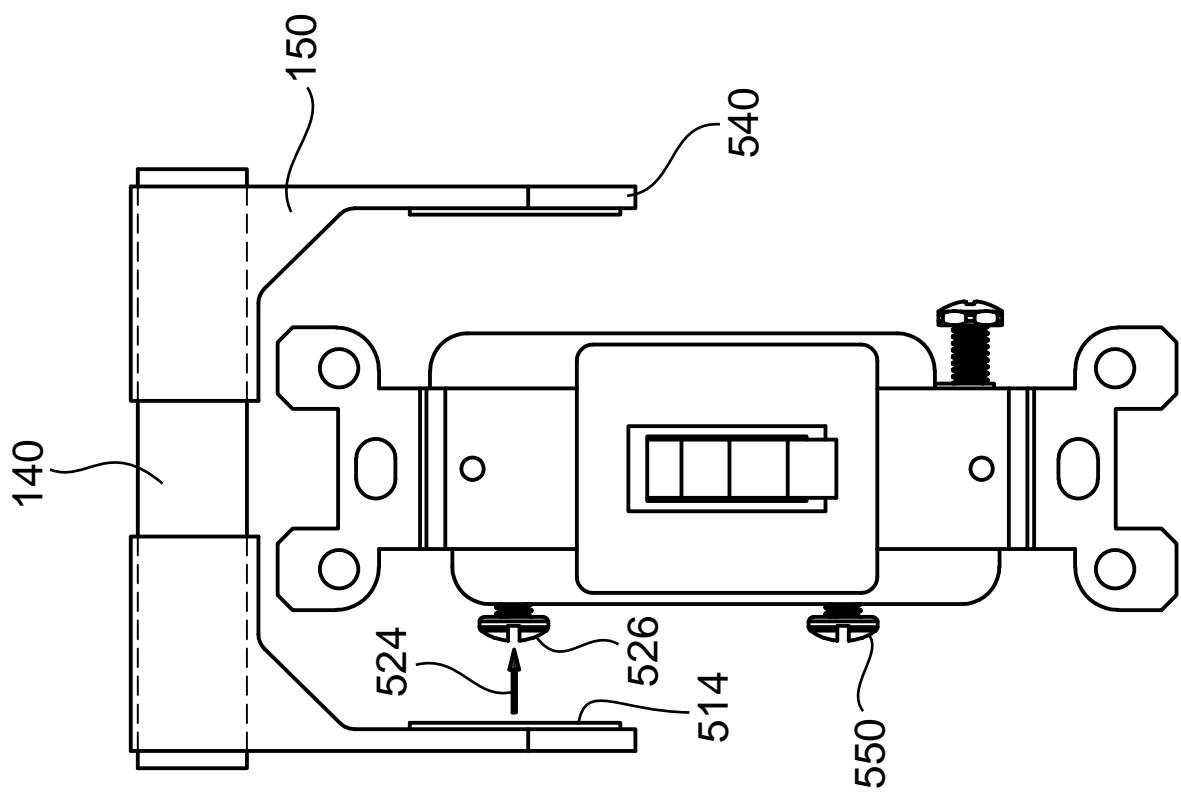
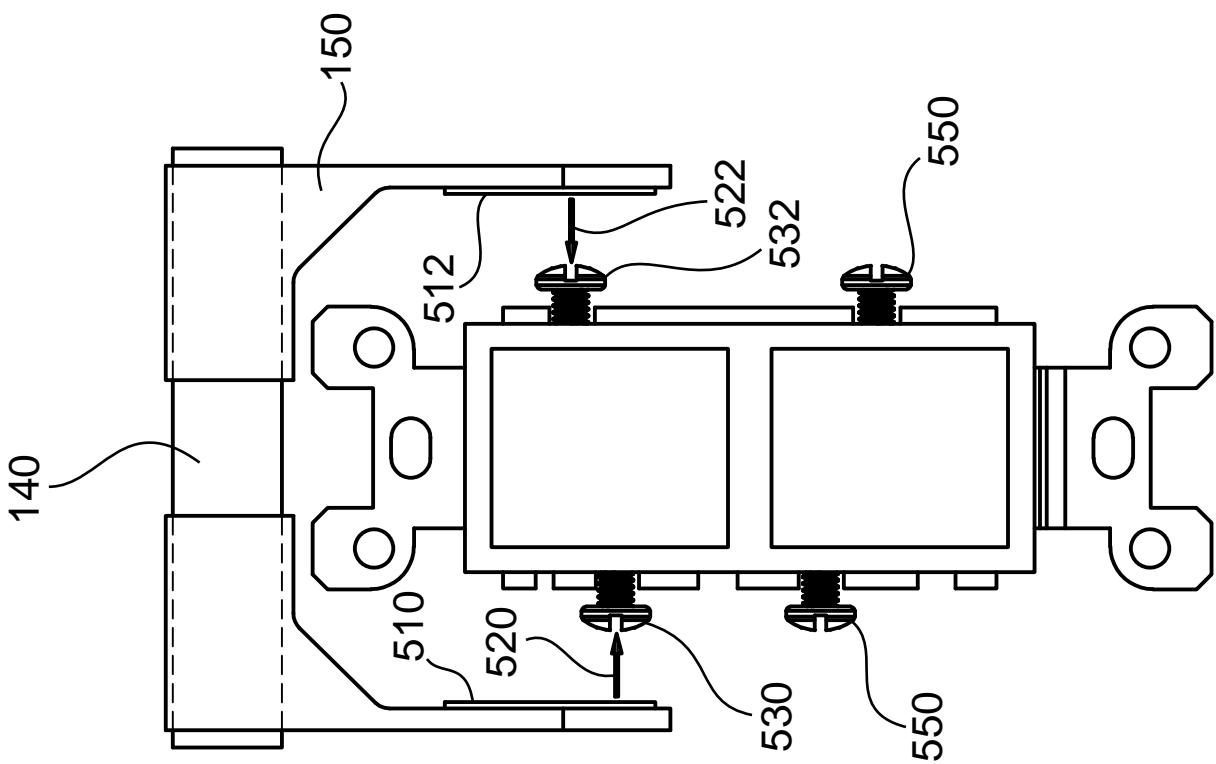


FIG. 5A



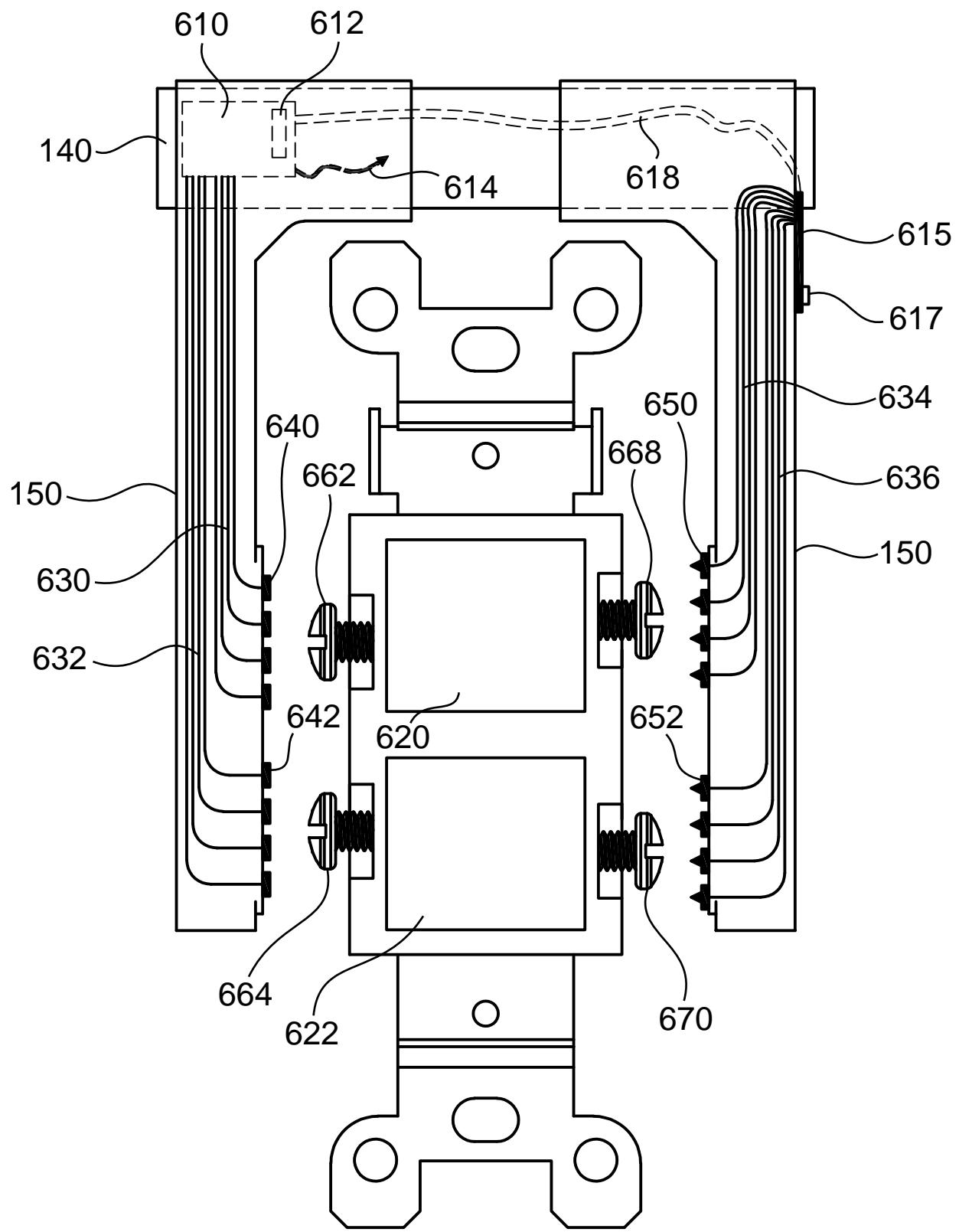


FIG. 6

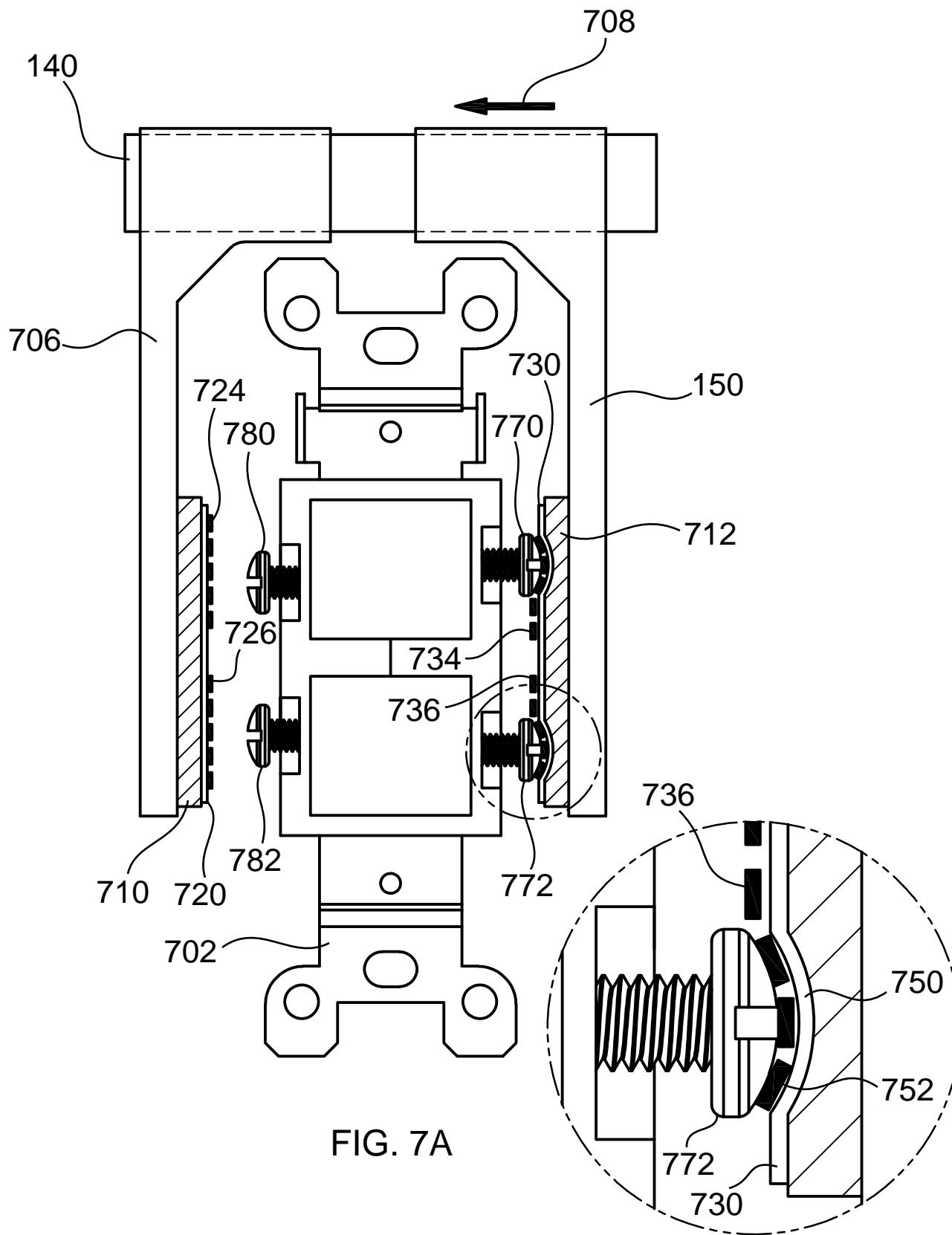


FIG. 7A

FIG. 7B



US011543801B2

(12) **United States Patent**
Hall et al.

(10) **Patent No.:** US 11,543,801 B2
(45) **Date of Patent:** Jan. 3, 2023

(54) **ACCESS SYSTEM FOR A STRUCTURE**

(71) Applicant: **Hall Labs LLC**, Provo, UT (US)

(72) Inventors: **David R Hall**, Provo, UT (US); **Chris Jones**, Spanish Fork, UT (US); **Trevor Bodily**, Lindon, UT (US); **Jerome Miles**, Spanish Fork, UT (US)

(73) Assignee: **Hall Labs LLC**, Provo, UT (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 333 days.

(21) Appl. No.: **16/805,732**

(22) Filed: **Feb. 29, 2020**

(65) **Prior Publication Data**

US 2021/0271227 A1 Sep. 2, 2021

(51) **Int. Cl.**

G05B 19/4155 (2006.01)
G06Q 10/08 (2012.01)
G06K 7/14 (2006.01)
H04W 12/06 (2021.01)

(52) **U.S. Cl.**

CPC **G05B 19/4155** (2013.01); **G06K 7/1413** (2013.01); **G06K 7/1417** (2013.01); **G06Q 10/0832** (2013.01); **G06Q 10/0833** (2013.01); **H04W 12/06** (2013.01); **G05B 2219/40062** (2013.01)

(58) **Field of Classification Search**

CPC G05B 19/4155; G05B 2219/40062; G06K

7/1413; G06K 7/1417; G06Q 10/0832; G06Q 10/0833; H04W 12/06; H04W 12/63; H04W 12/77; G06F 21/32

See application file for complete search history.

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2019/0282015 A1 * 9/2019 High A47G 29/141

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Umbarkar, S., et al. "Keypad/Bluetooth/GSM Based Digital Door Lock Security System." ICCASP/ICMMD 137 (2016): 749-757. (Year: 2016).*

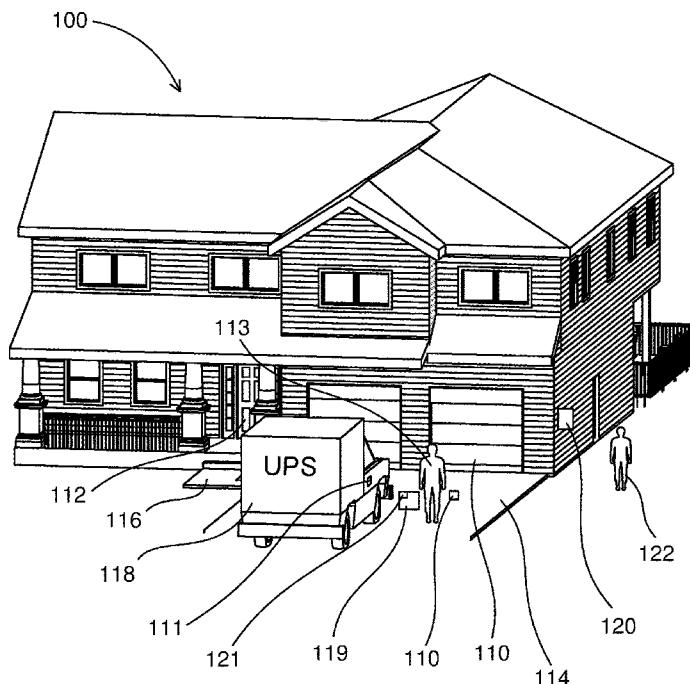
* cited by examiner

Primary Examiner — Matthew Mikels

(57) **ABSTRACT**

An access system and system for enabling a package to be delivered to a house are disclosed. The access unit includes a keypad, a light, and an activatable open button. The access unit opens a door to the structure when the button is pressed while active. The access unit also includes an authentication module configured to communicate via Bluetooth with a package delivery unit when the package delivery unit reaches a predetermined delivery distance near the structure and to authenticate the package delivery unit. The access unit also includes an execution module configured to store one or more rules pertaining to delivery of a package by the package delivery unit and to execute the one or more rules in response to the access unit successfully communicating with the package delivery unit, wherein one of the rules is to activate the activatable open button if the authentication is successful.

17 Claims, 4 Drawing Sheets



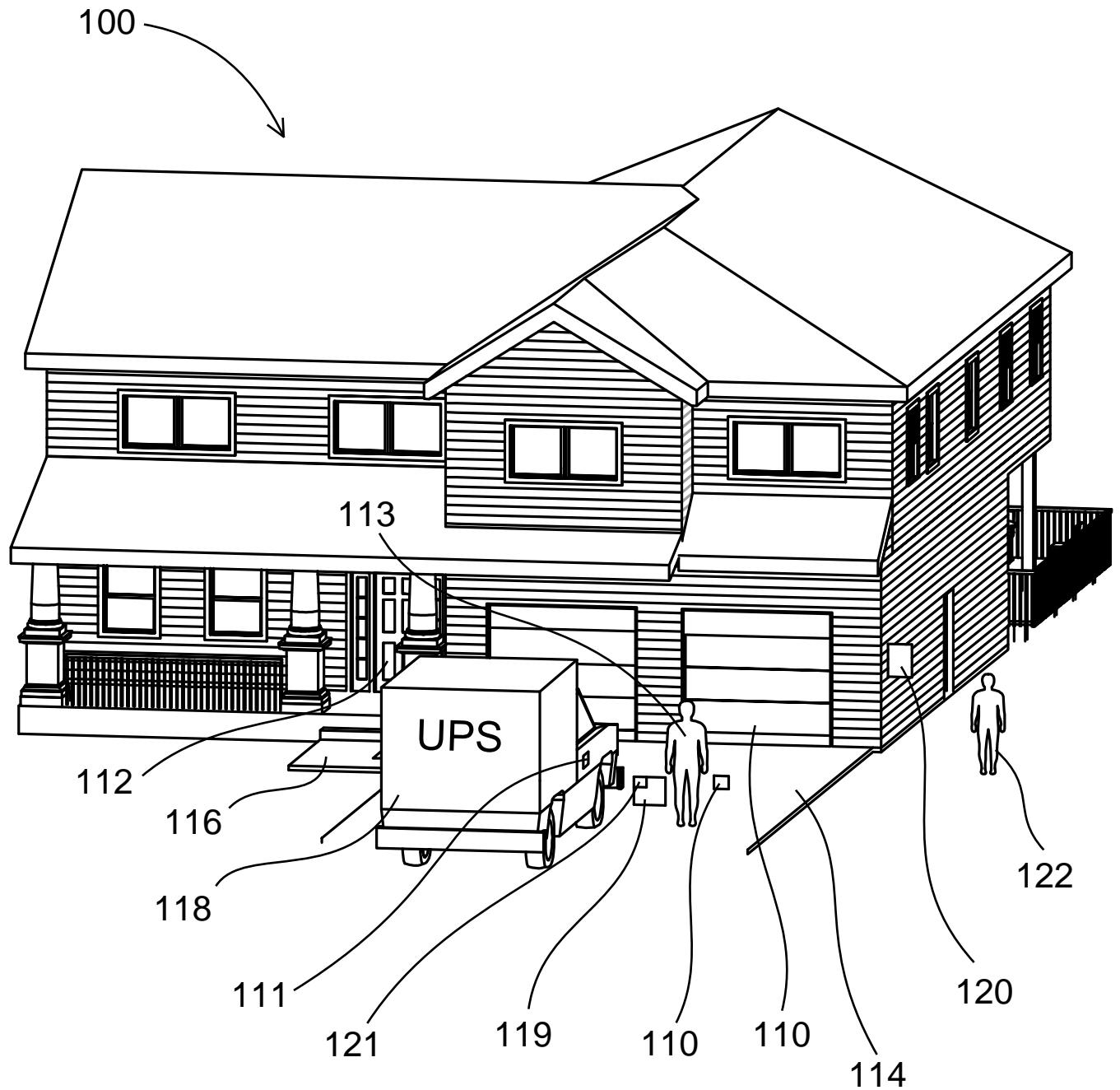


FIG. 1

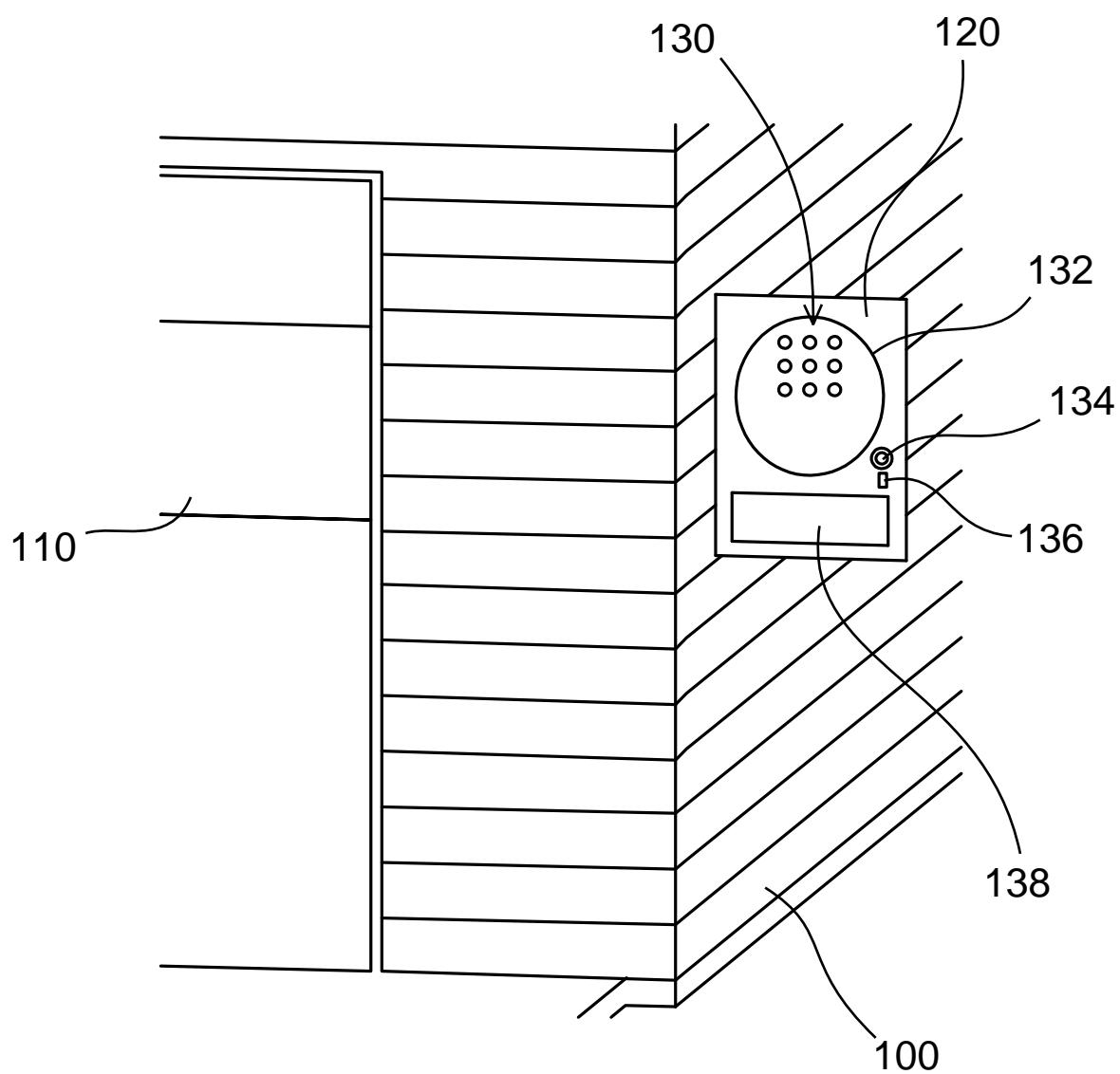


FIG. 2

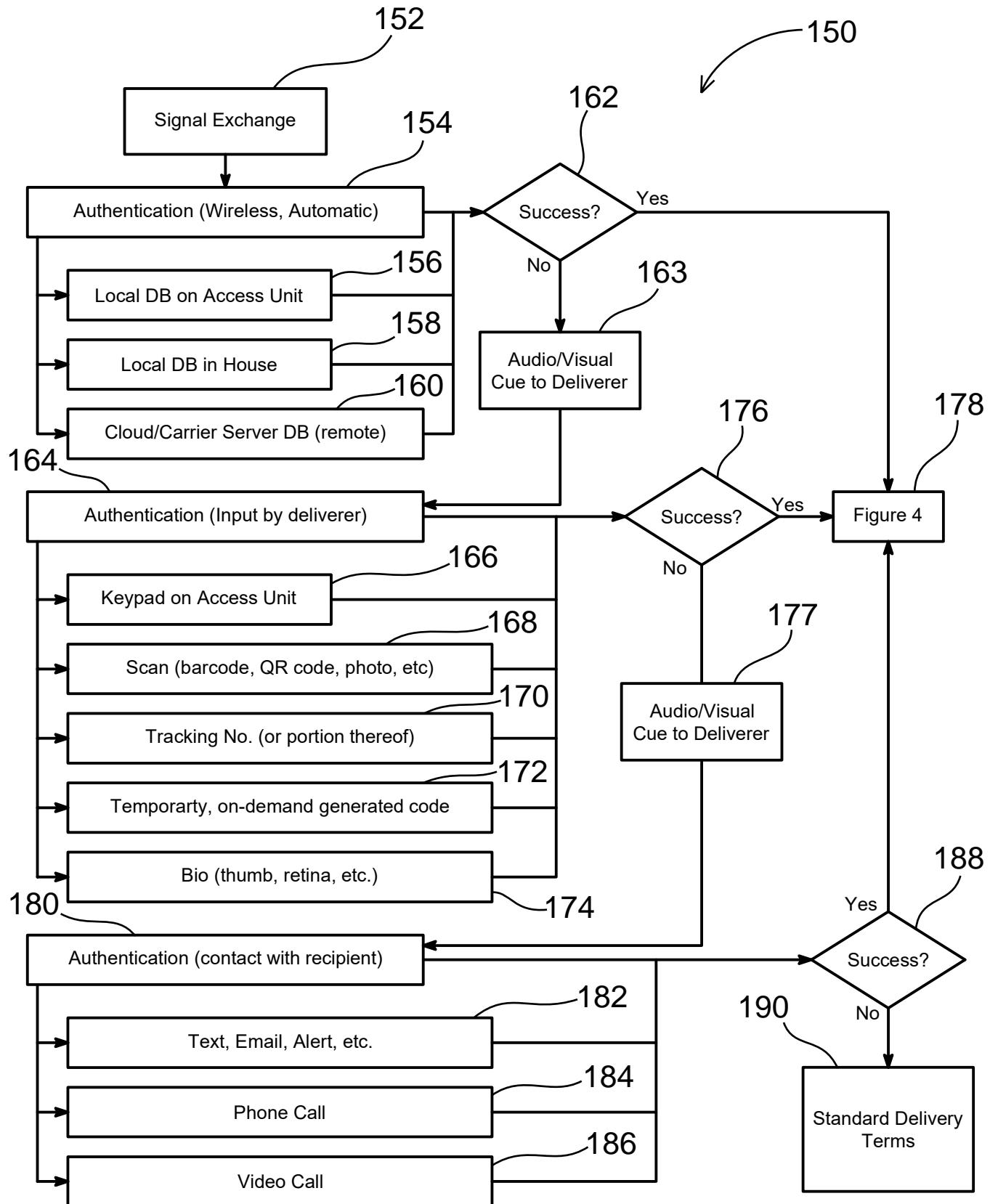


FIG. 3

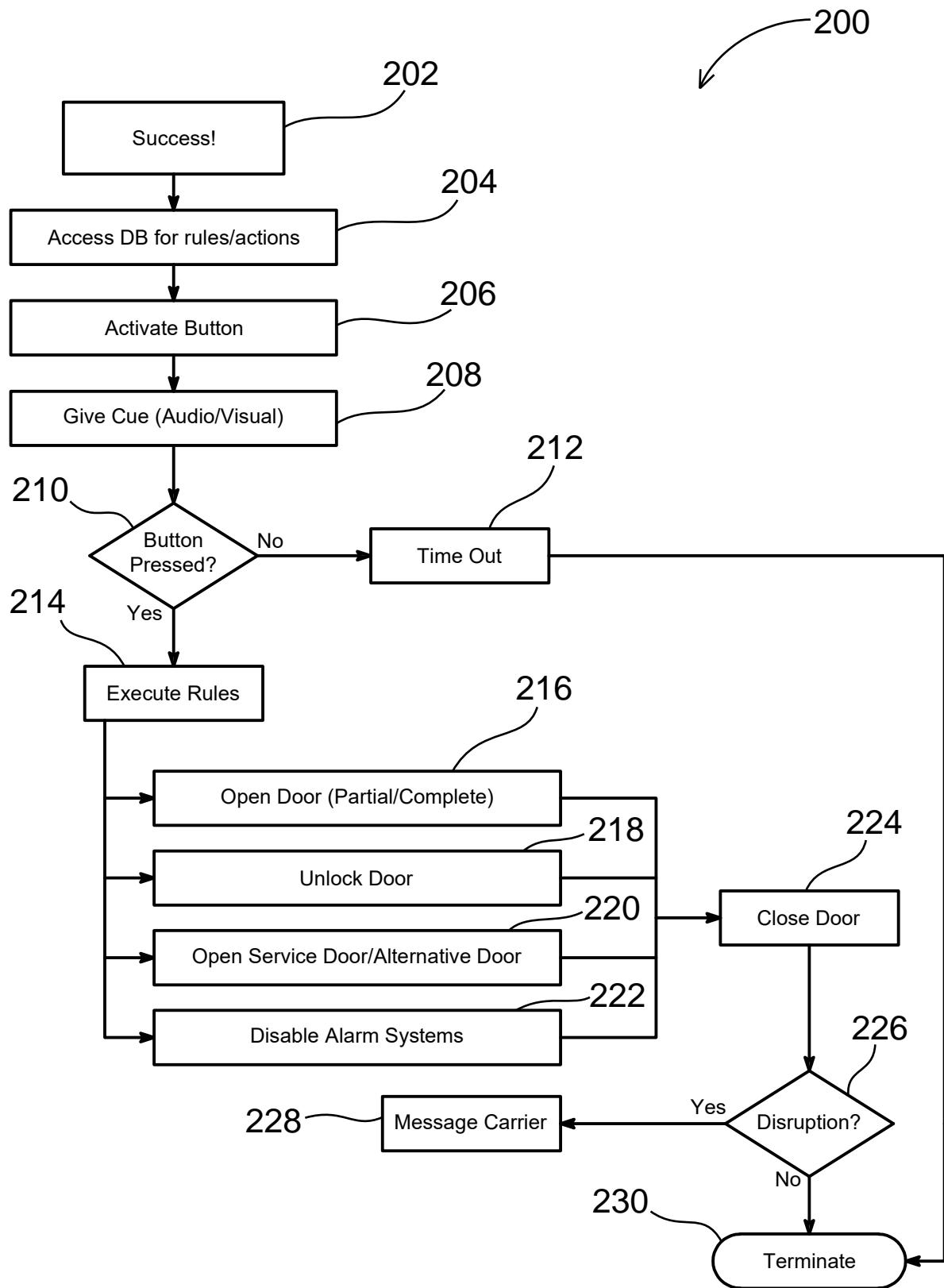


FIG. 4



US 20220282550A1

(19) **United States**

(12) **Patent Application Publication**

Hall et al.

(10) **Pub. No.: US 2022/0282550 A1**

(43) **Pub. Date: Sep. 8, 2022**

(54) **AUTOMATED WINDOW MECHANISM
WITH MOTOR LOCKDOWN**

(71) Applicant: **Hall Labs LLC**, Provo, UT (US)

(72) Inventors: **David R. Hall**, Provo, UT (US);
Jerome Miles, Spanish Fork, UT (US);
Mark Madsen, Provo, UT (US);
Christopher Jones, Spanish Fork, UT
(US)

(73) Assignee: **Hall Labs LLC**, Provo, UT (US)

(21) Appl. No.: **17/686,384**

(22) Filed: **Mar. 3, 2022**

Related U.S. Application Data

(60) Provisional application No. 63/156,322, filed on Mar. 3, 2021.

Publication Classification

(51) **Int. Cl.**
E05F 15/665 (2006.01)

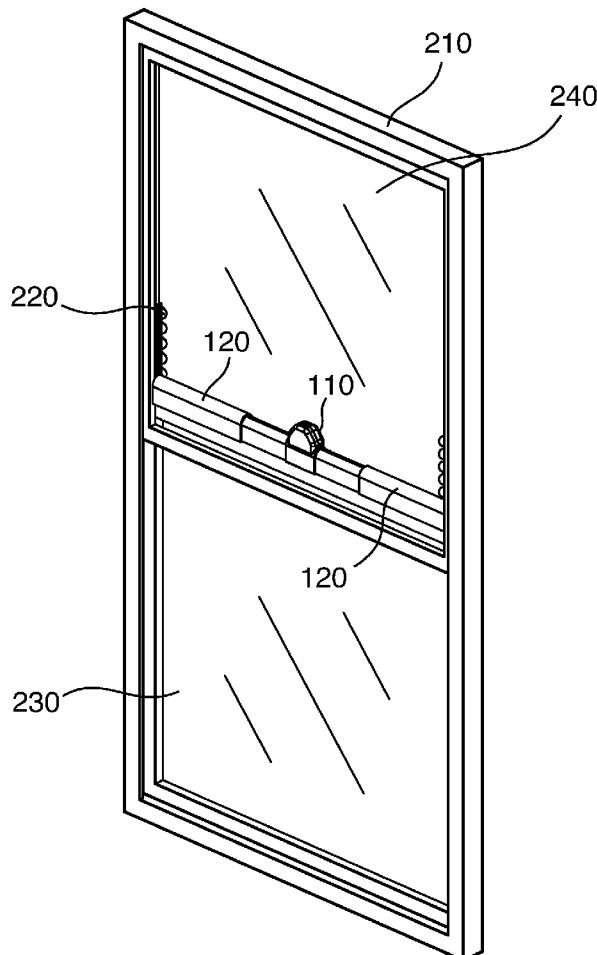
(52) **U.S. Cl.**

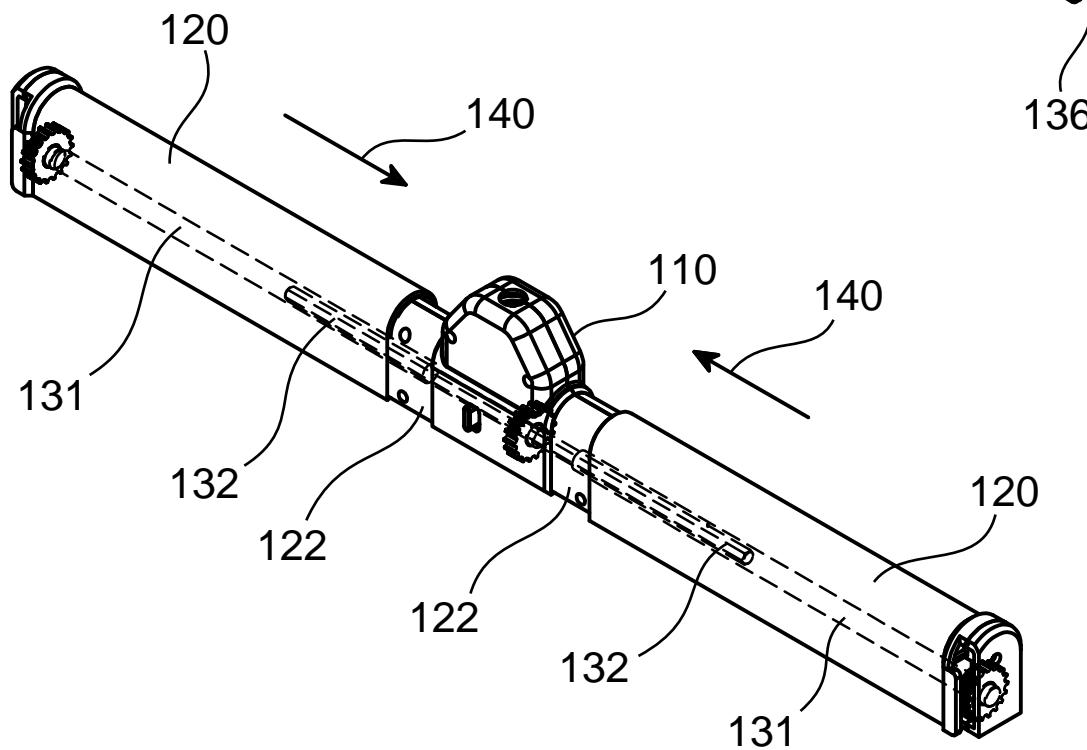
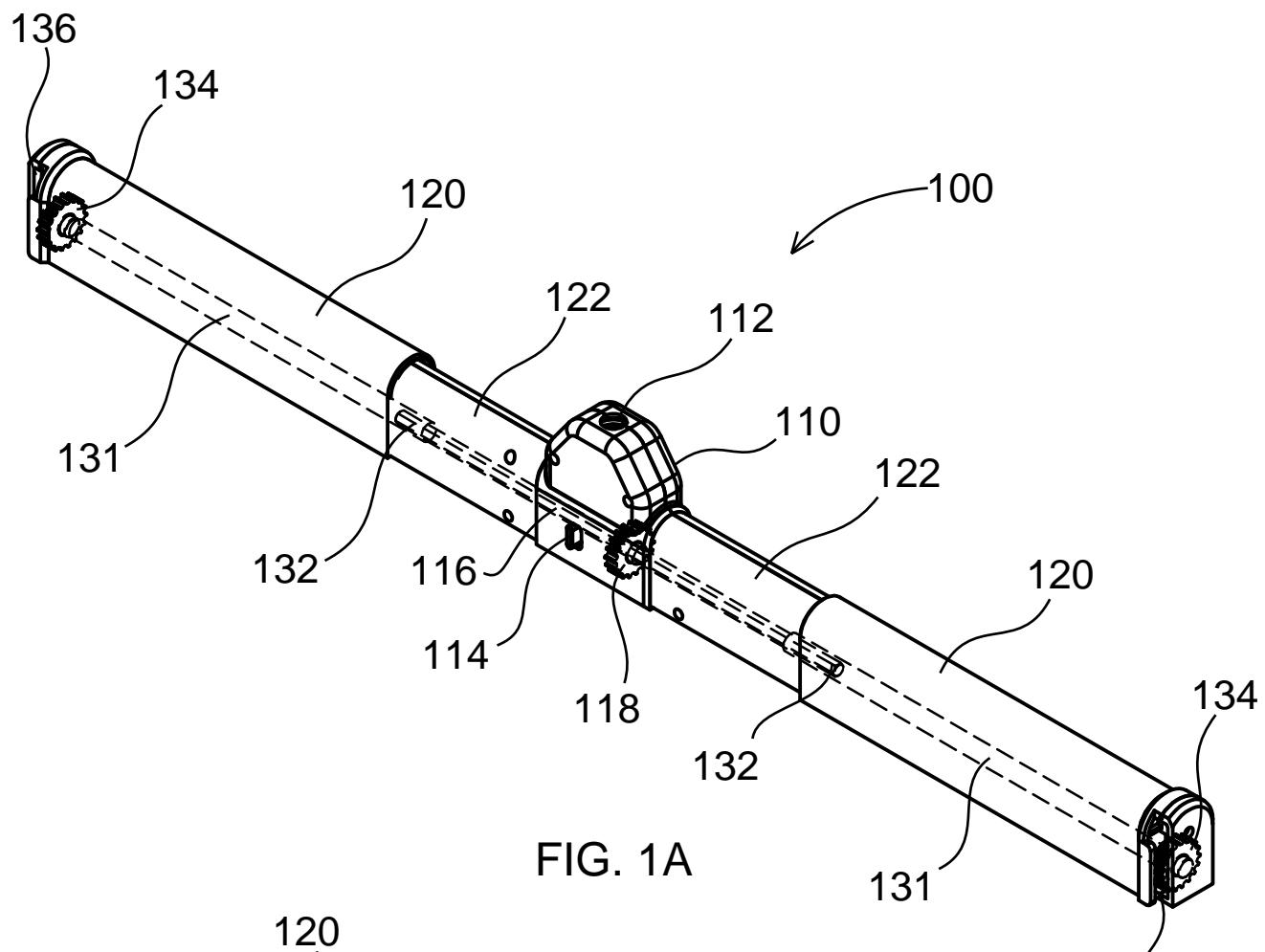
CPC **E05F 15/665** (2015.01); **E05Y 2201/21**
(2013.01); **E05Y 2201/246** (2013.01); **E05Y**
2201/434 (2013.01); **E05Y 2201/716**
(2013.01); **E05Y 2201/722** (2013.01); **E05Y**
2400/32 (2013.01); **E05Y 2400/40** (2013.01);
E05Y 2400/44 (2013.01); **E05Y 2400/52**
(2013.01); **E05Y 2400/612** (2013.01); **E05Y**
2800/70 (2013.01); **E05Y 2800/10** (2013.01);
E05Y 2900/148 (2013.01)

(57)

ABSTRACT

The invention is an automated window mechanism having an electric motor attached to a sliding panel of a window configured to open and close the window by moving the sliding panel. The electric motor has a locked state in which the electric motor and sliding panel are stationary. The automated window mechanism also includes a monitor configured to detect an external force applied to the sliding panel while the electric motor is in the locked state. In response to the monitor detecting the external force while the electric motor is in the locked state the positive lead and the negative lead to a same electric potential thereby rendering the electric motor an electric brake impeding the external force from moving the sliding panel. A method and system for preventing unwanted movement of an automated window are also disclosed.





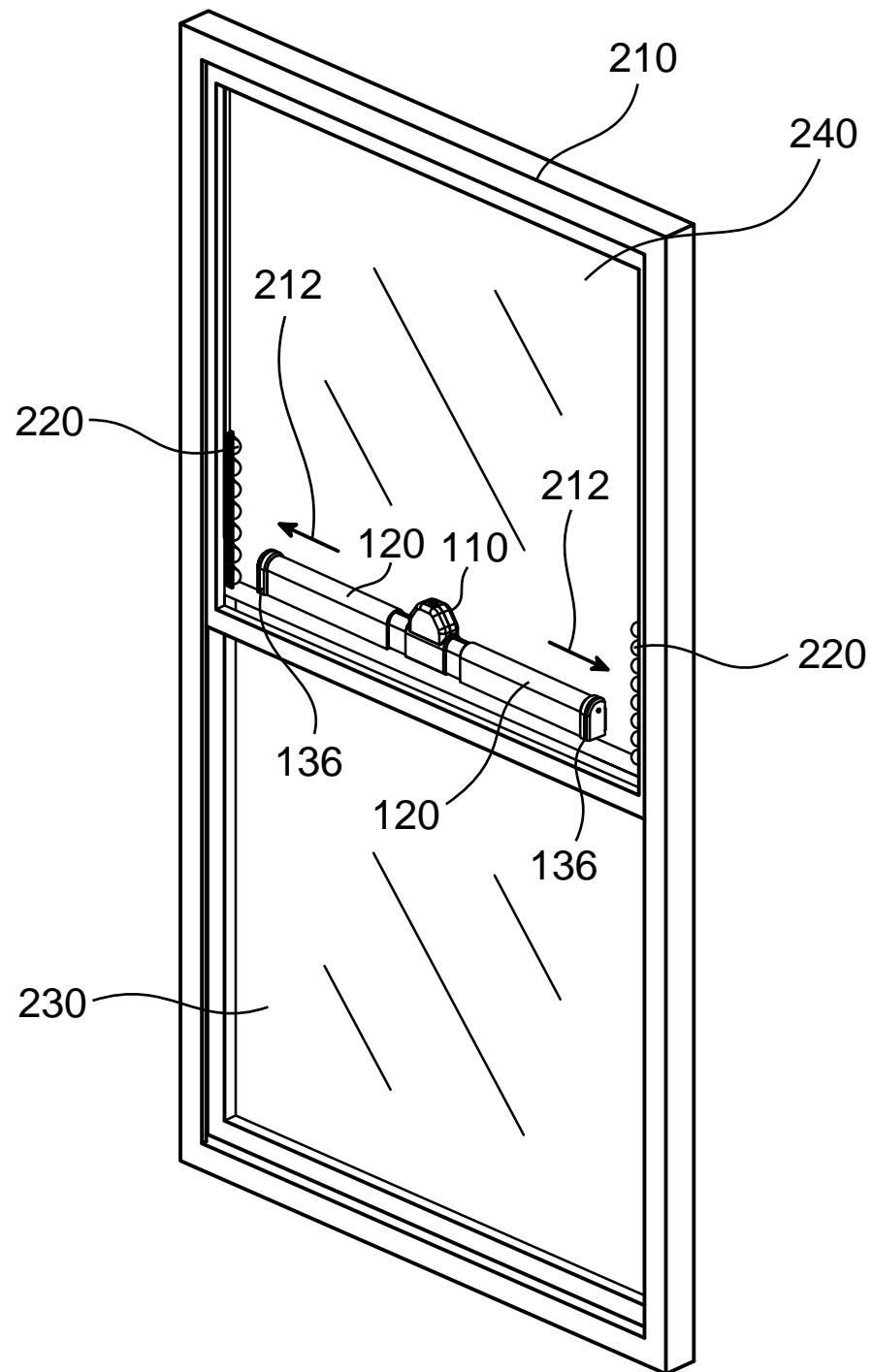


FIG. 2A

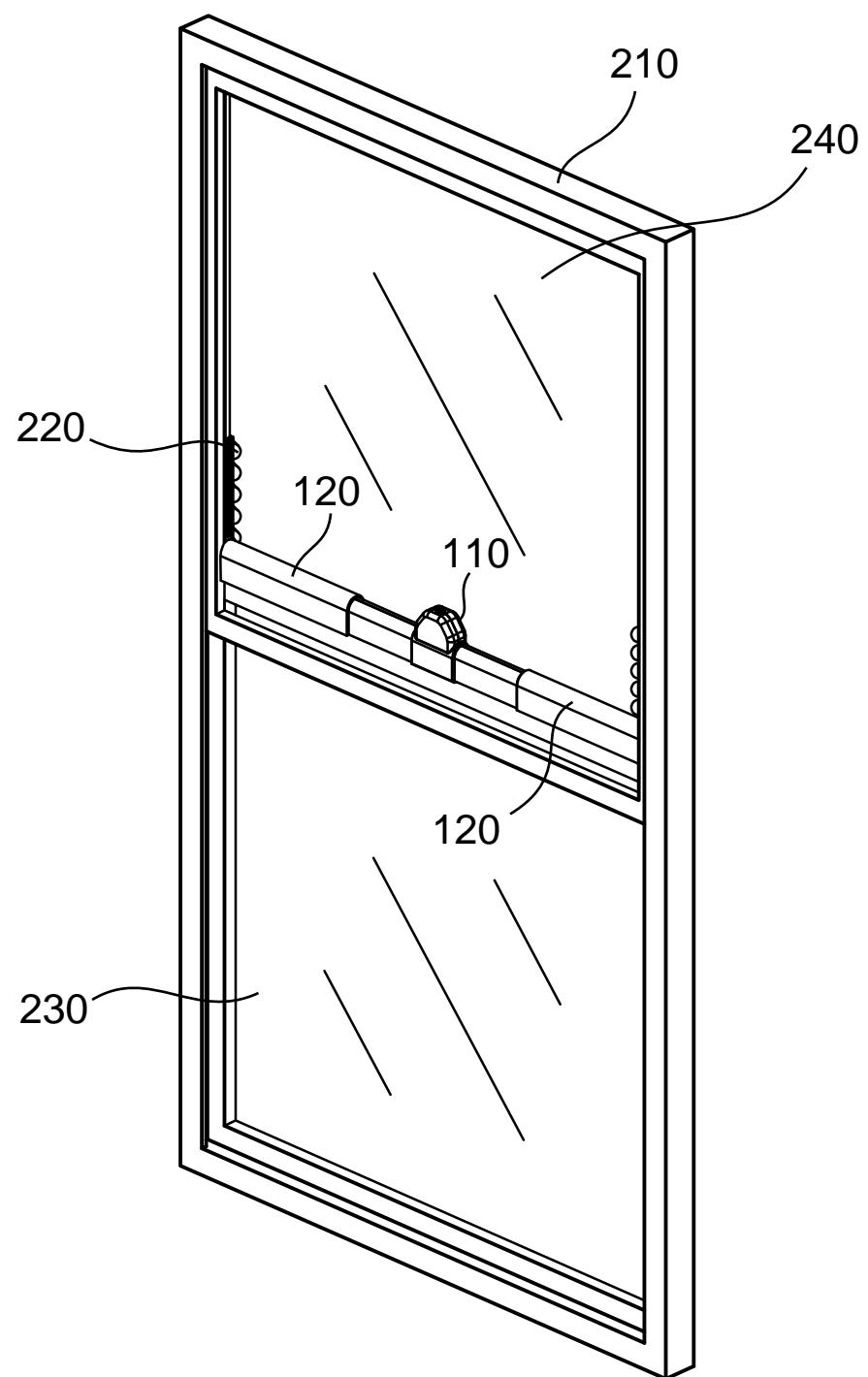


FIG. 2B

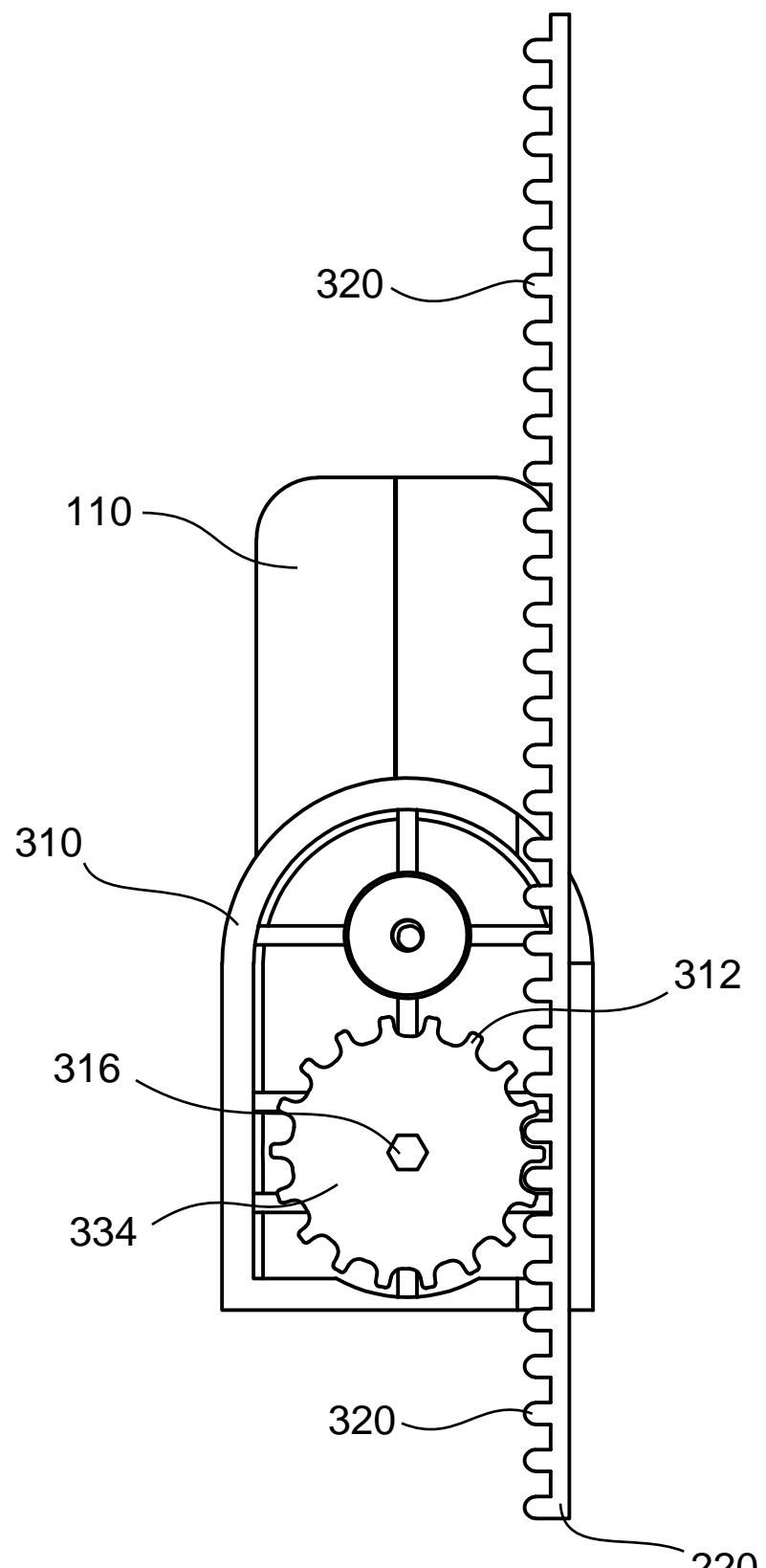


FIG. 3A

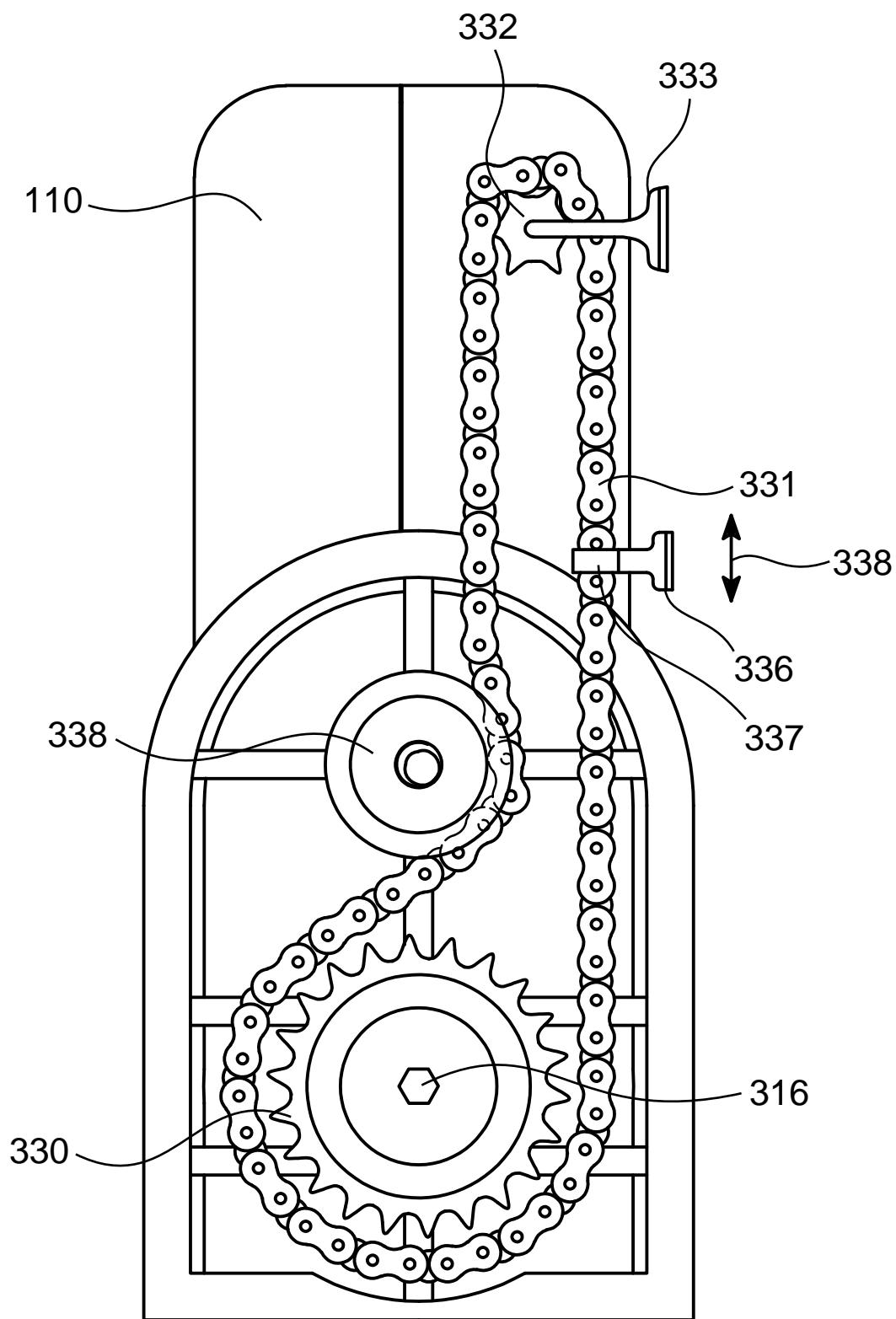


FIG. 3B

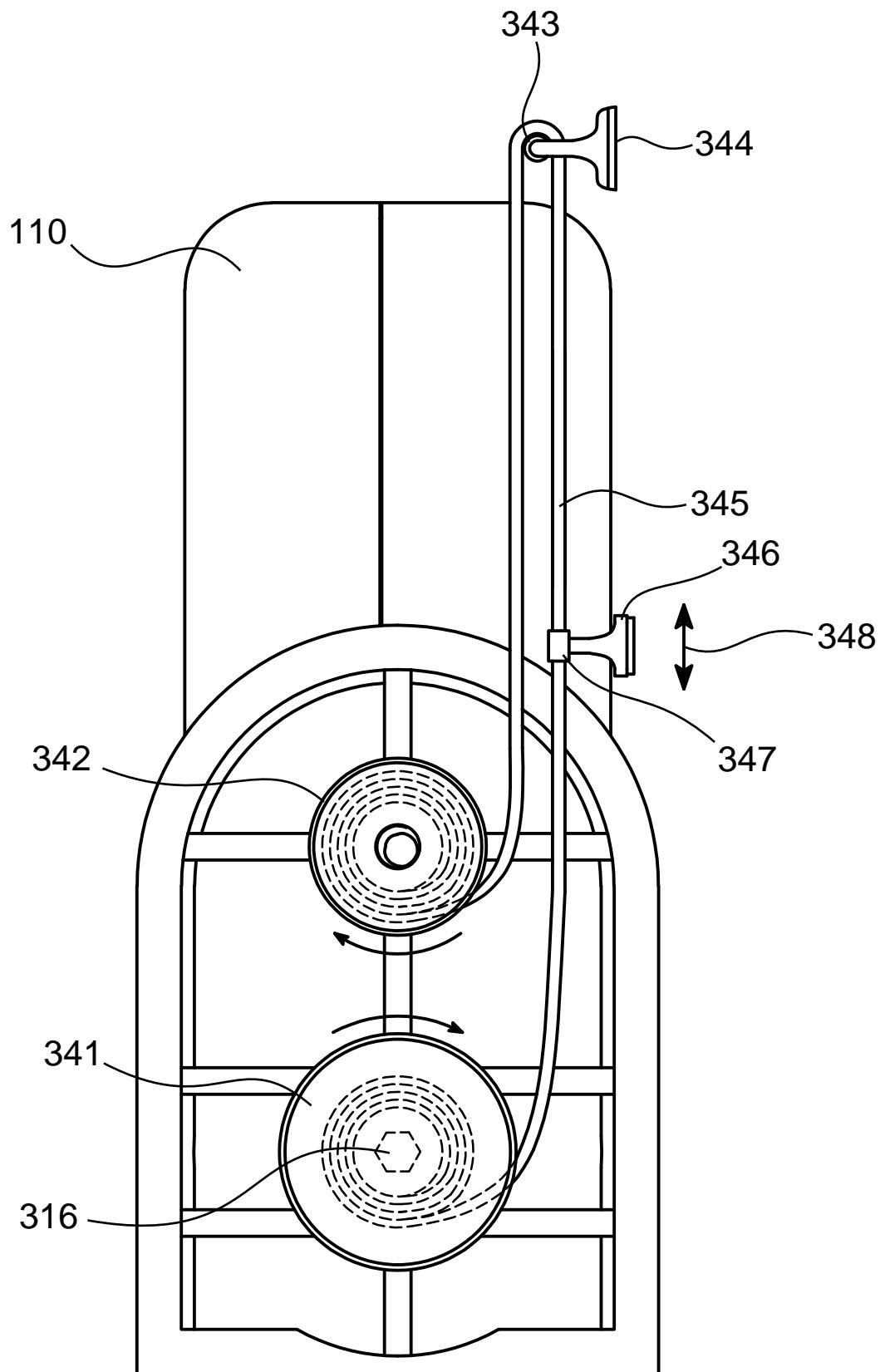


FIG. 3C

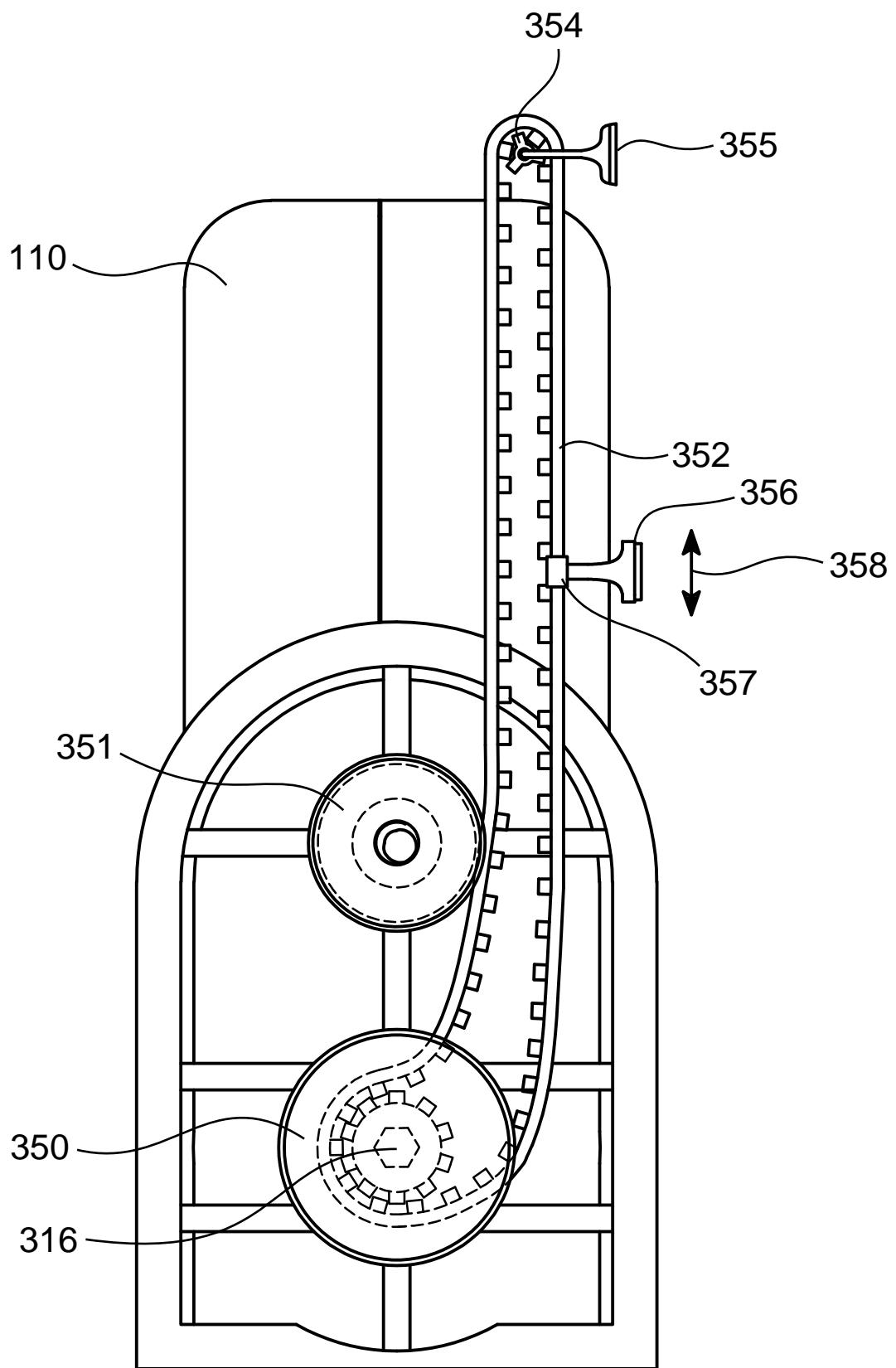


FIG. 3D

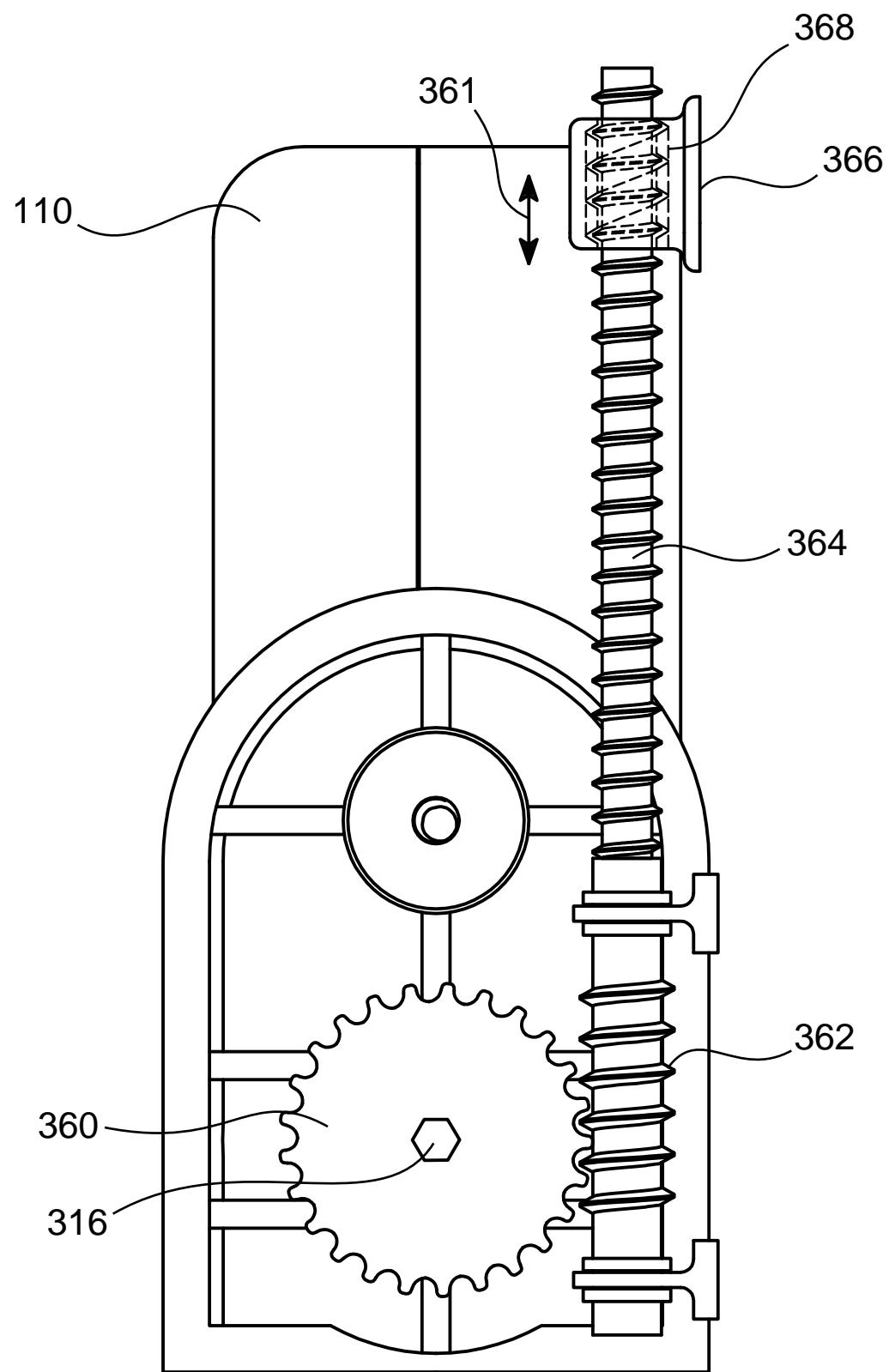


FIG. 3E

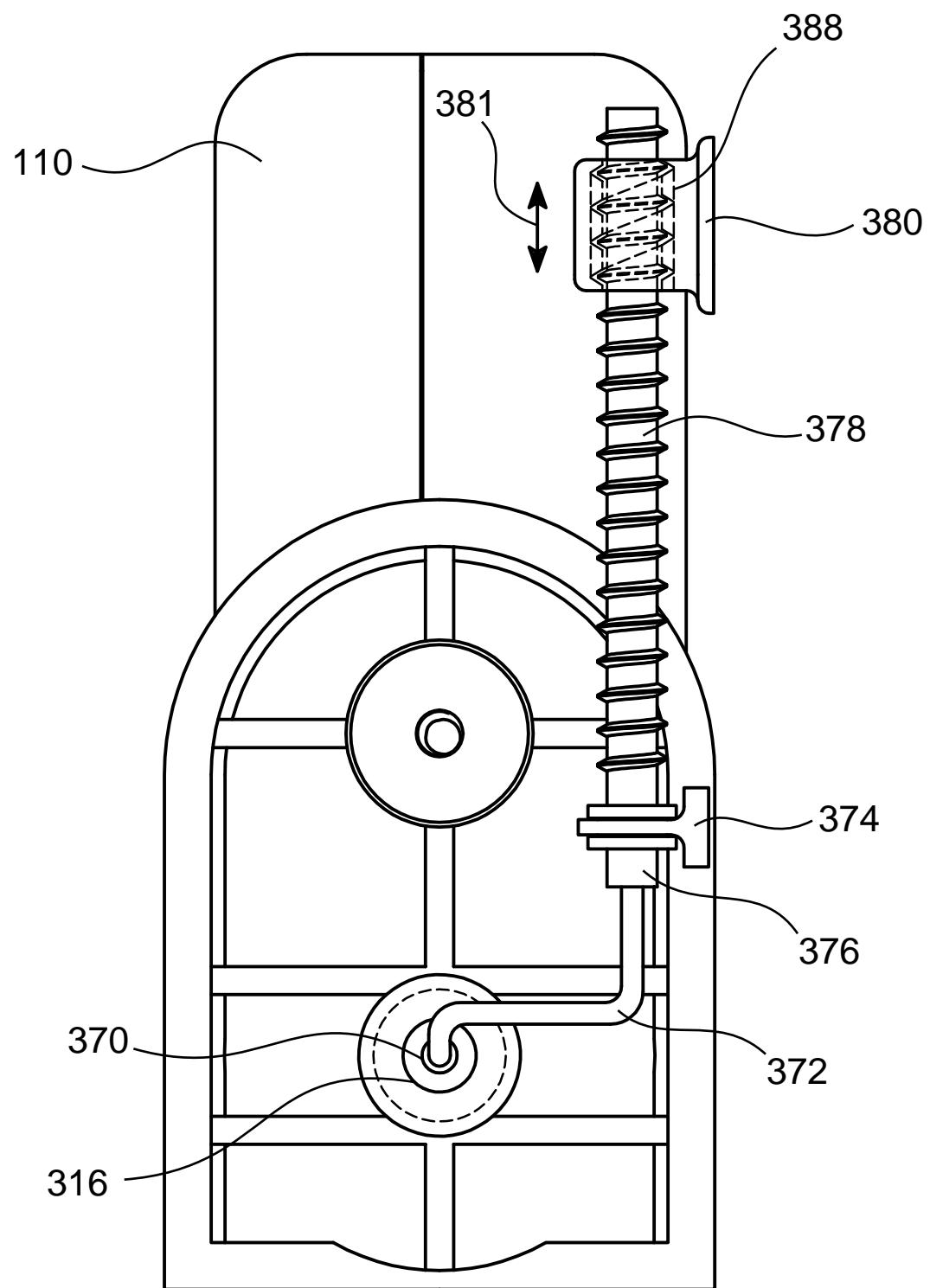


FIG. 3F

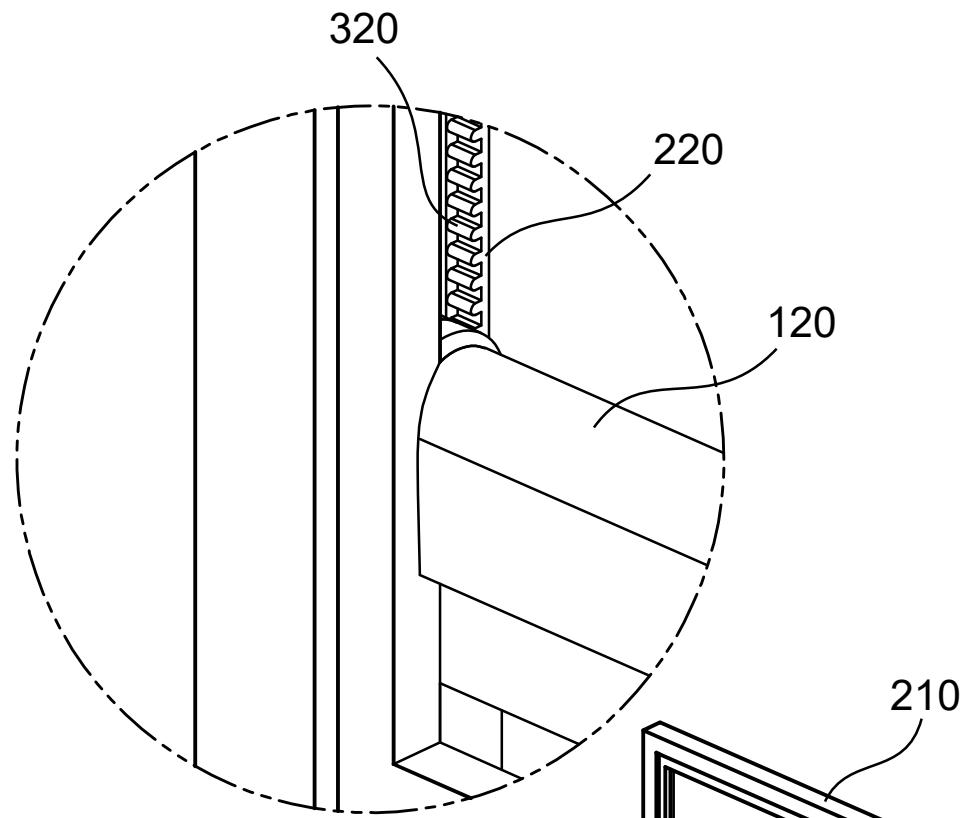


FIG. 4B

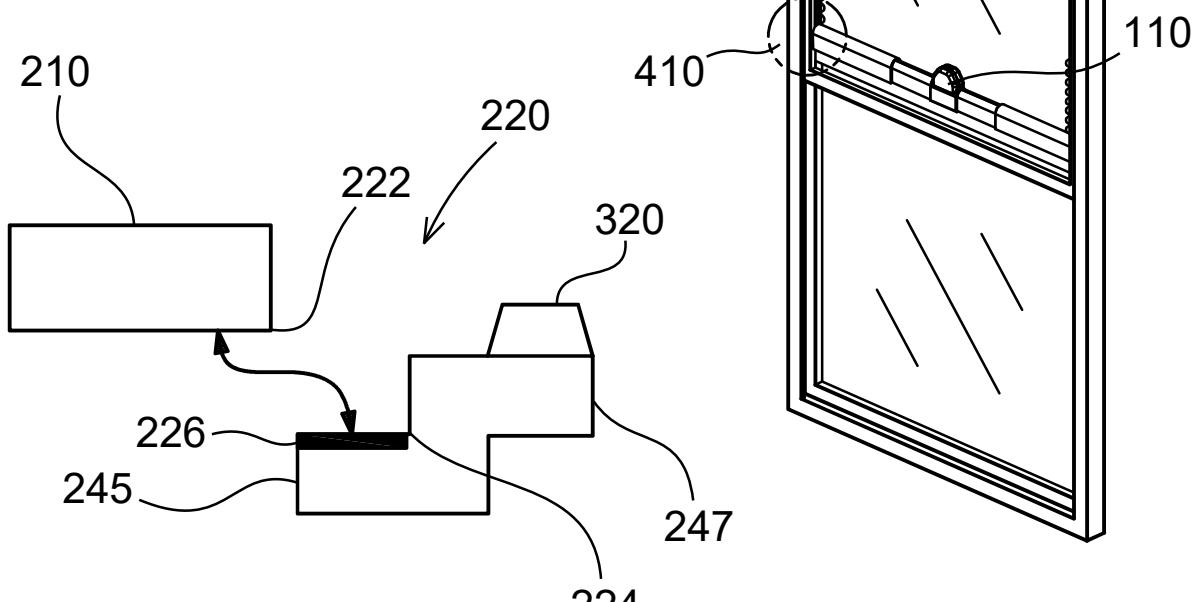


FIG. 4C

FIG. 4A

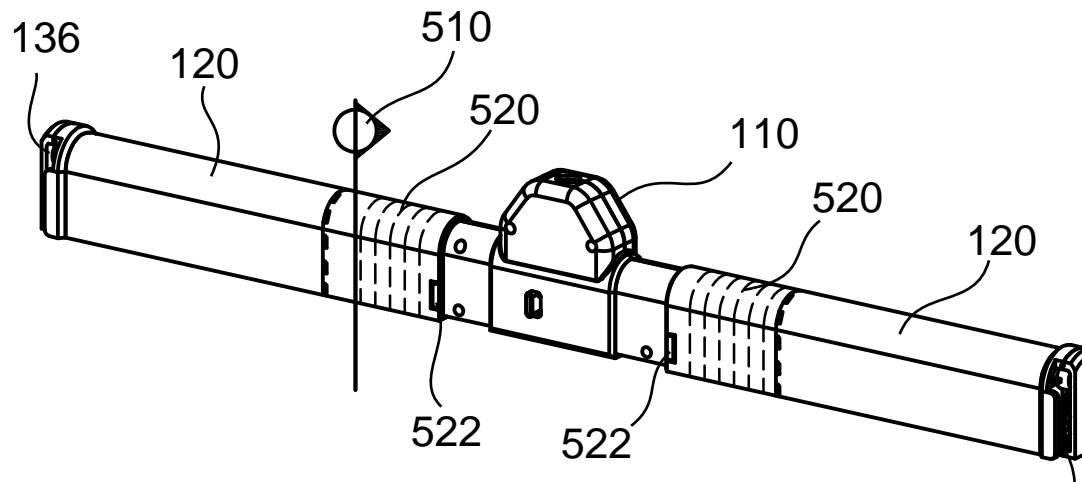


FIG. 5A

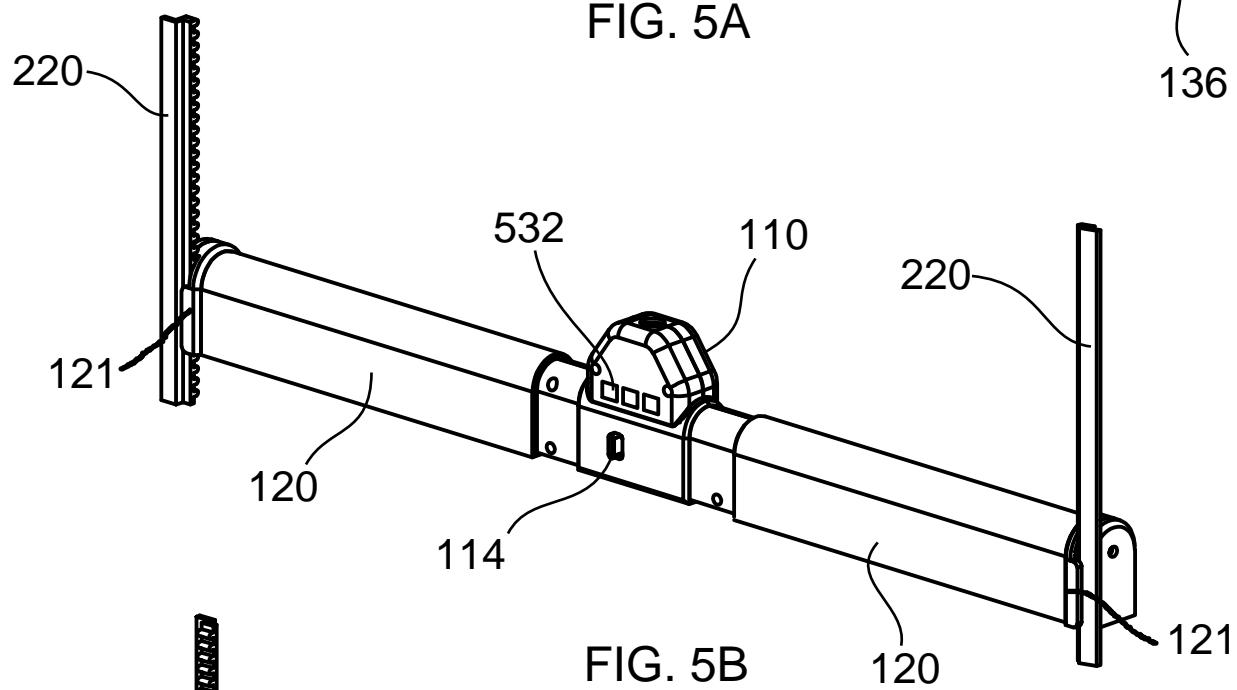


FIG. 5B

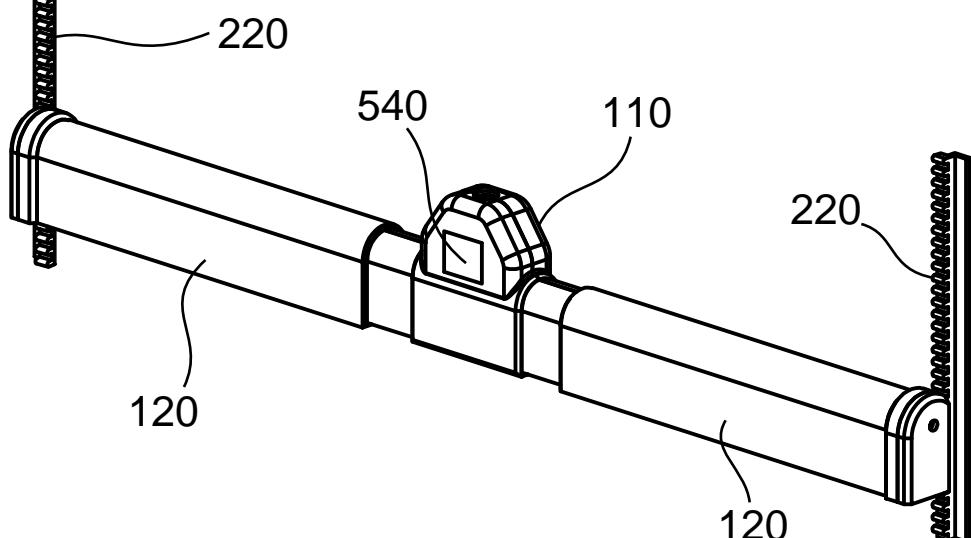


FIG. 5C

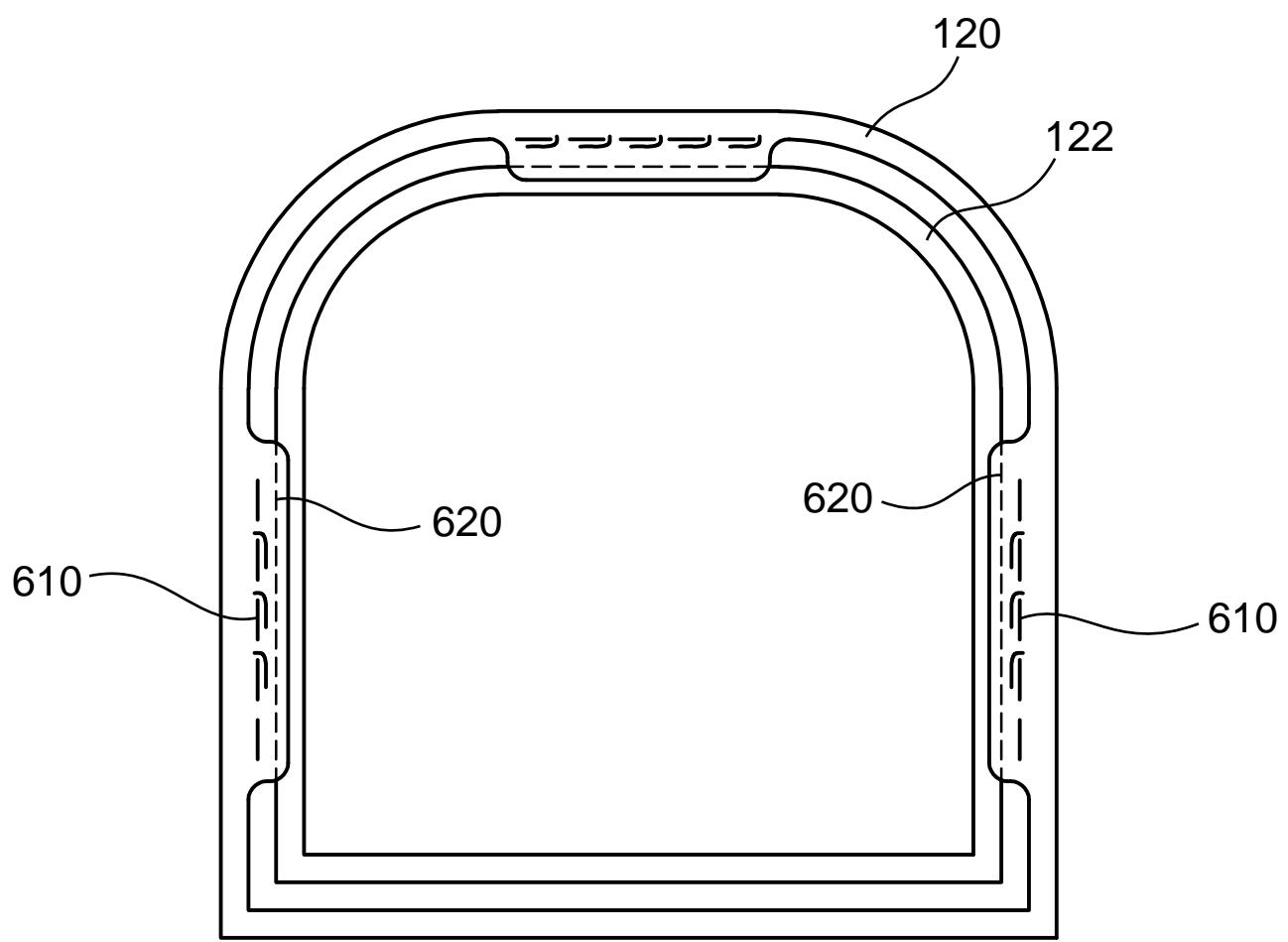


FIG. 6

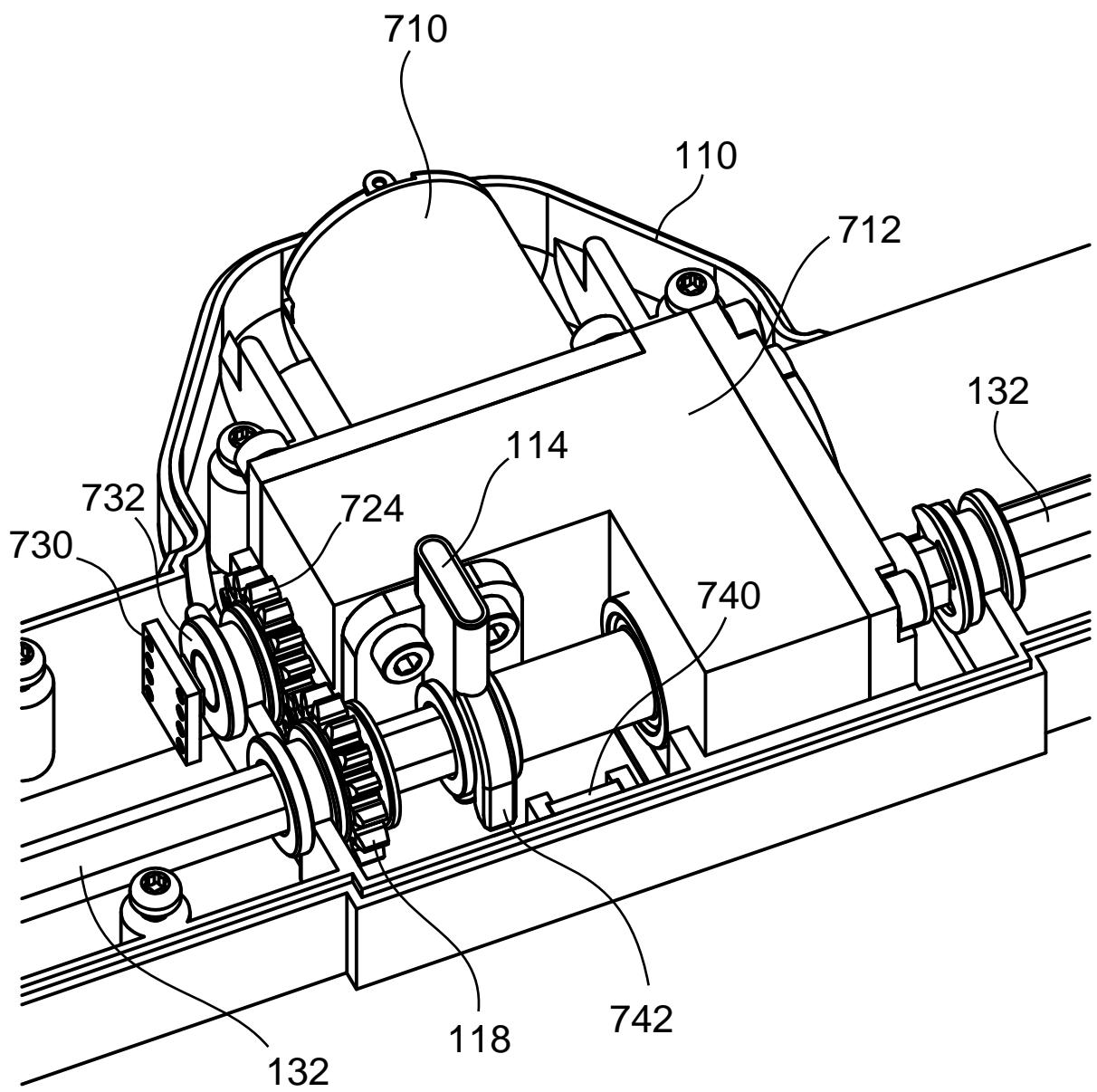


FIG. 7A

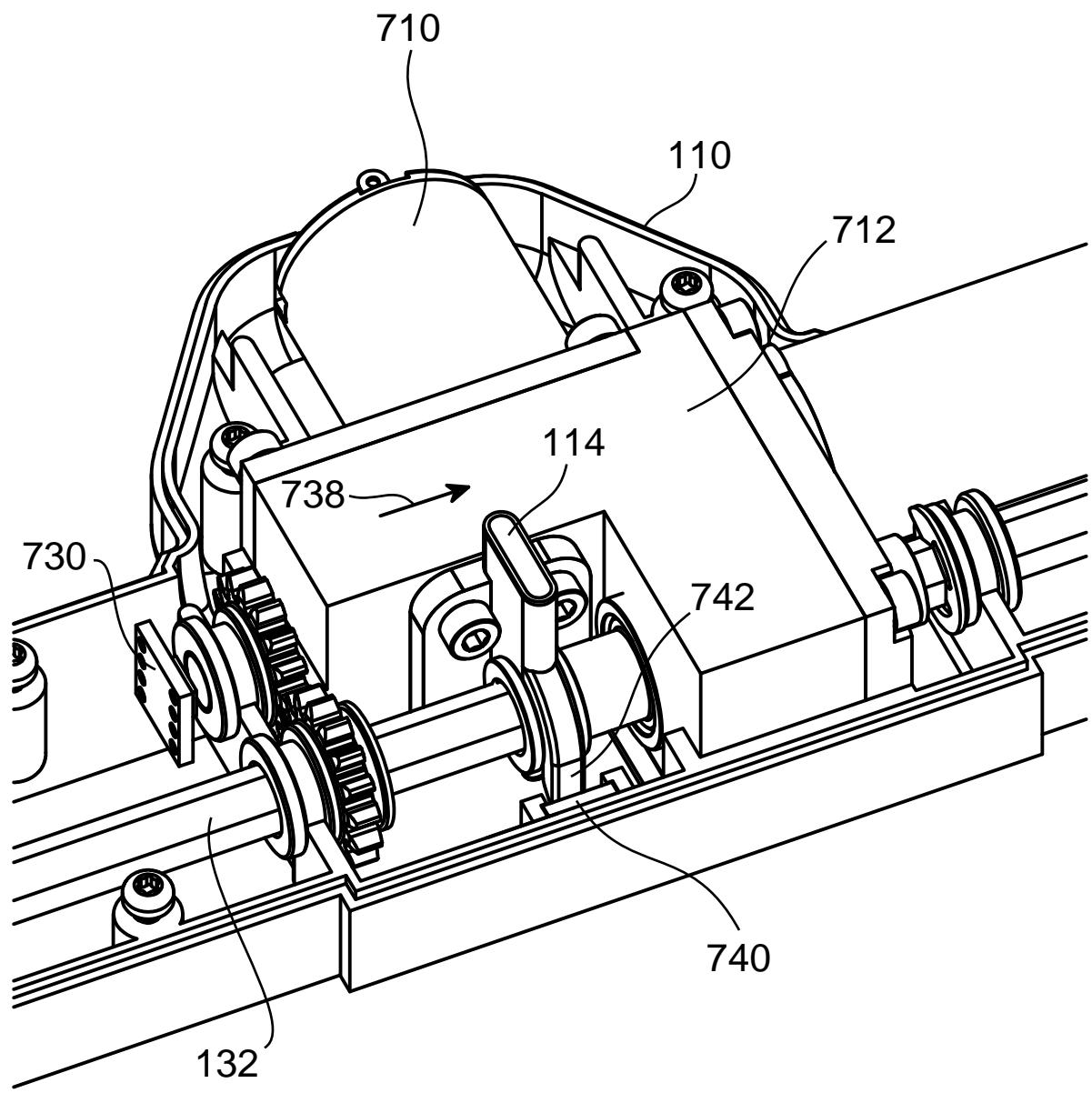


FIG. 7B

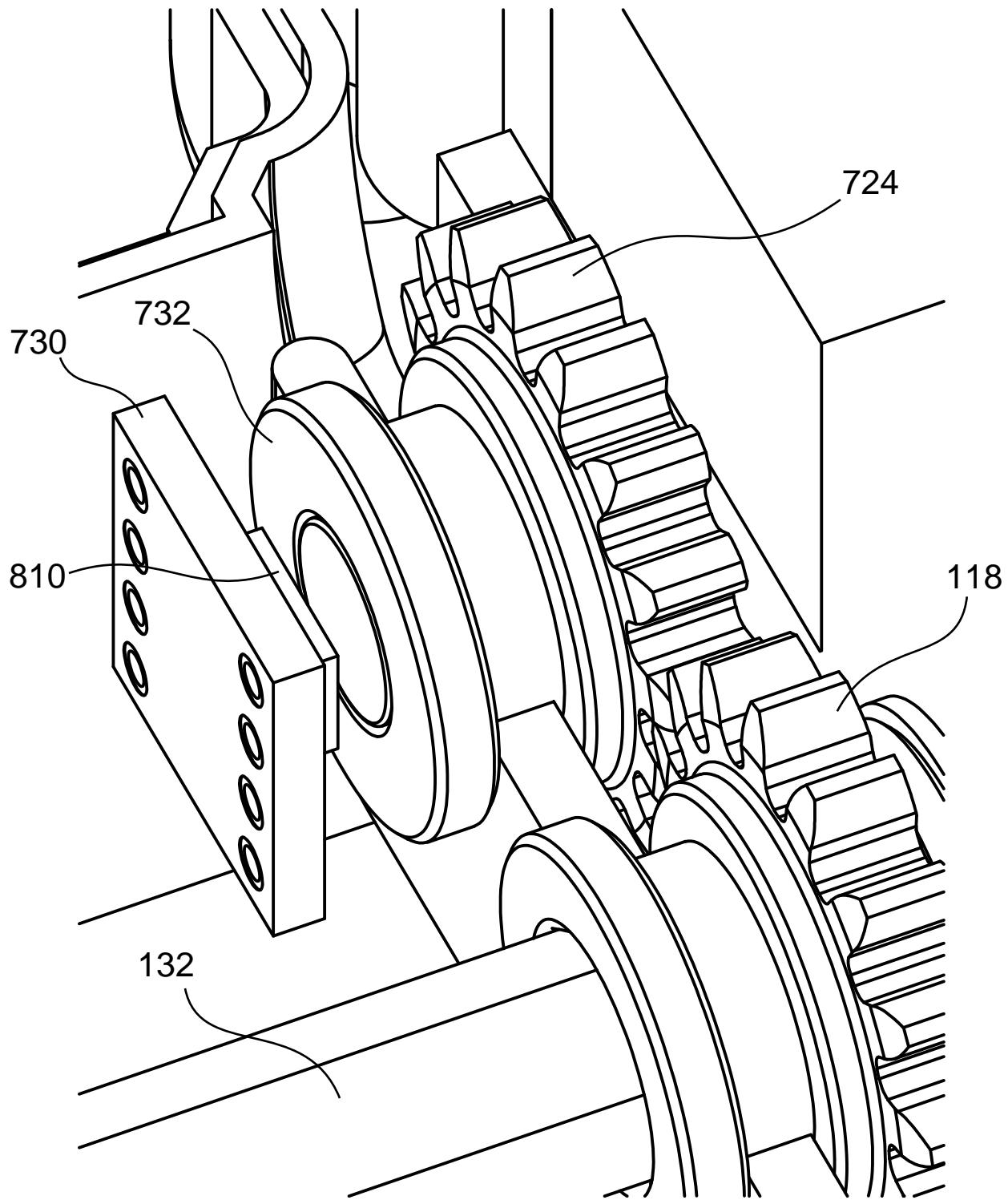


FIG. 8

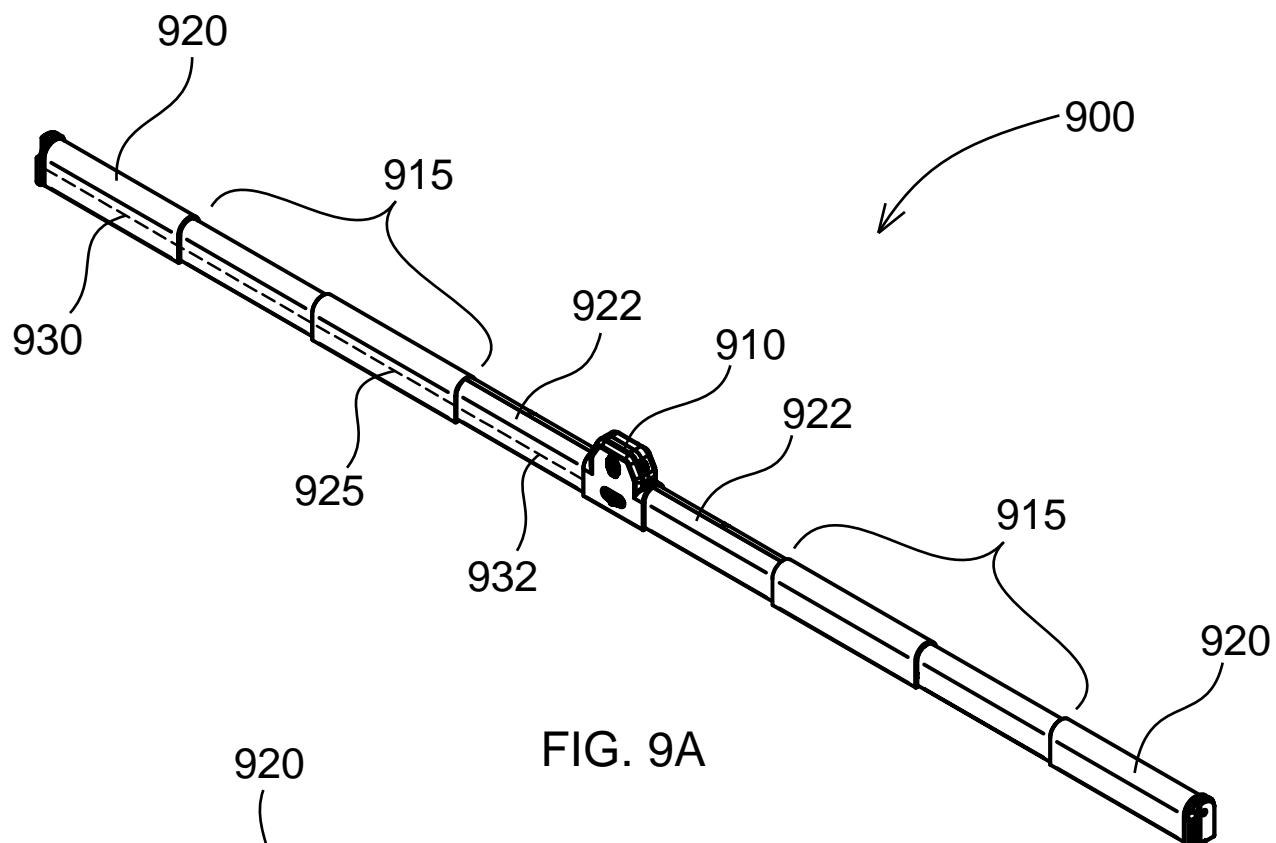


FIG. 9A

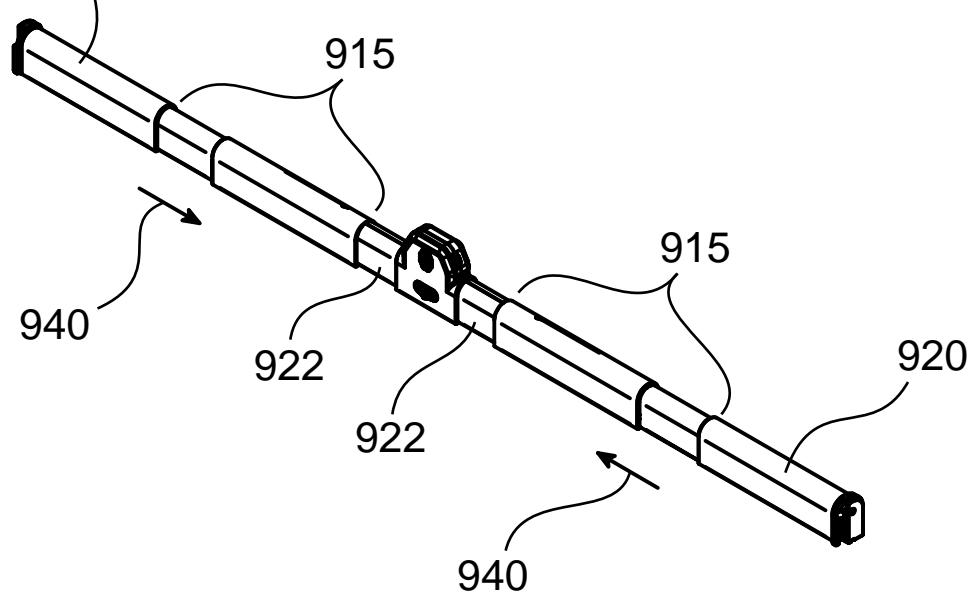


FIG. 9B

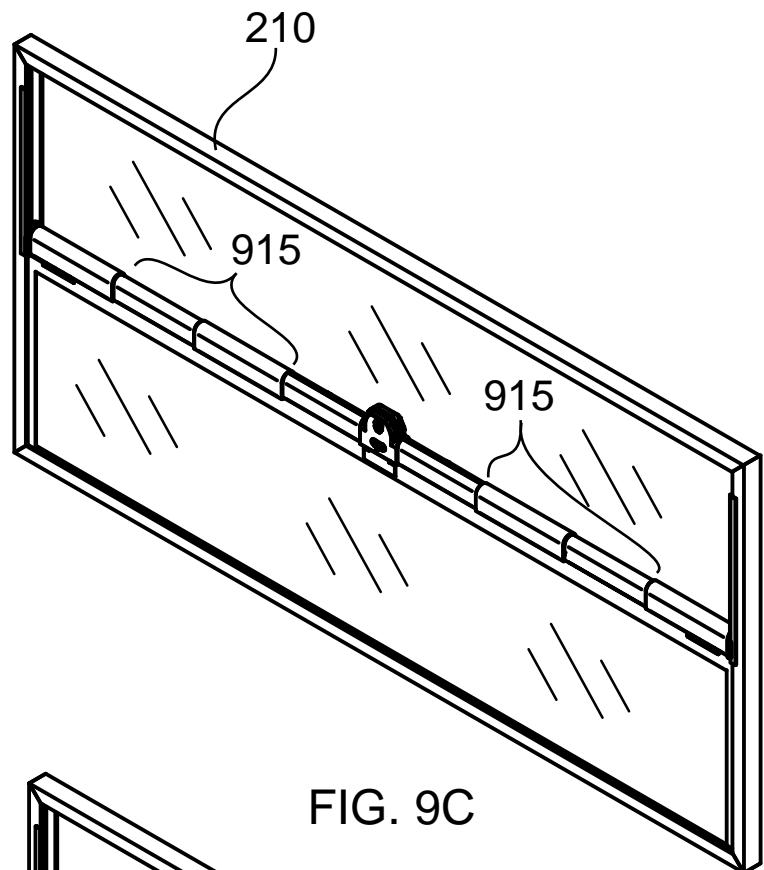


FIG. 9C

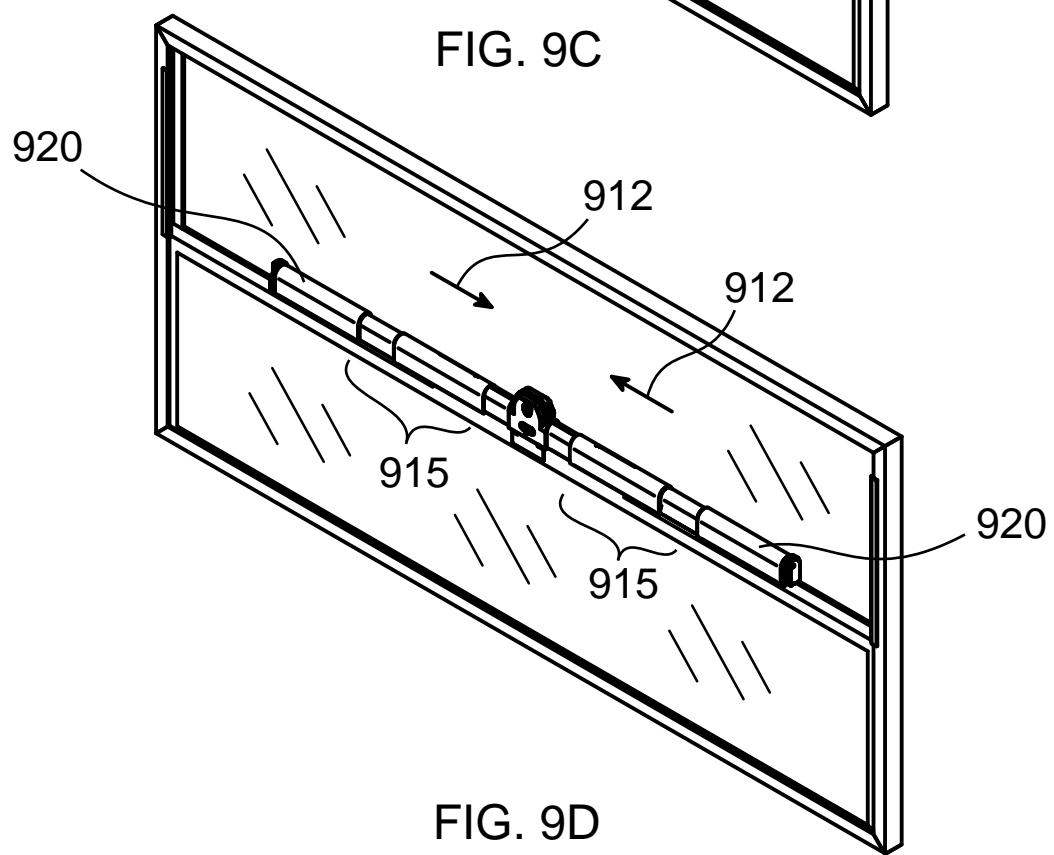


FIG. 9D

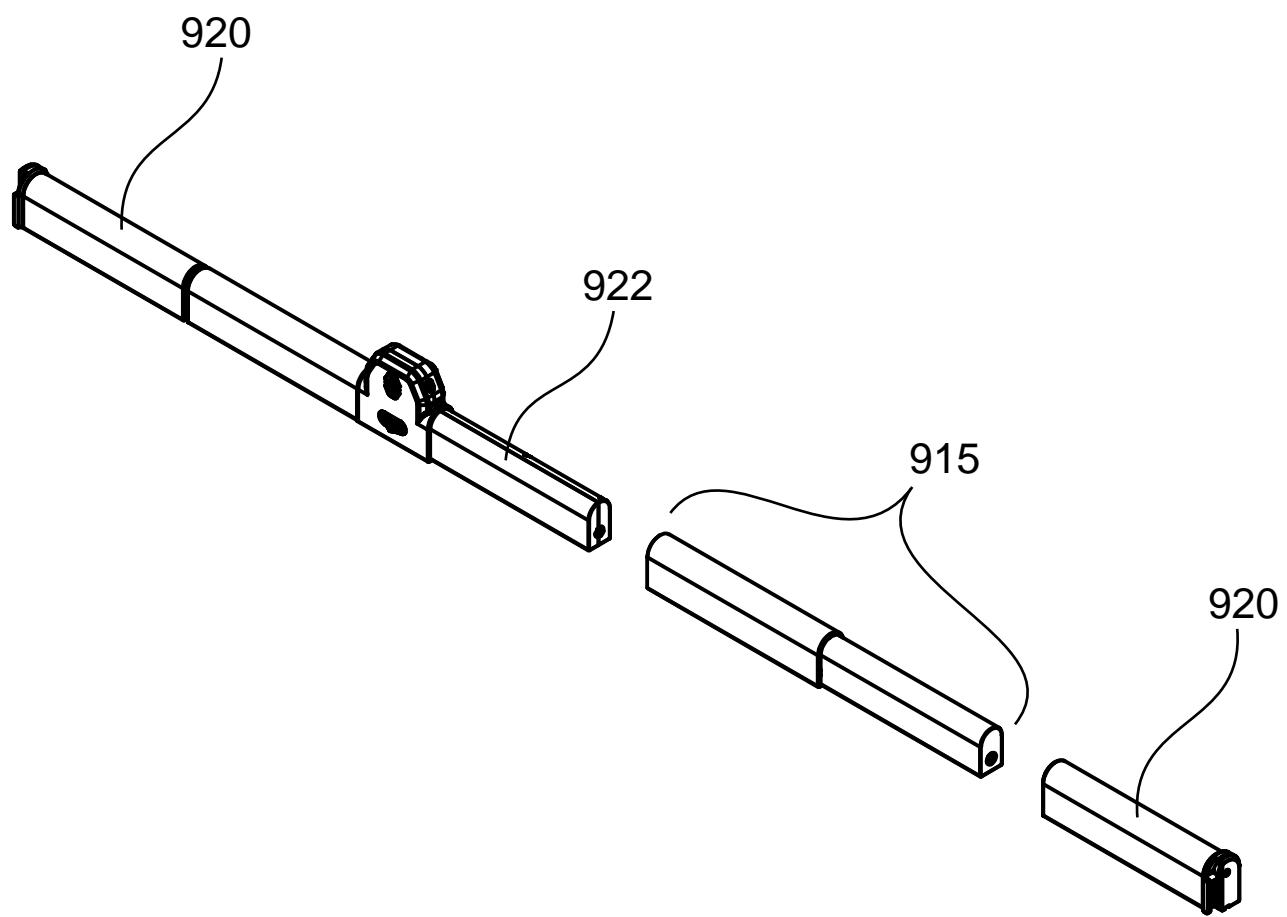


FIG. 10

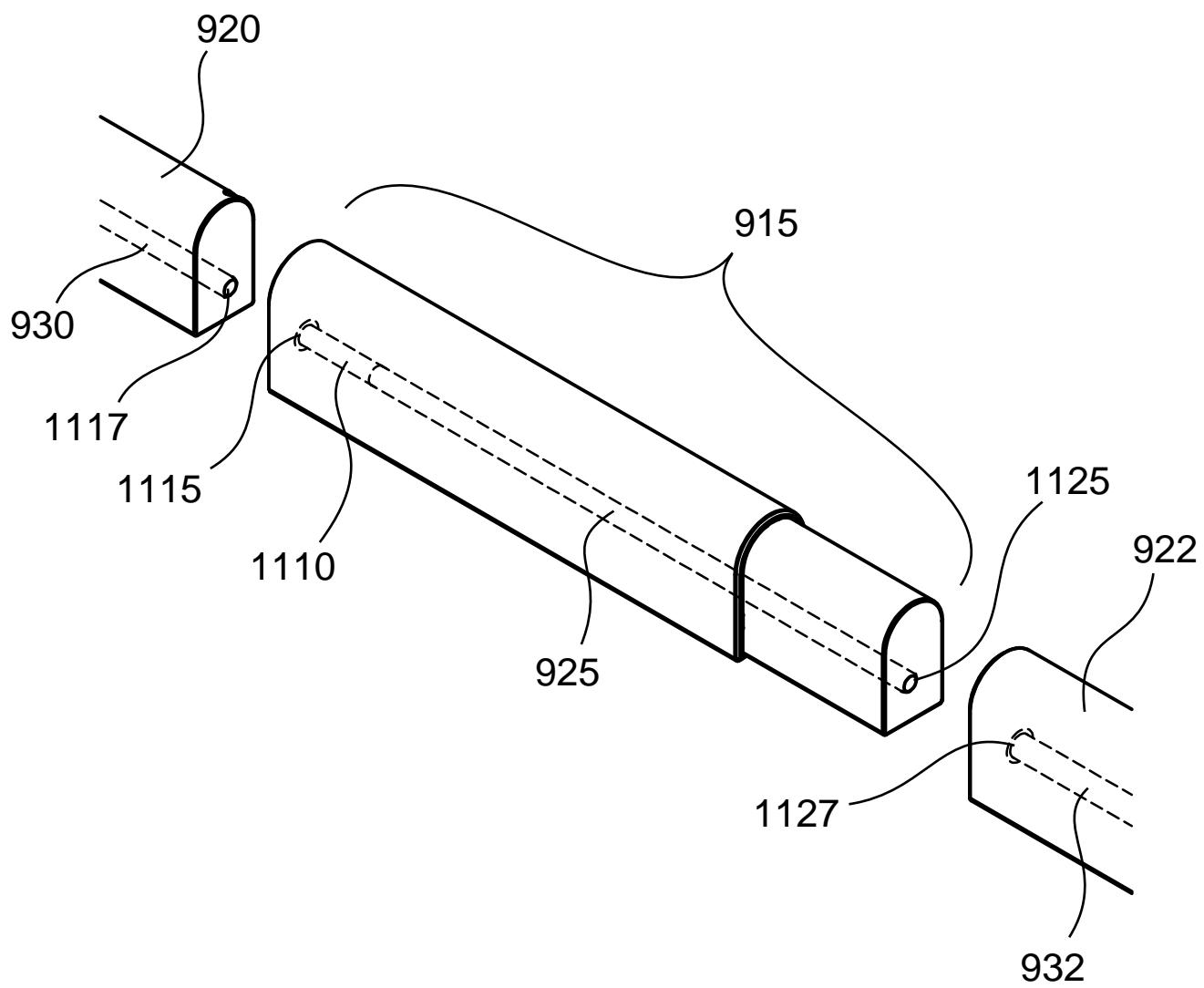


FIG. 11

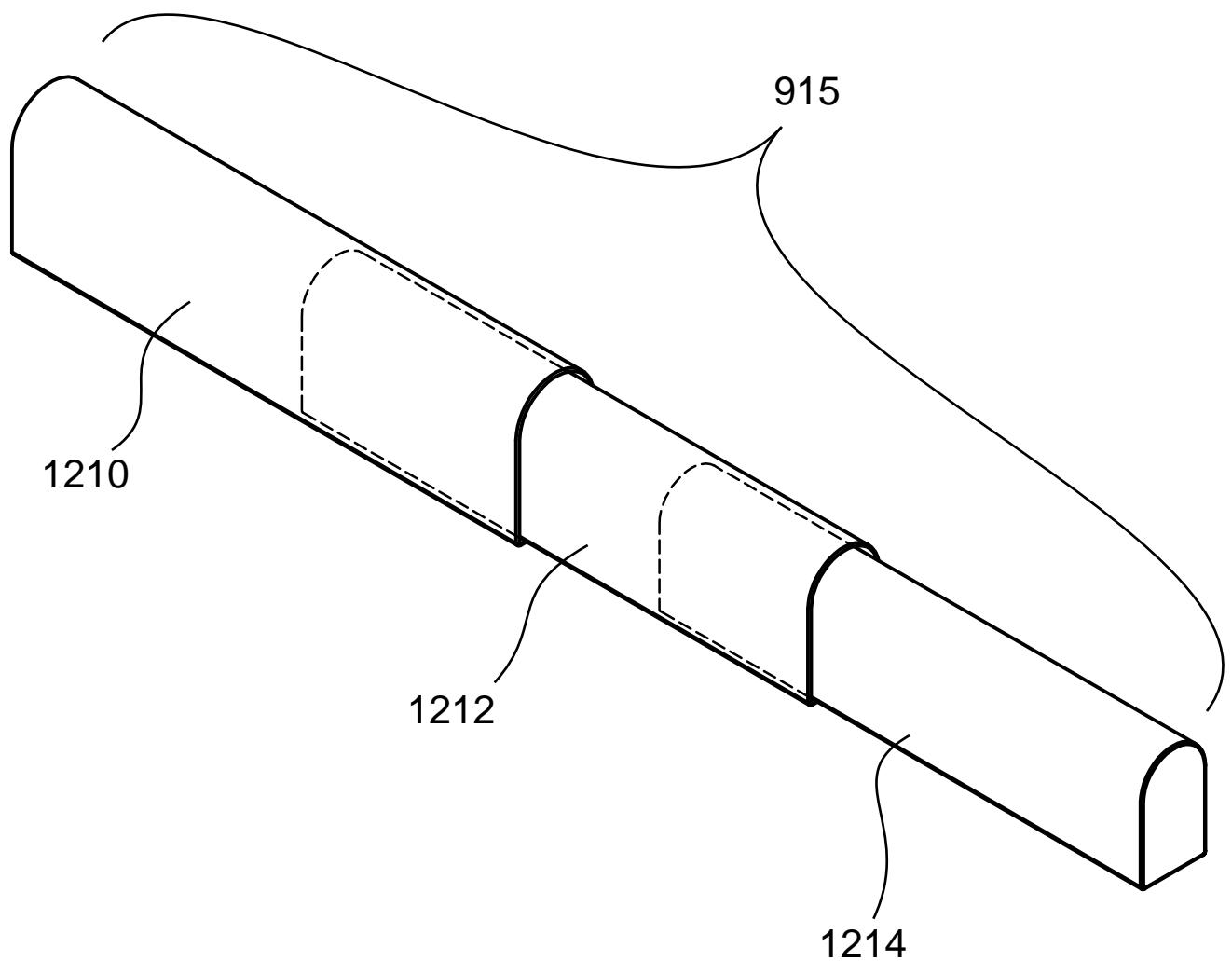


FIG. 12

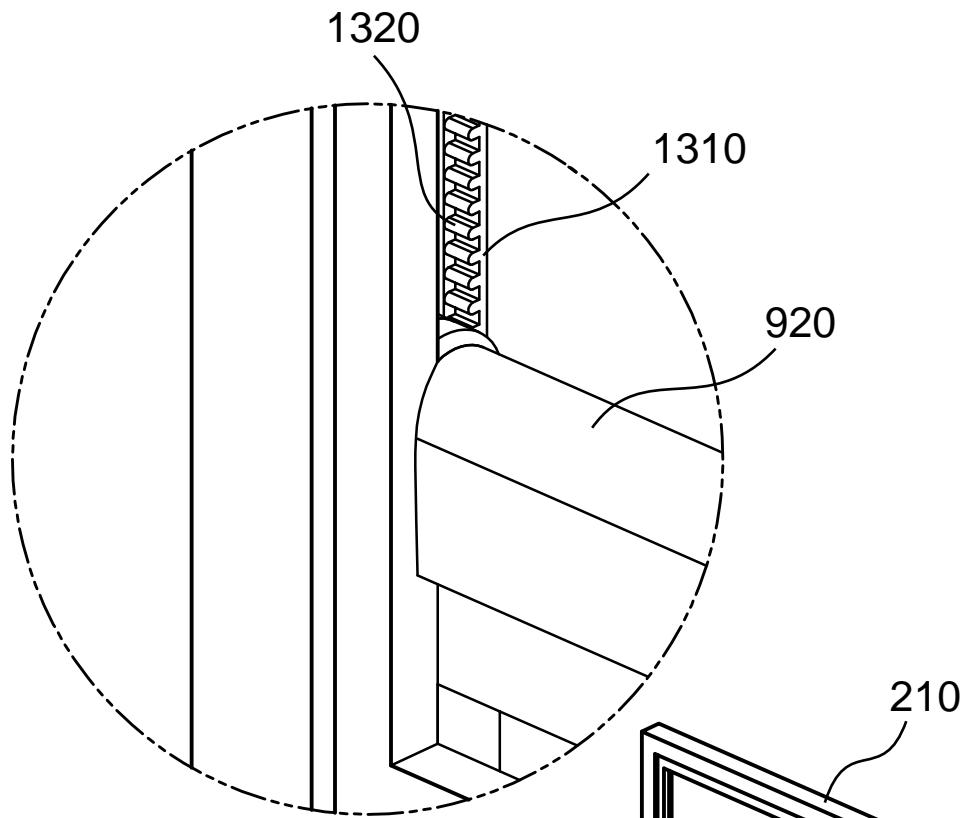


FIG. 13B

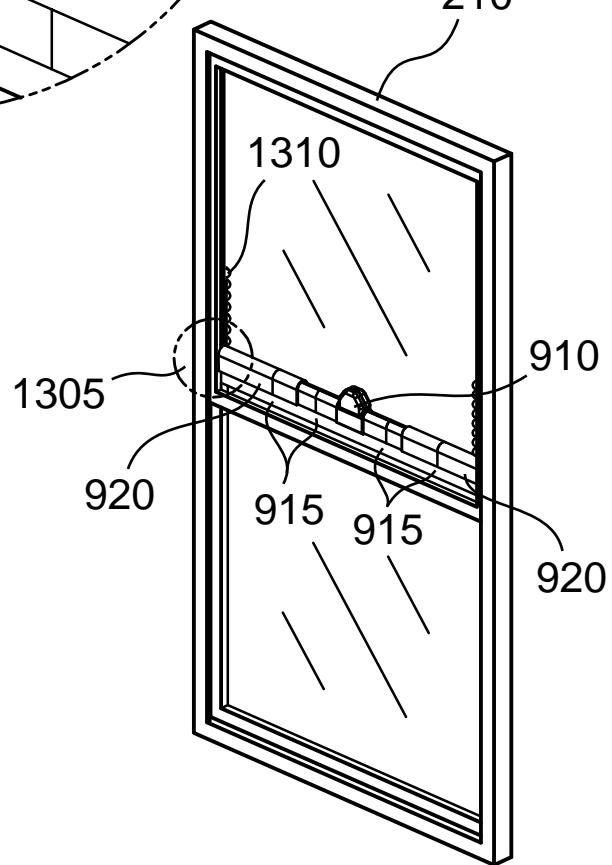


FIG. 13A

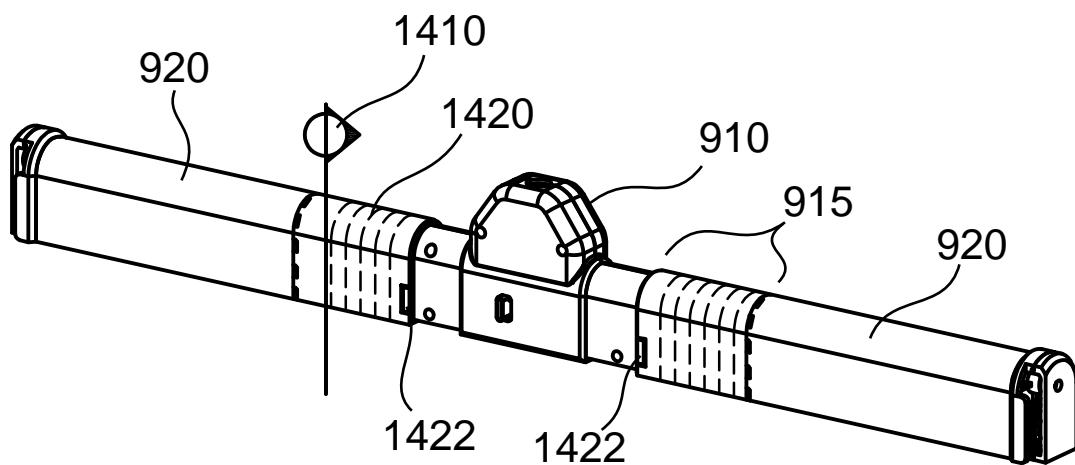


FIG. 14A

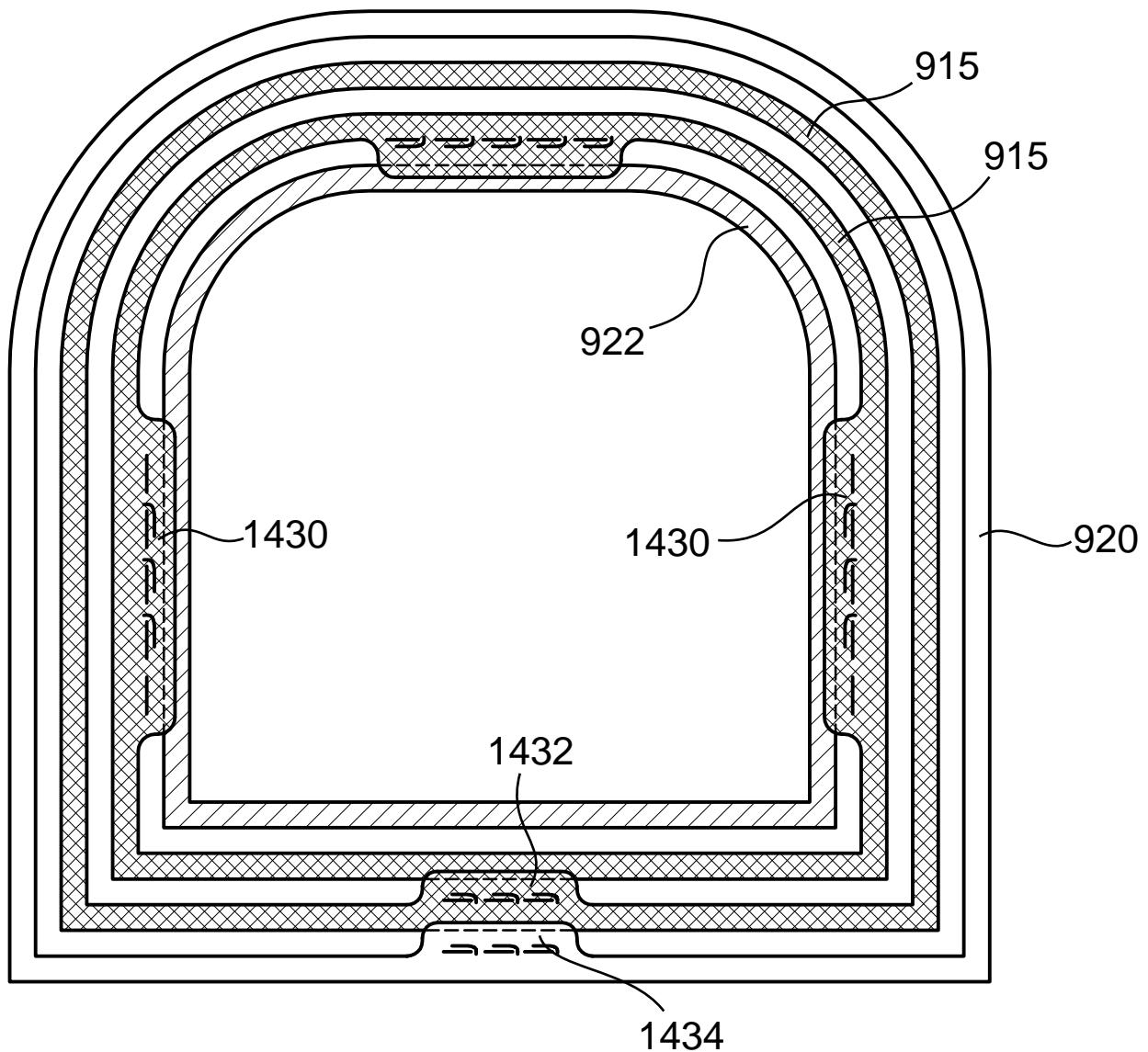


FIG. 14B

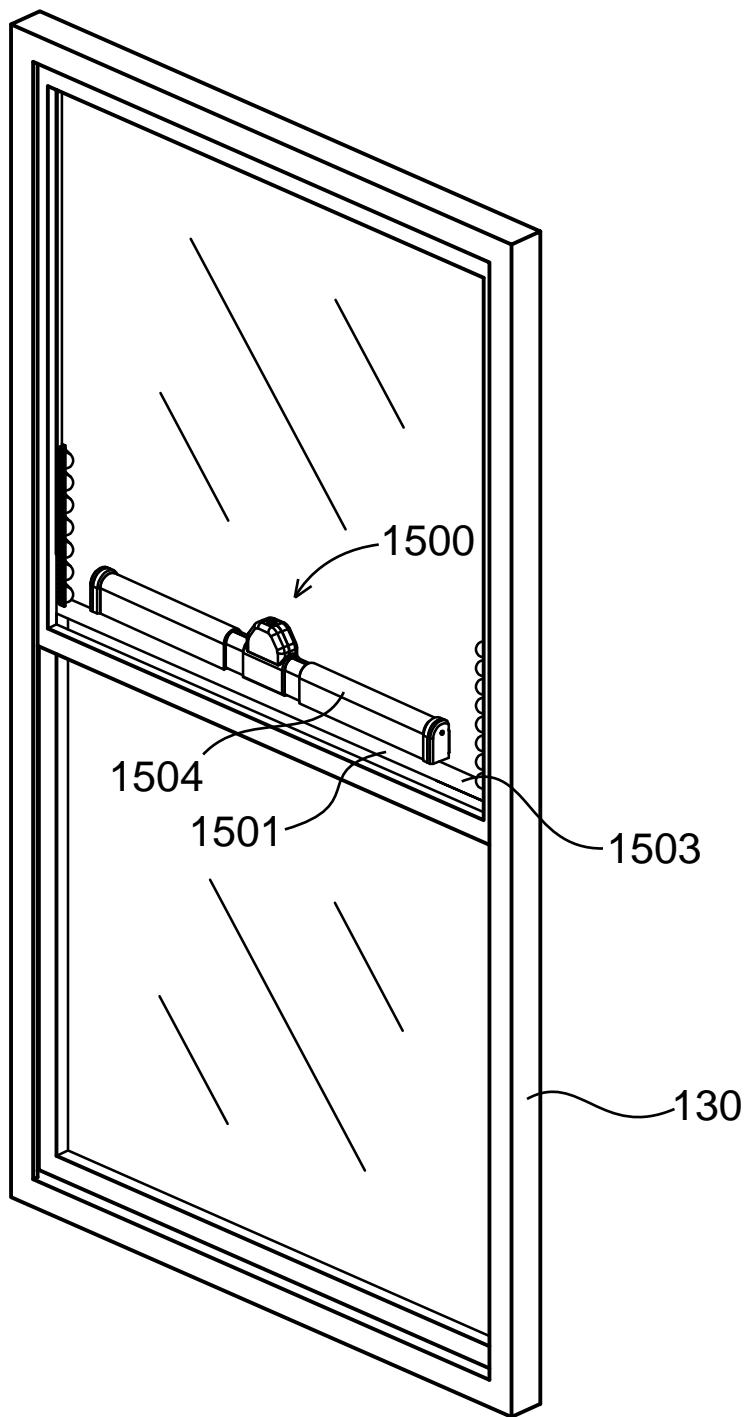


FIG. 15

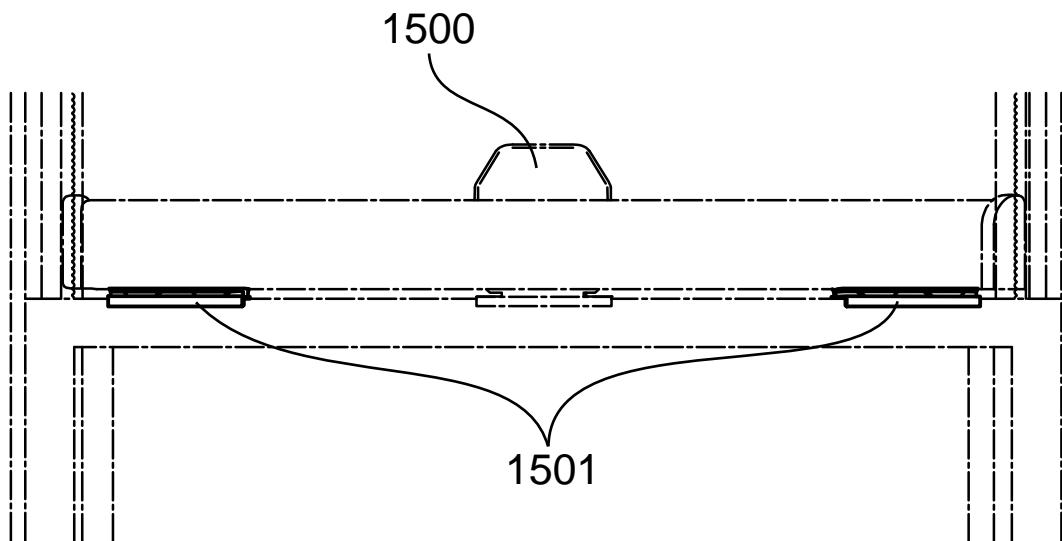


FIG. 16

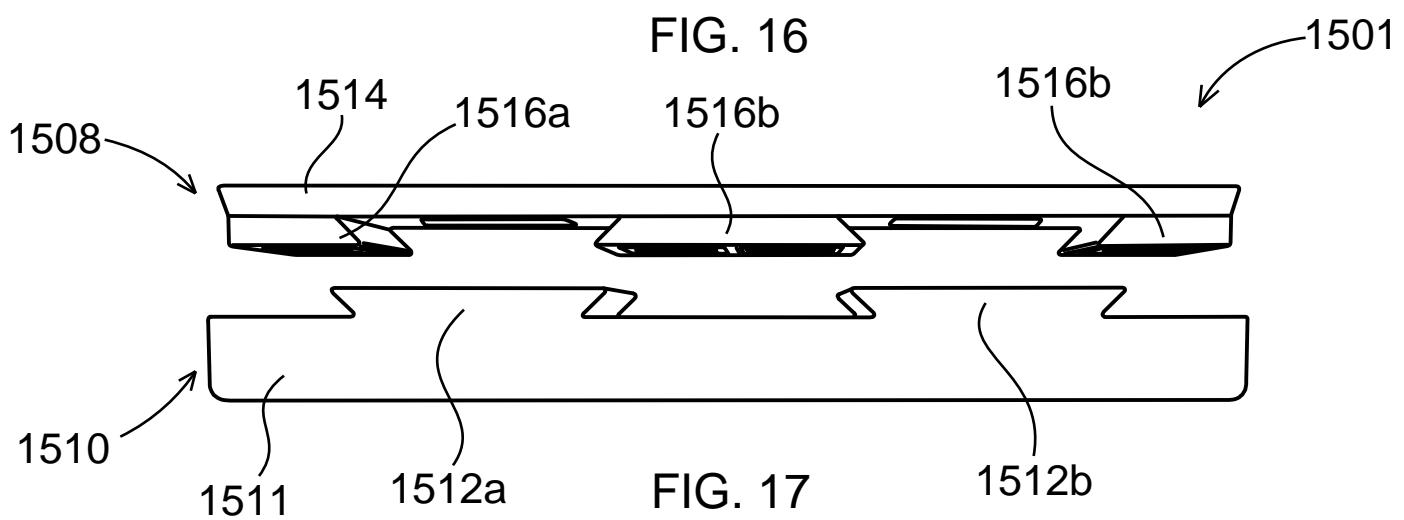


FIG. 17

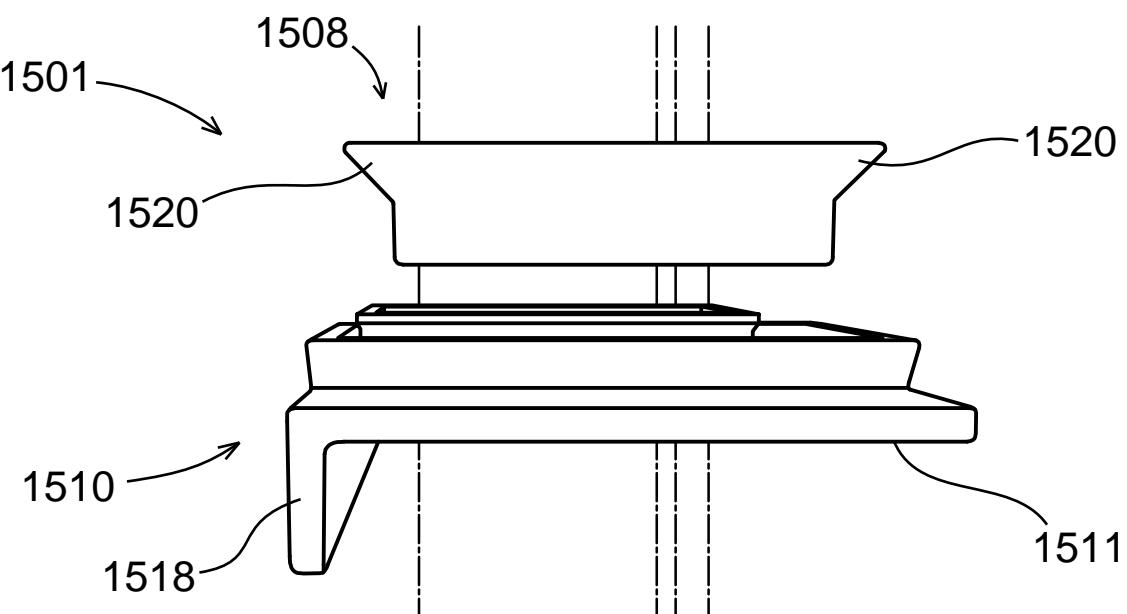


FIG. 18

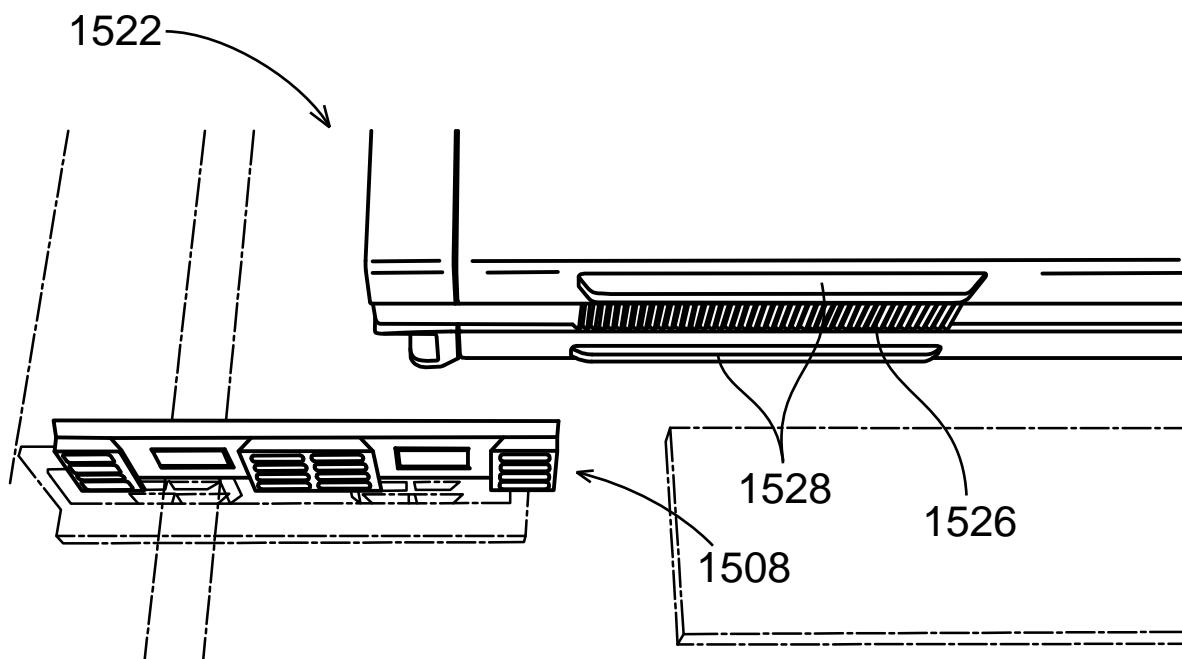


FIG. 19

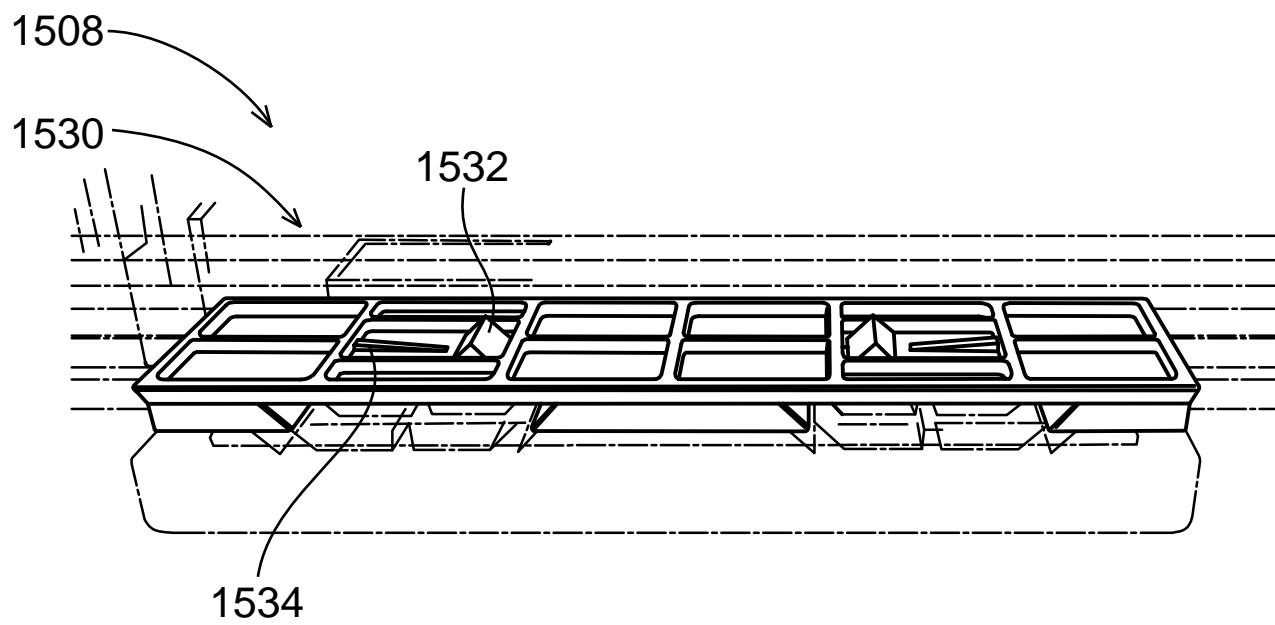


FIG. 20

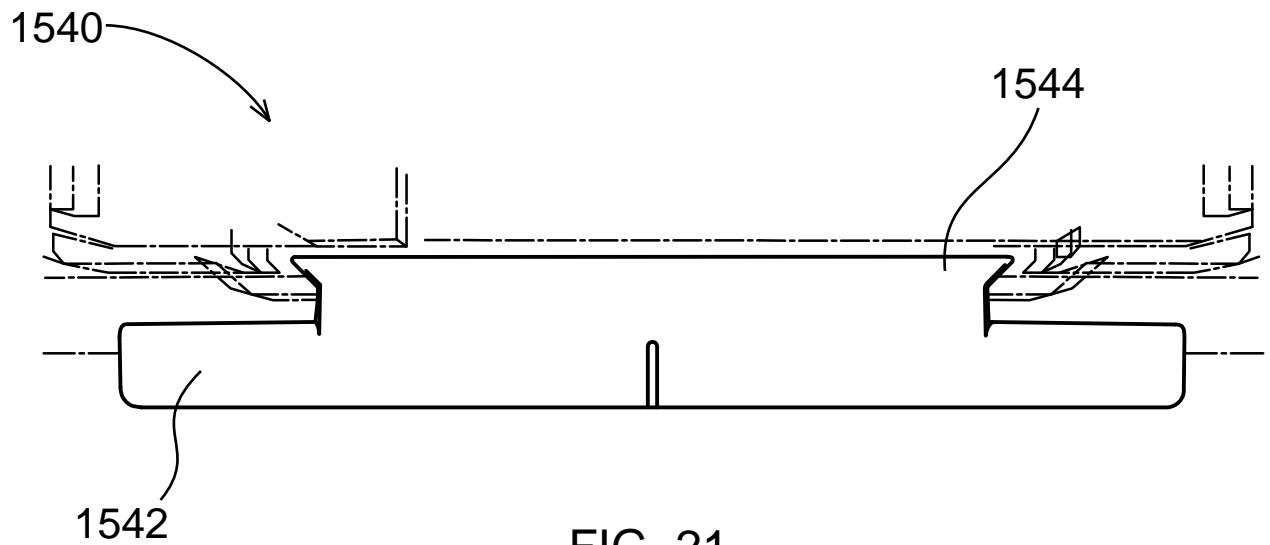


FIG. 21

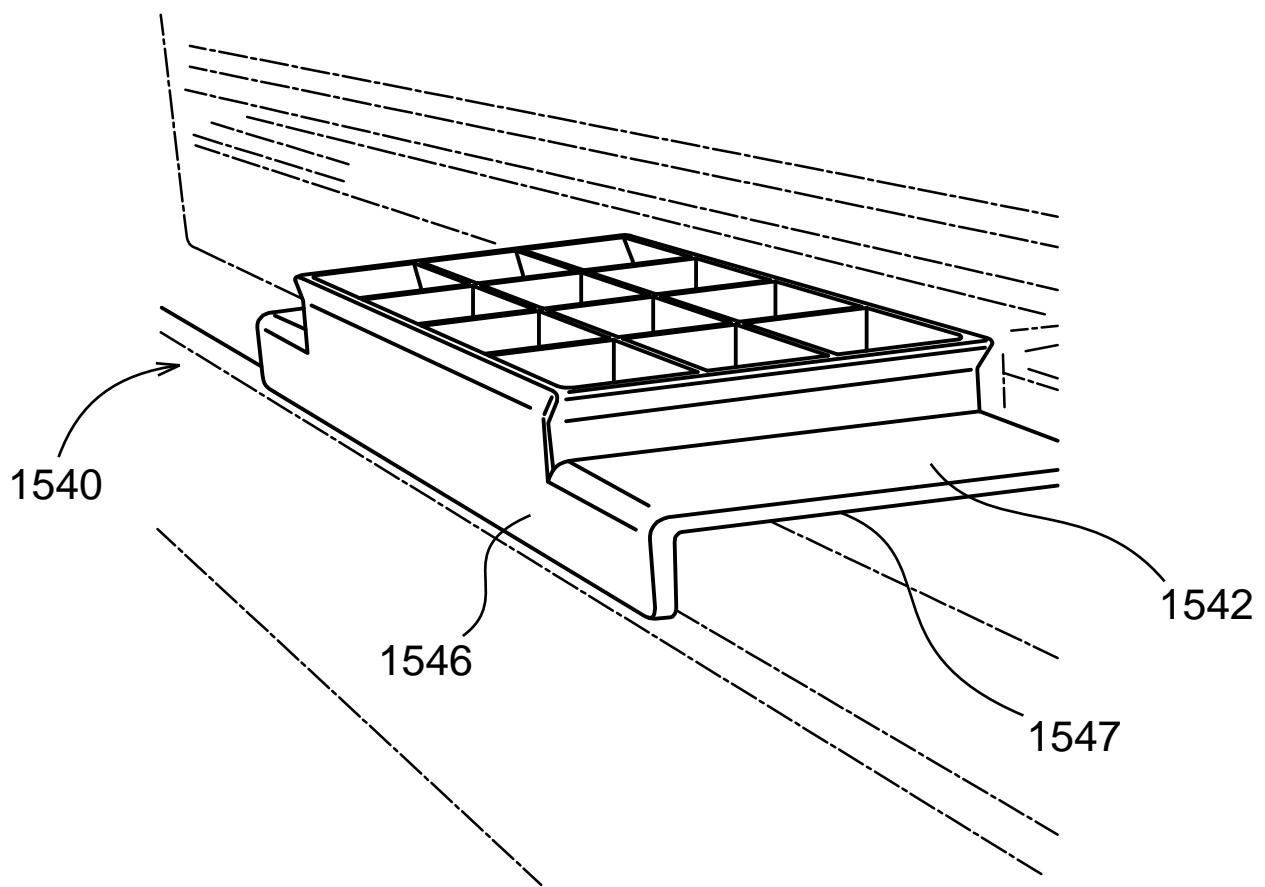


FIG. 22

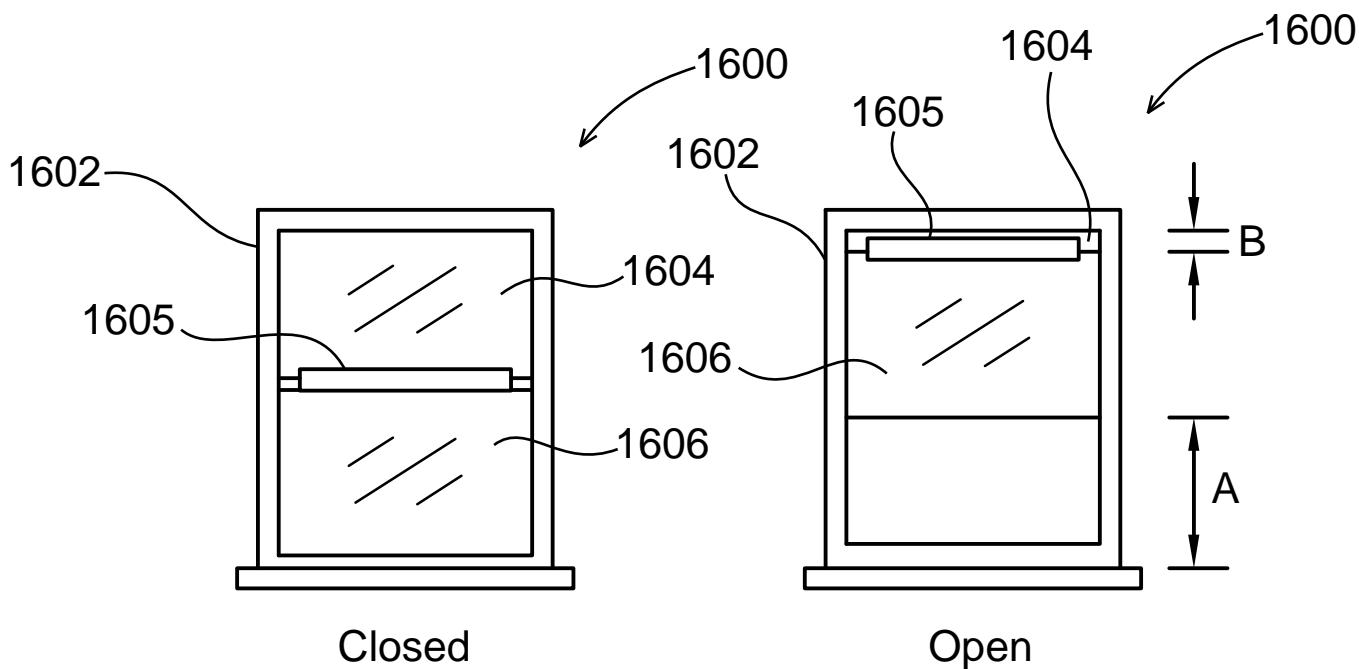


FIG. 23

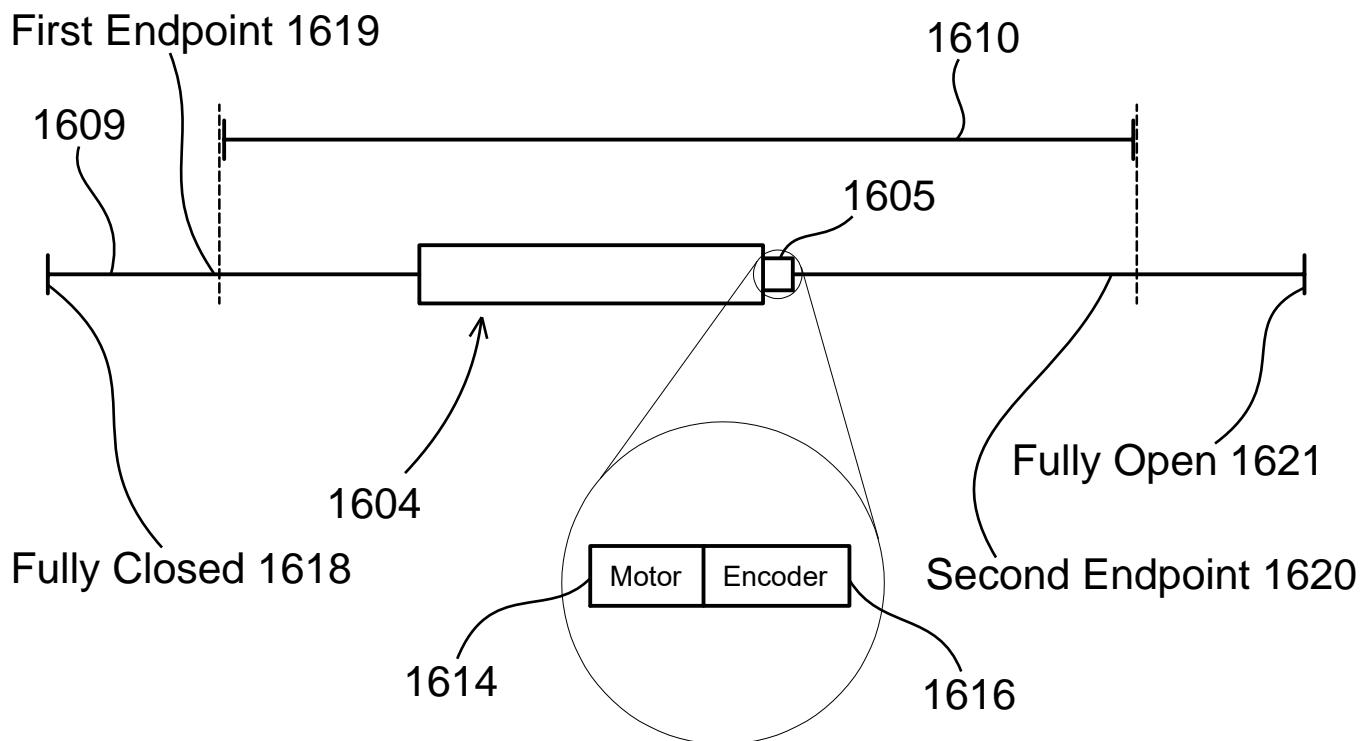
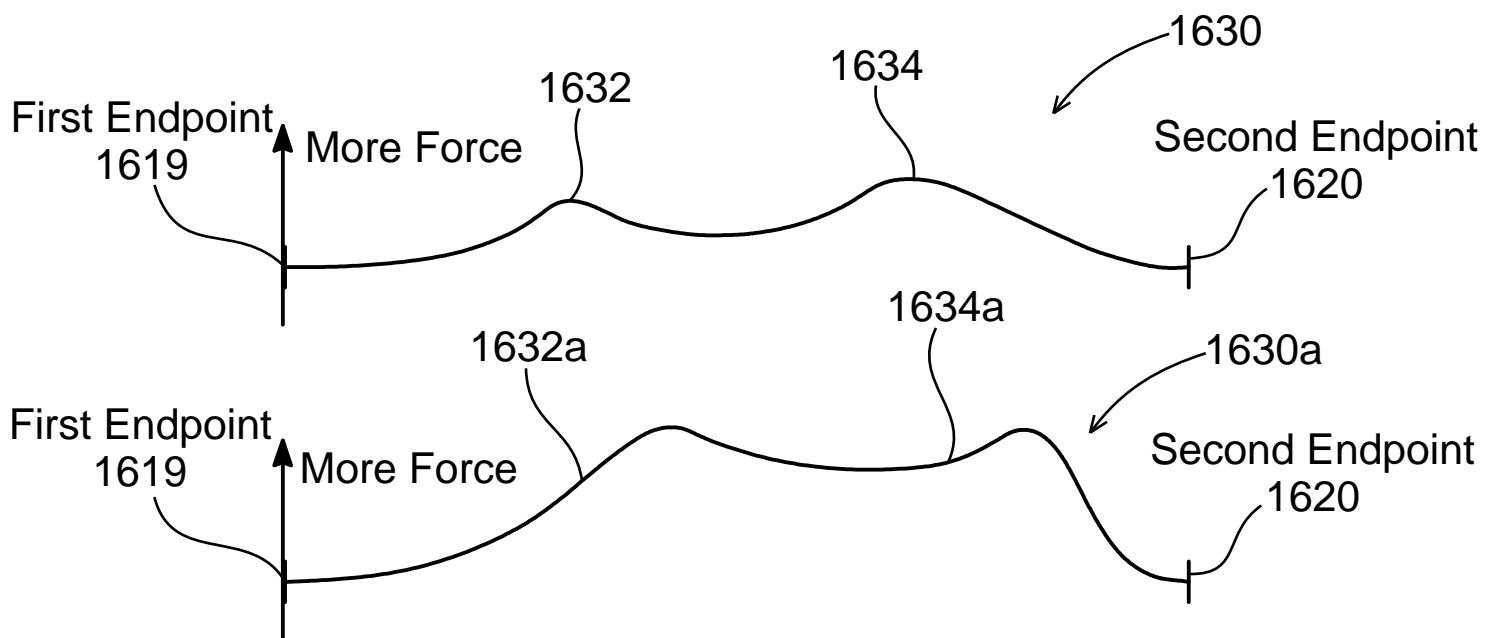
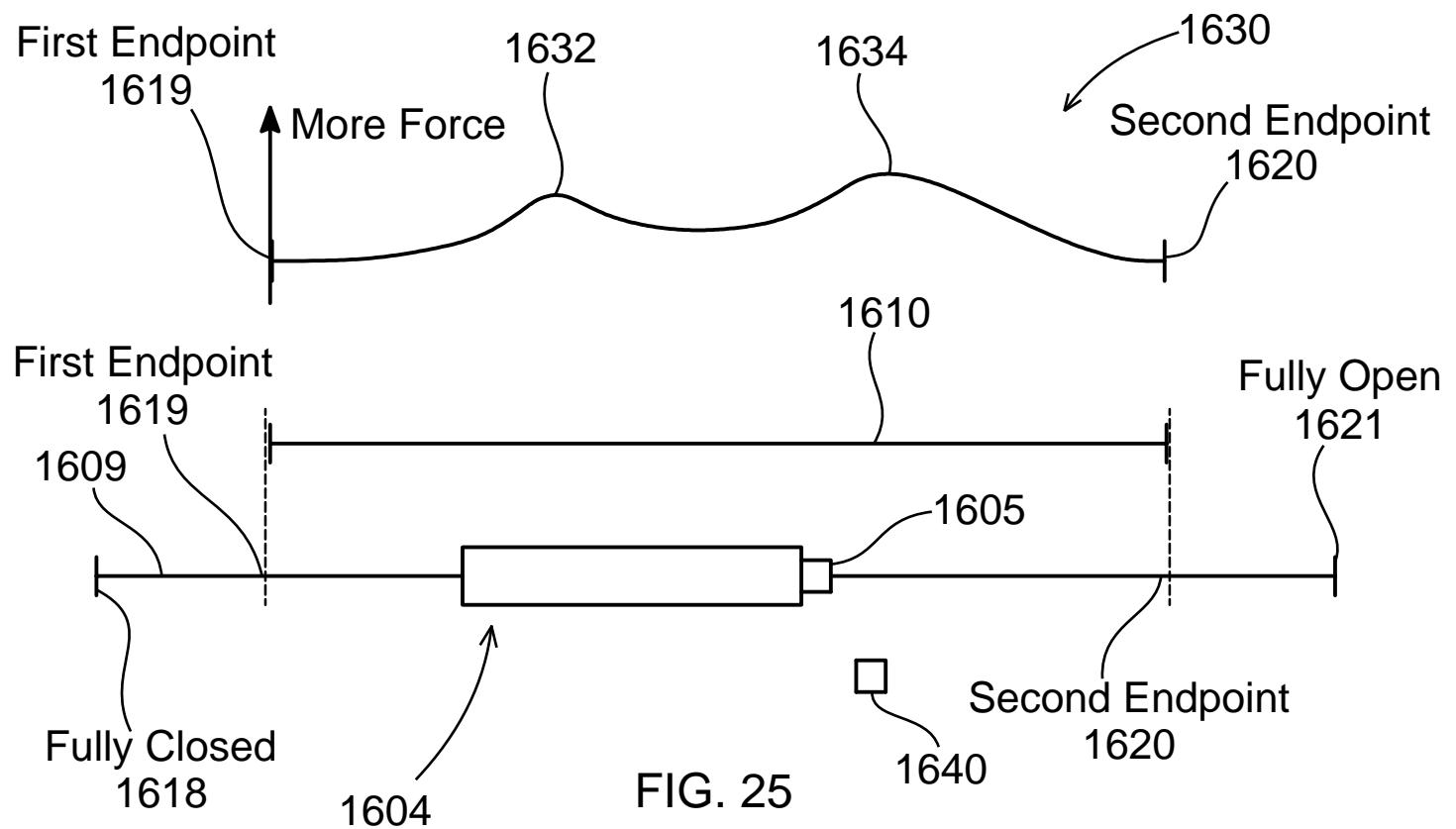


FIG. 24



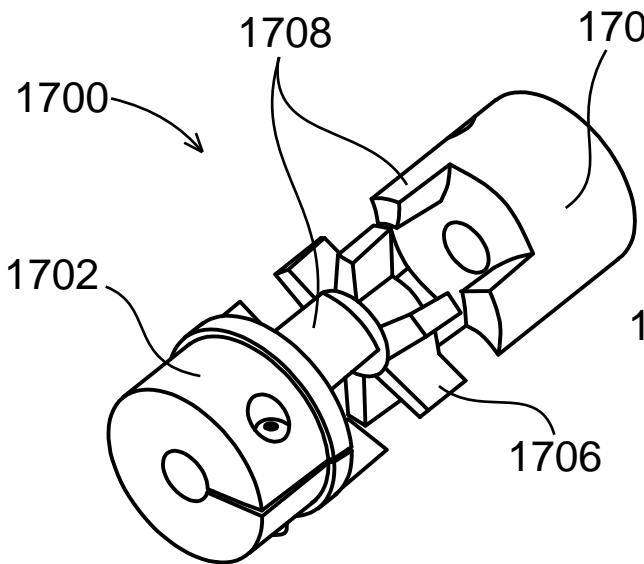


FIG. 27

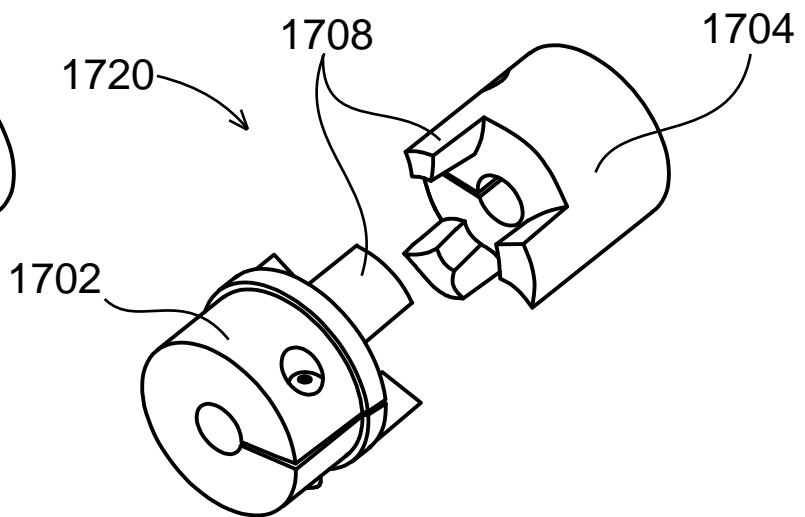


FIG. 28

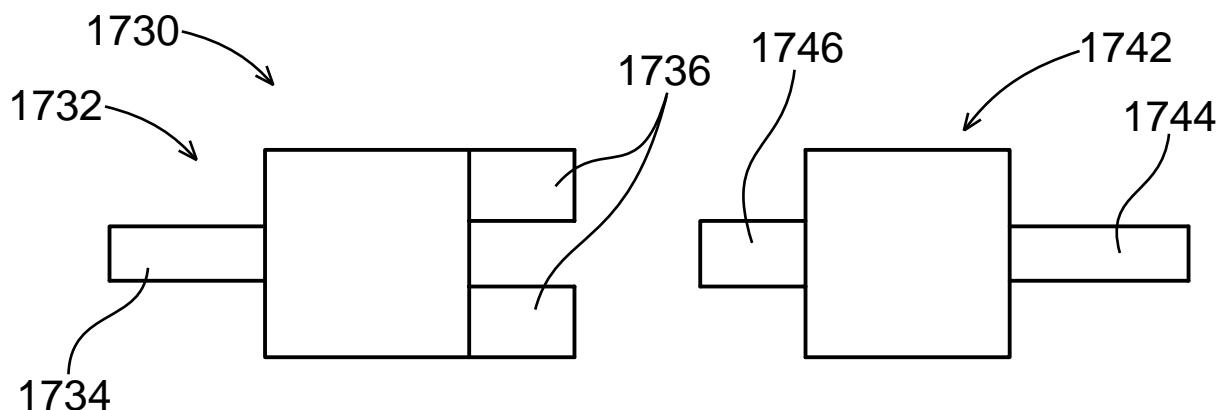


FIG. 29

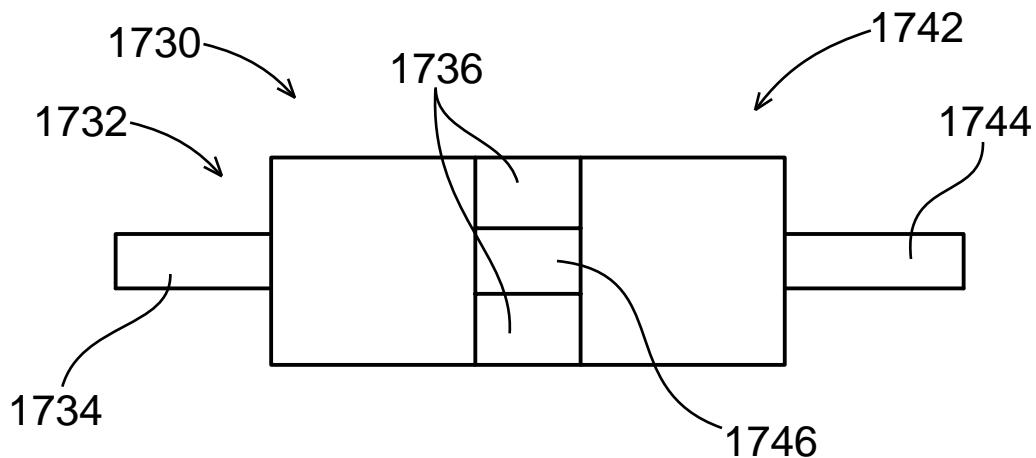


FIG. 30

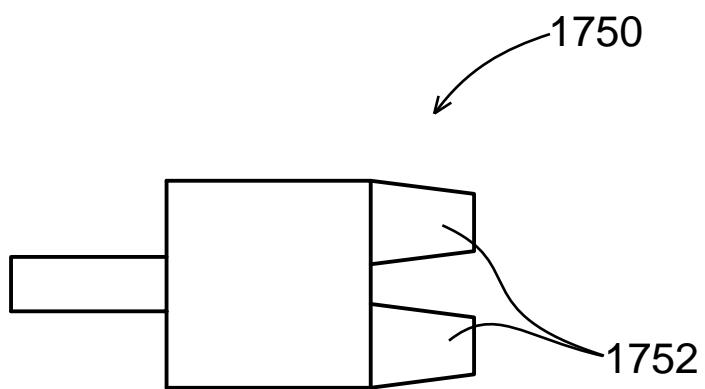


FIG. 31

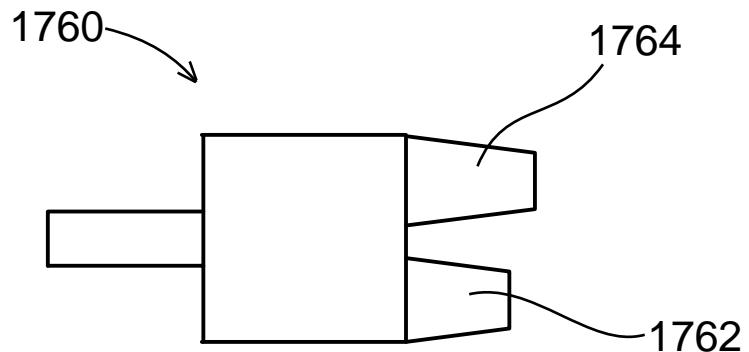


FIG. 32

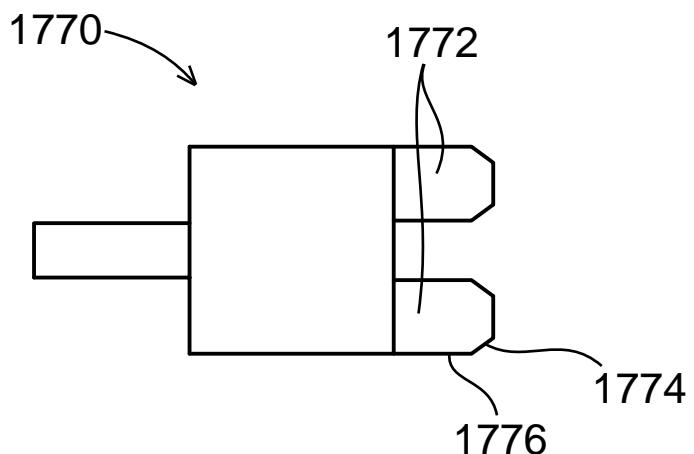


FIG. 33

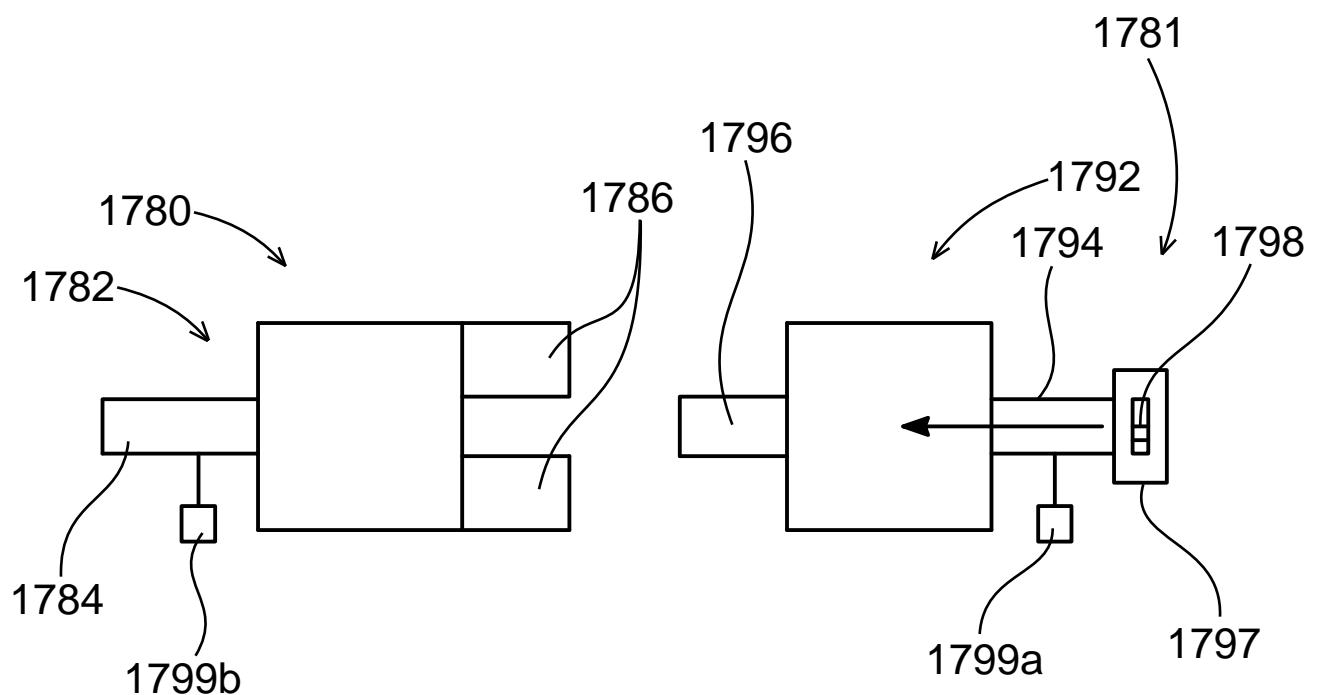


FIG. 34

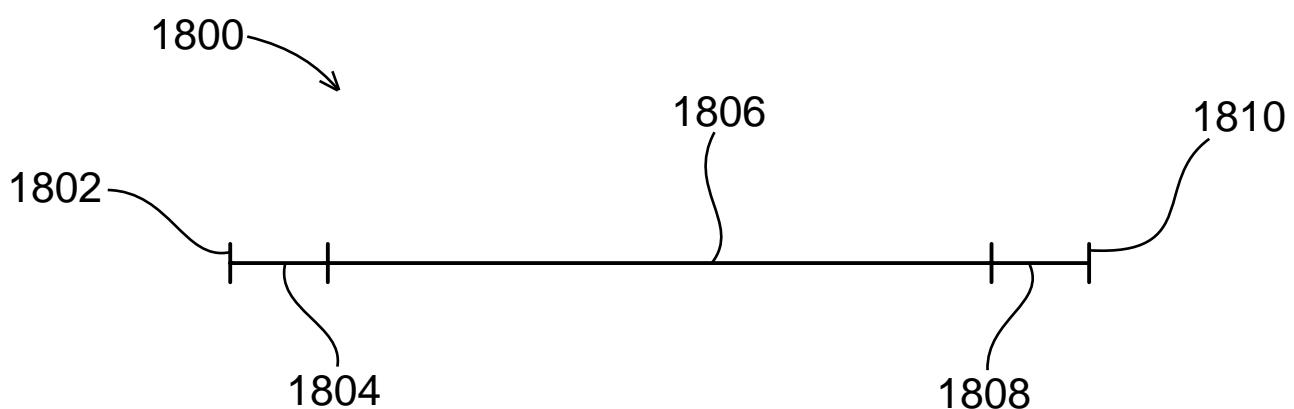


FIG. 35

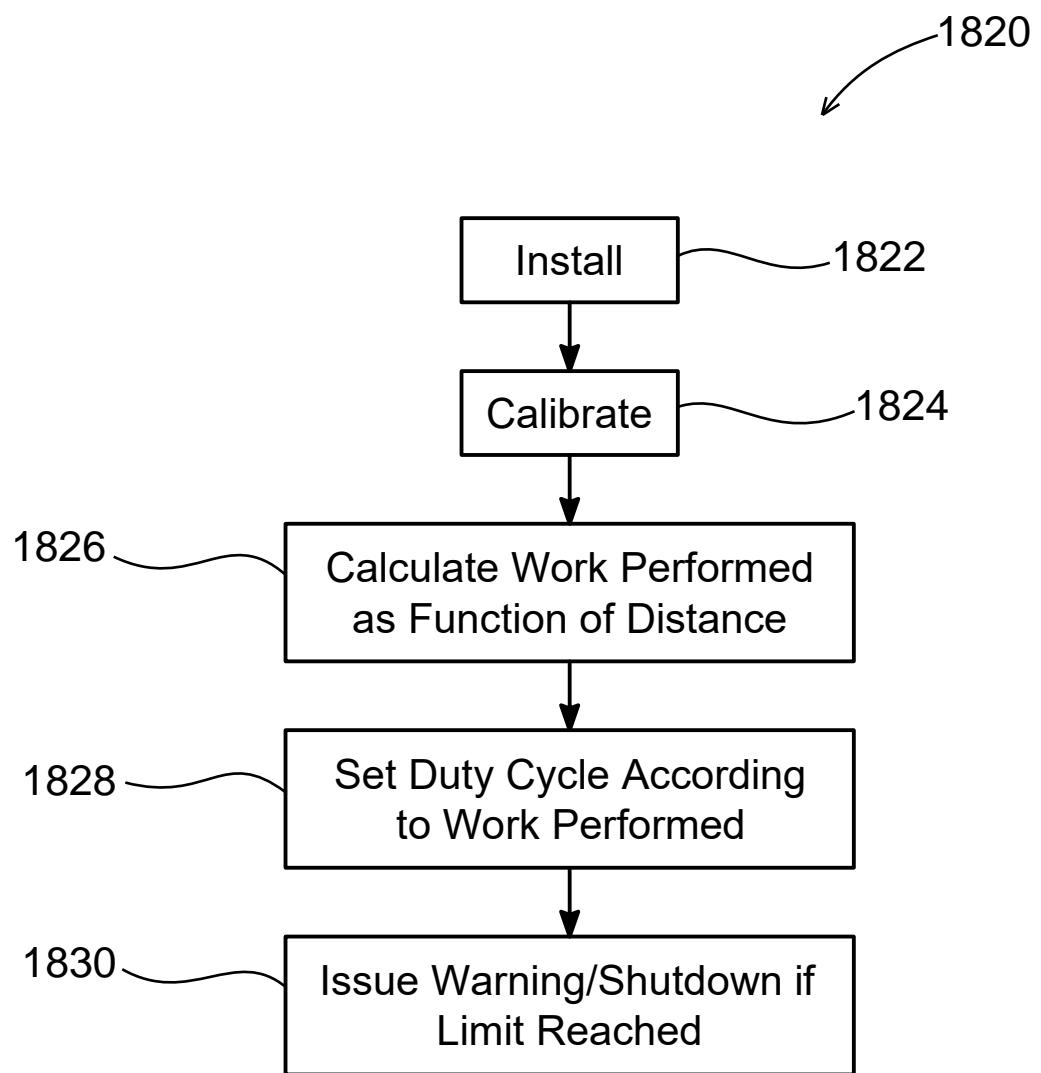
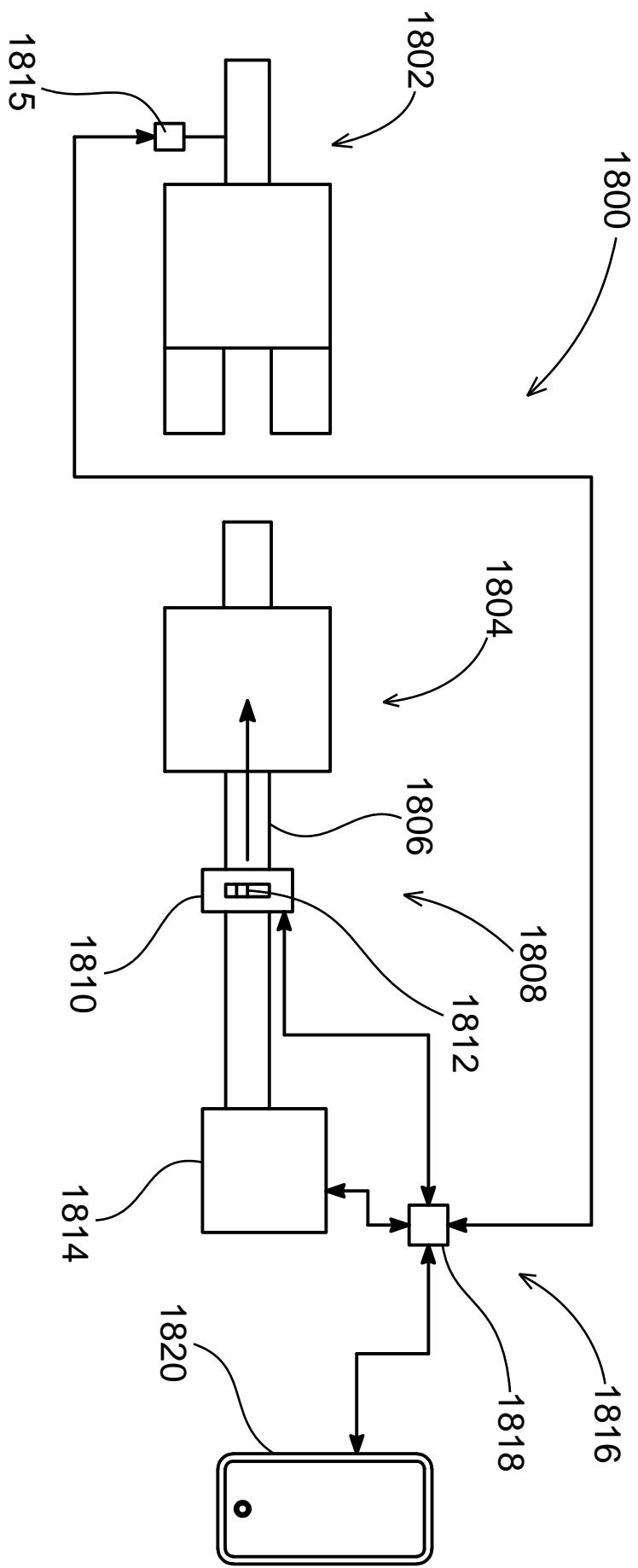


FIG. 36

FIG. 37



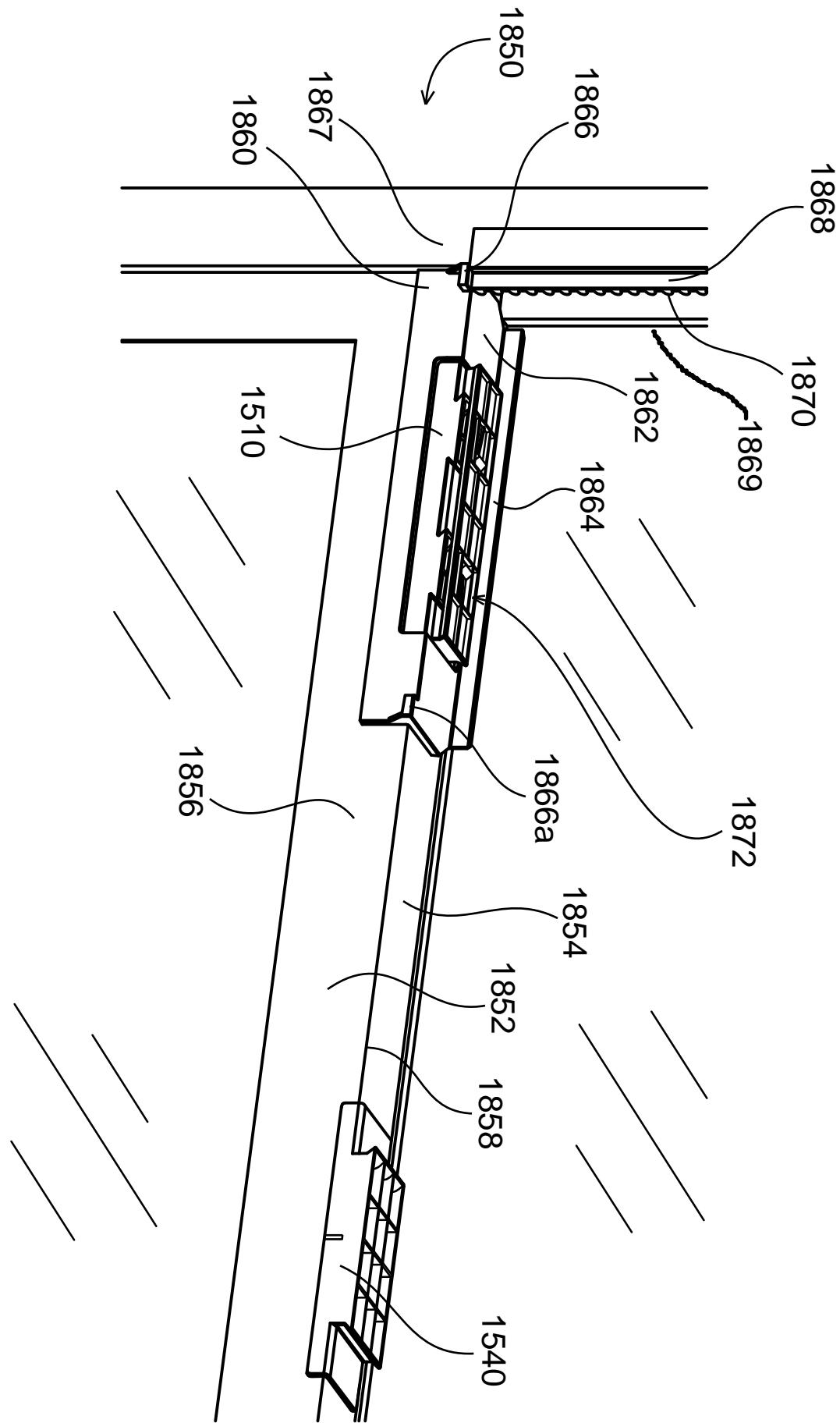


FIG. 38

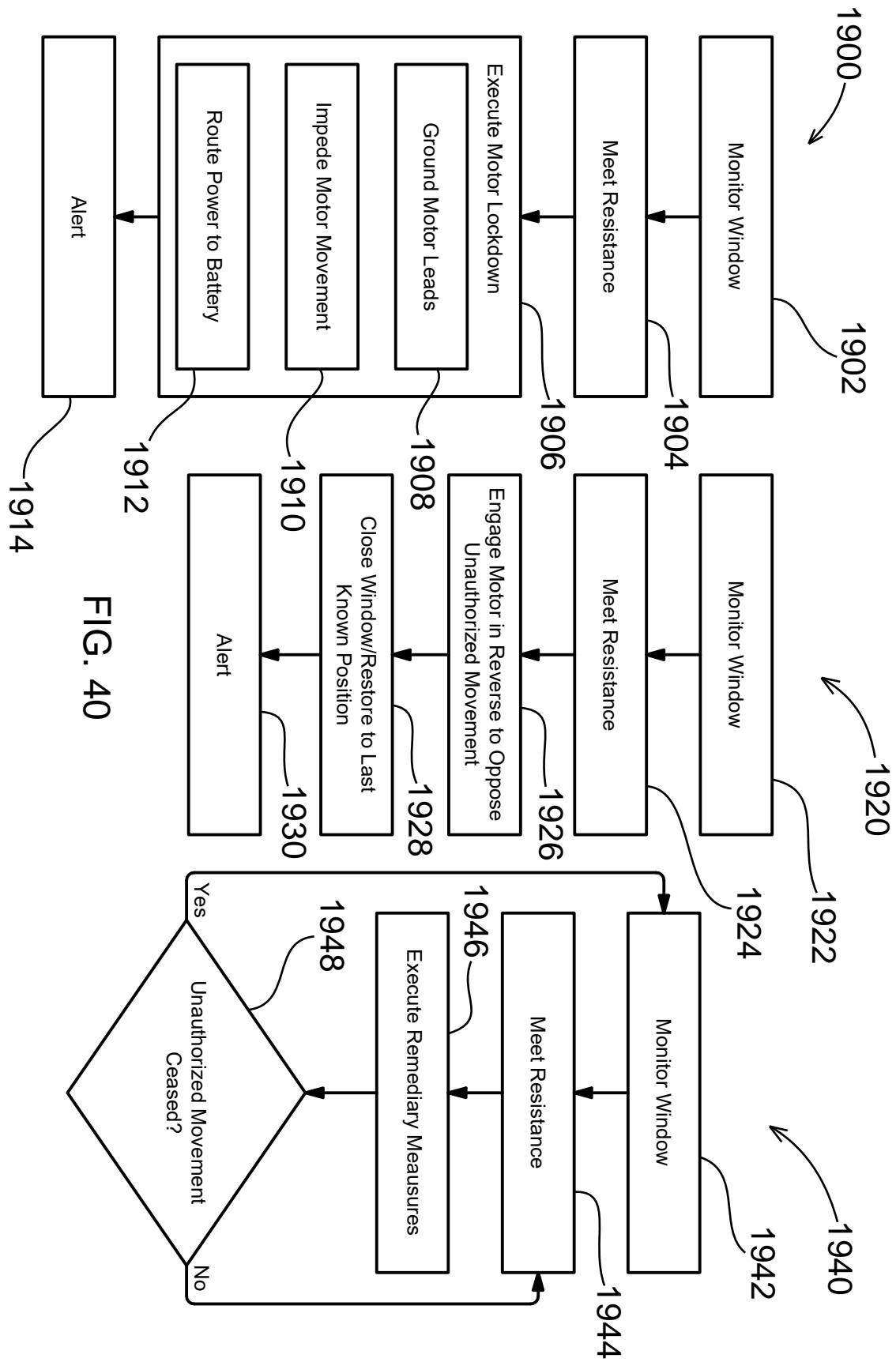


FIG. 39

FIG. 40

FIG. 41



US 20240109573A1

(19) **United States**

(12) **Patent Application Publication**

Hall et al.

(10) **Pub. No.: US 2024/0109573 A1**

(43) **Pub. Date:** Apr. 4, 2024

(54) **MOBILE CART WITH ADJUSTABLE CARGO CONTAINER**

B62B 3/08 (2006.01)

B62B 5/00 (2006.01)

G05D 1/02 (2006.01)

(71) Applicant: **Hall Labs, LLC**, Provo, UT (US)

(52) **U.S. Cl.**

CPC *B62B 3/022* (2013.01); *B62B 3/005* (2013.01); *B62B 3/08* (2013.01); *B62B 5/004* (2013.01); *B62B 5/0043* (2013.01); *B62B 5/0053* (2013.01); *G05D 1/0214* (2013.01)

(72) Inventors: **David R. Hall**, Provo, UT (US);
Jerome Miles, Spanish Fork, UT (US);
Quinn Riley, Provo, UT (US); **Stephen Warren**, Provo, UT (US)

(21) Appl. No.: **18/465,963**

(57)

ABSTRACT

(22) Filed: **Sep. 12, 2023**

Related U.S. Application Data

(60) Provisional application No. 63/375,337, filed on Sep. 12, 2022.

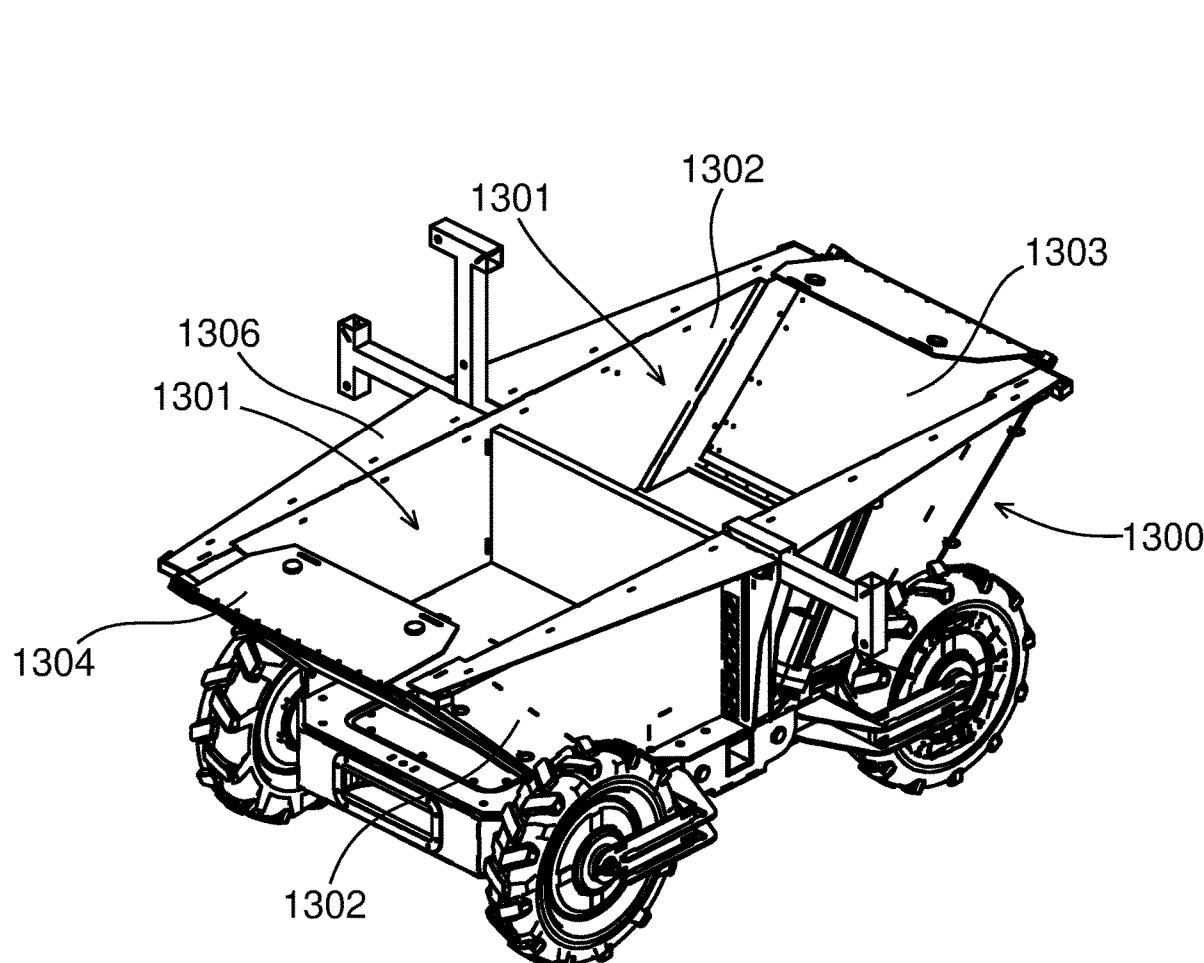
Publication Classification

(51) **Int. Cl.**

B62B 3/02 (2006.01)

B62B 3/00 (2006.01)

A system for moving cargo is disclosed. The system includes a cart, which, in turn, includes a body with a battery compartment and a platform. The cart also includes wheels and a motor for driving the wheels. A battery is housed in the battery compartment for powering the motor. The system also includes a cargo carrier mounted on the platform. The cargo carrier includes a base, two side walls, and two end walls. At least one end wall or side wall is adapted to be moved between different positions to change the shape and/or size of the compartment.



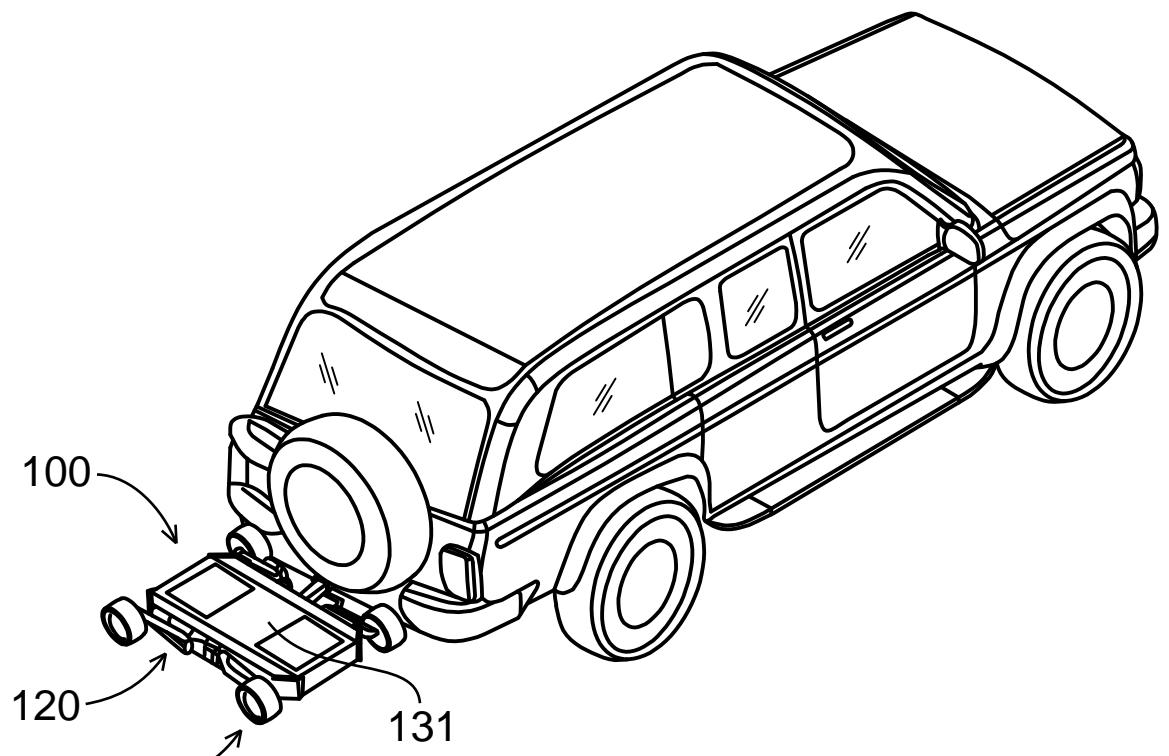


FIG. 1

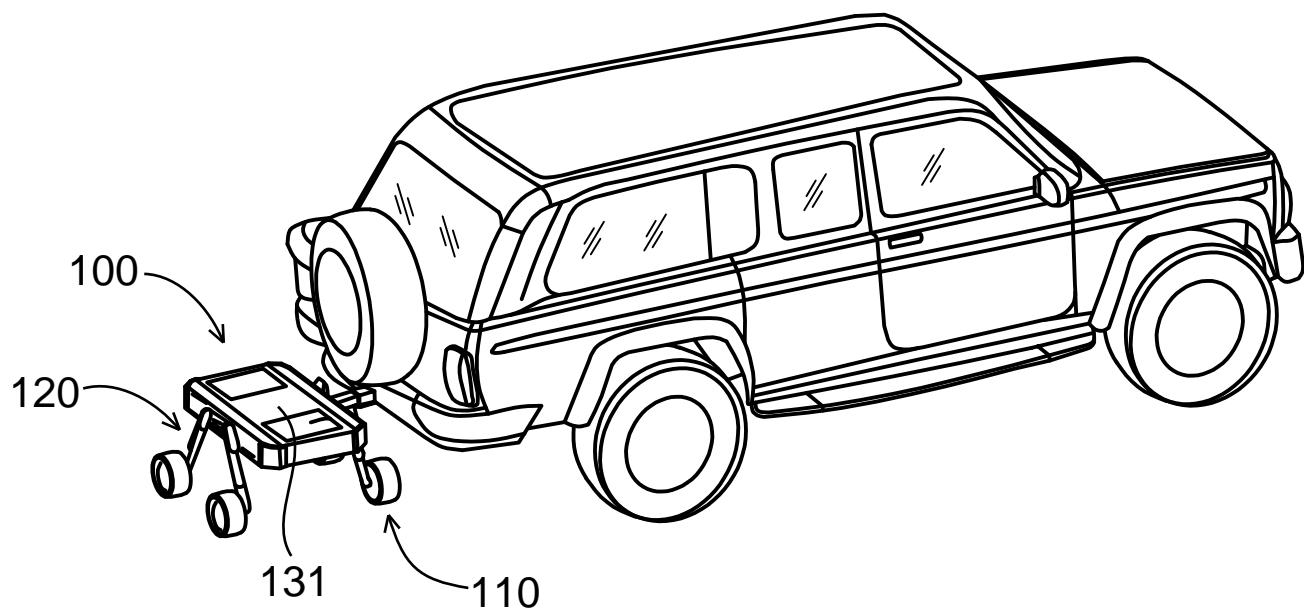


FIG. 2

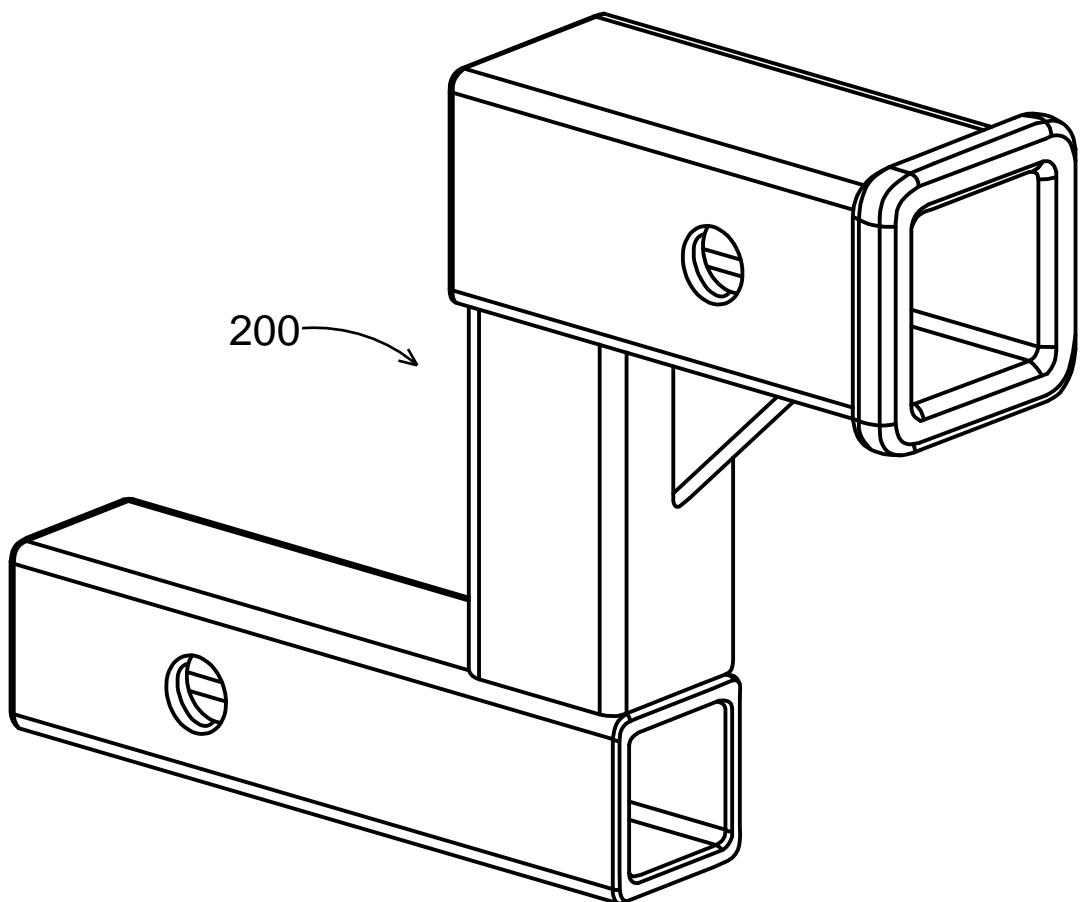


FIG. 3

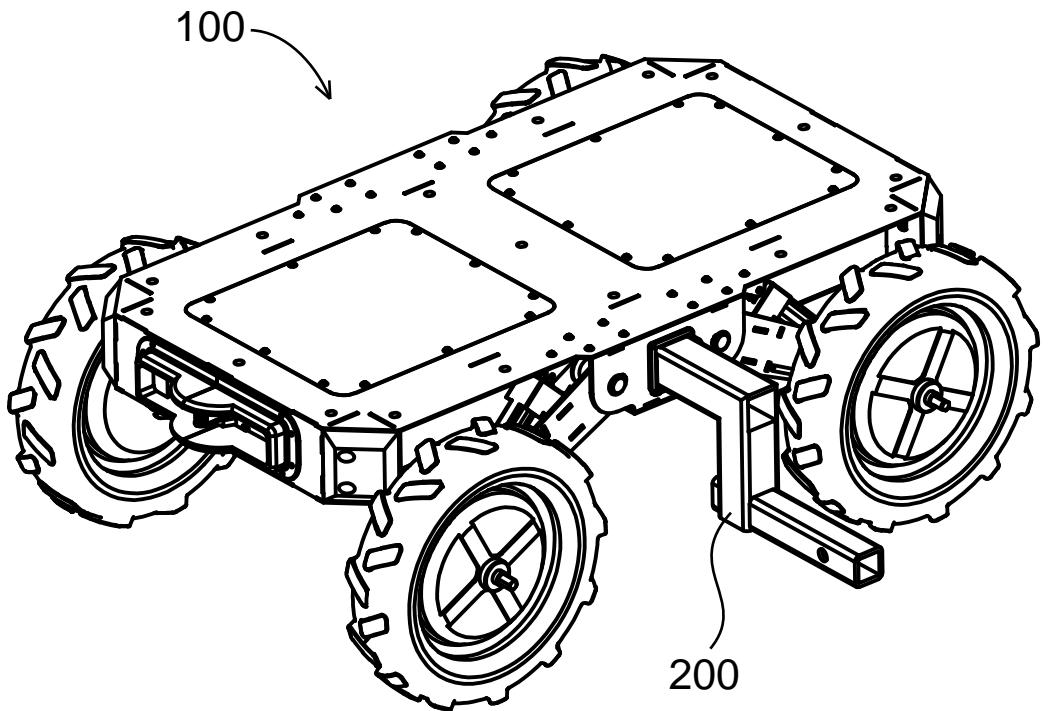


FIG. 4

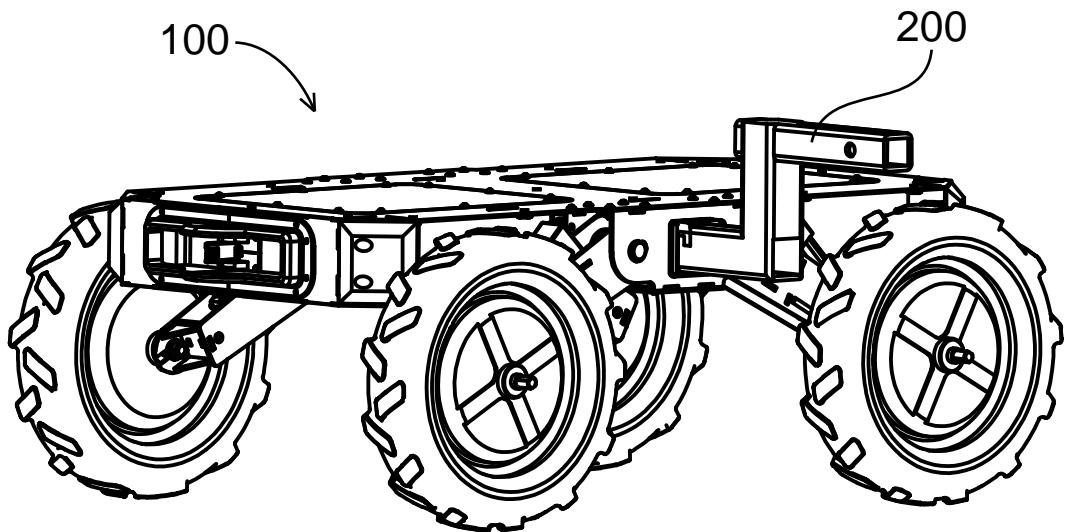


FIG. 5

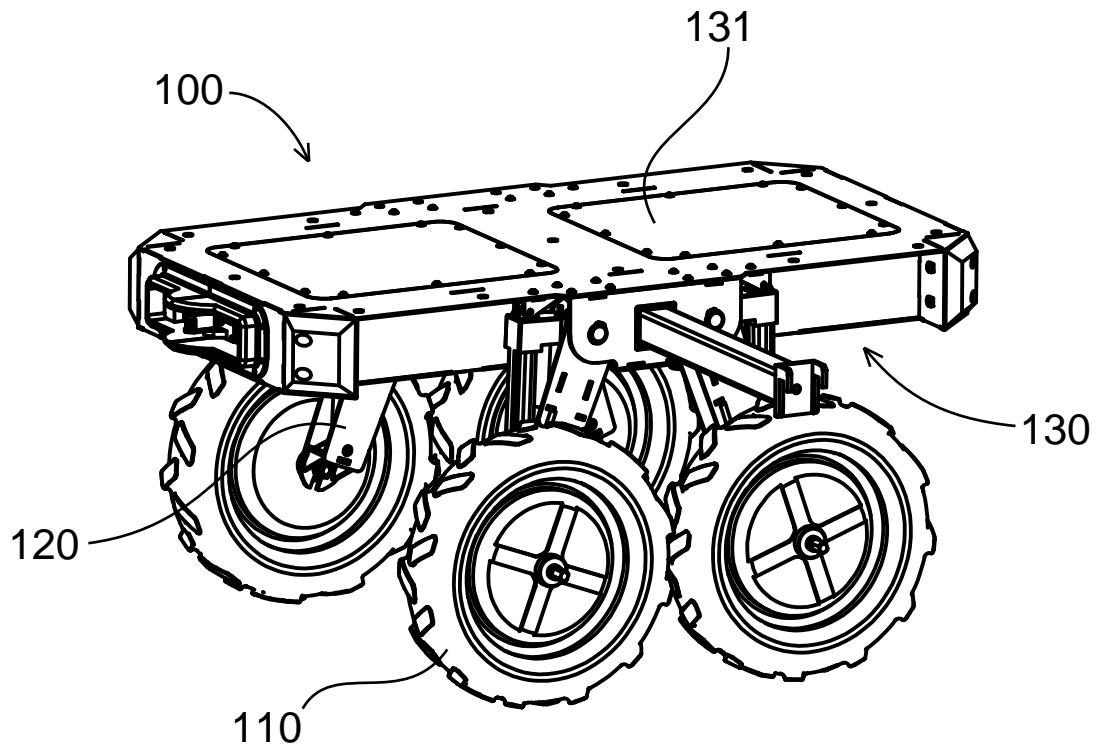


FIG. 6

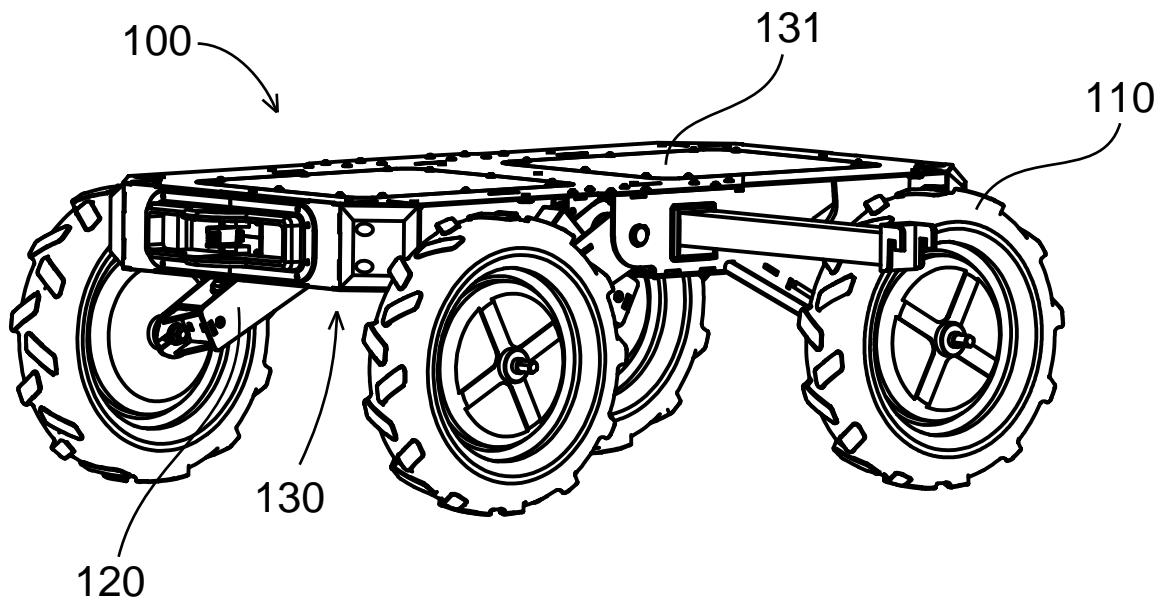


FIG. 7

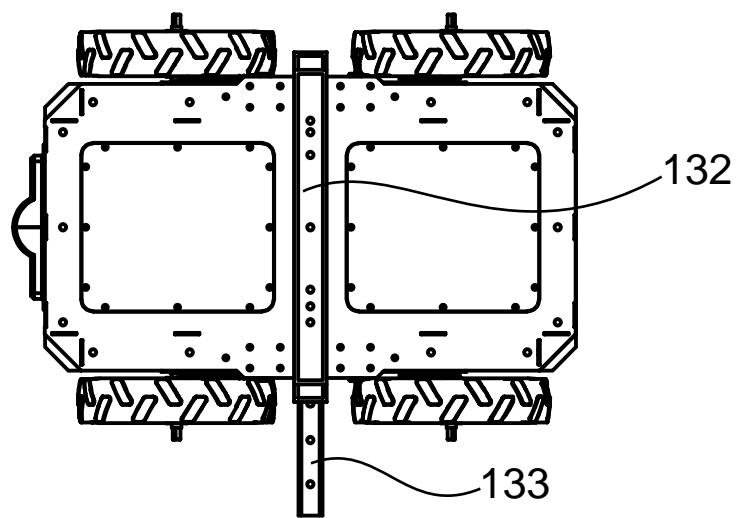


FIG. 8

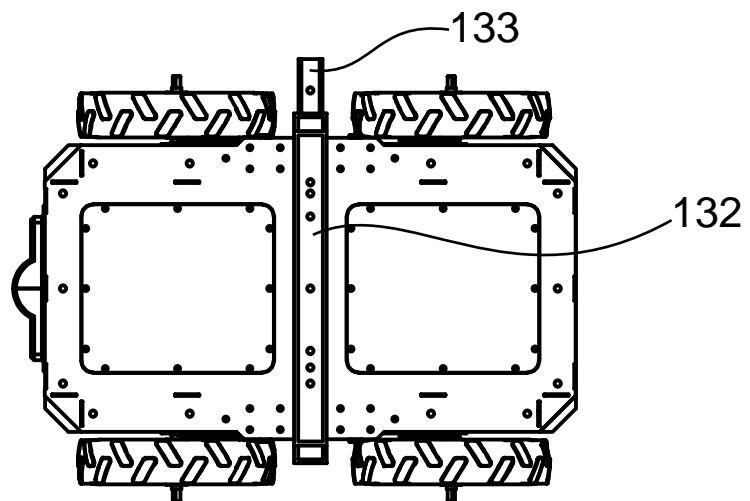


FIG. 9

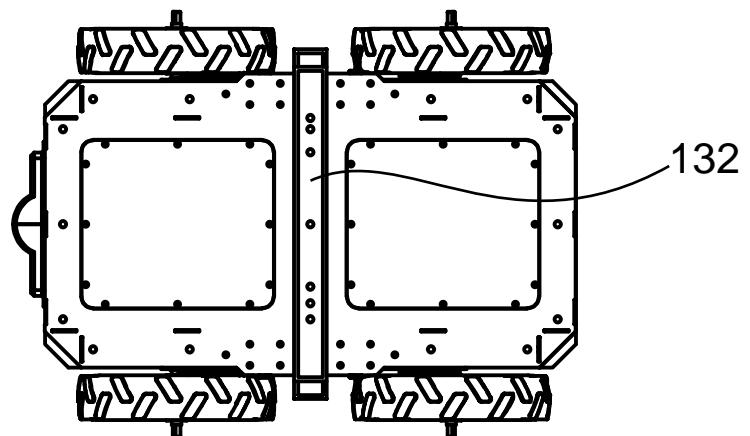


FIG. 10

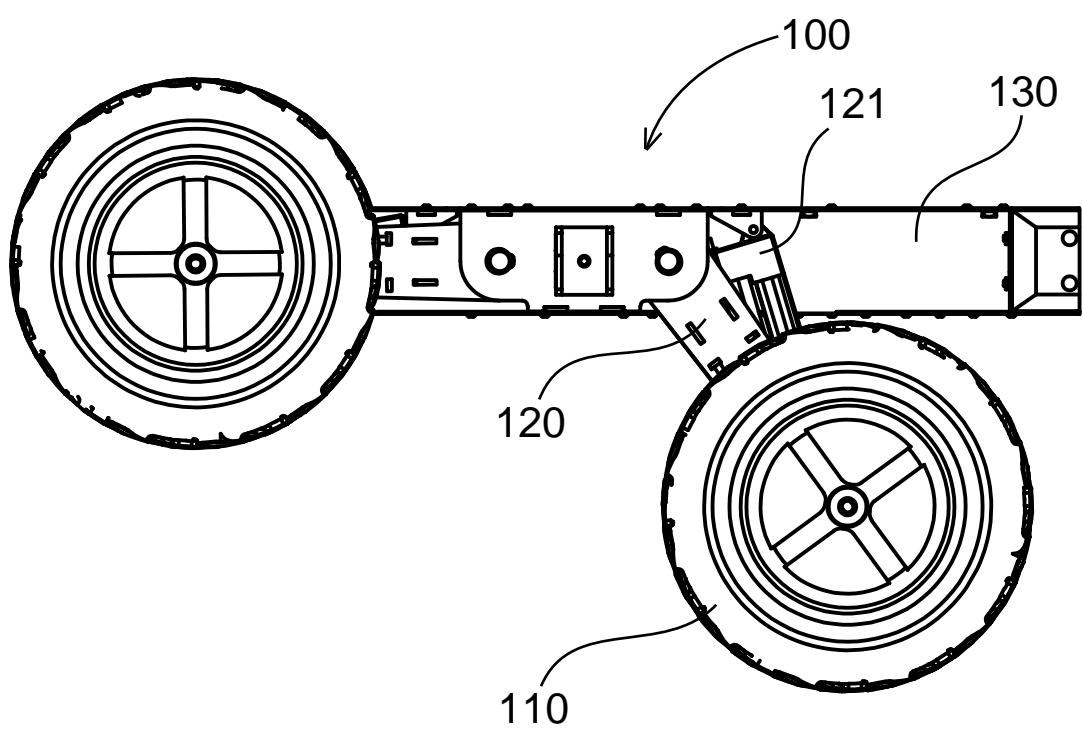


FIG. 11

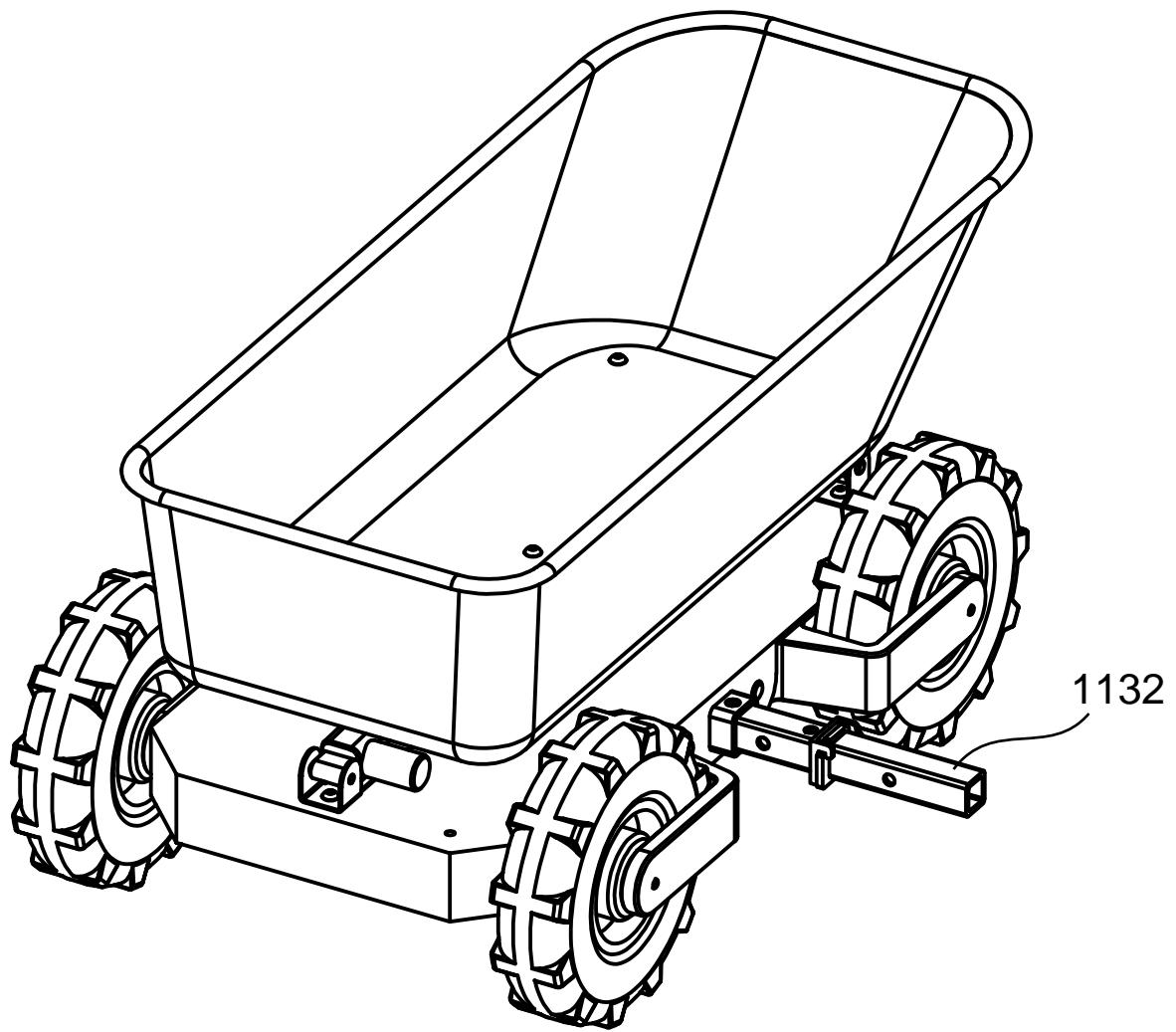


FIG. 12

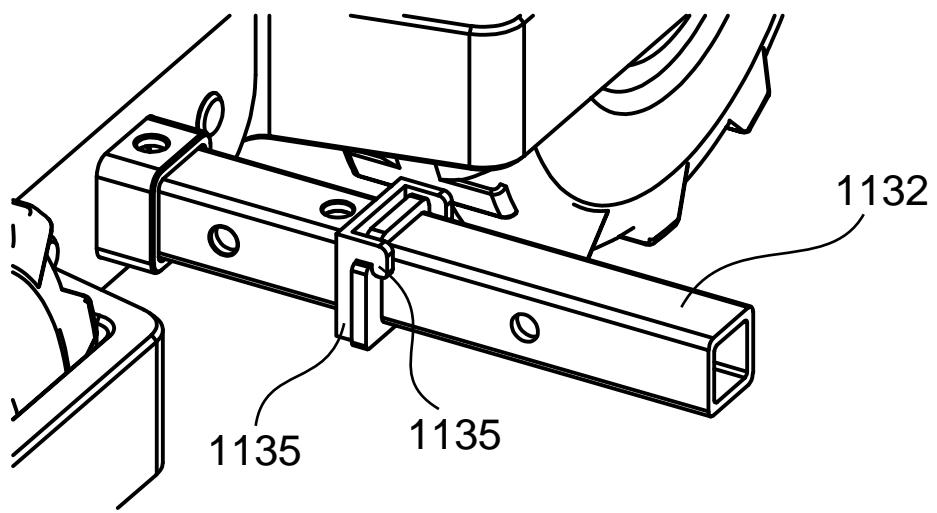


FIG. 13

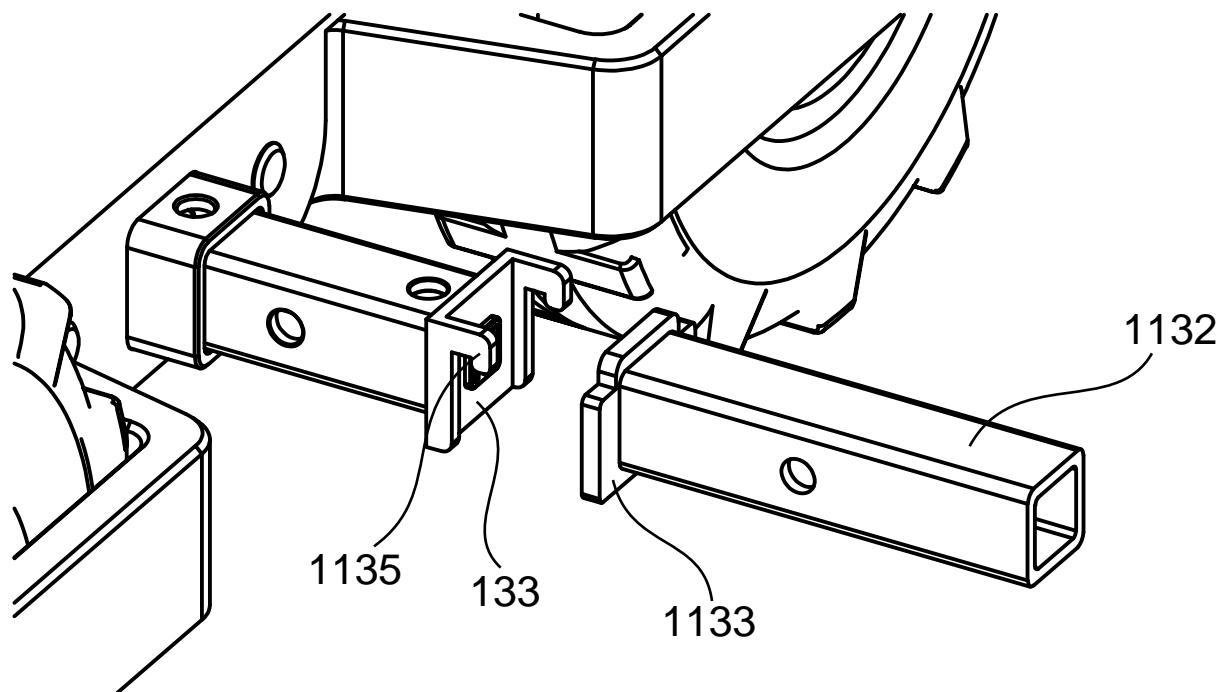


FIG. 14

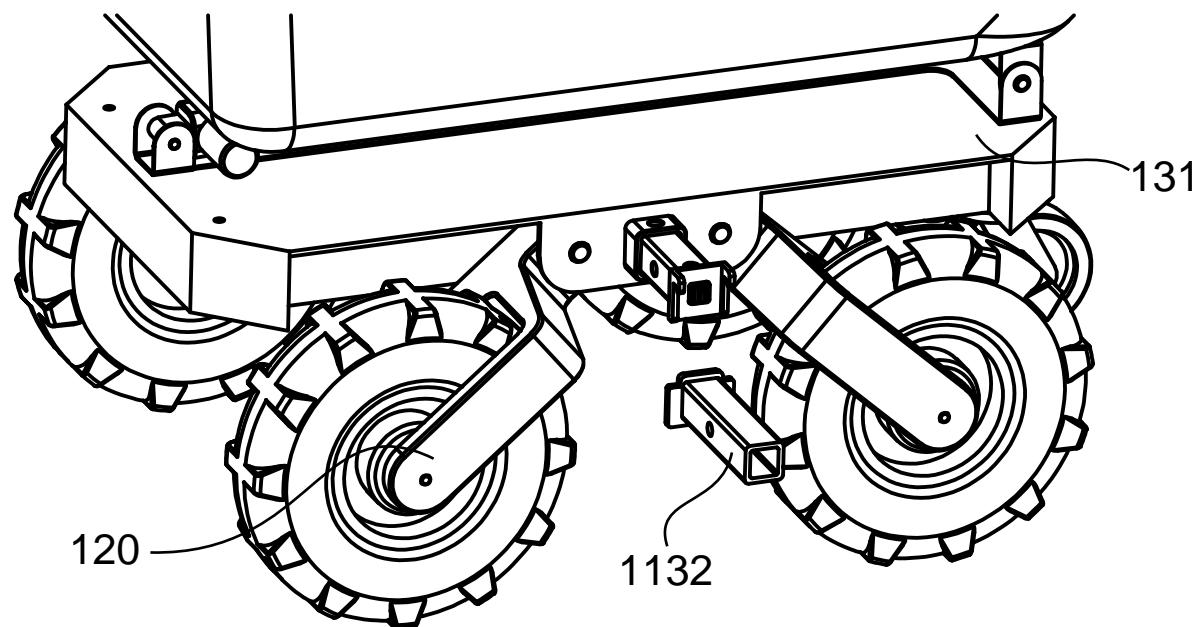


FIG. 15

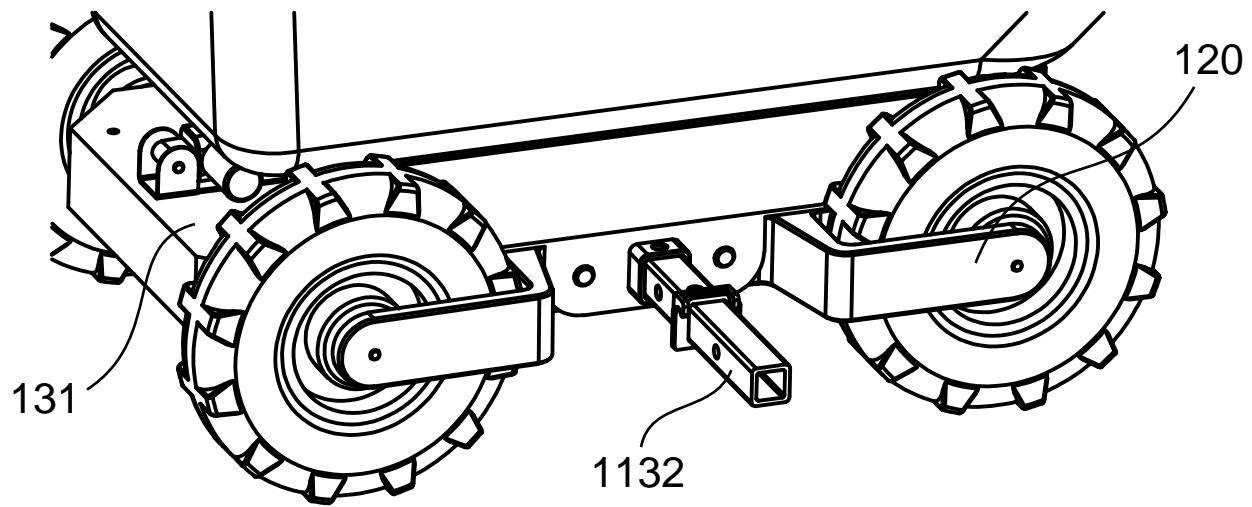


FIG. 16

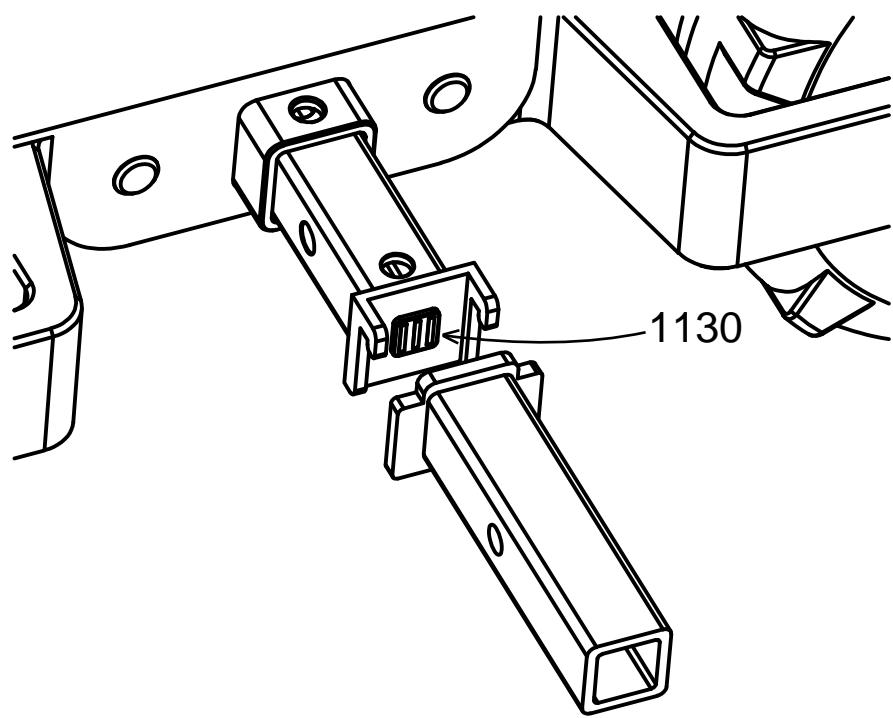


FIG. 17

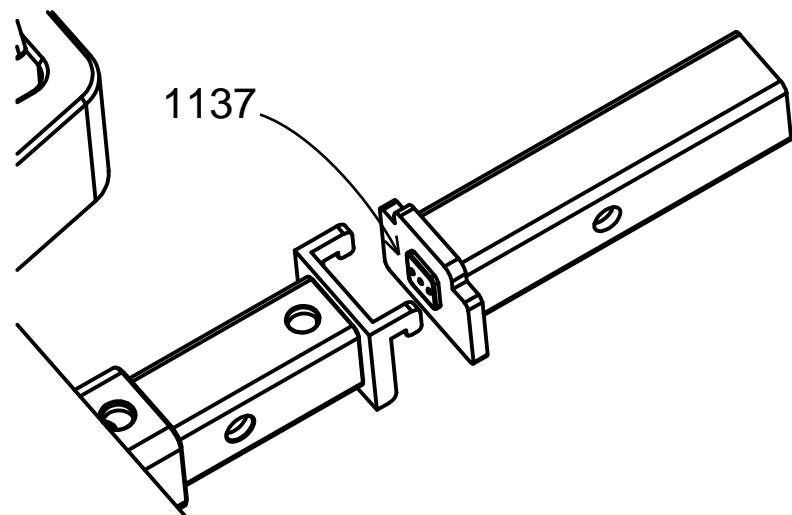


FIG. 18

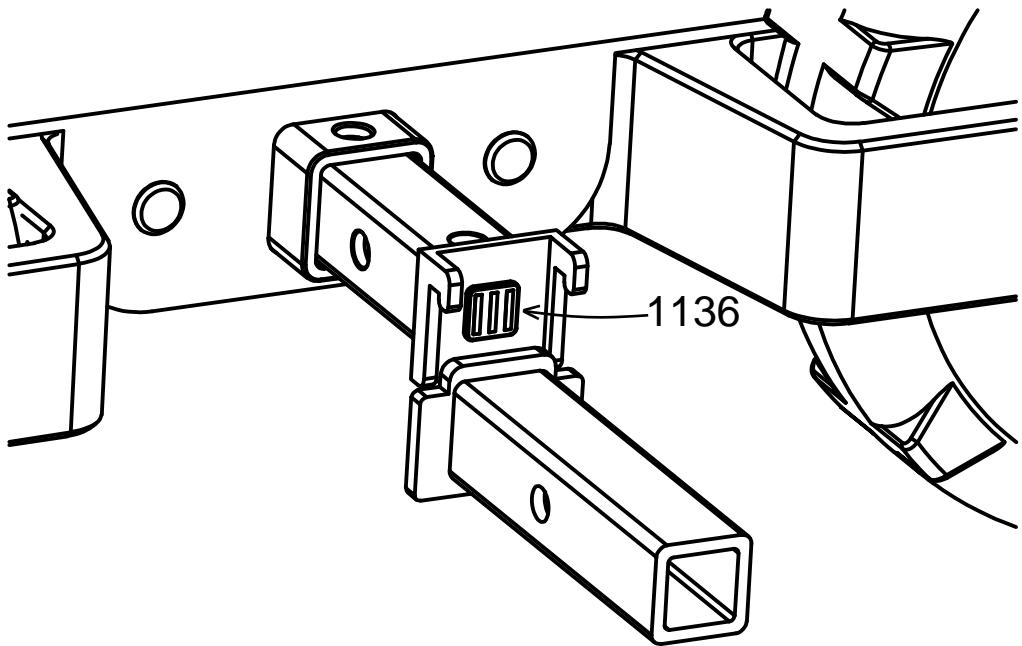


FIG. 19

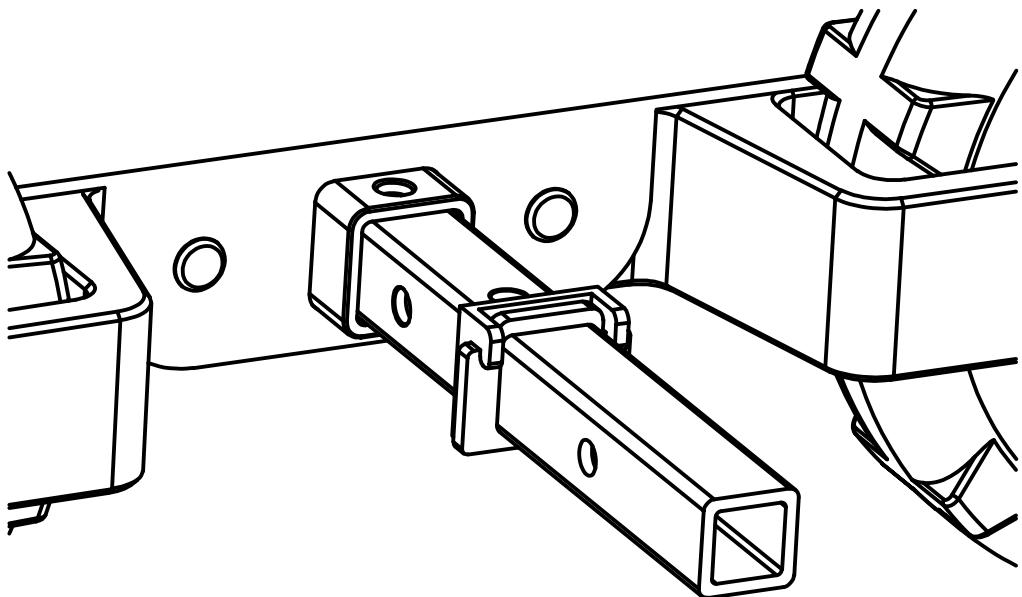


FIG. 20

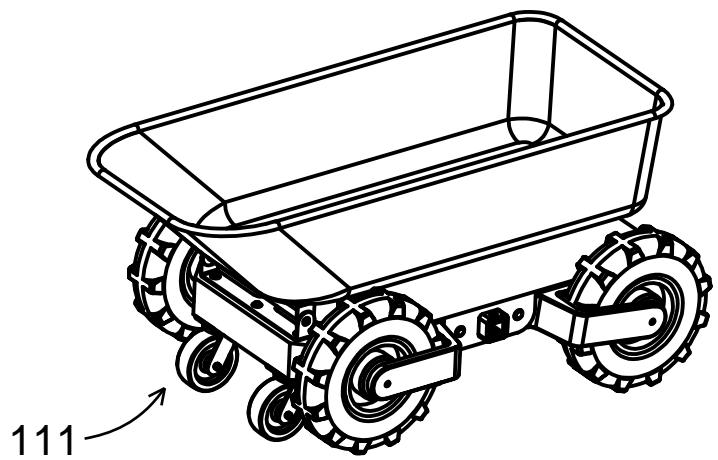


FIG. 21

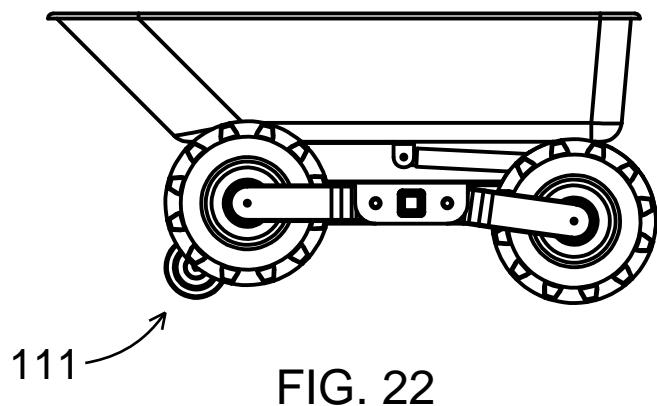


FIG. 22

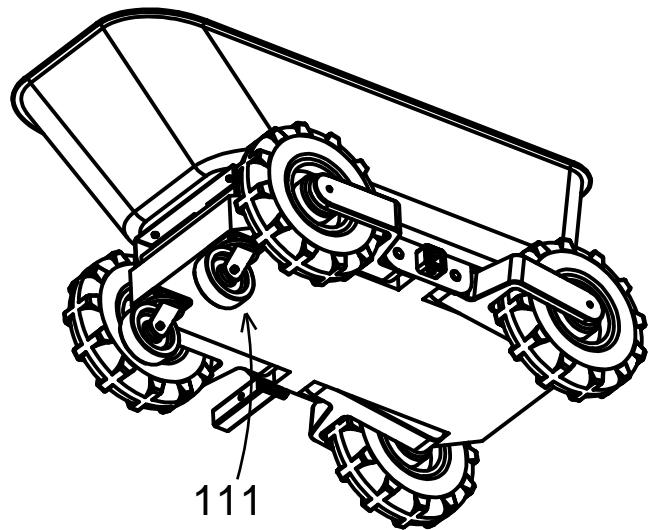
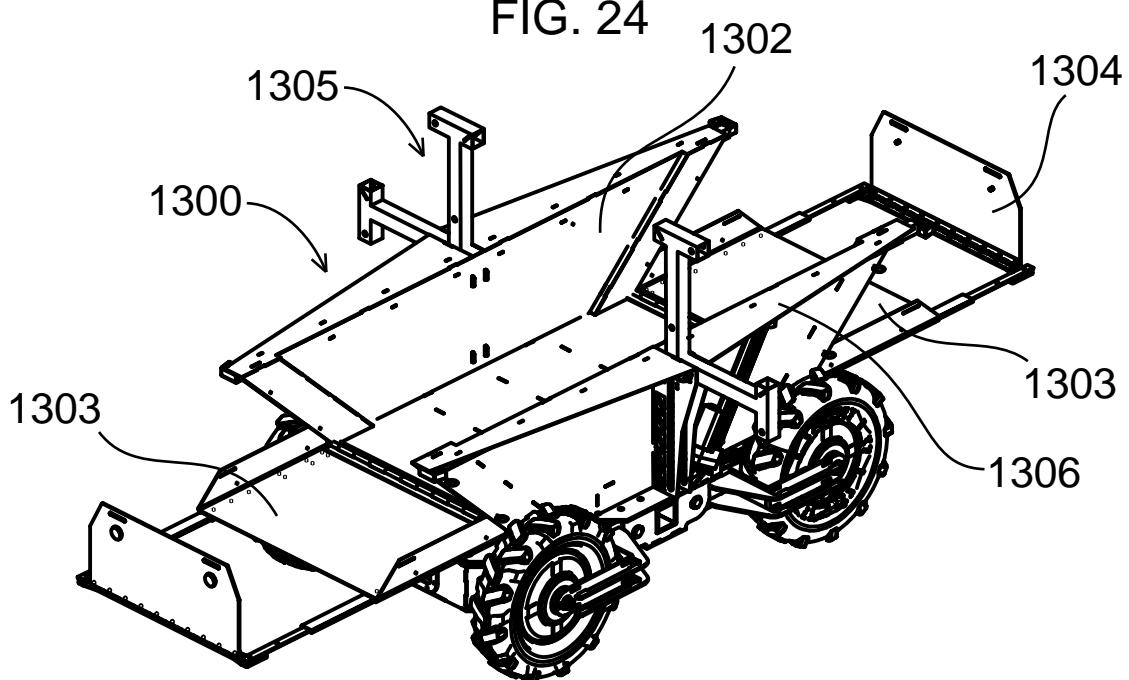
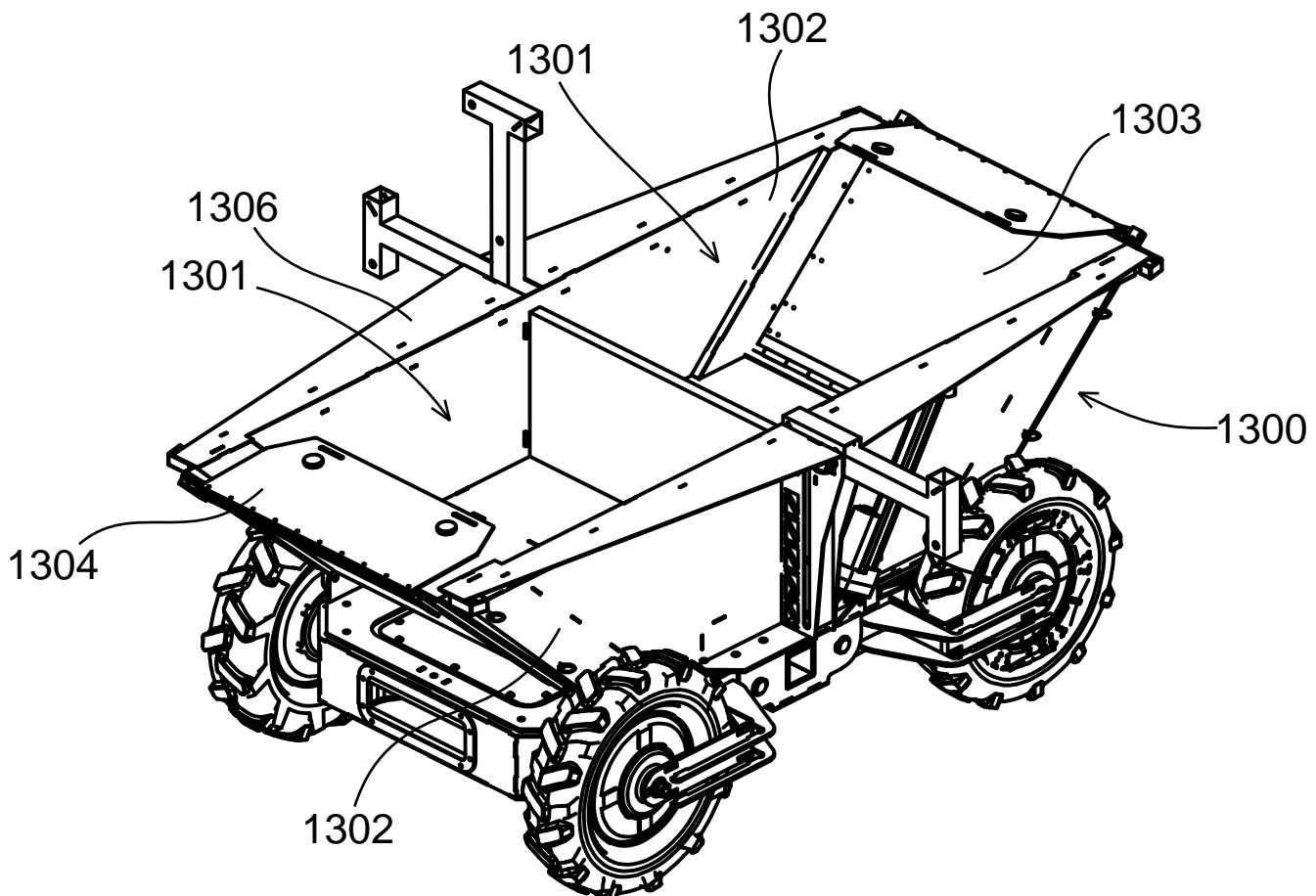


FIG. 23



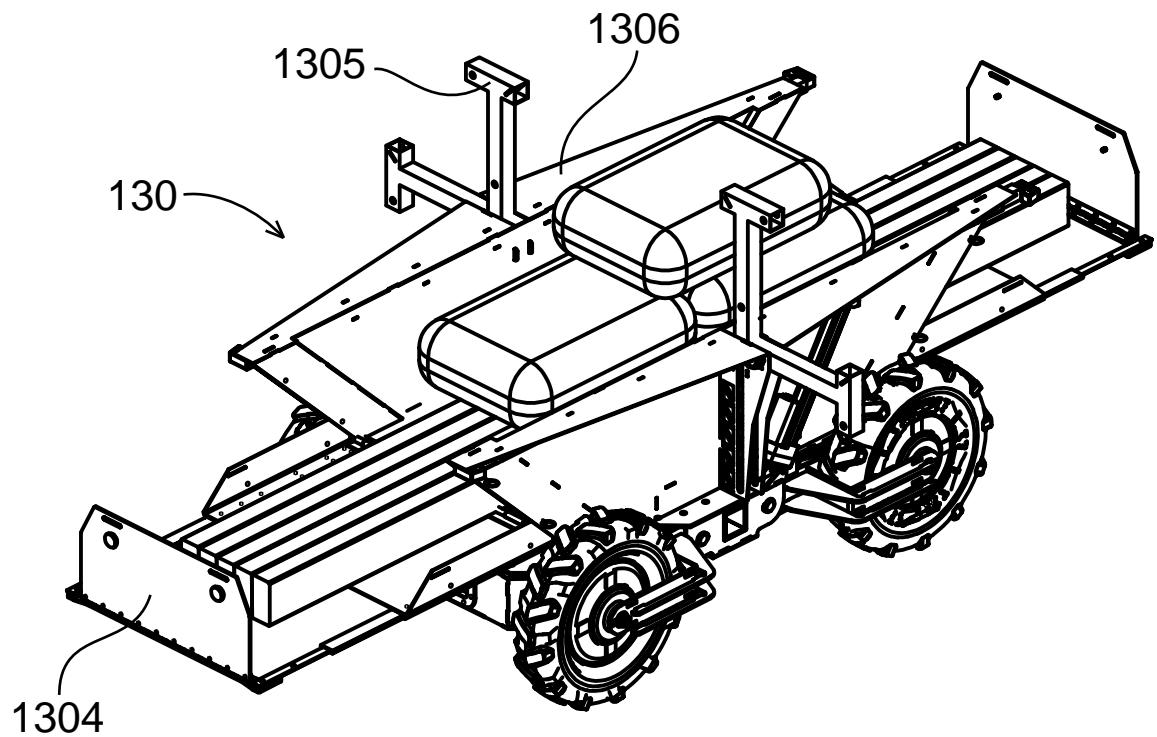


FIG. 26

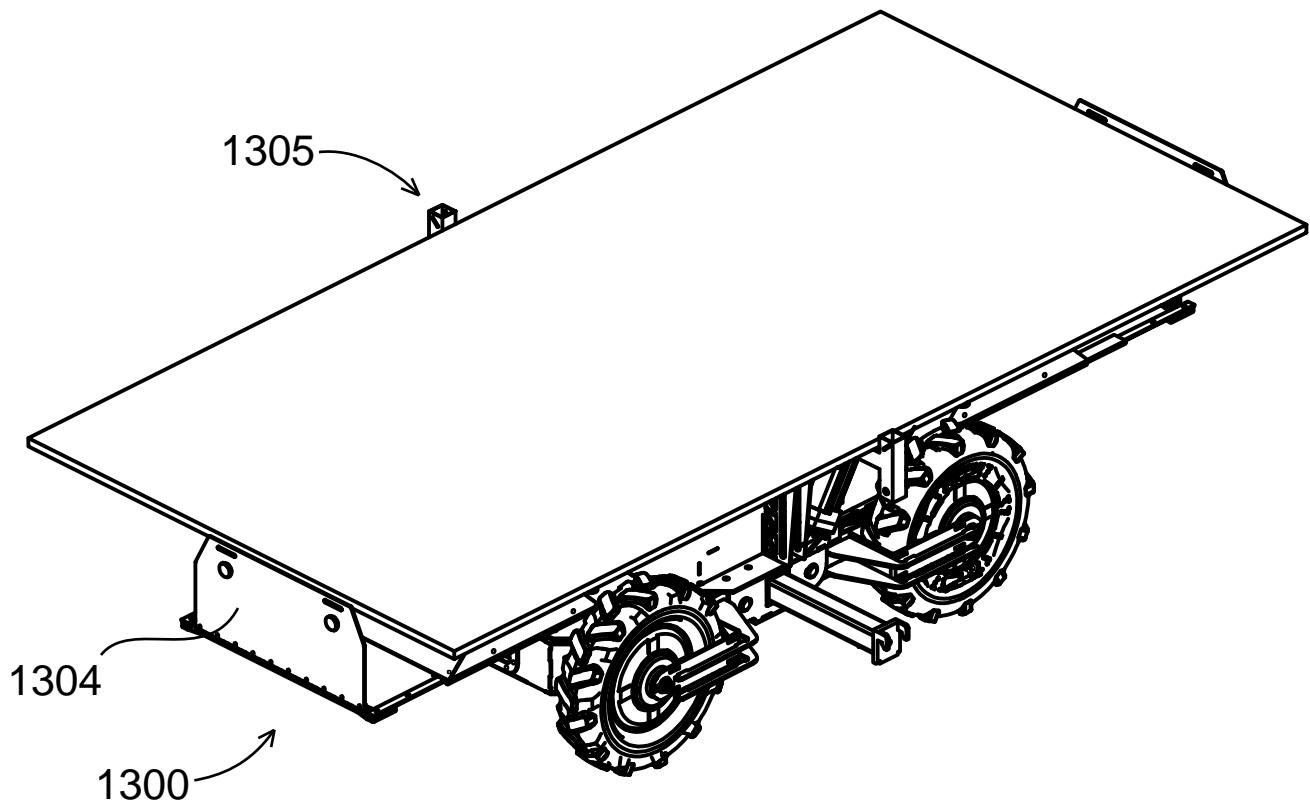


FIG. 27

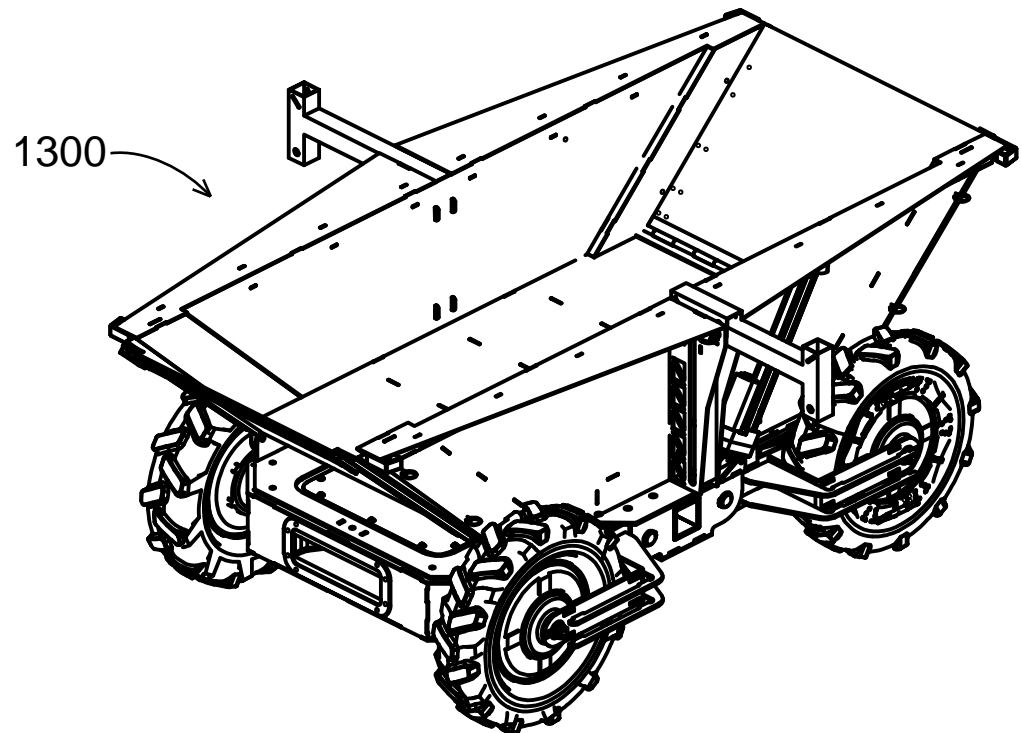


FIG. 28

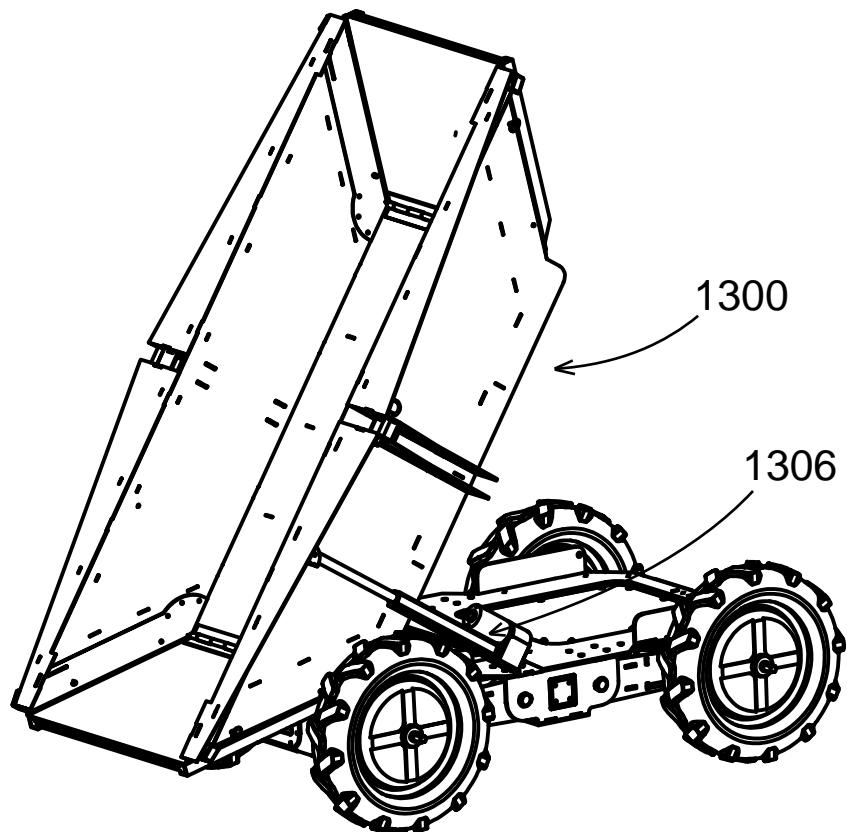


FIG. 29

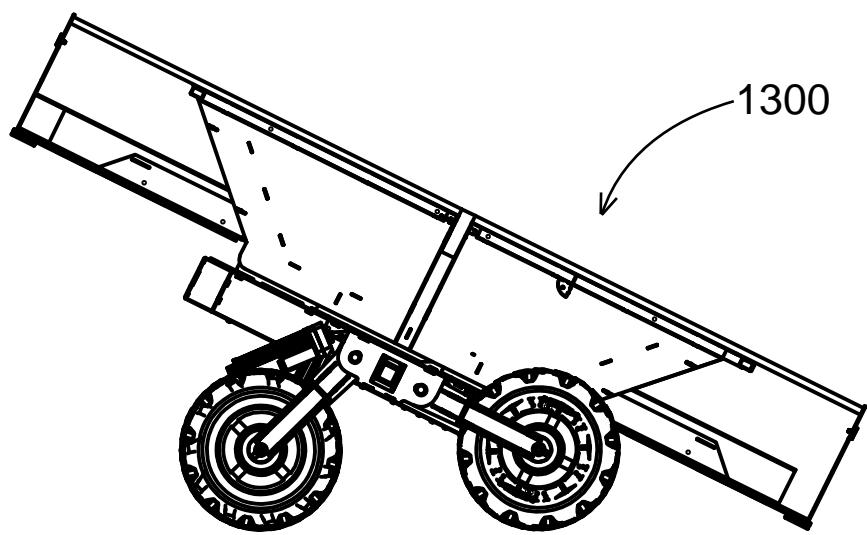


FIG. 30

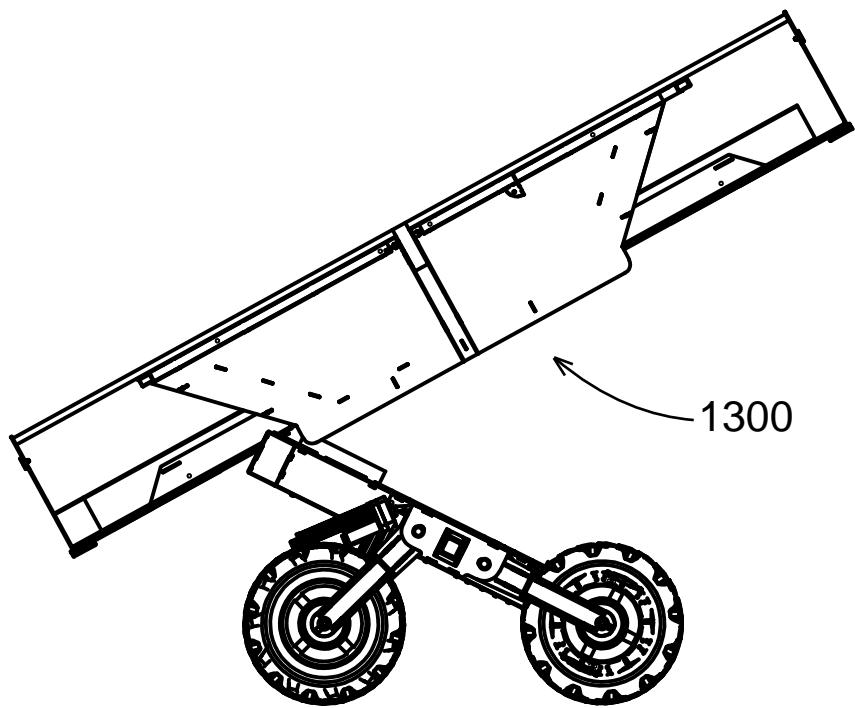


FIG. 31

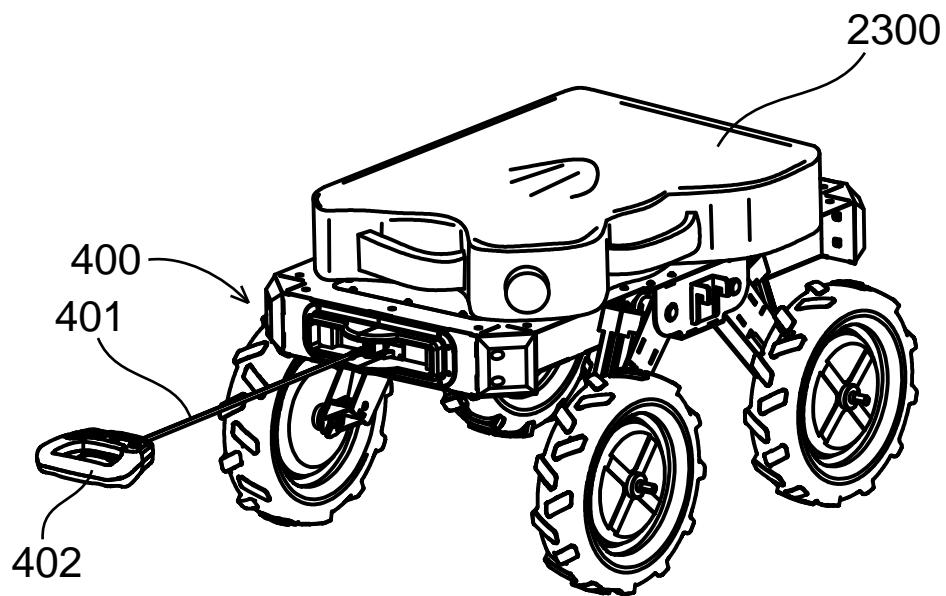


FIG. 32

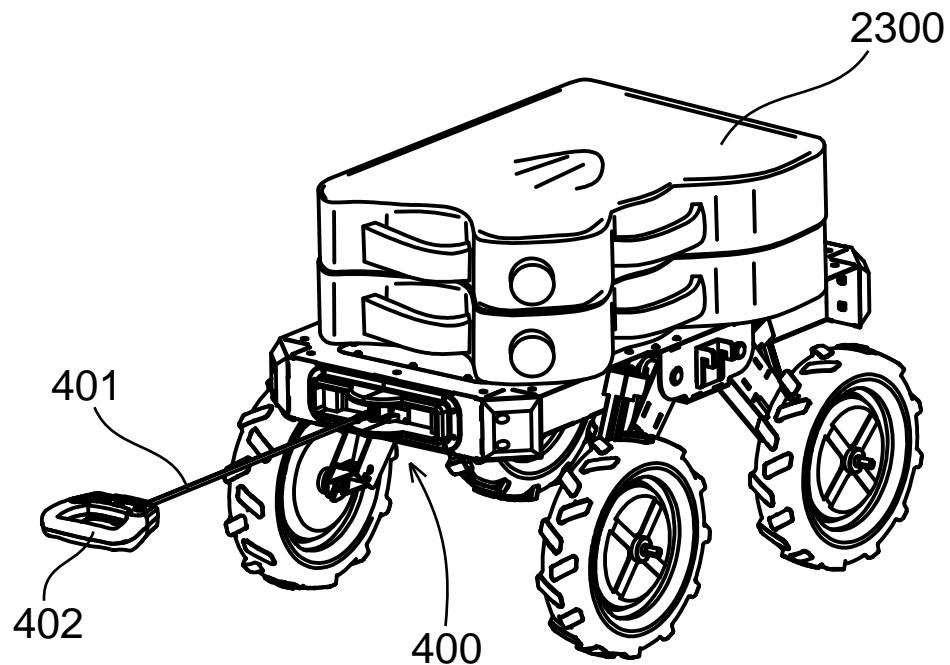


FIG. 33

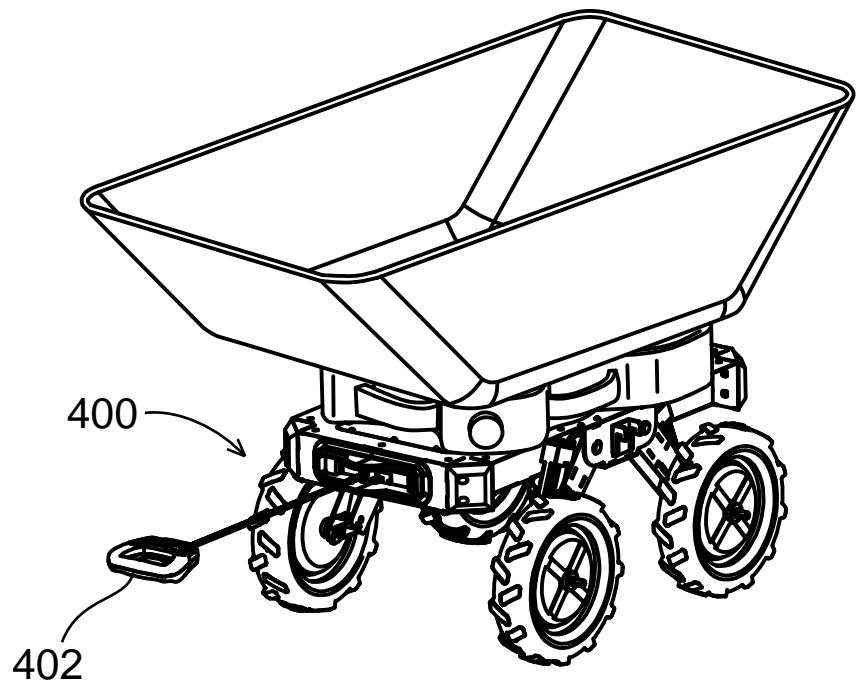


FIG. 34

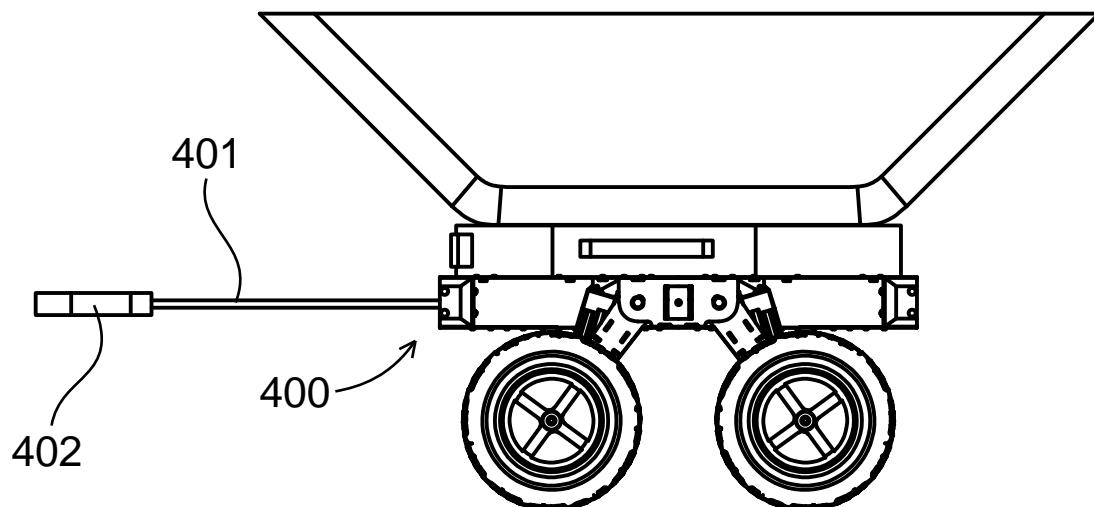


FIG. 35

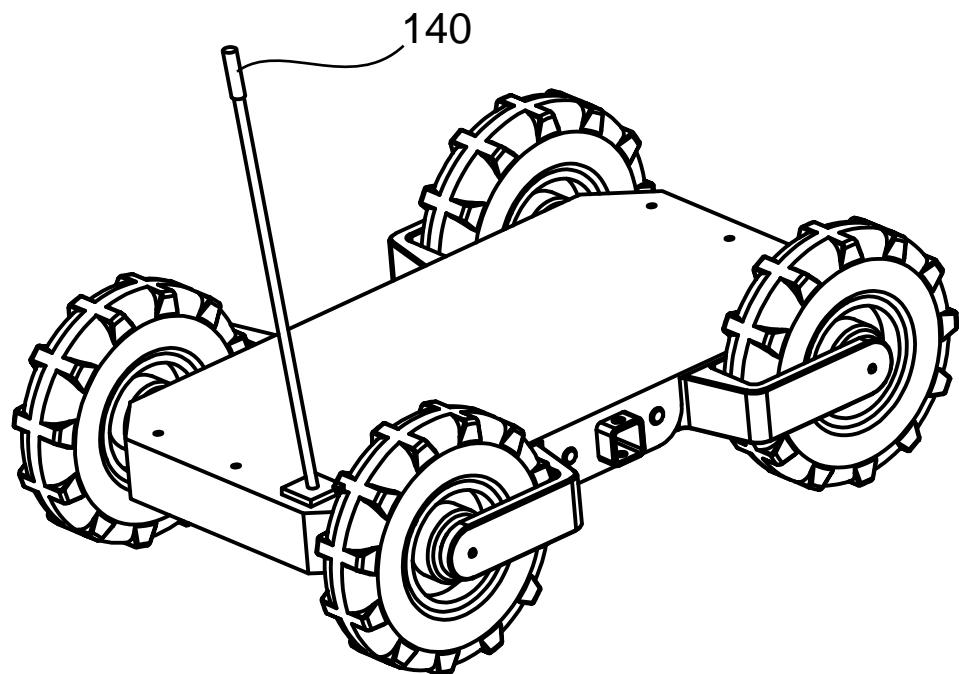


FIG. 36

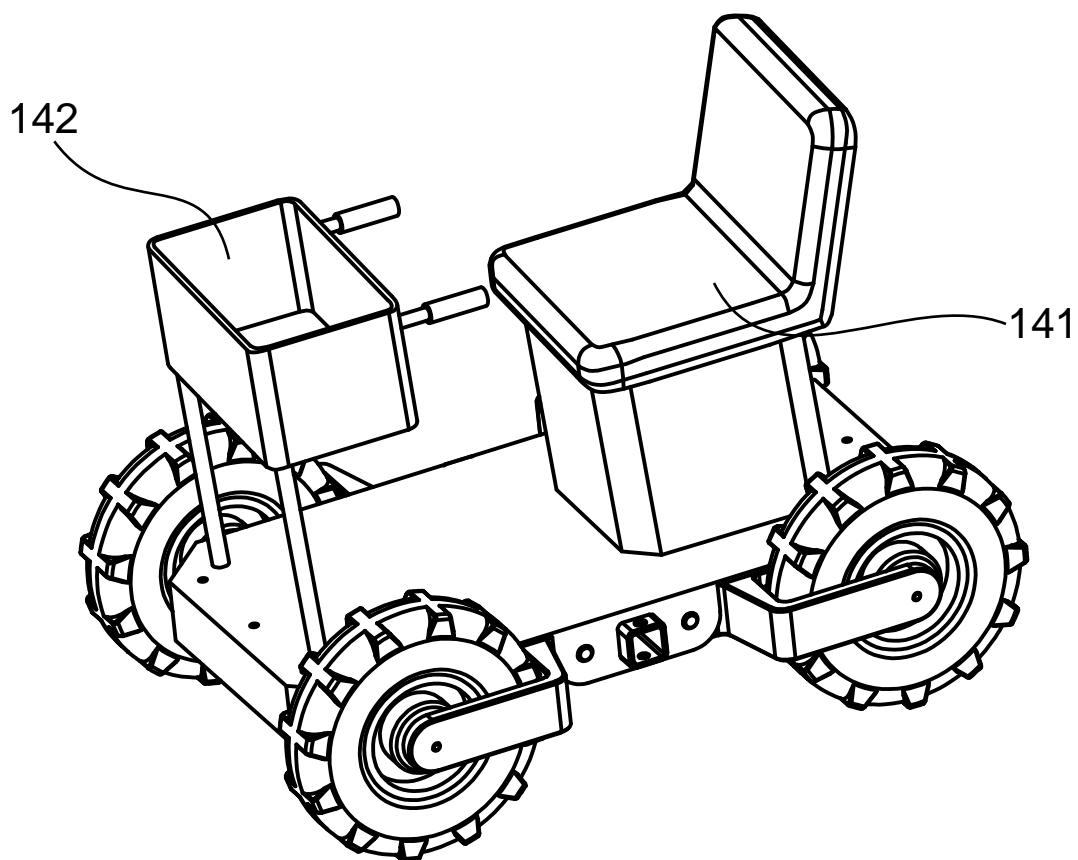


FIG. 37

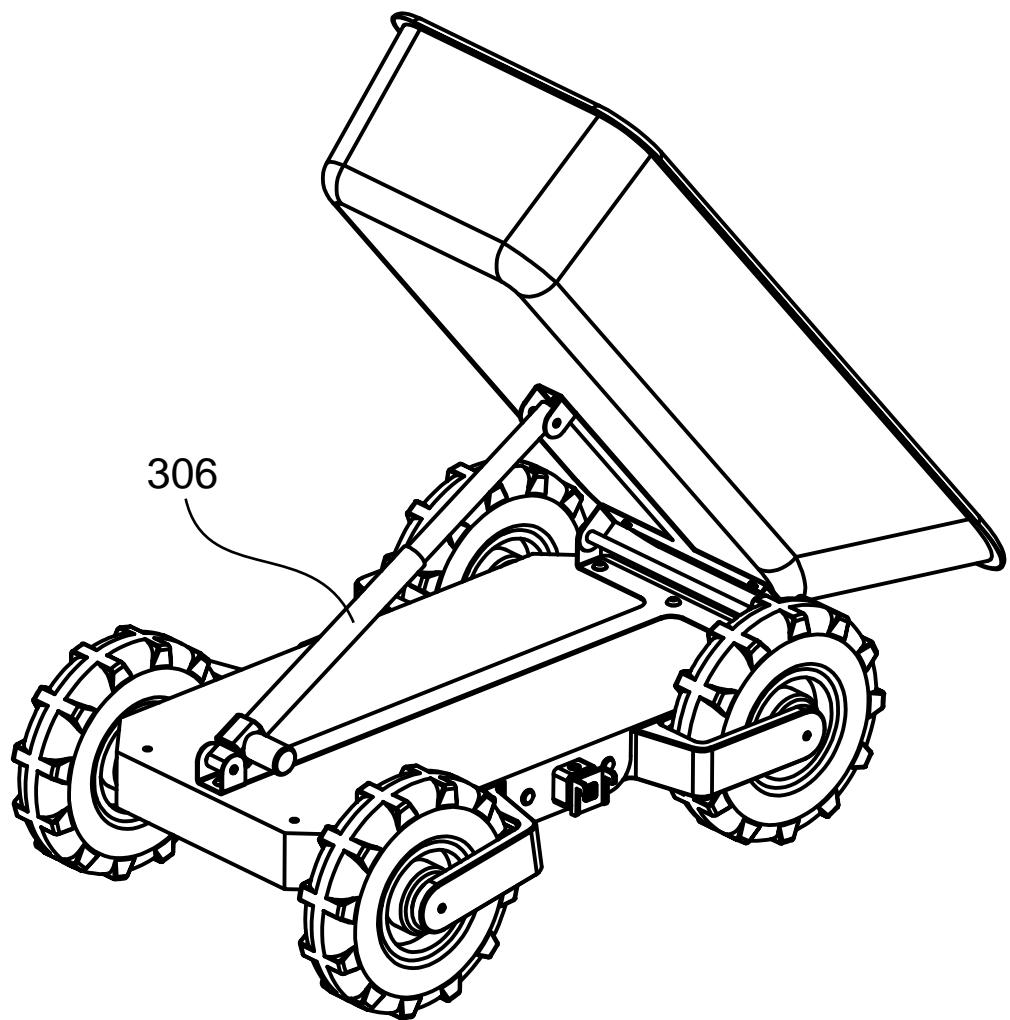


FIG. 38



US012077087B2

(12) **United States Patent**
Hall et al.

(10) **Patent No.:** US 12,077,087 B2
(45) **Date of Patent:** Sep. 3, 2024

(54) **PACKAGE DELIVERY SYSTEM**

(71) Applicant: **Hall Labs LLC**, Provo, UT (US)

(72) Inventors: **Stephen Hall**, Provo, UT (US); **David R. Hall**, Provo, UT (US); **Jeff Duncan**, Tucson, AZ (US); **Nathan Davis**, Bountiful, UT (US)

(73) Assignee: **Hall Labs LLC**, Provo, UT (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/476,265**

(22) Filed: **Sep. 15, 2021**

(65) **Prior Publication Data**

US 2022/0084154 A1 Mar. 17, 2022

Related U.S. Application Data

(60) Provisional application No. 63/078,637, filed on Sep. 15, 2020, provisional application No. 63/078,631, (Continued)

(51) **Int. Cl.**

G06Q 10/08 (2024.01)
A47G 29/14 (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC **B60P 3/007** (2013.01); **A47G 29/141** (2013.01); **B60L 53/80** (2019.02); **B60P 1/003** (2013.01);

(Continued)

(58) **Field of Classification Search**

CPC B60P 1/486; B60P 1/6418; B60P 1/6409; B60P 1/5428; B60P 1/6427; B60P 3/007;

(Continued)

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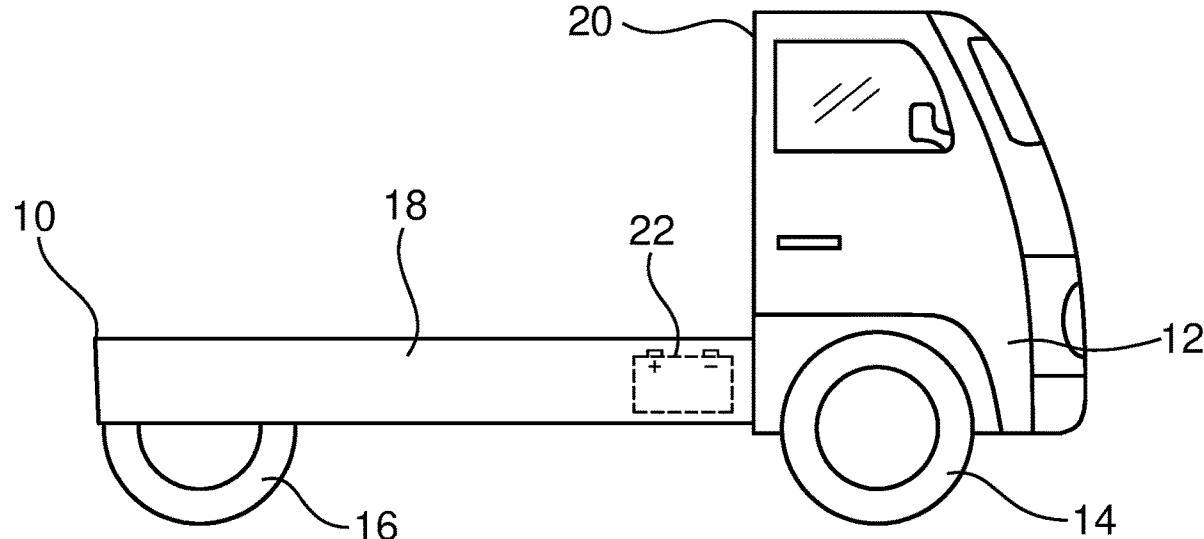
Primary Examiner — Omar Zeroual

Assistant Examiner — Duane N. Moore

(57) **ABSTRACT**

A system for delivering packages from a warehouse to end destinations, the system comprising a fleet of self-propelled long-range transports and a fleet of containers, each configured to be loaded at the warehouse with packages destined for end destinations. Each long-range transport is configured to be loaded with at least four of the loaded containers and transport the at least four of the loaded containers from the warehouse to one or more intermediate destinations. Upon arrival of one of the loaded long-range transports at one of the one or more intermediate destinations, at least one of the loaded containers is separated from the loaded long-range transport, whereupon the separated container delivers packages to end destinations proximate to the one of the one or more intermediate destinations. After delivery of at least some of the packages loaded thereon at the warehouse, the container is once again loaded on the long-range transport and returned to the warehouse to be loaded with more packages.

19 Claims, 32 Drawing Sheets



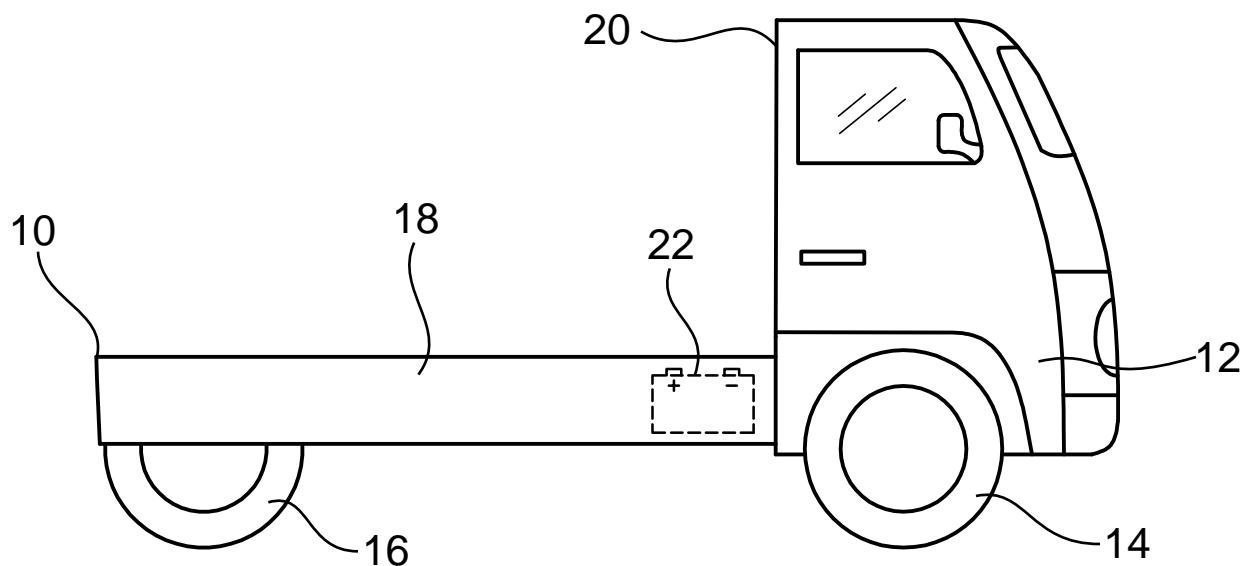


FIG. 1

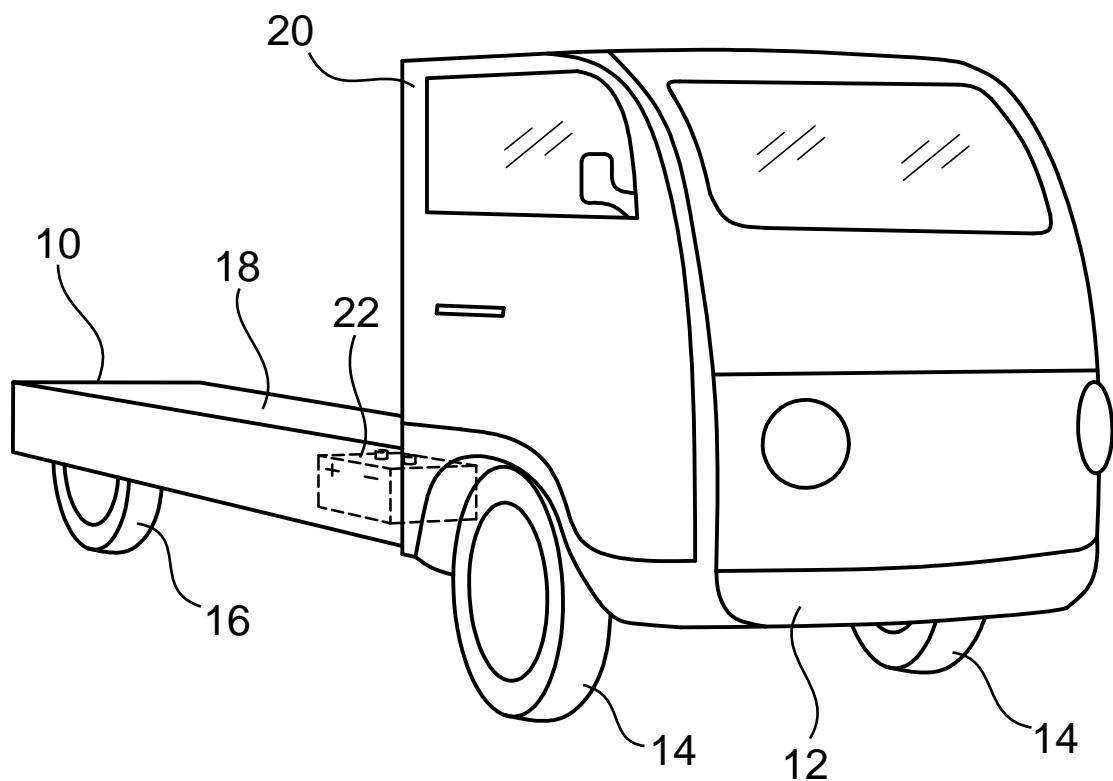


FIG. 2

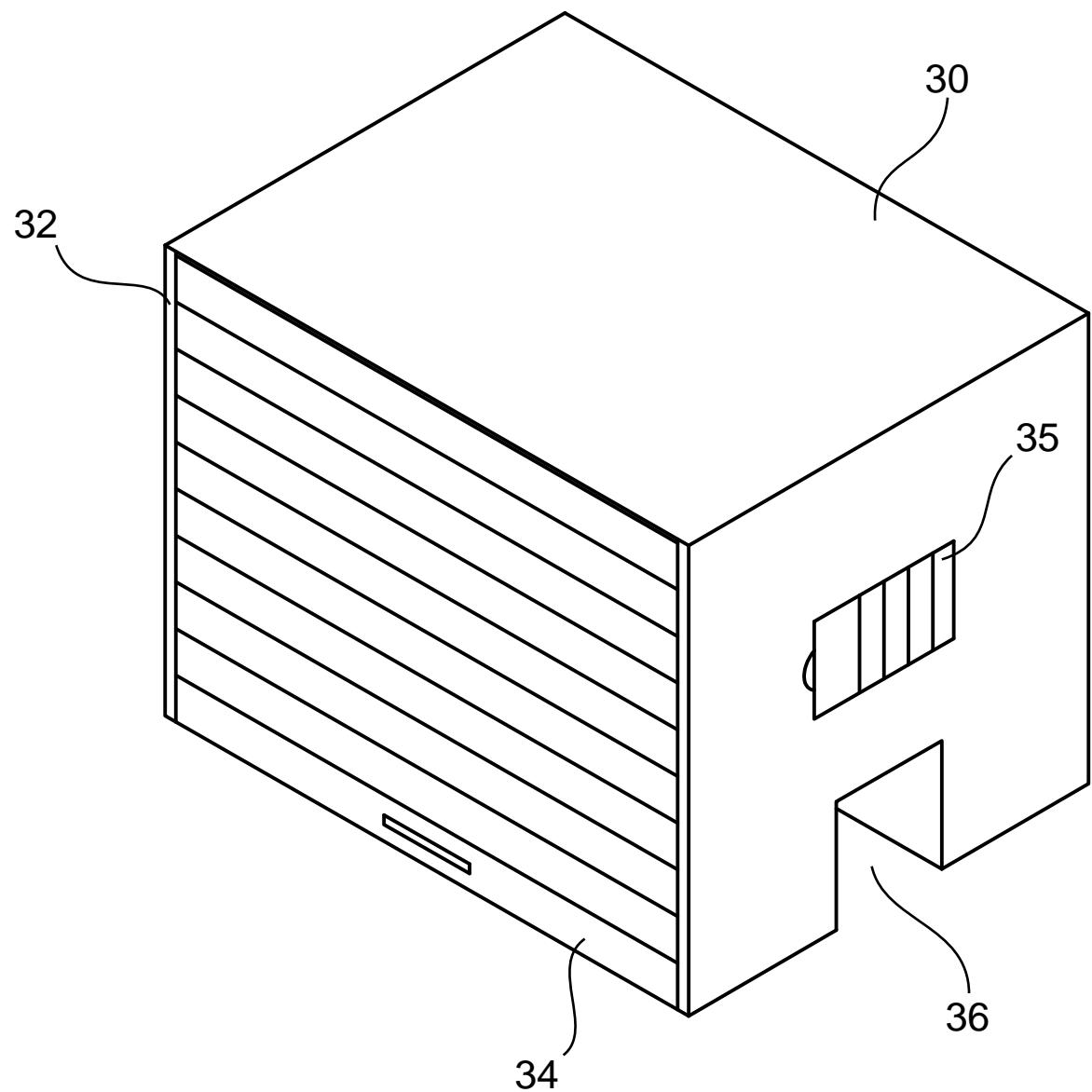


FIG. 3

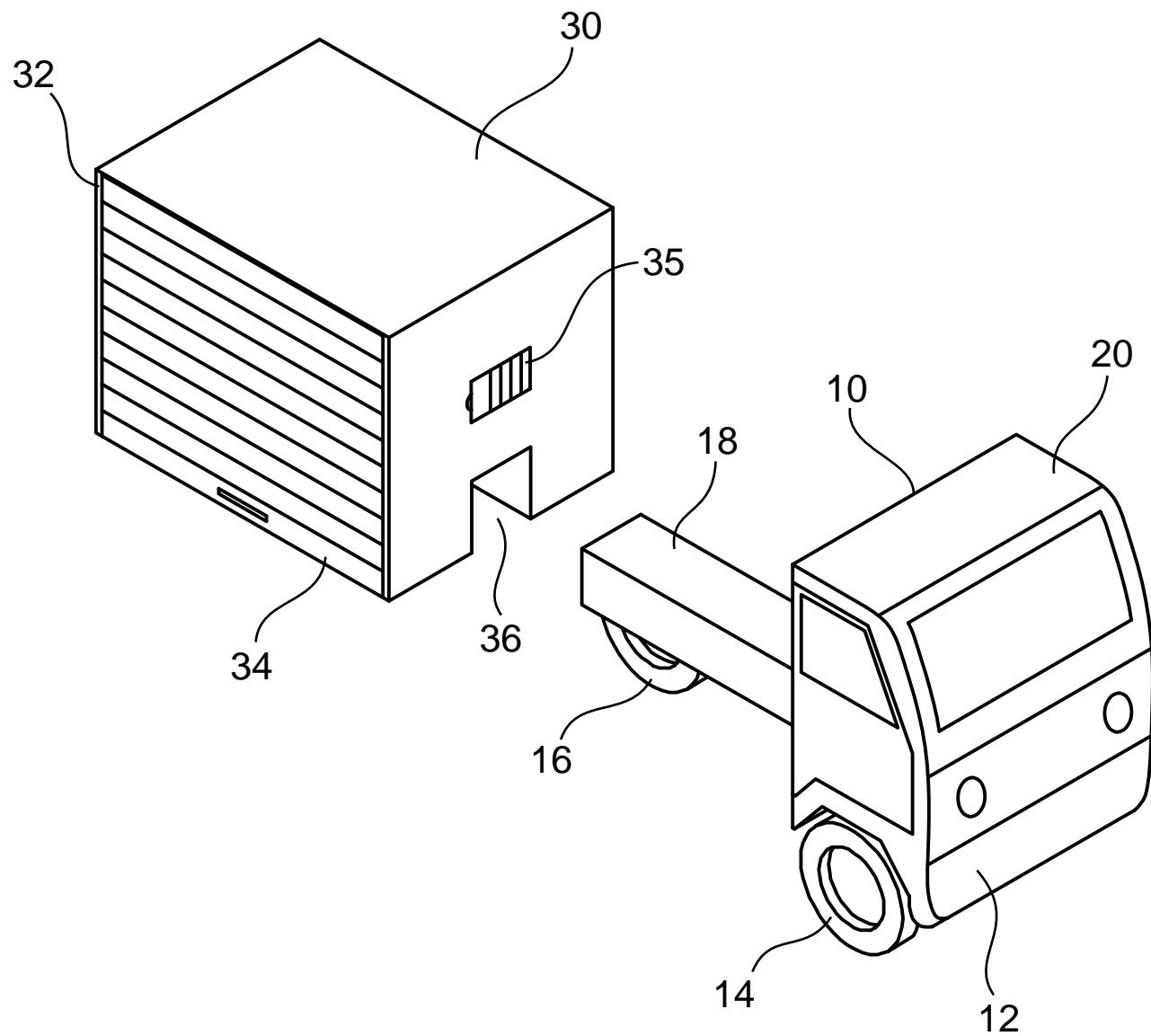
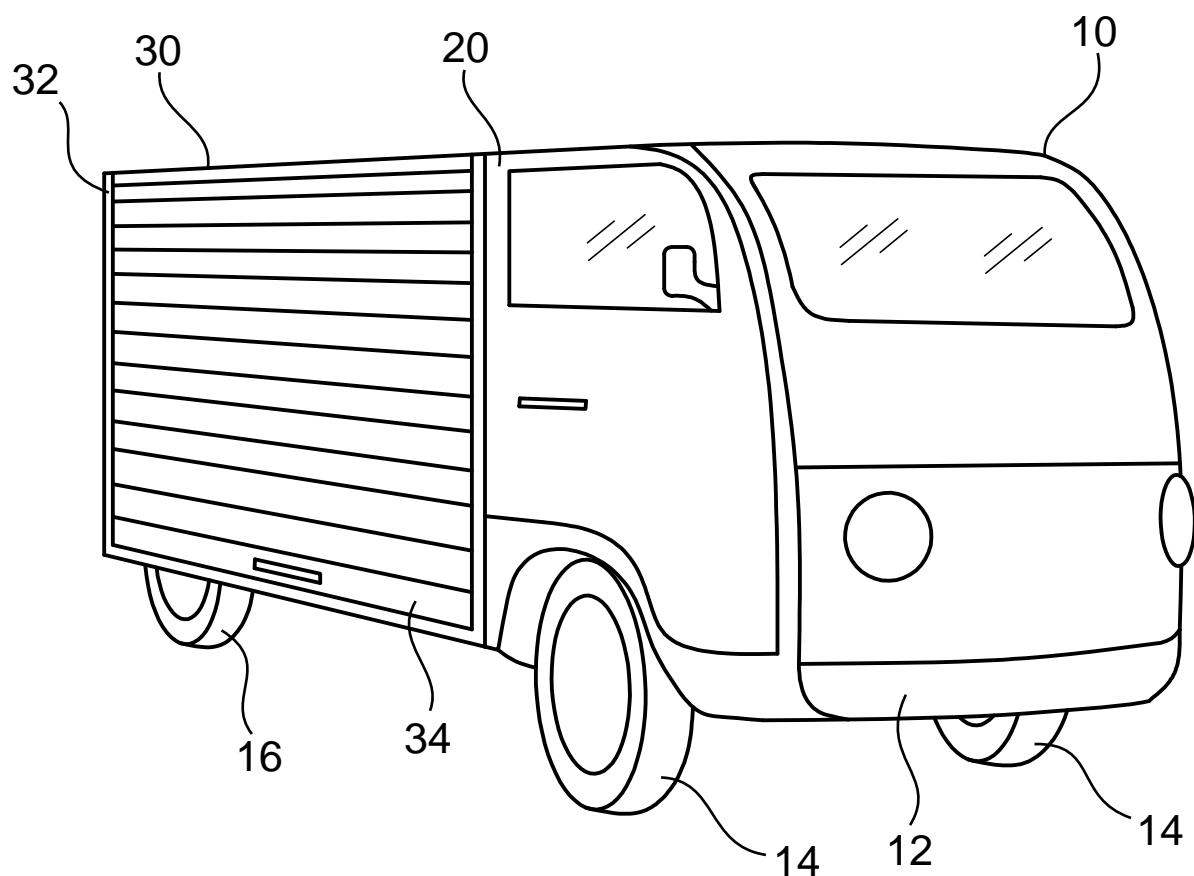
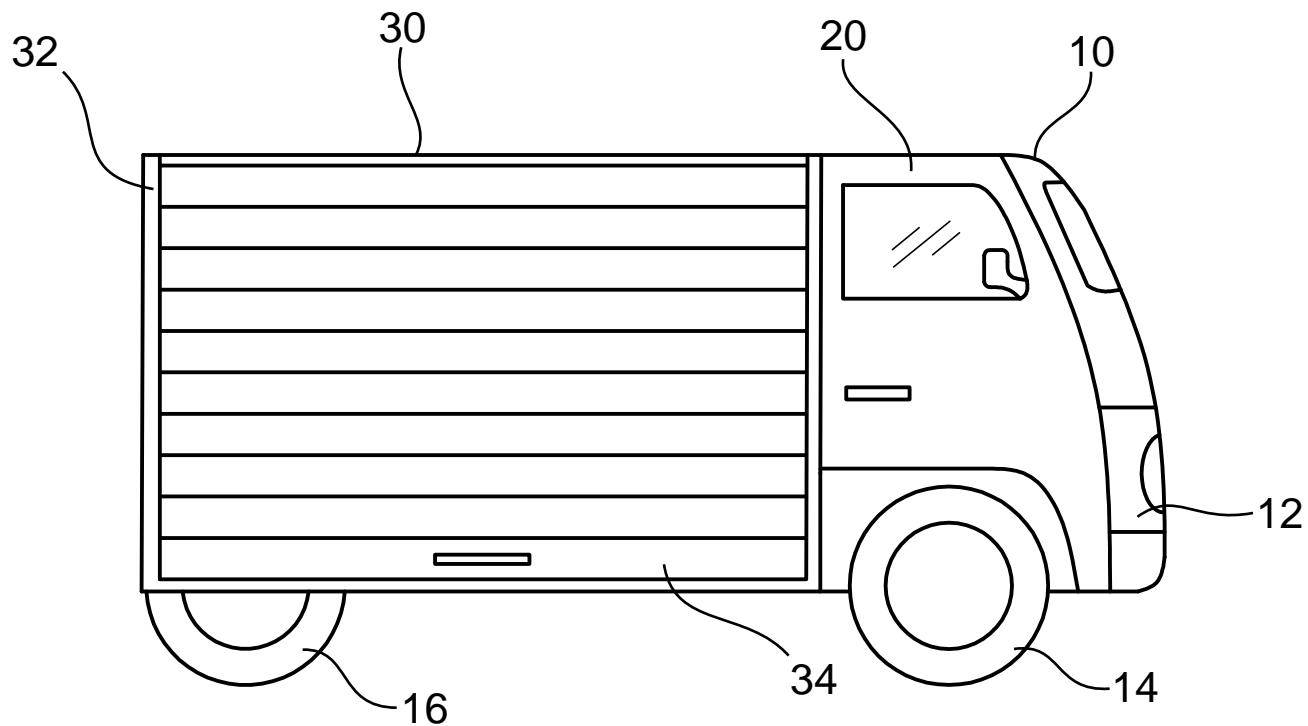


FIG. 4



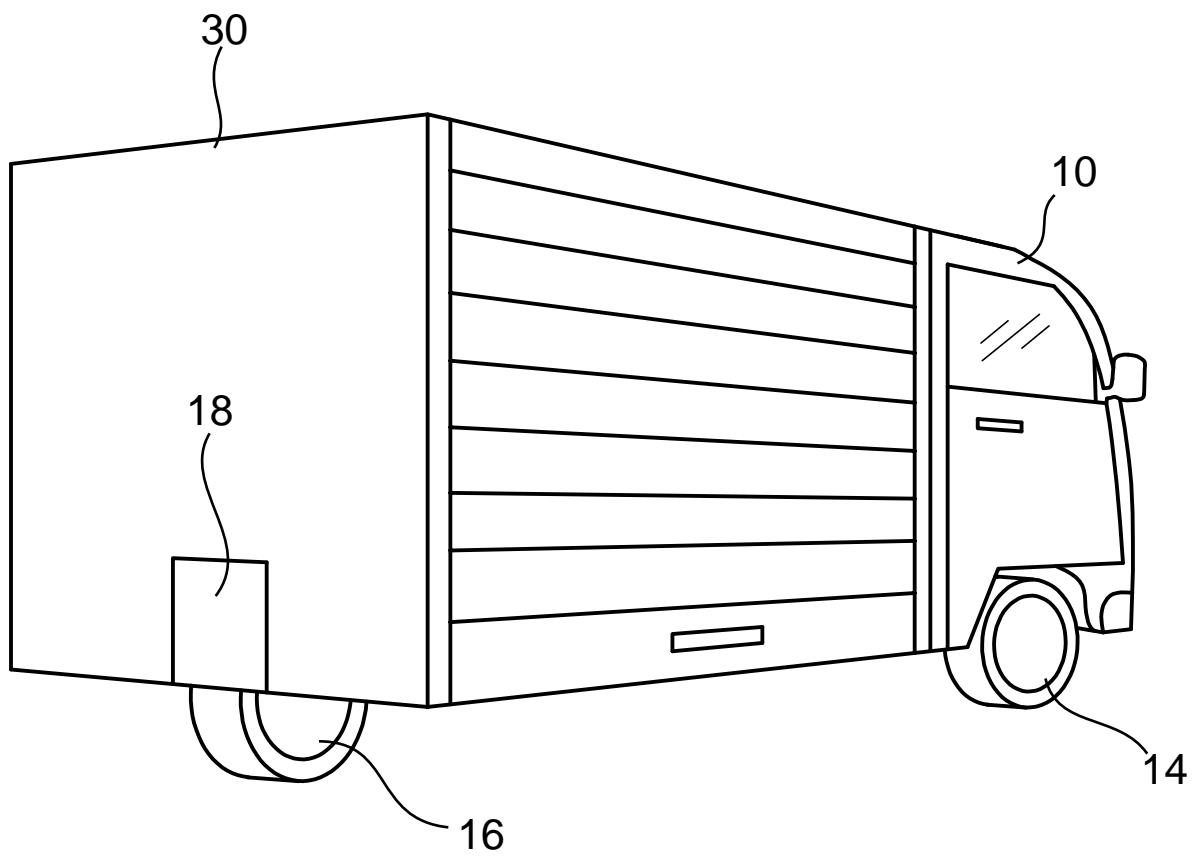
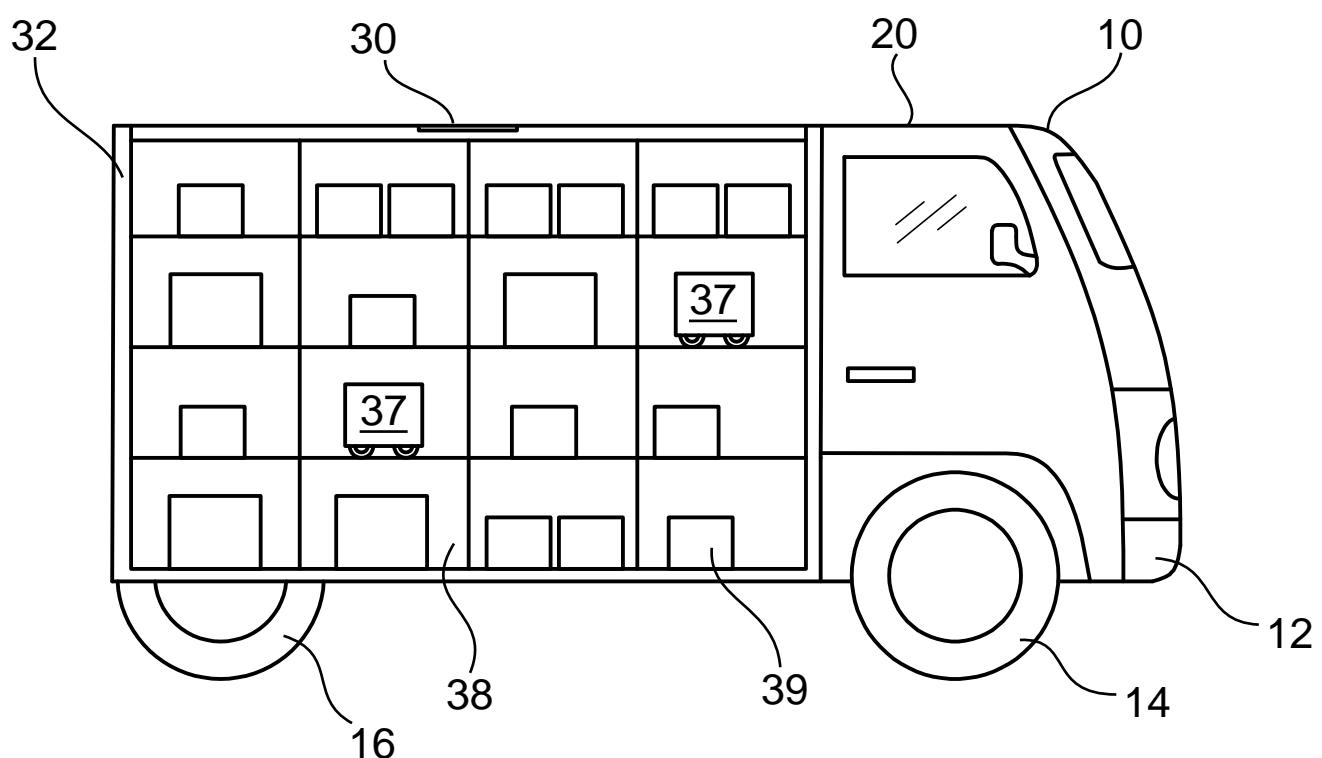
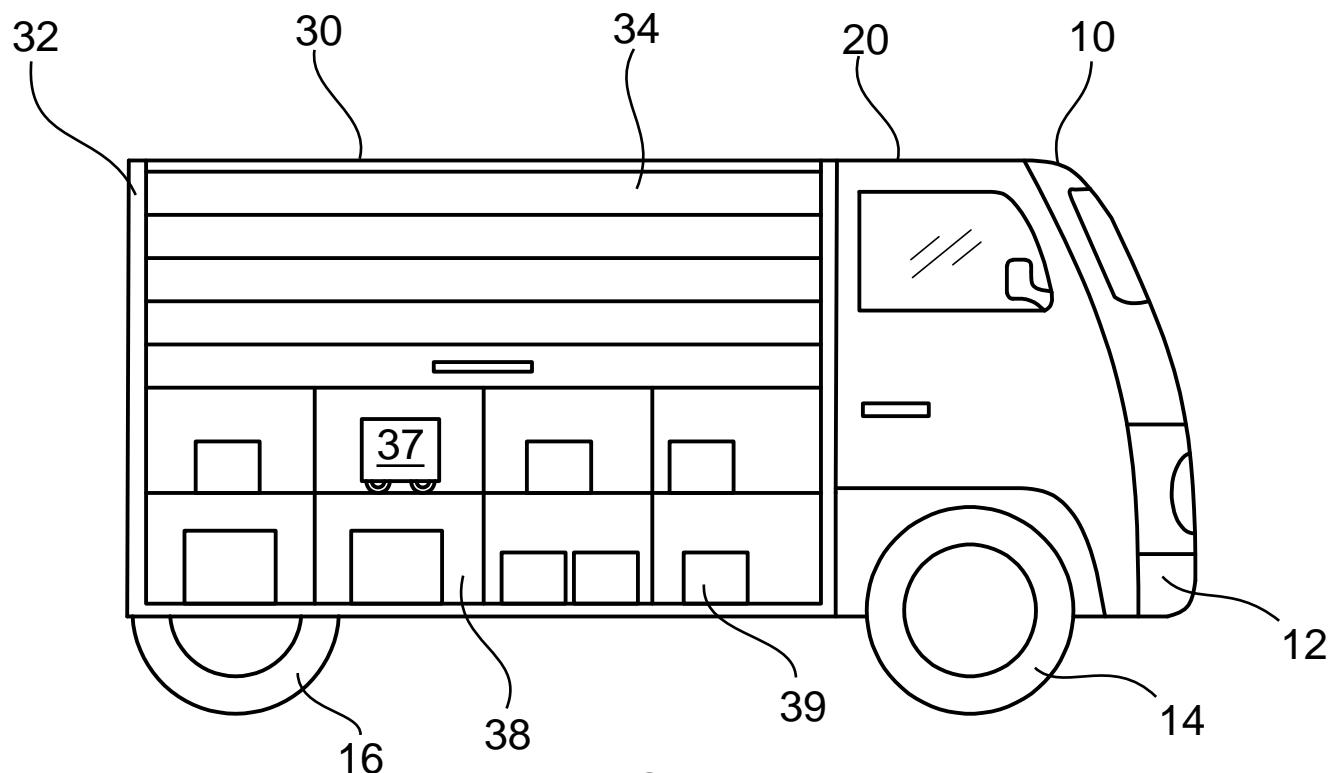
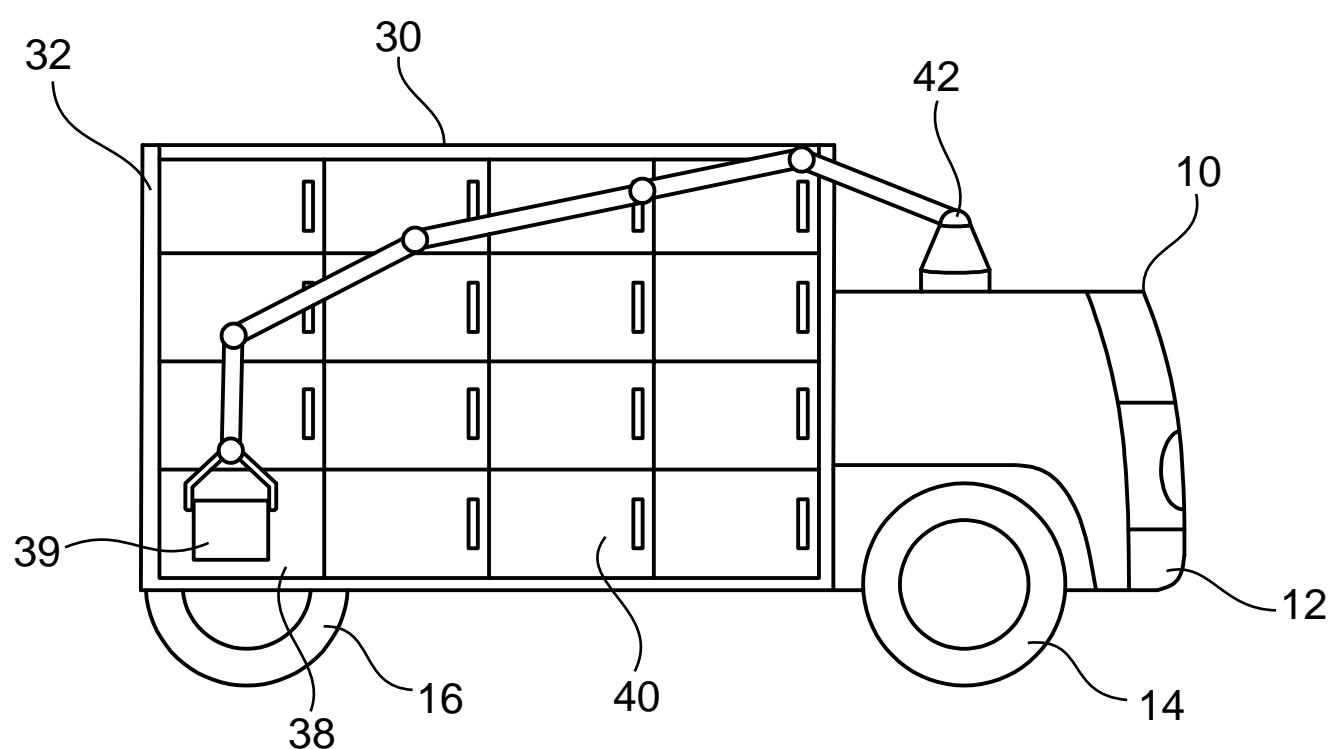
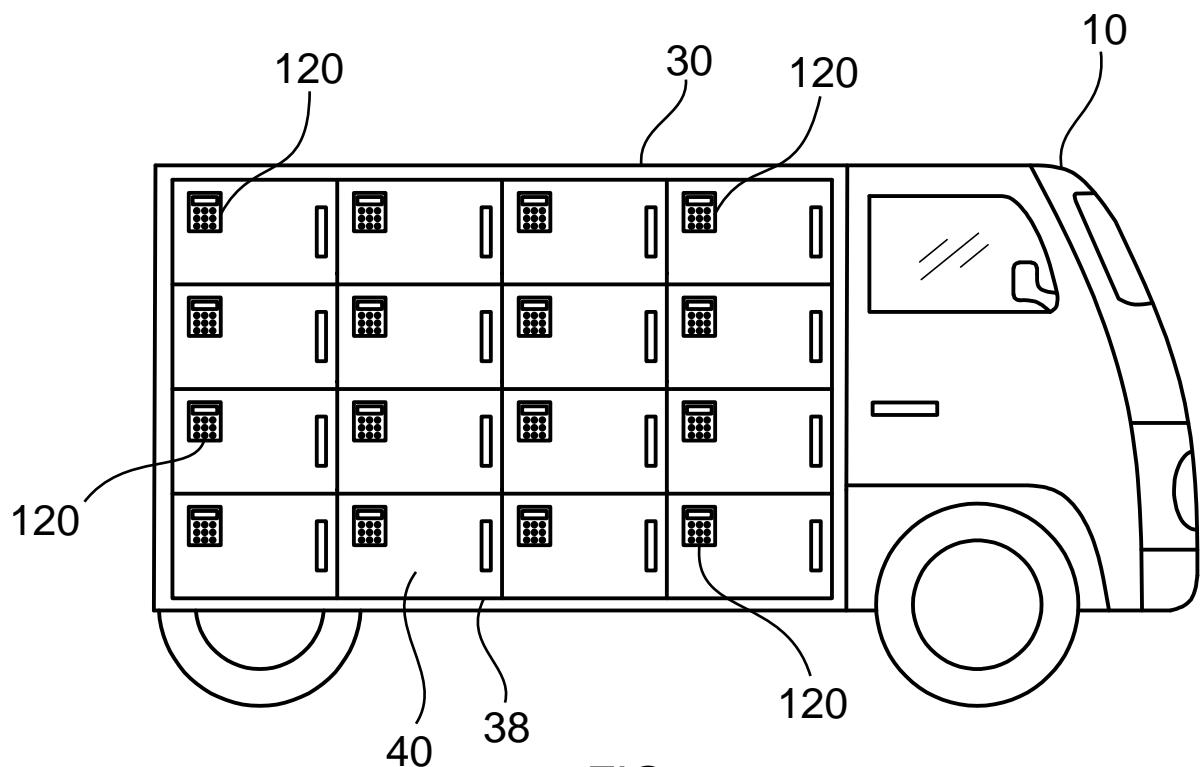


FIG. 7





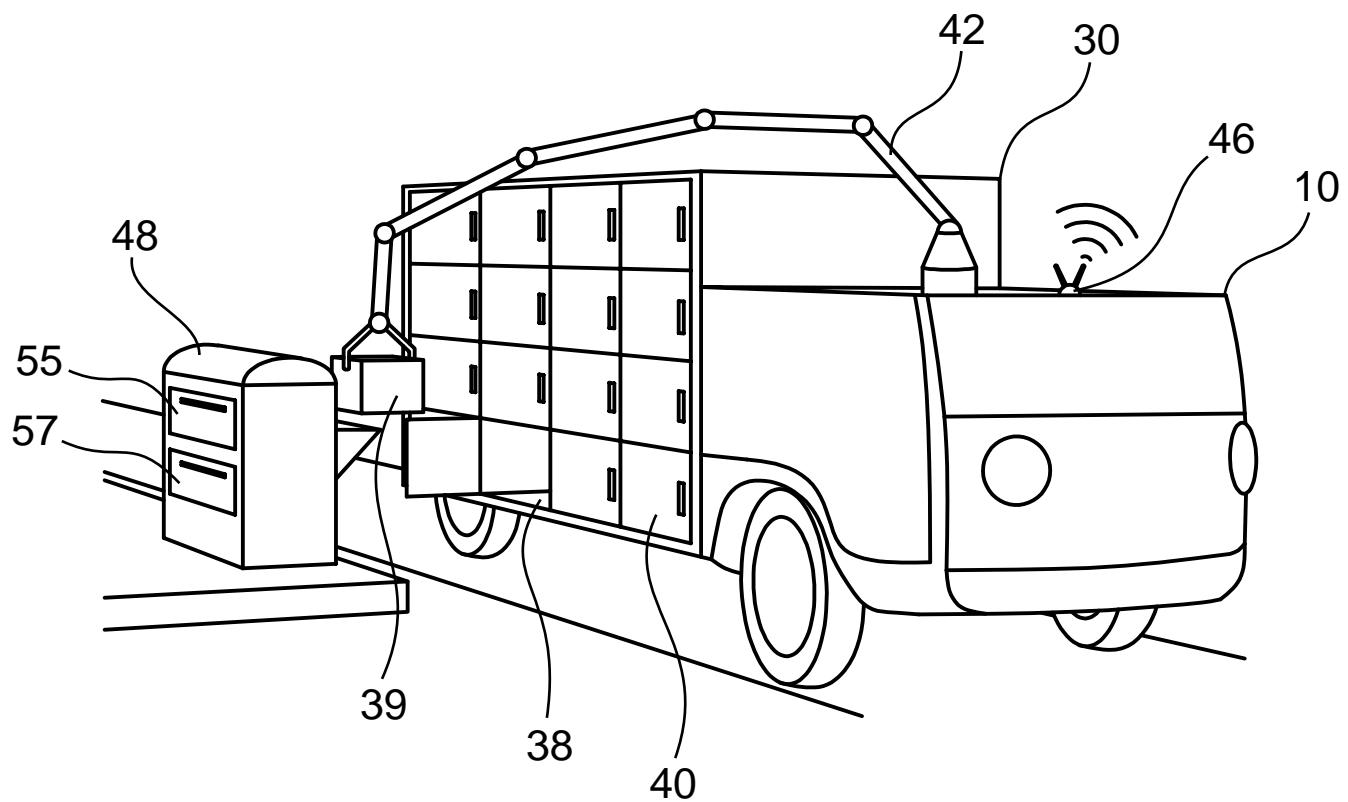


FIG. 12

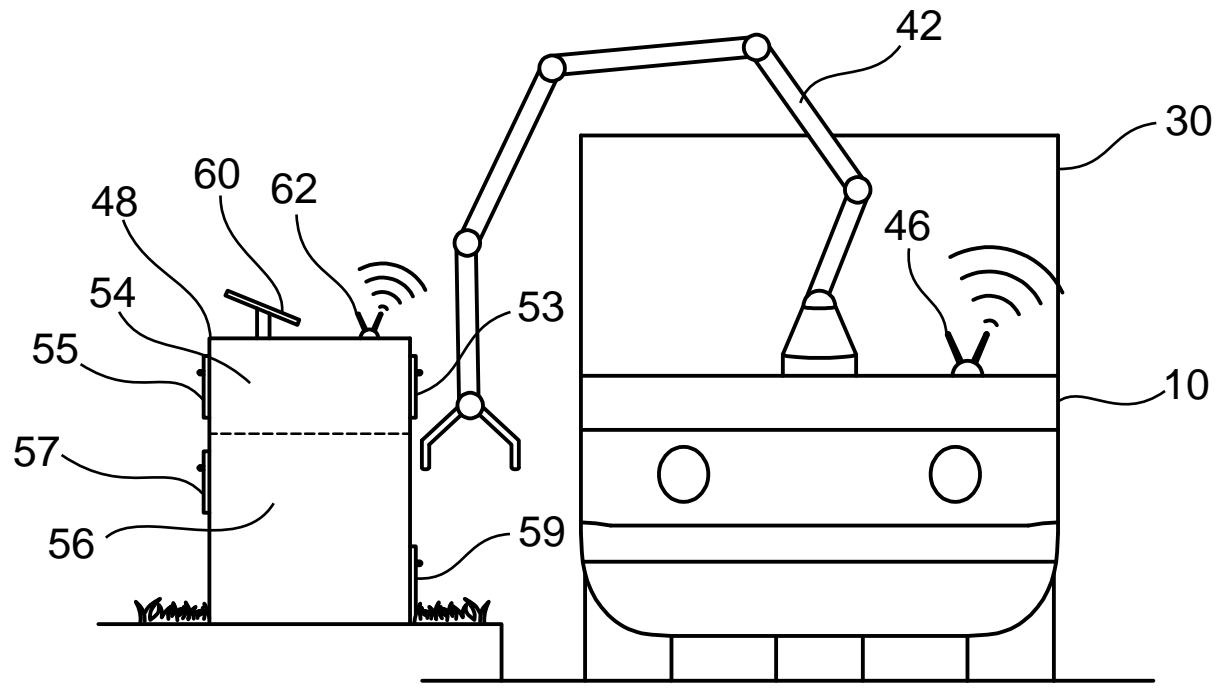


FIG. 13

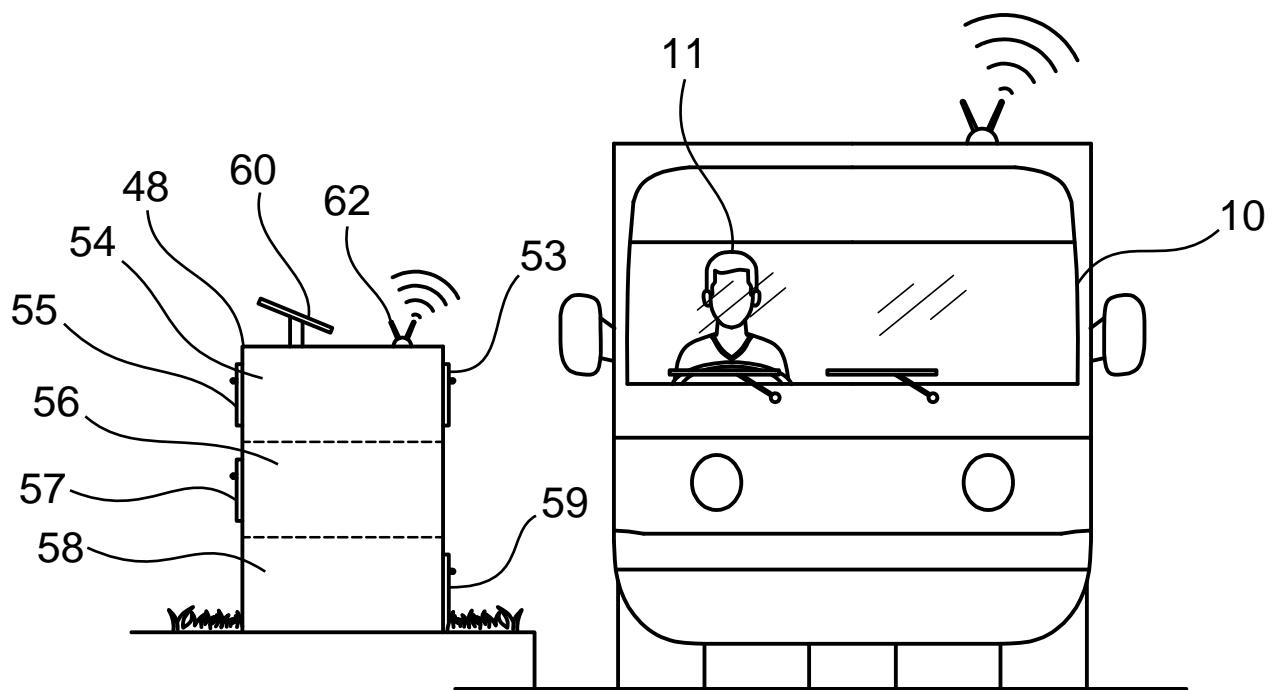


FIG. 14

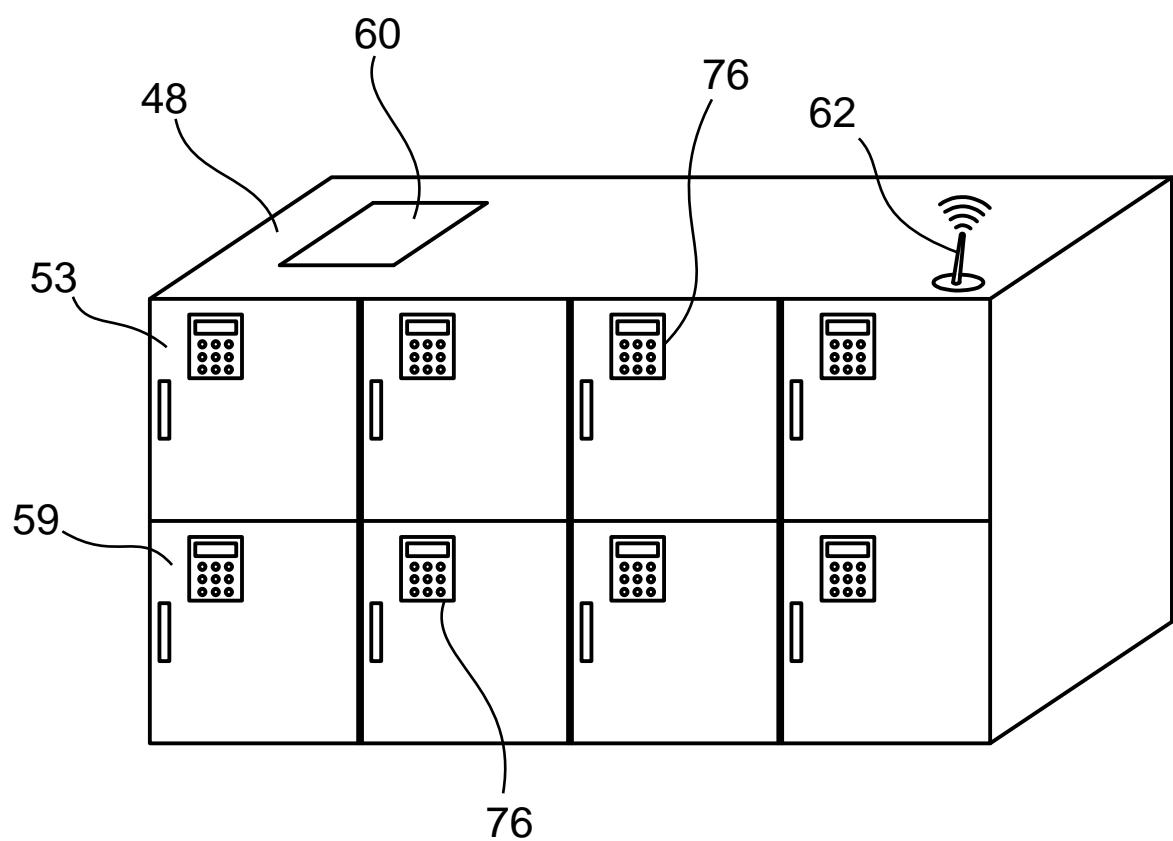


FIG. 15

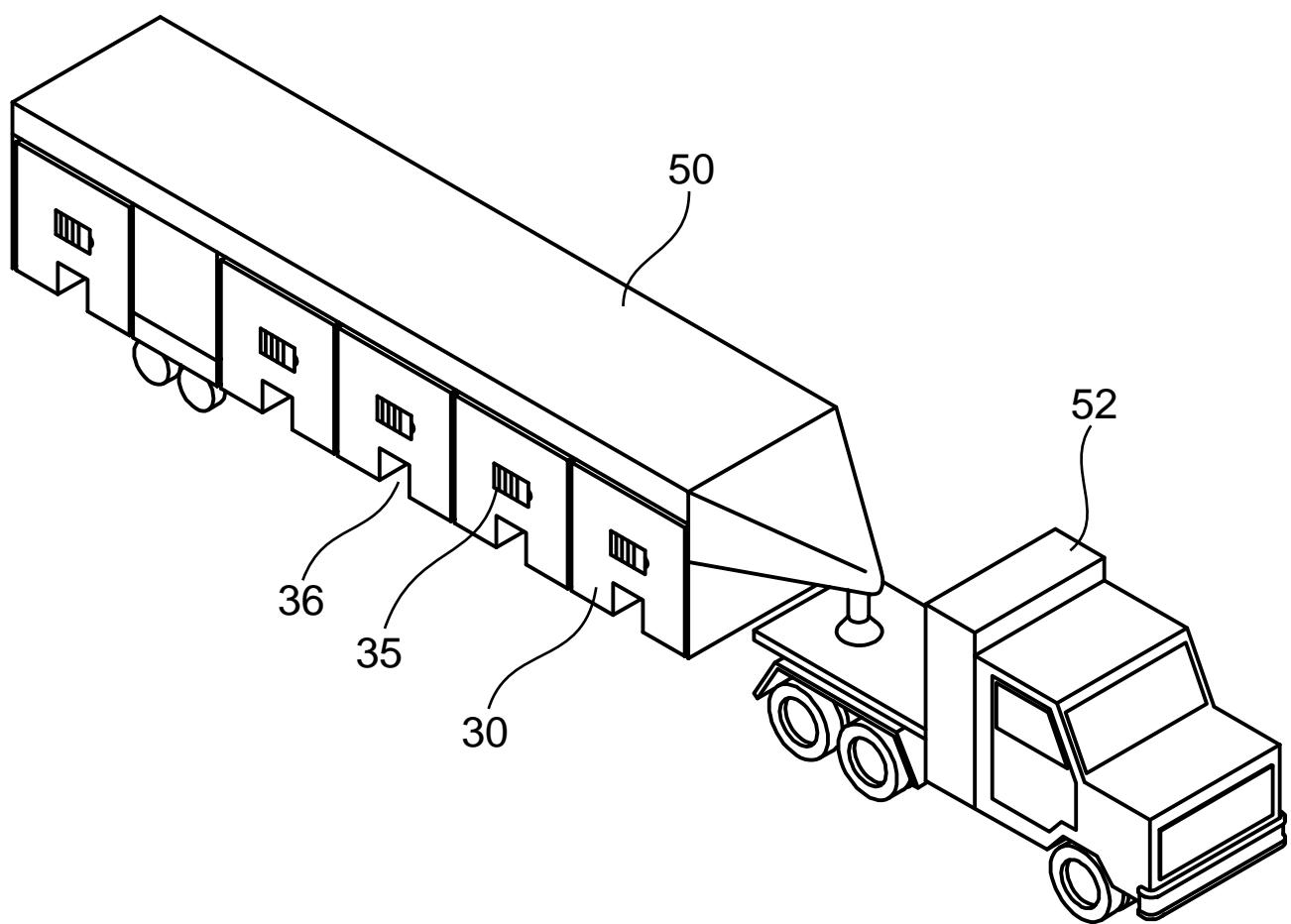


FIG. 16

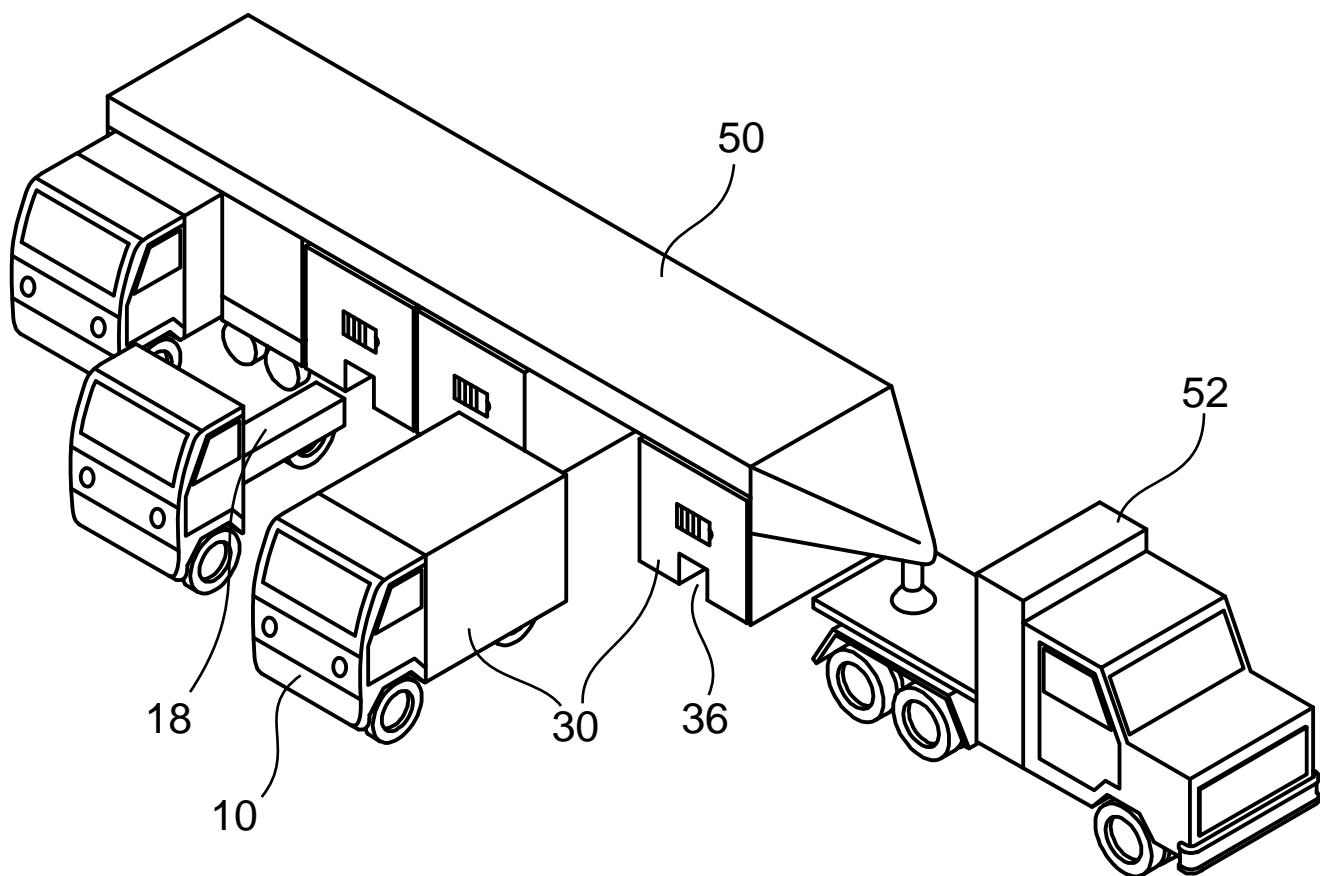


FIG. 17

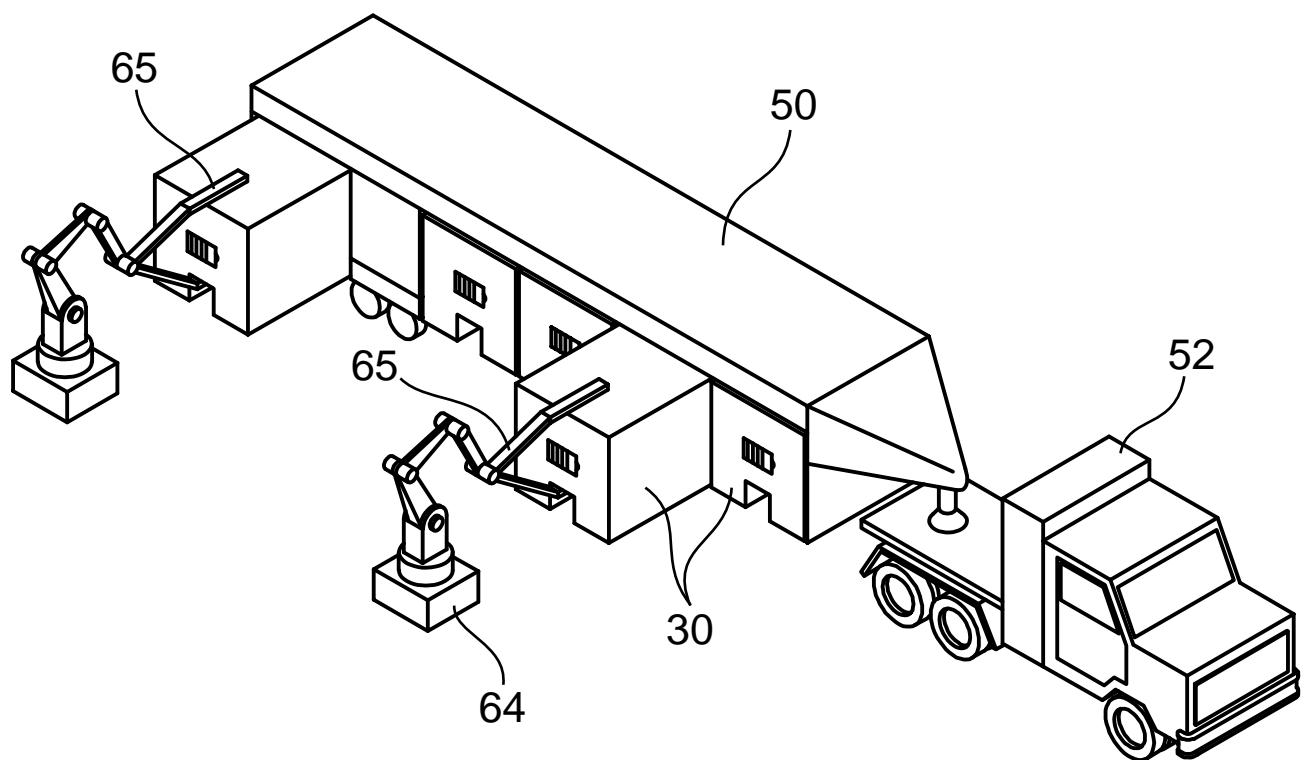


FIG. 18

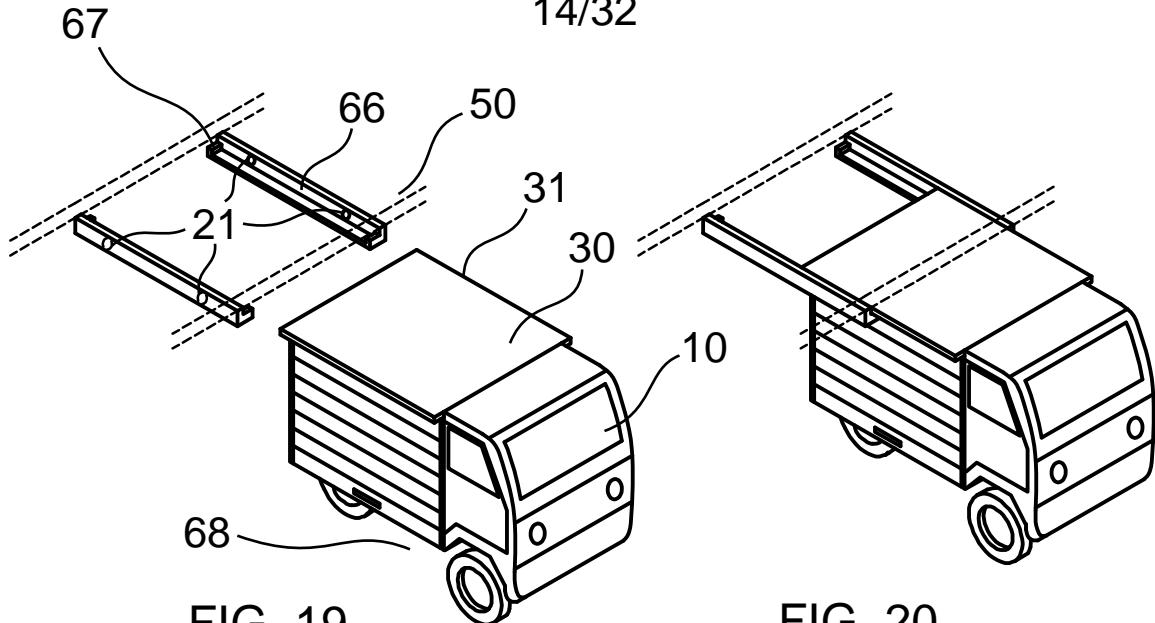


FIG. 19

FIG. 20

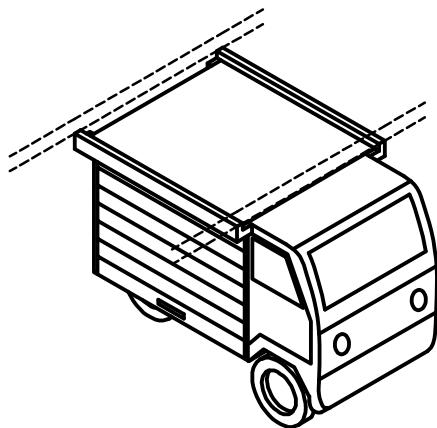
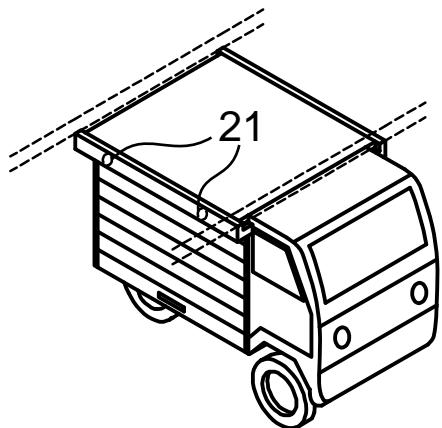


FIG. 21

FIG. 22

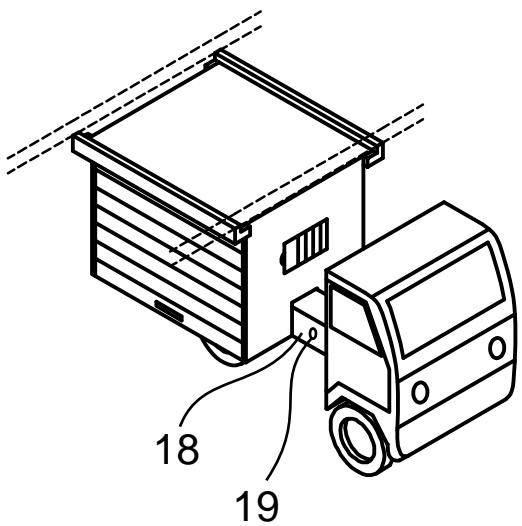


FIG. 23

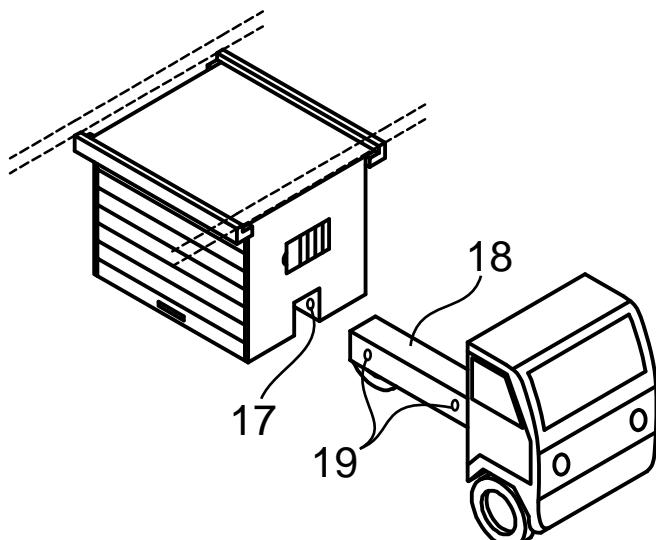
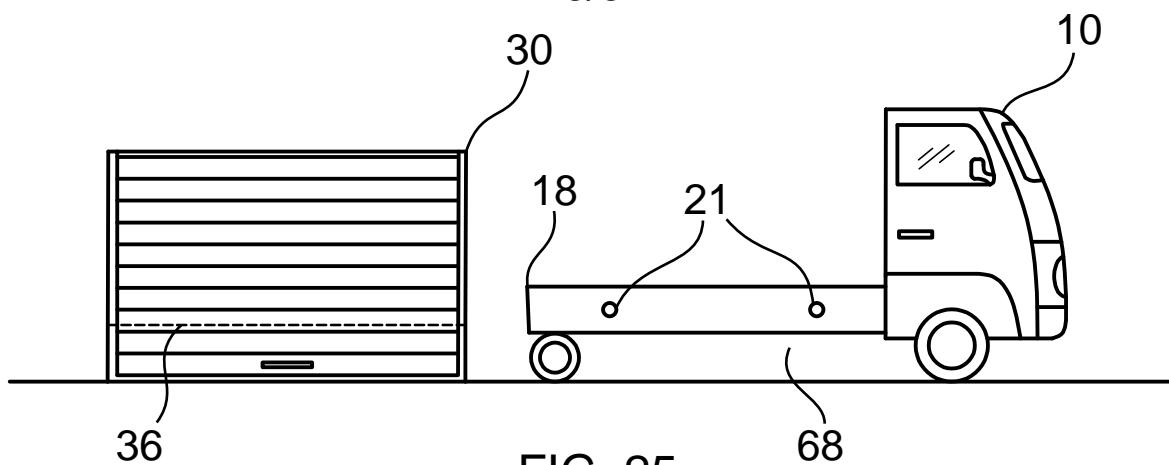
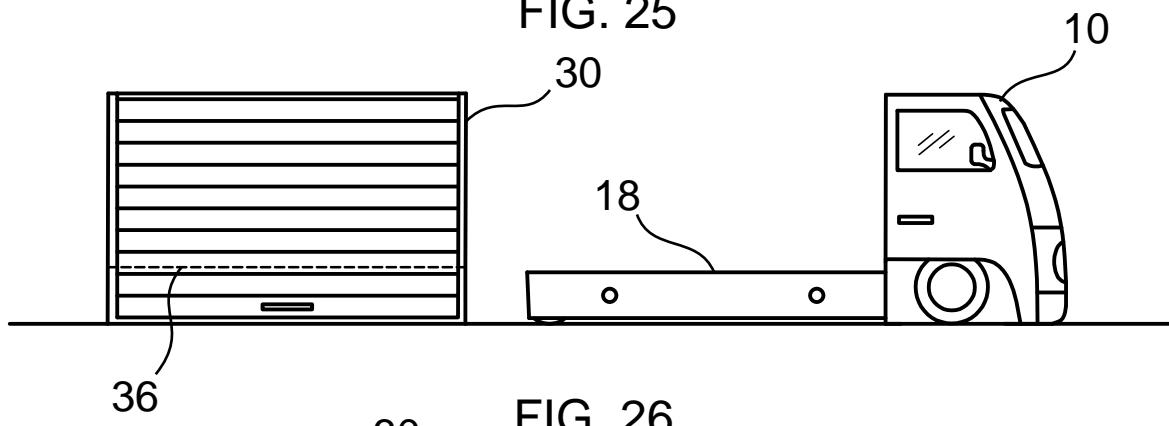


FIG. 24

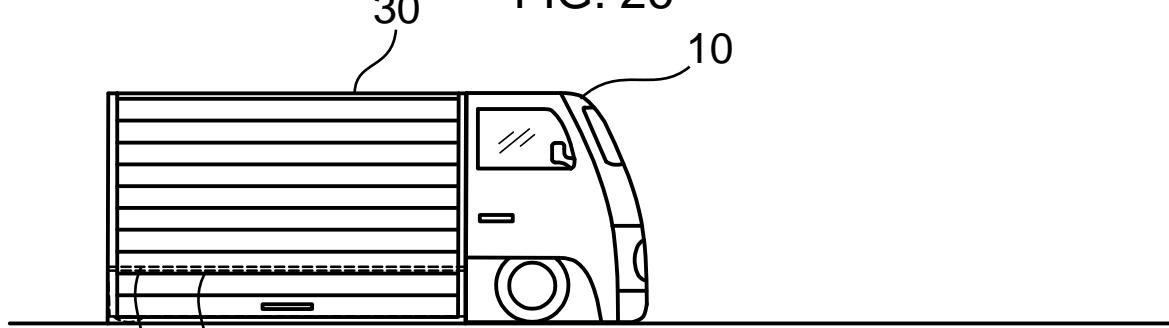
15/32



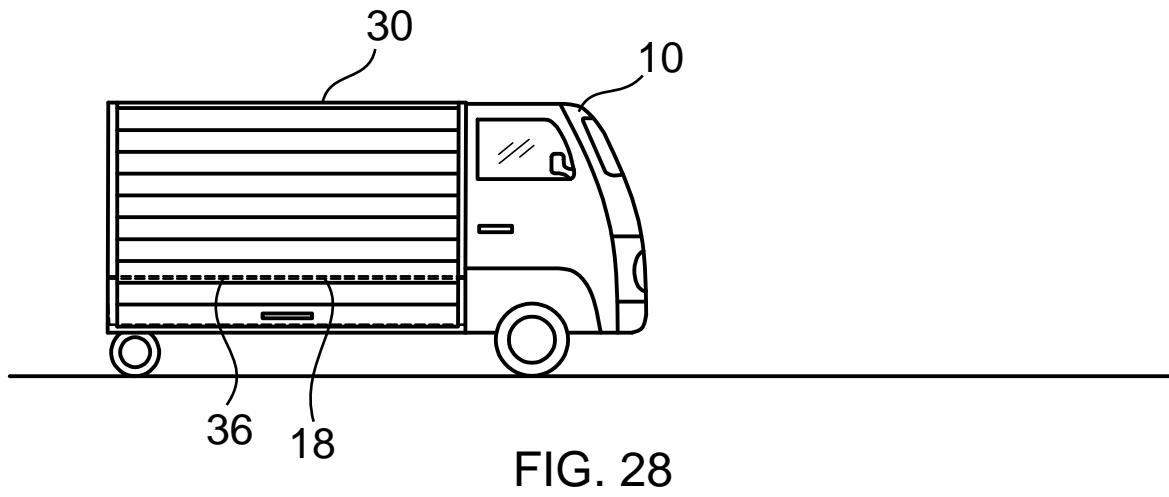
10



10



10



10

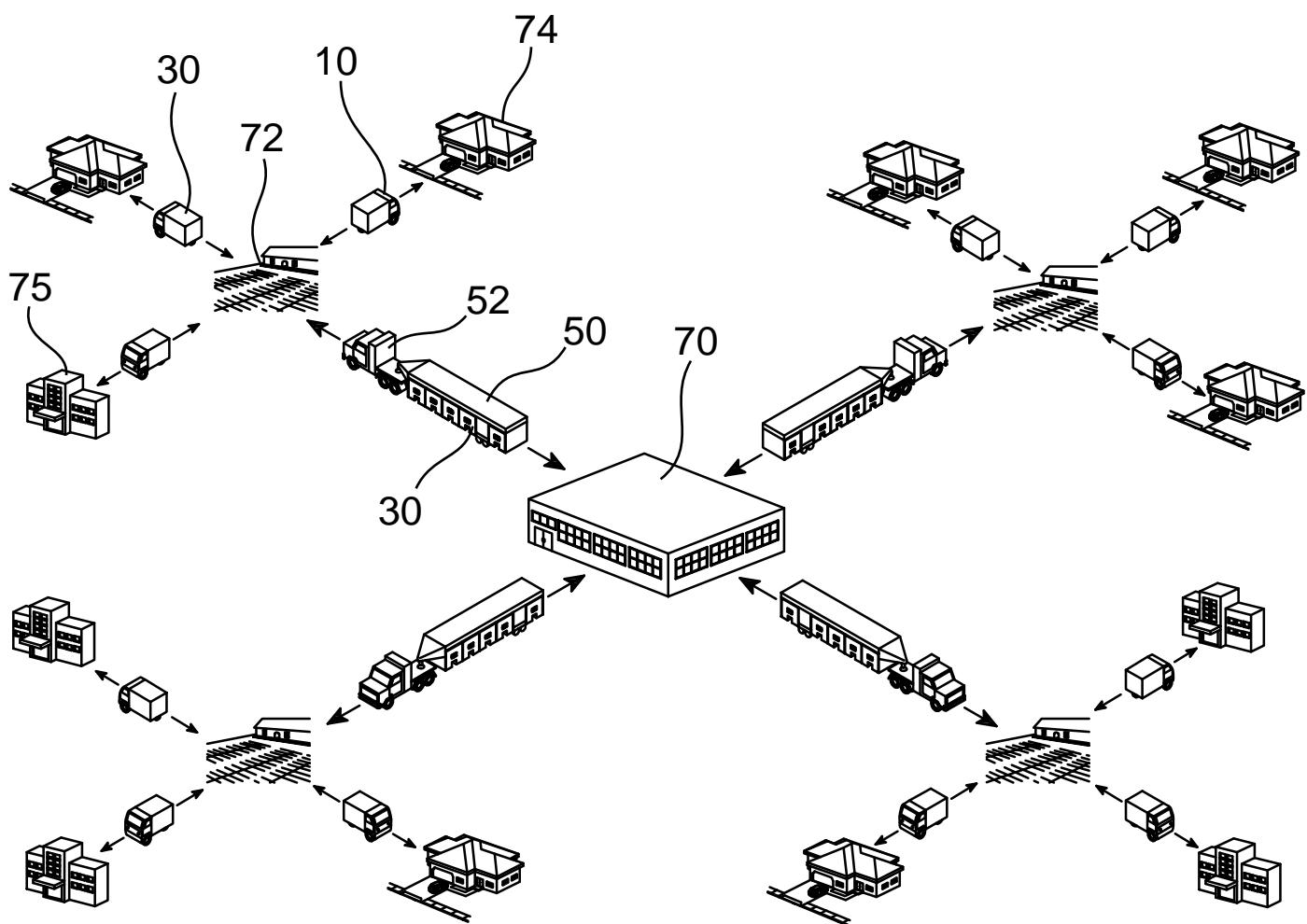


FIG. 29

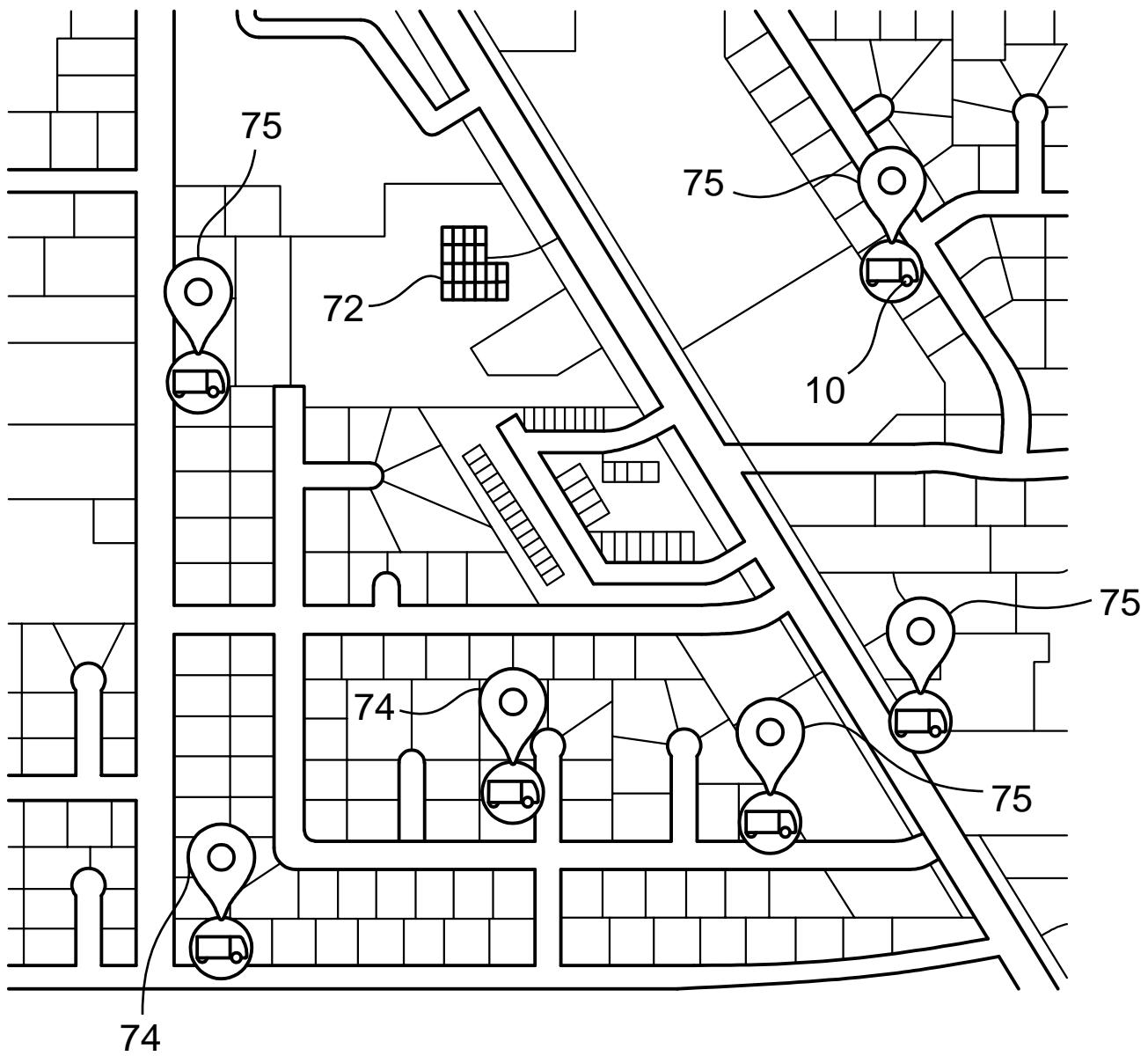


FIG. 30

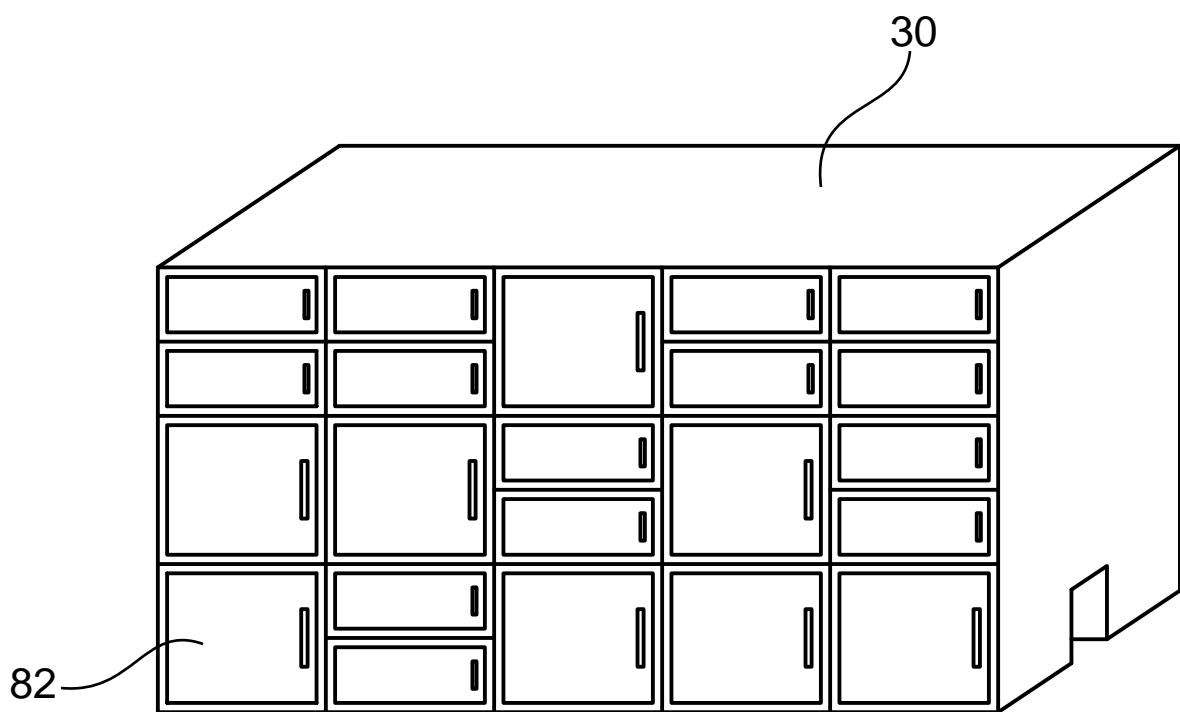


FIG. 31

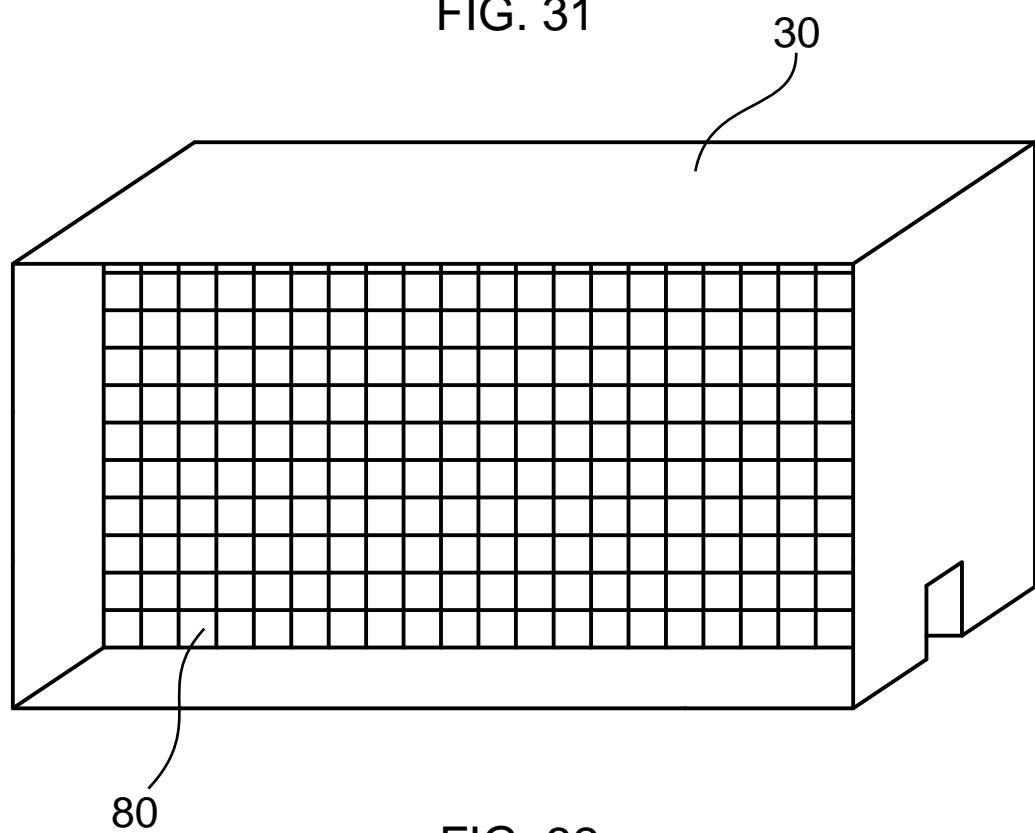


FIG. 32

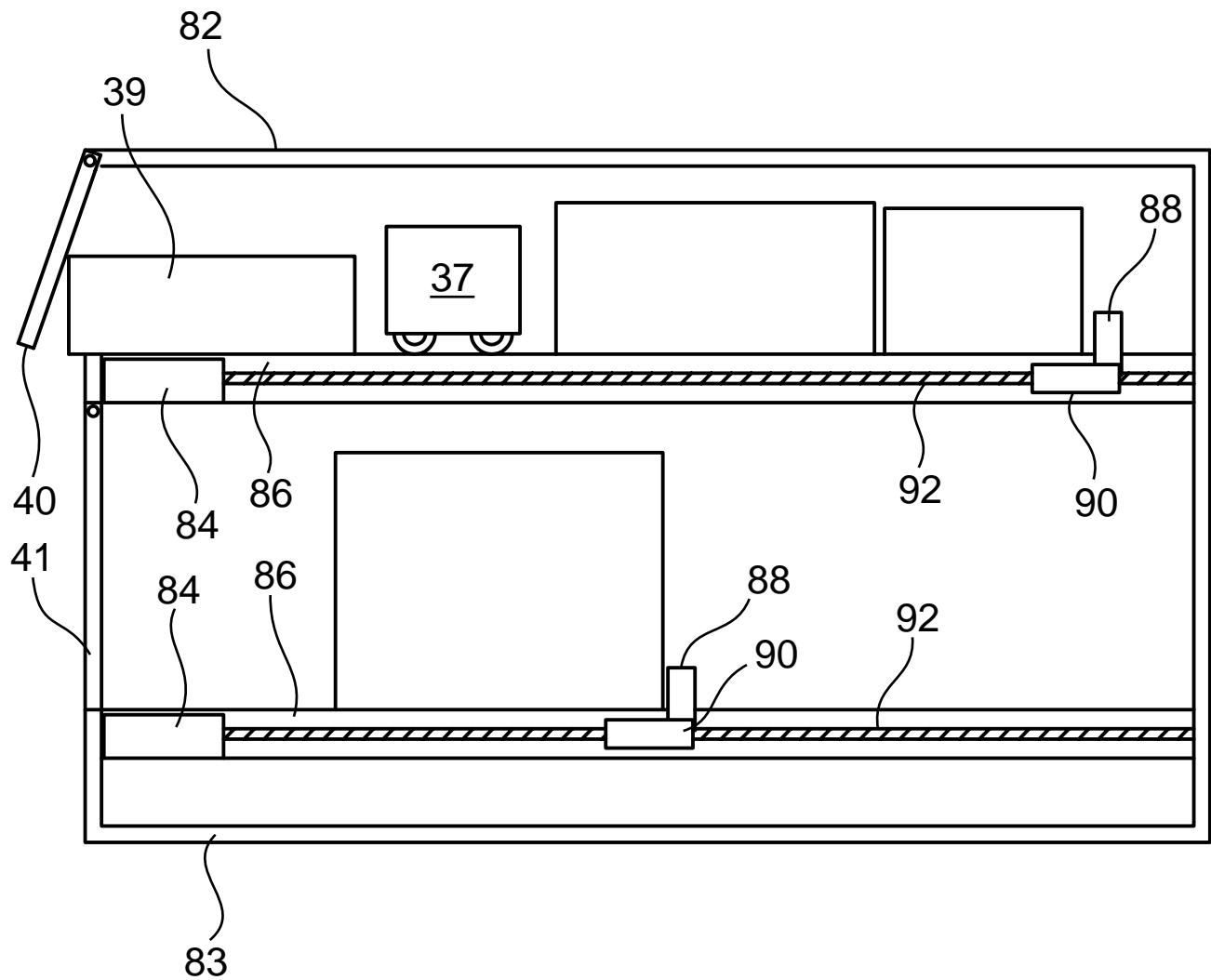


FIG. 33

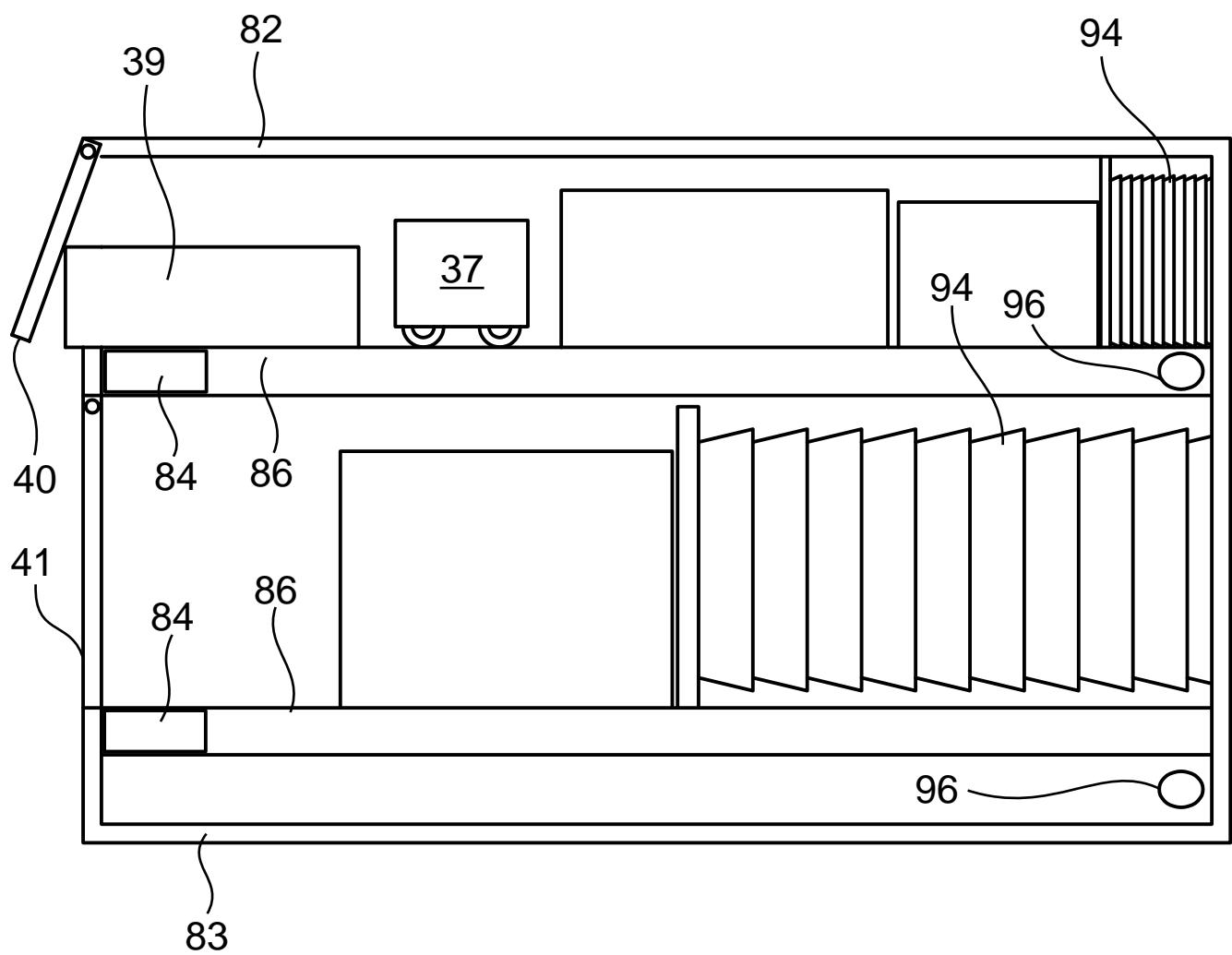


FIG. 34

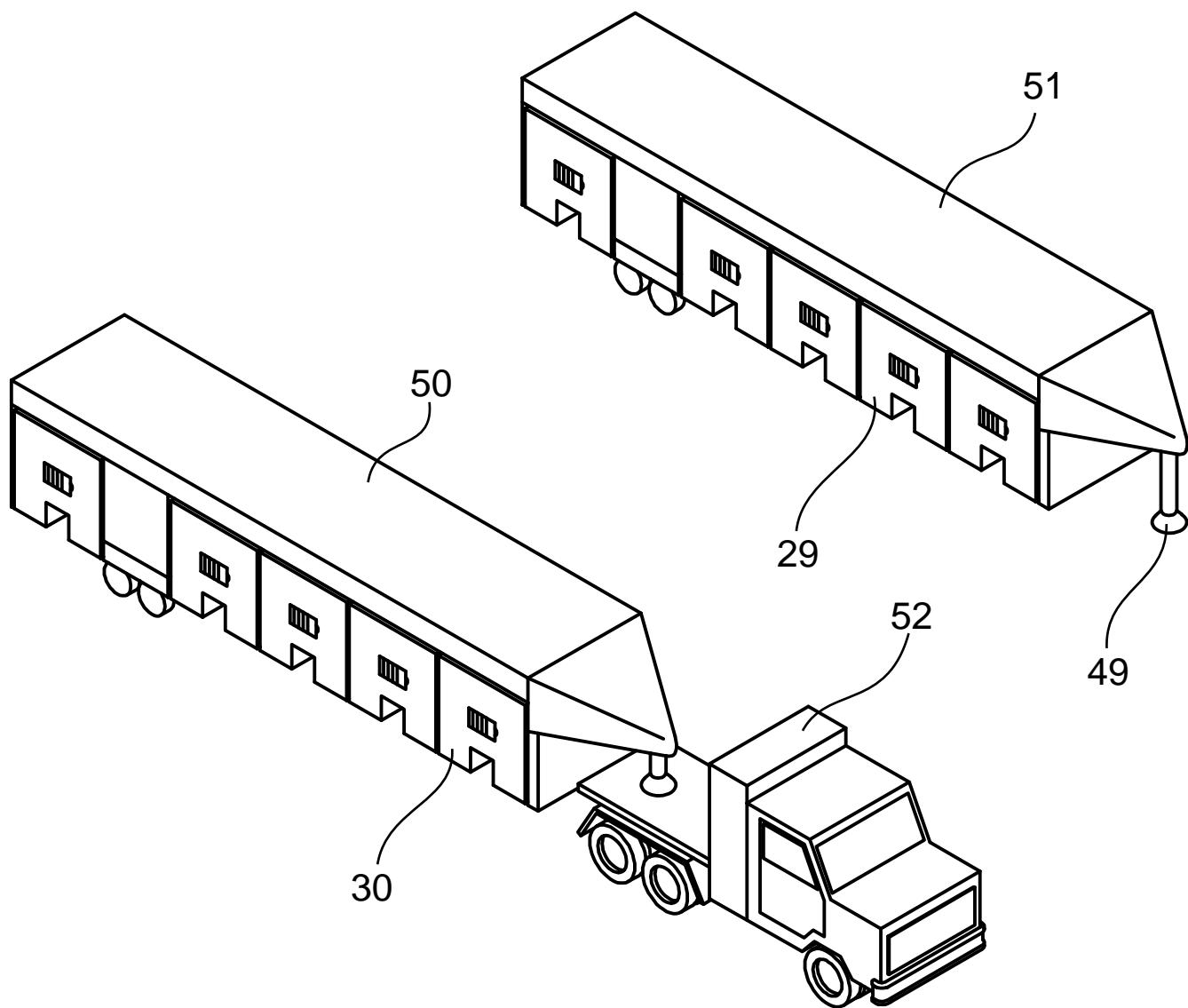


FIG. 35

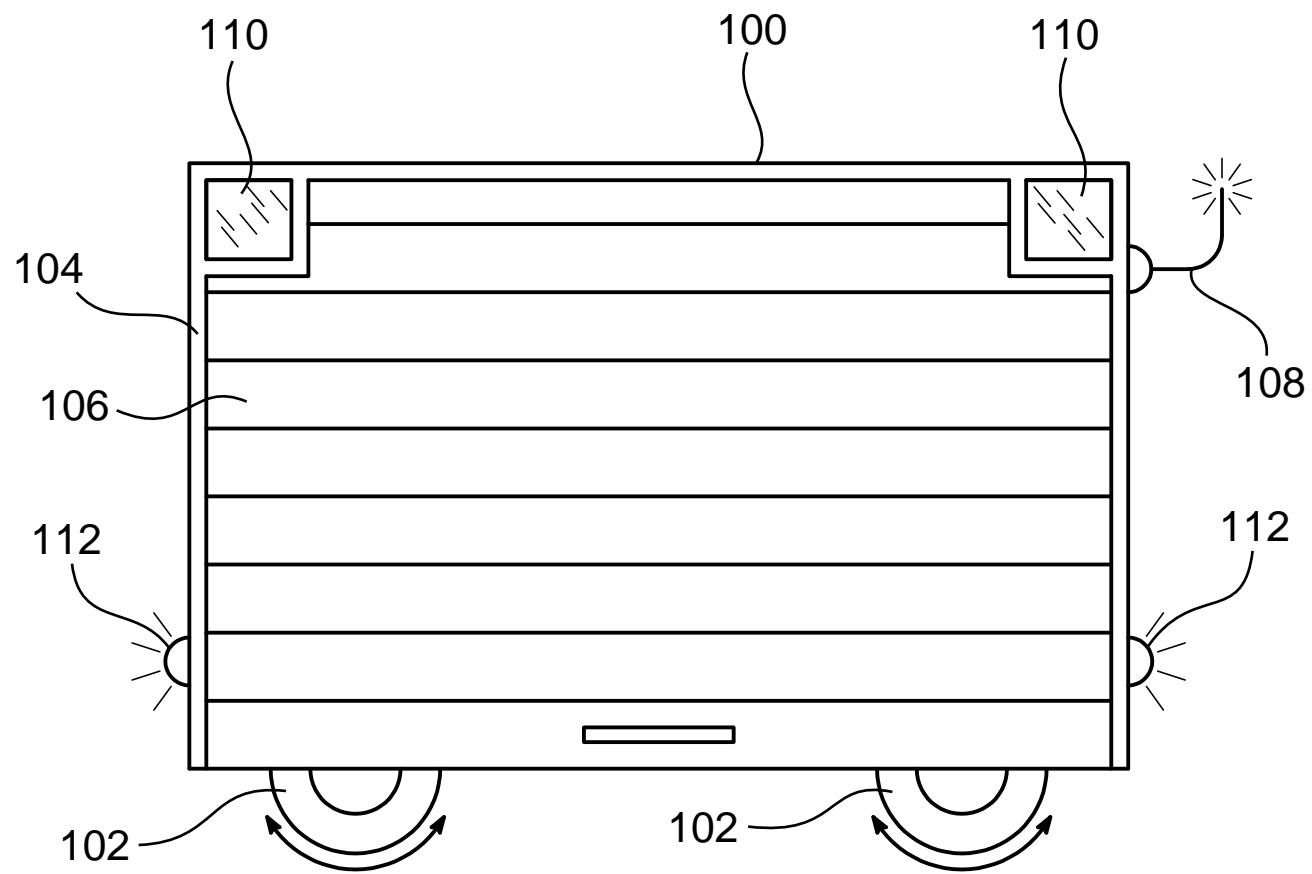


FIG. 36

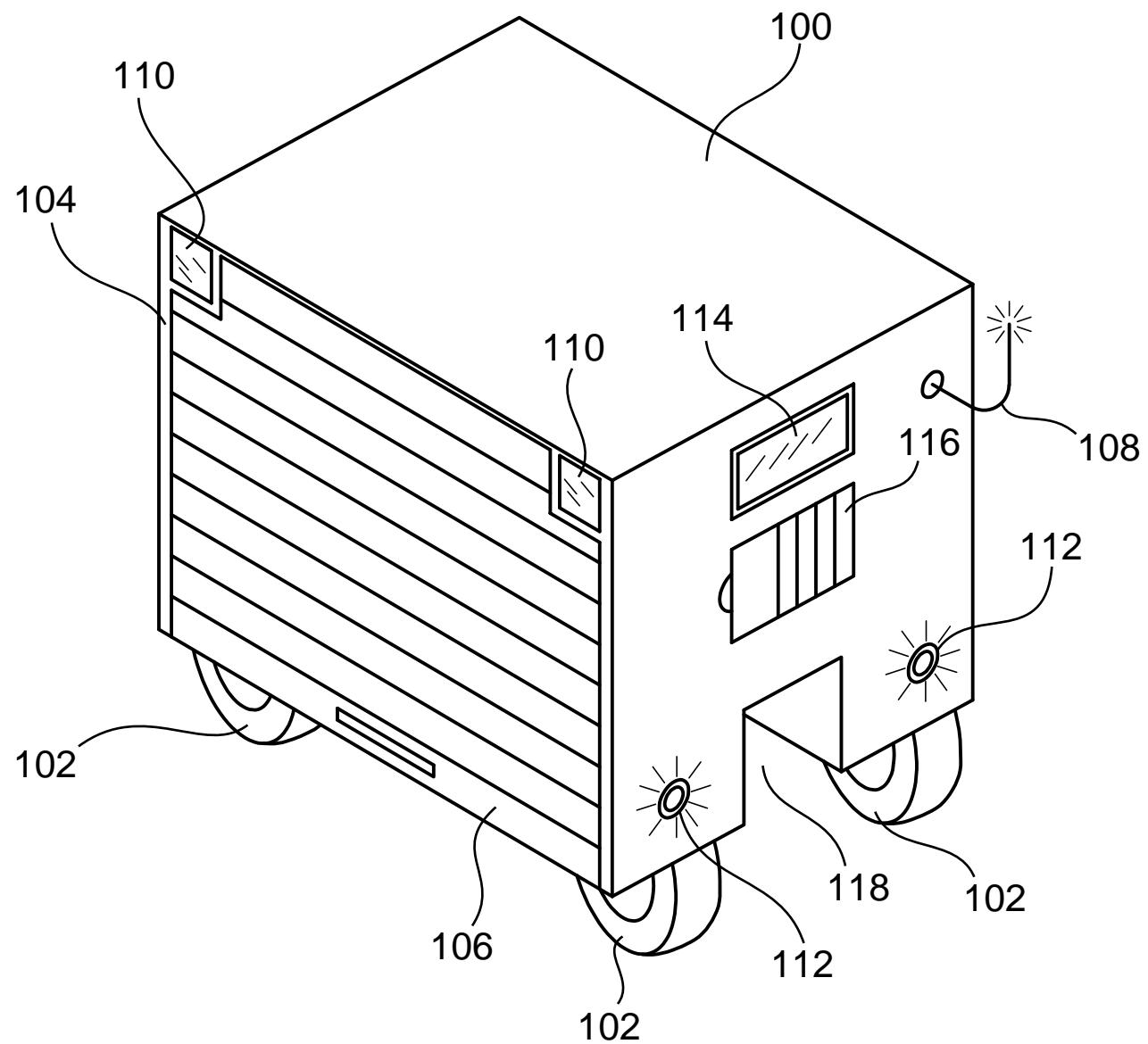


FIG. 37

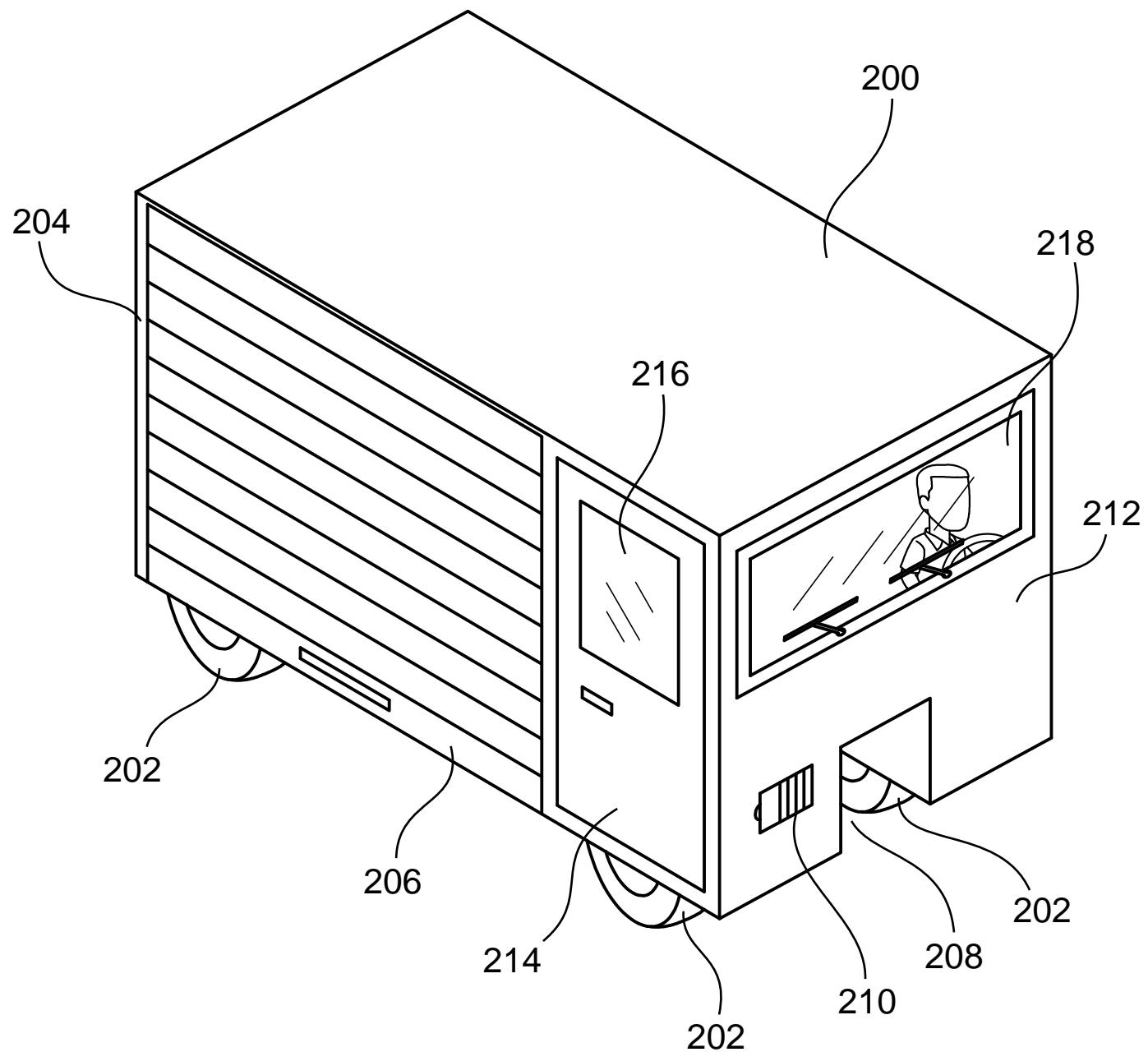


FIG. 38

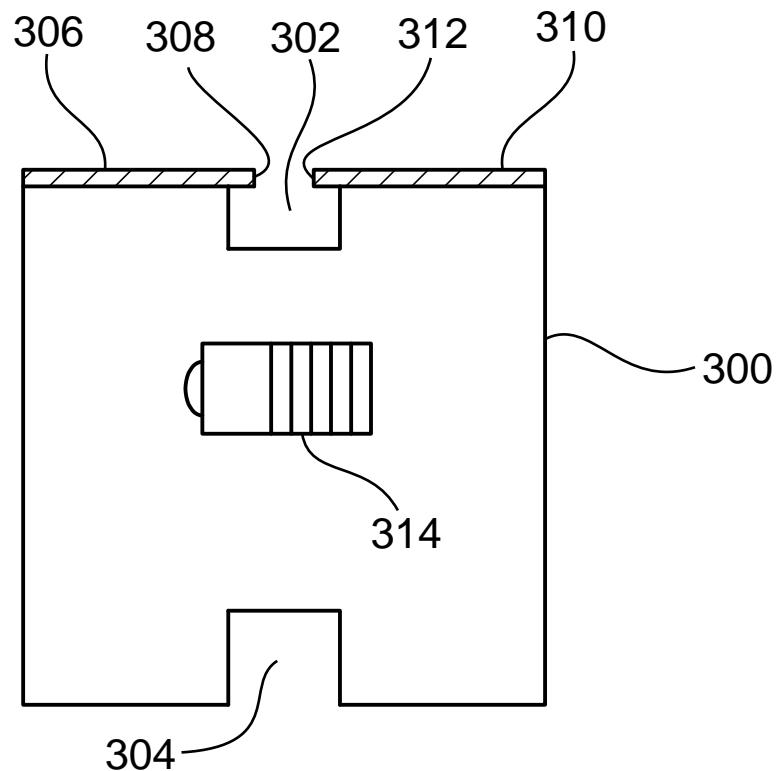


FIG. 39

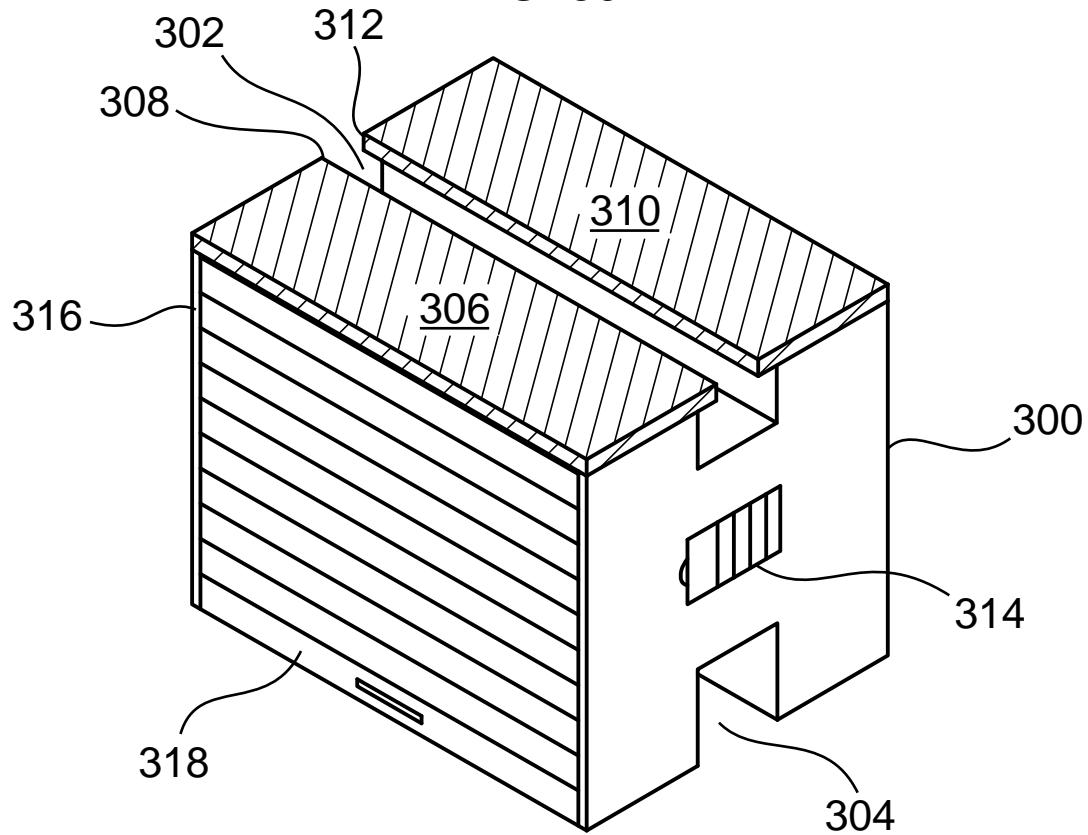


FIG. 40

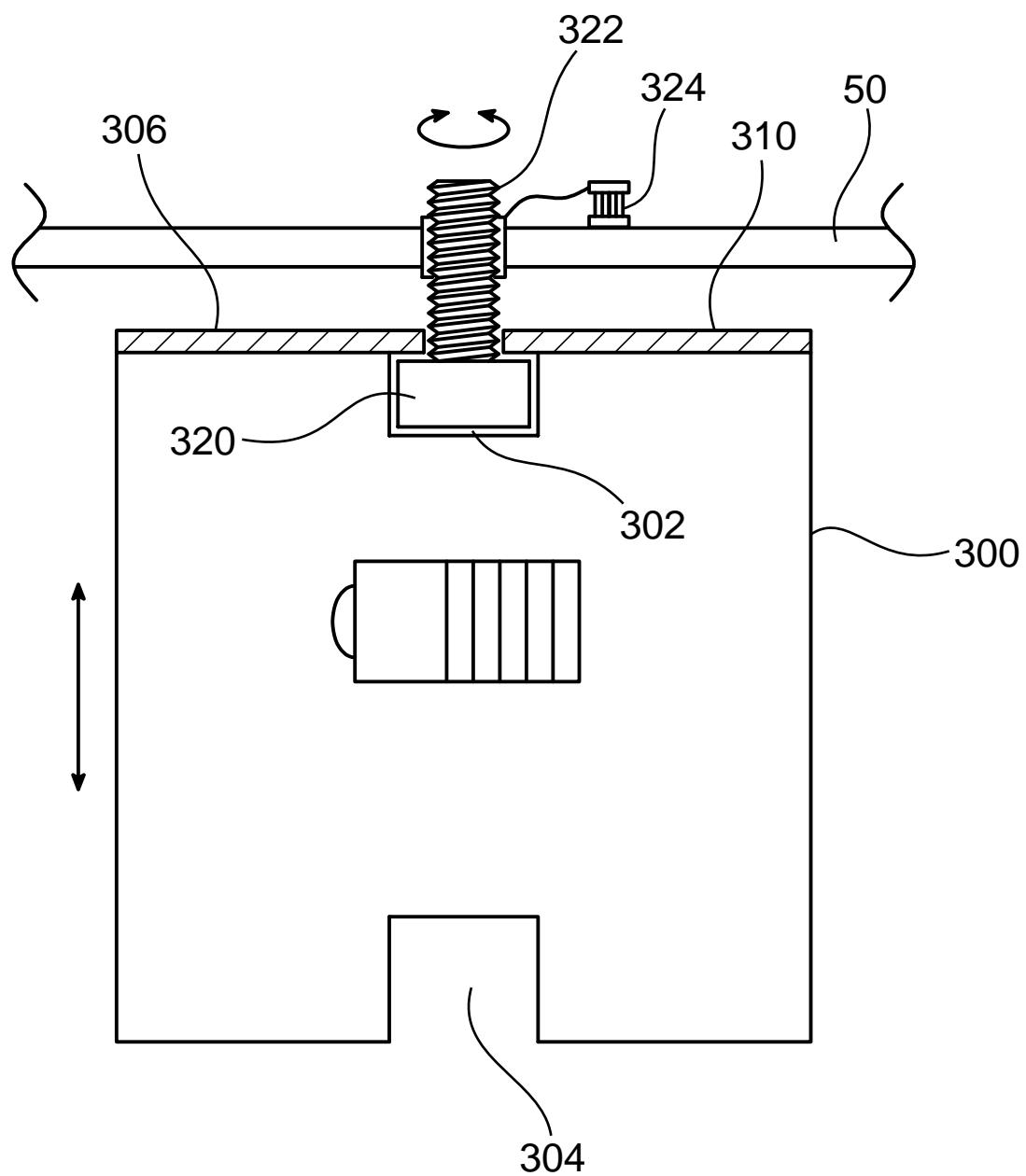


FIG. 41

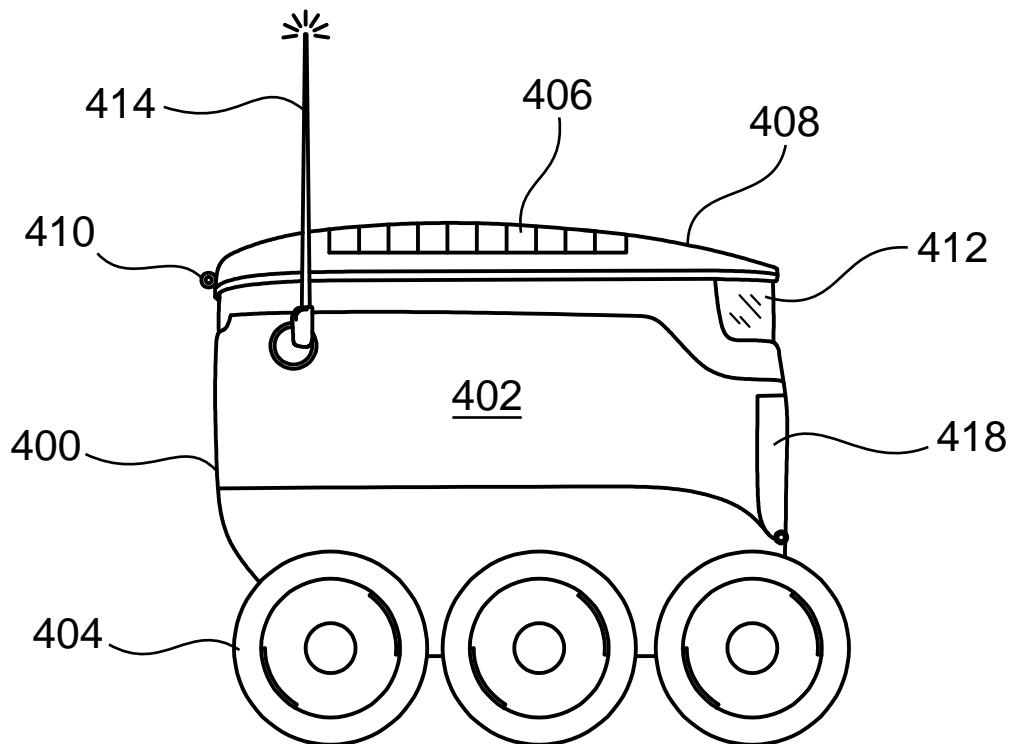


FIG. 42

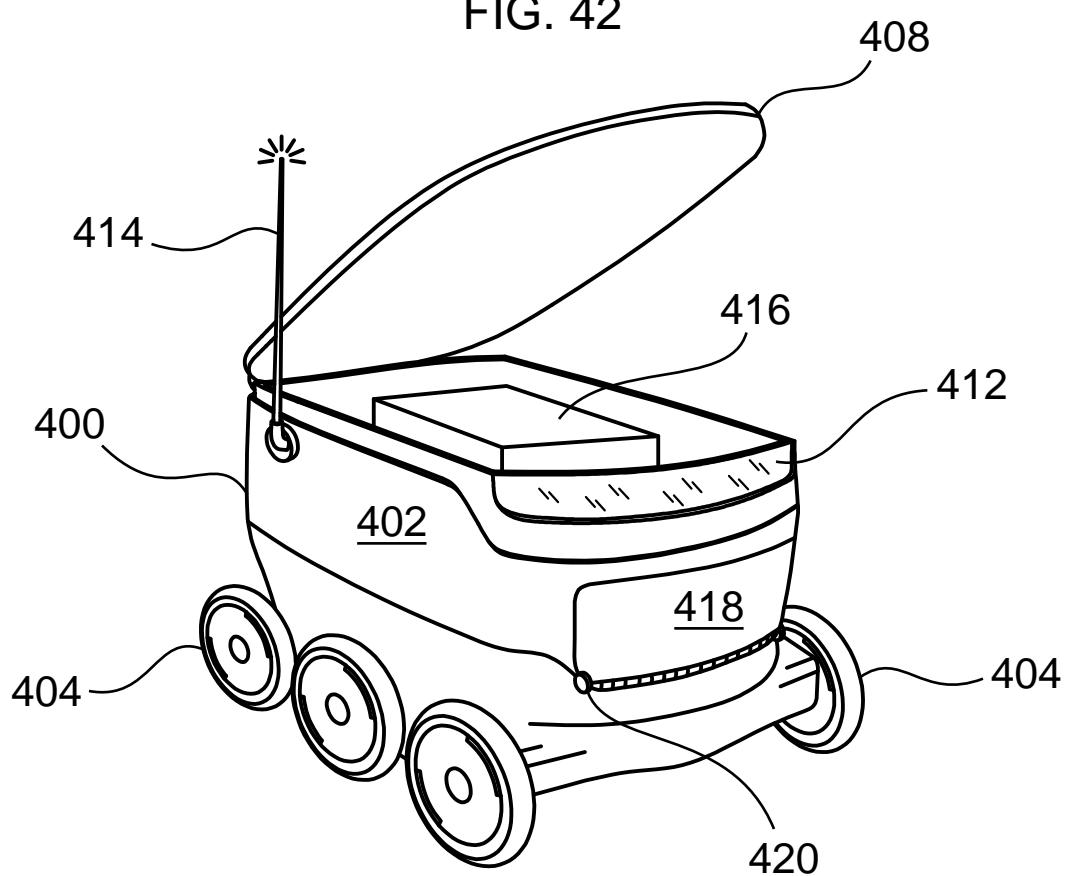


FIG. 43

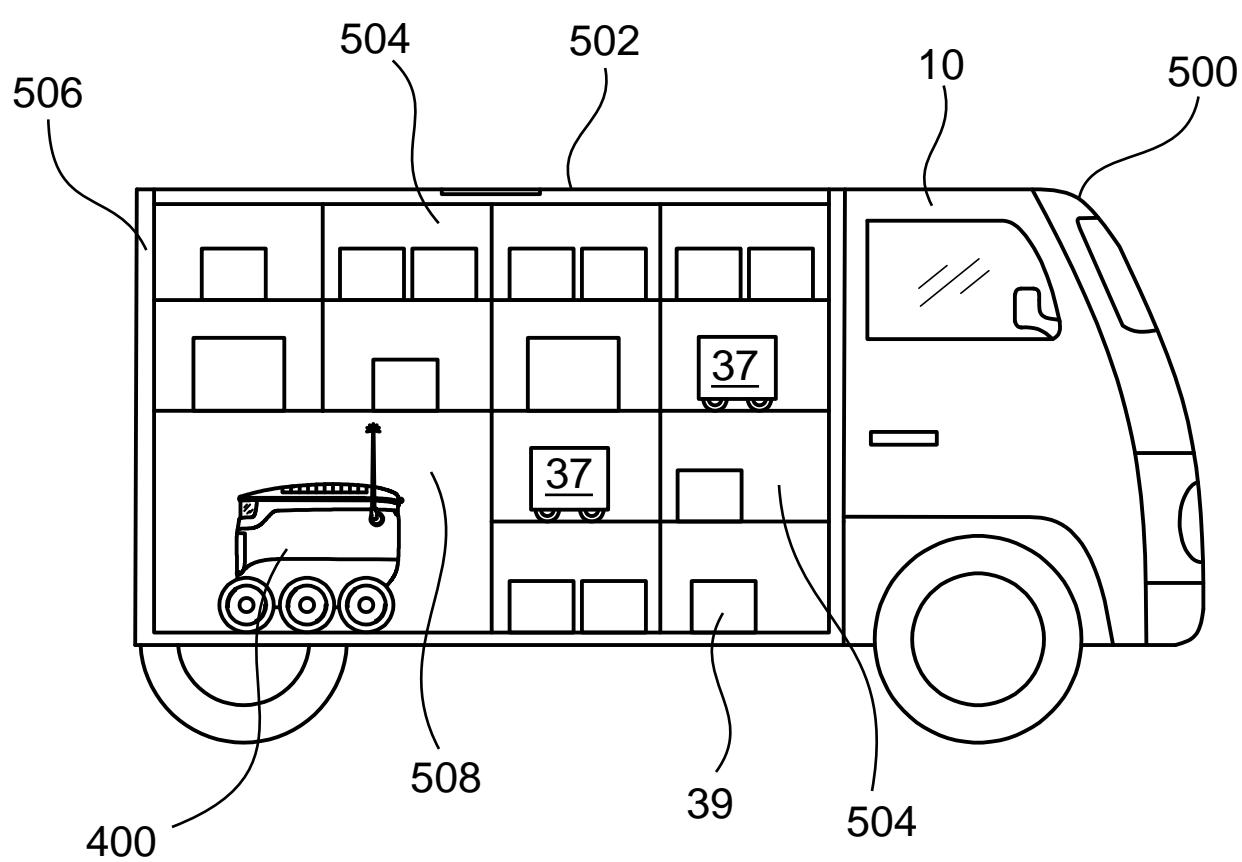


FIG. 44

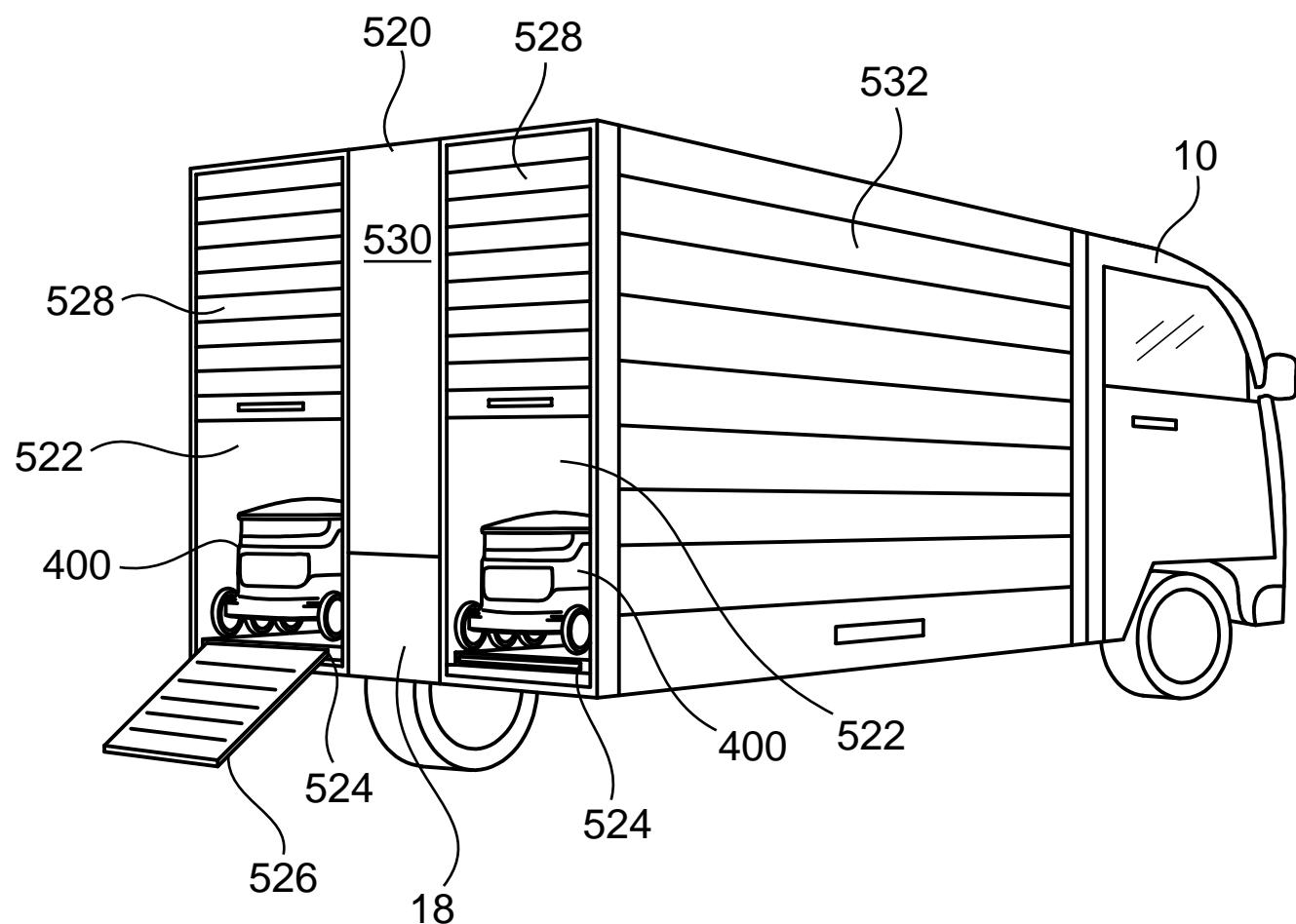


FIG. 45

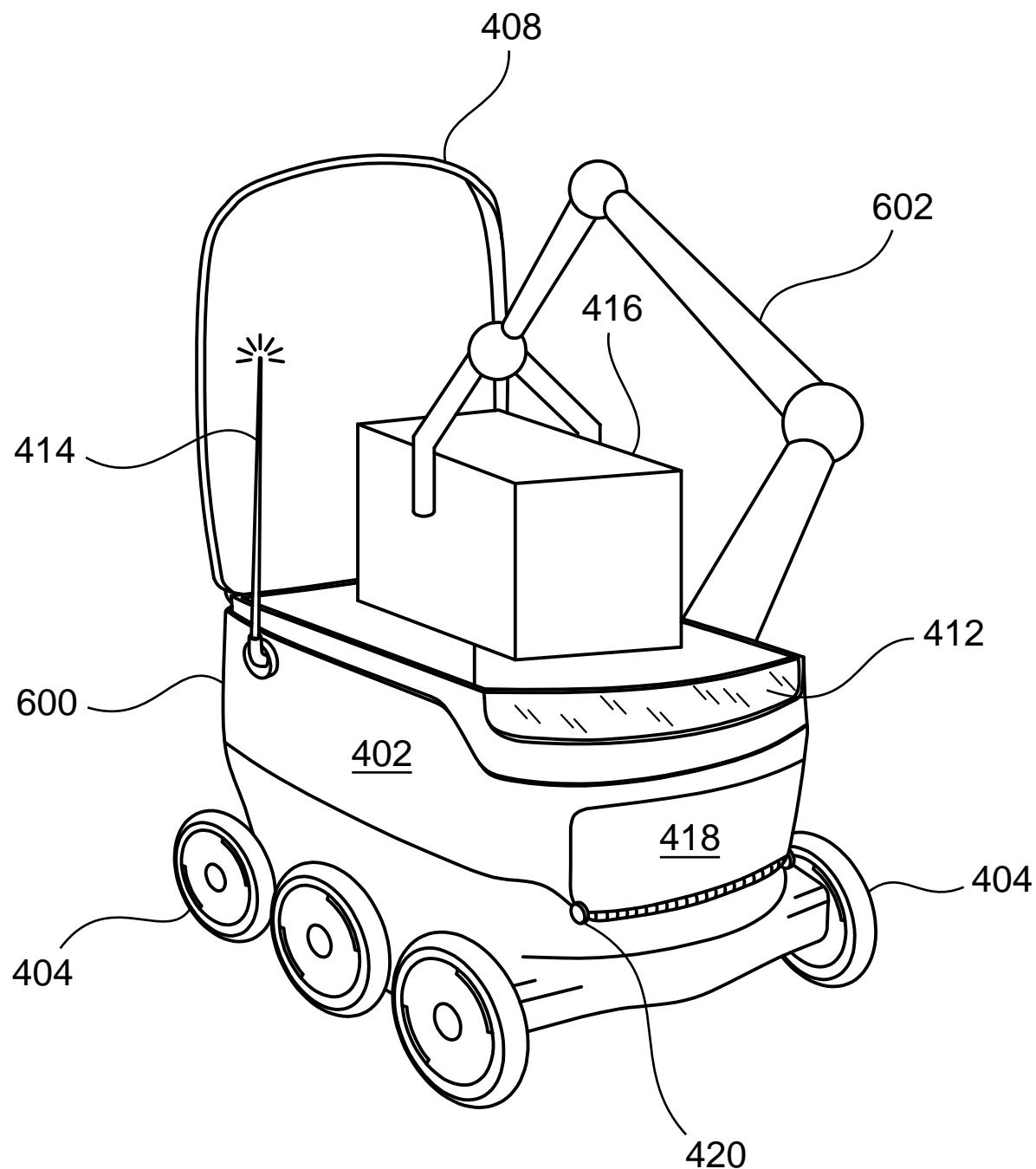


FIG. 46

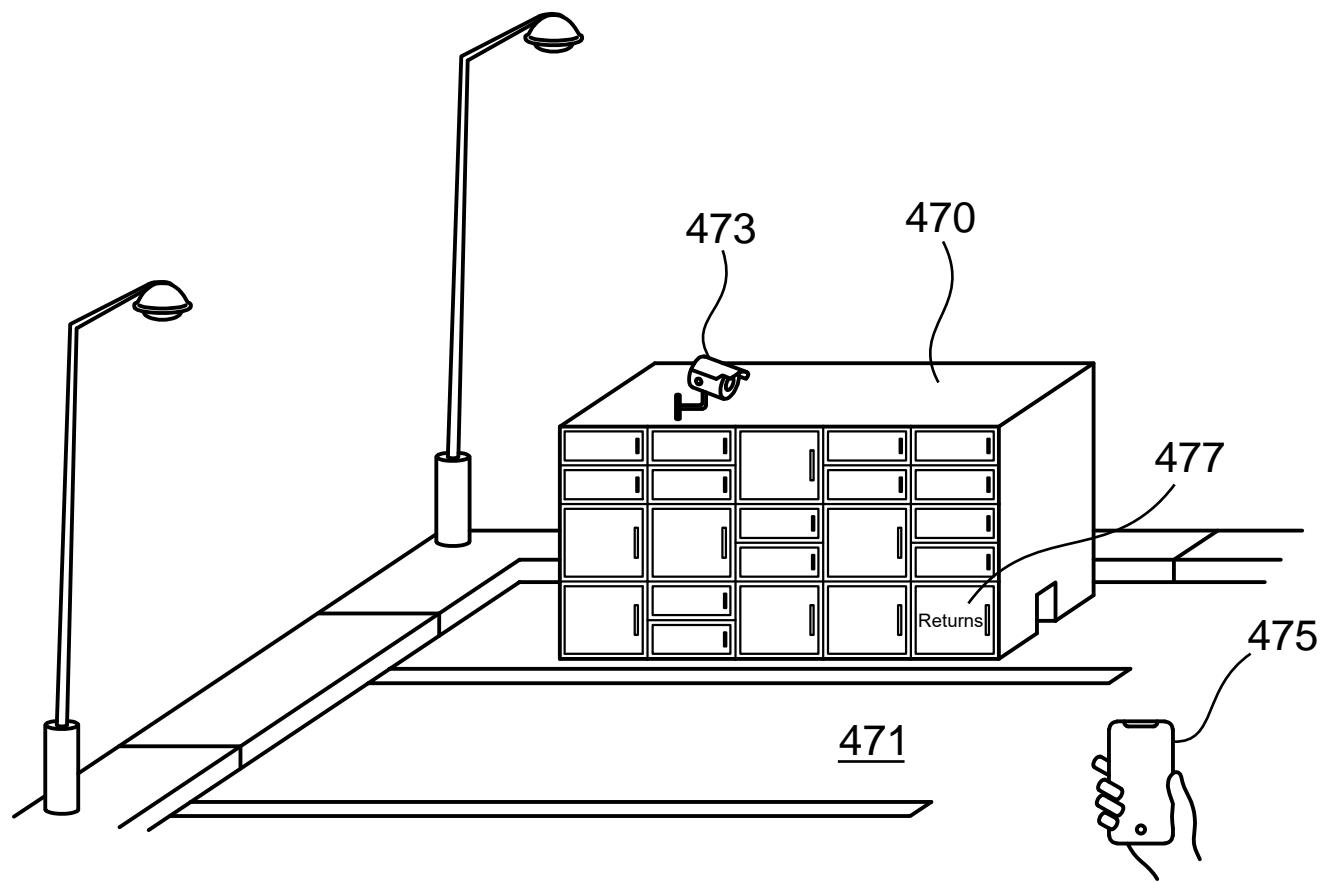


FIG. 47

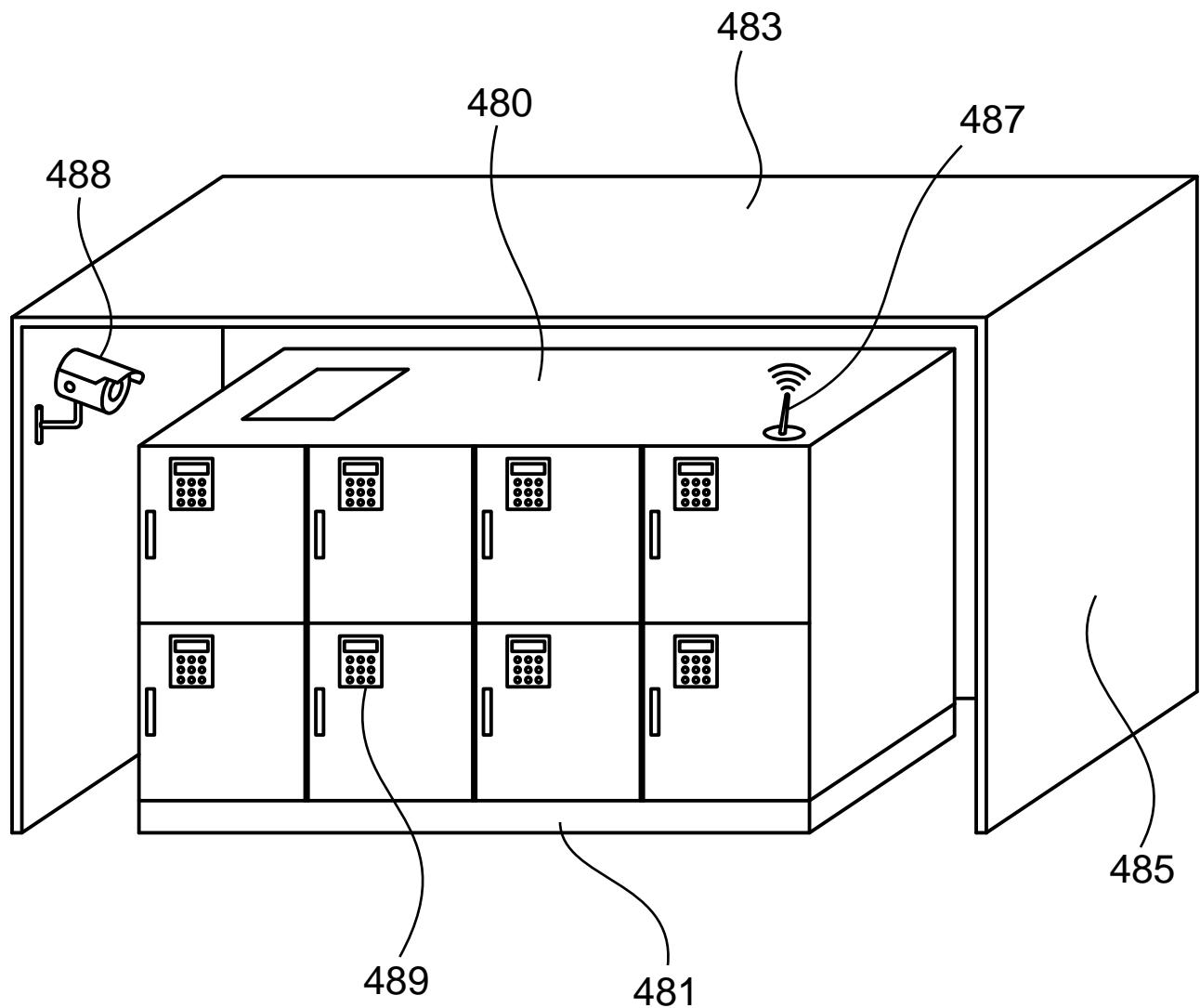


FIG. 48

Various Sample Drawings

From Various Patents

In order as they appear:

- FIG. 1 – Air Gun
- FIG. 15 – Air Filtering Face Covering Device
- FIG. 12 – Boat Towing Communication System
- FIG. 4 - Air Gun Exploded View
- FIG. 5 – Truck Communication System
- FIG. 4 – Smart Blinds System
- FIG. 2 – Structure Pulley System
- FIG. 2 – House Unit
- FIG. 4 – Floor Plan Air Flow
- FIG. 18 – Air Filtering Device
- FIG. 19 – Air Patch
- FIG. 5 & 6 – Car Engine System
- FIG. 10A & 10B – Towing System

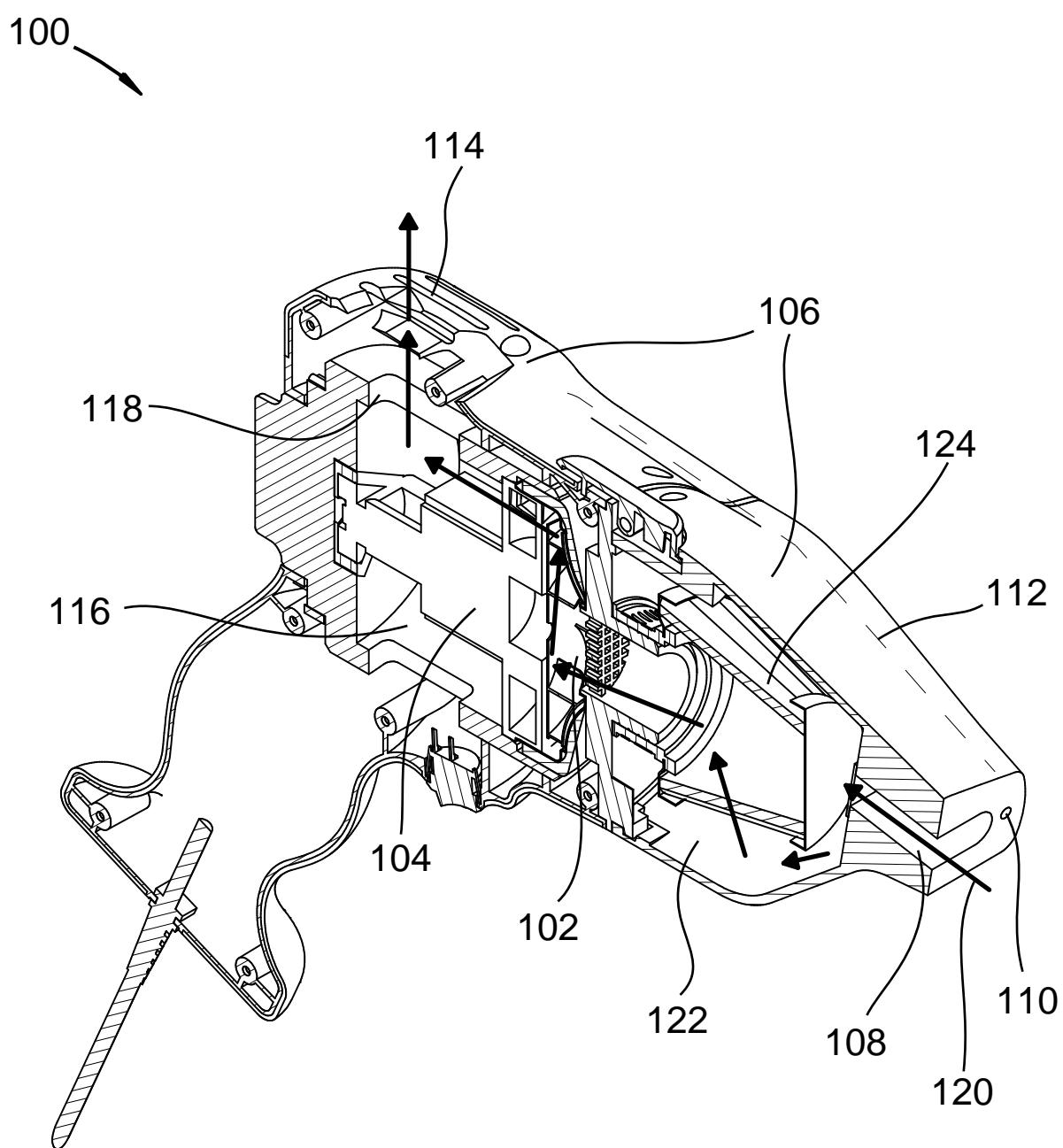


FIG. 1

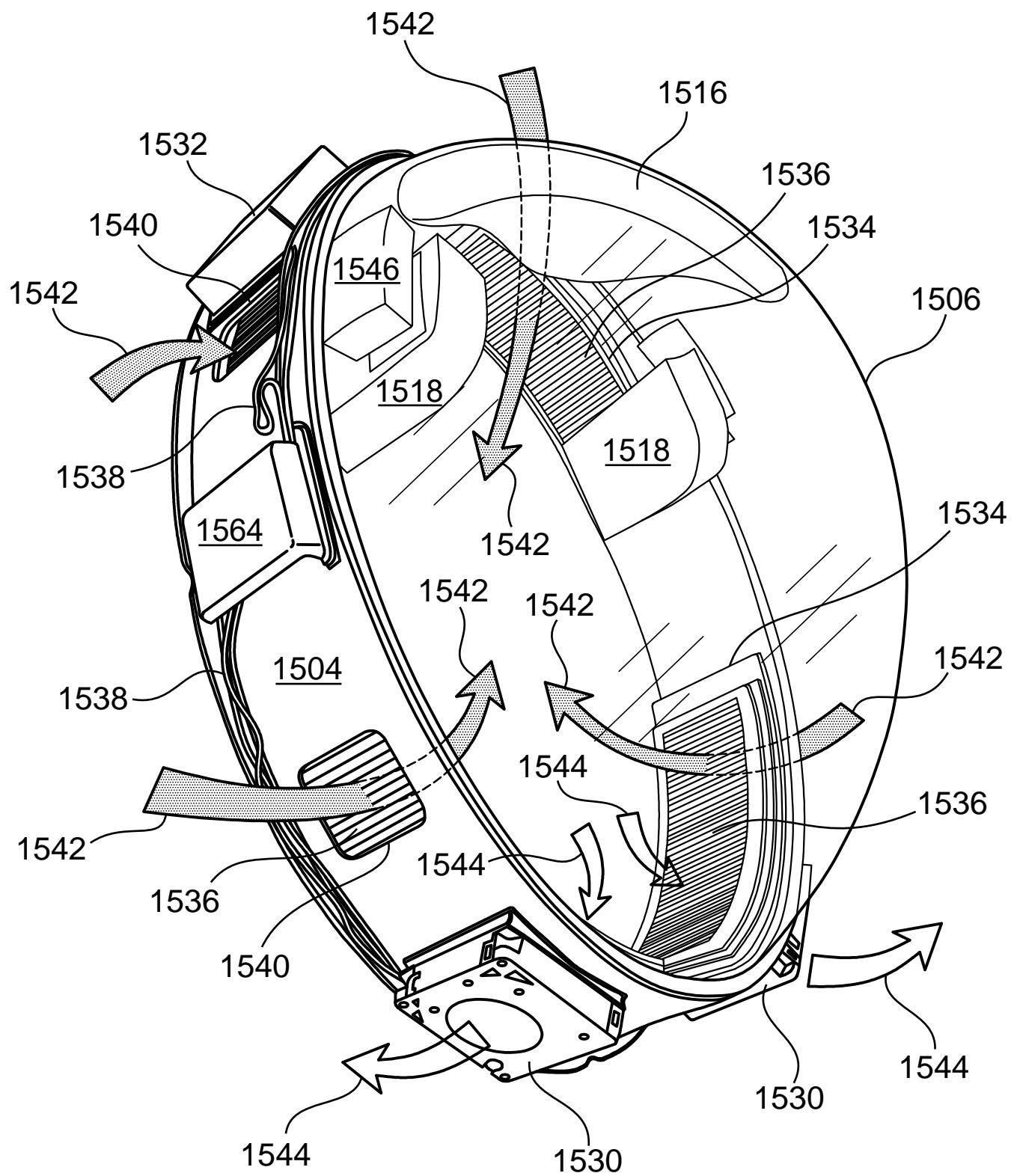


FIG. 15

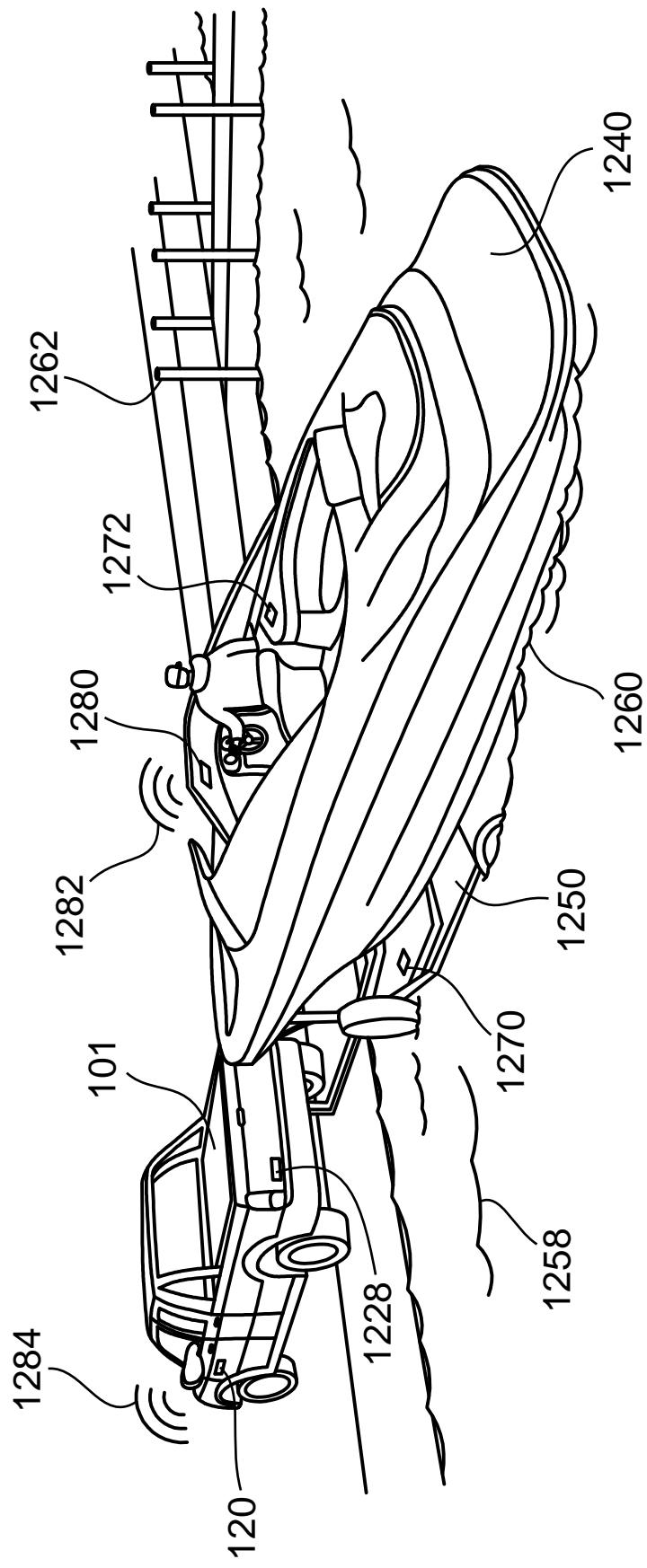


FIG. 12

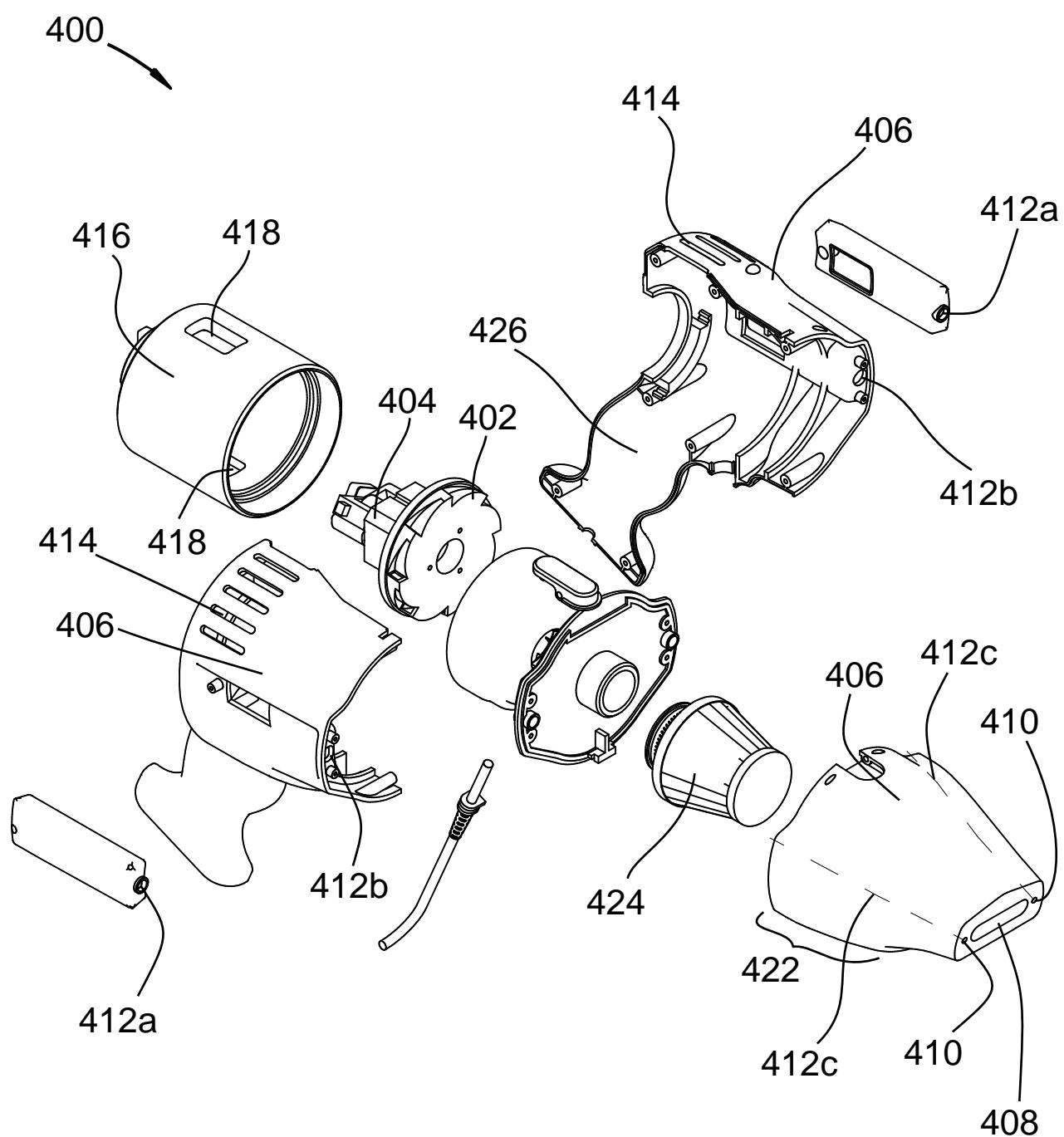


FIG. 4

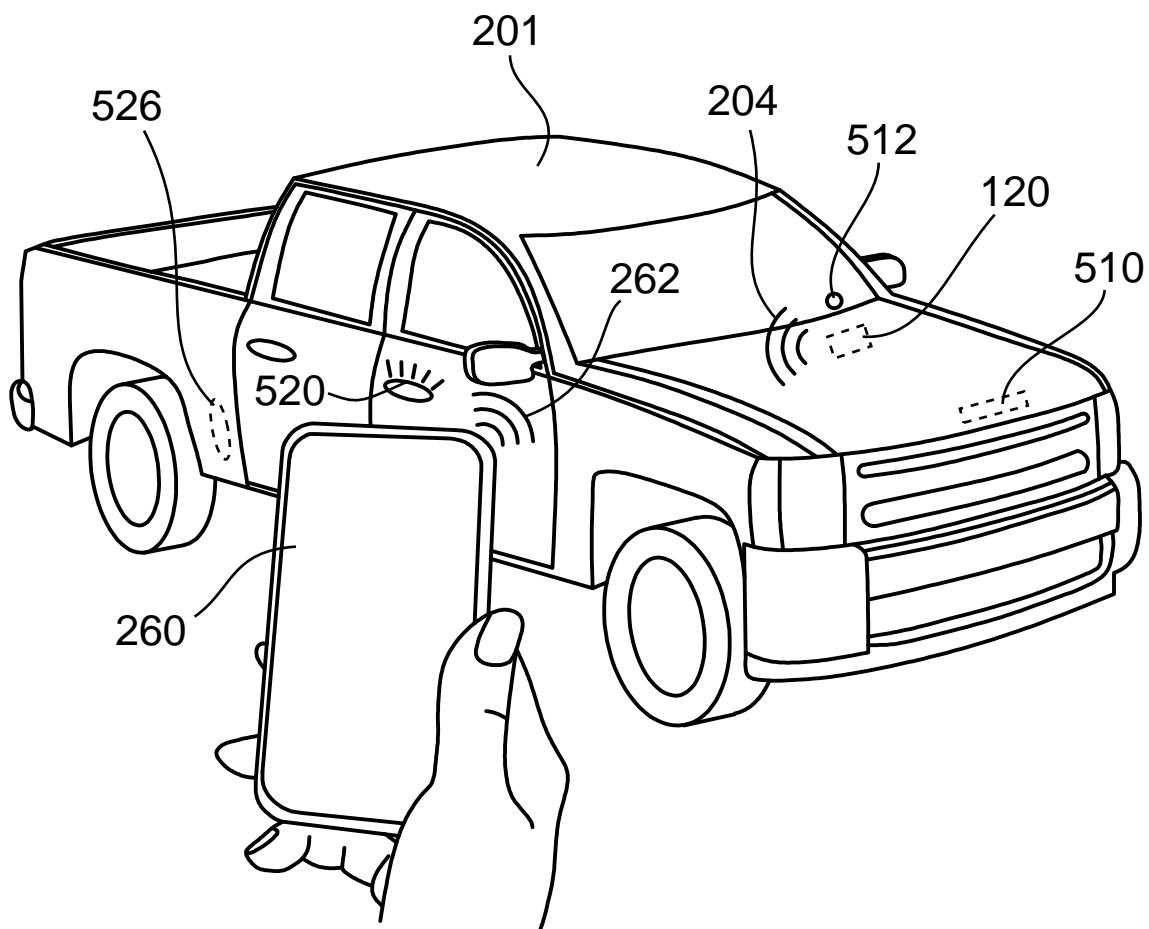


FIG. 5

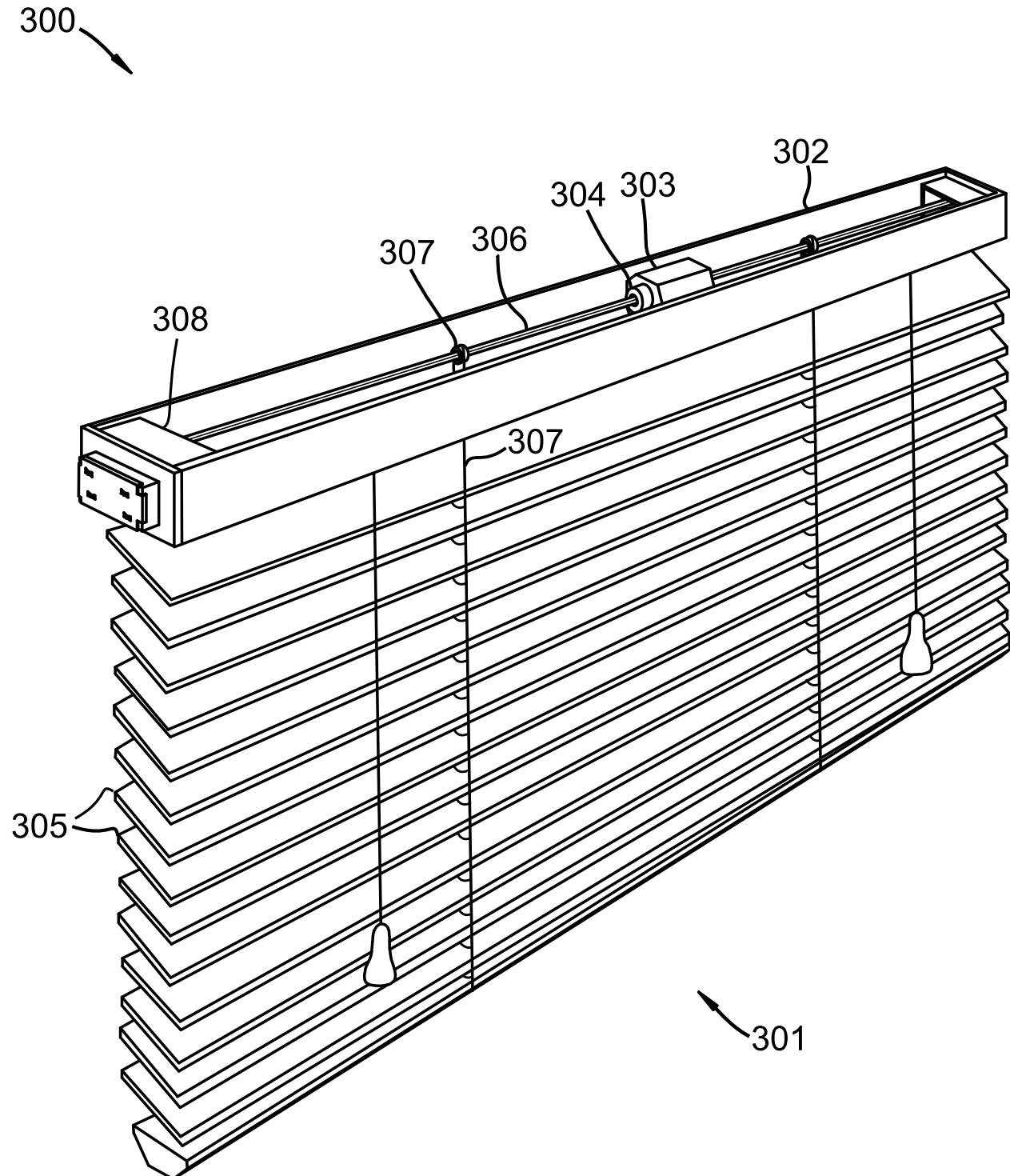


FIG. 4

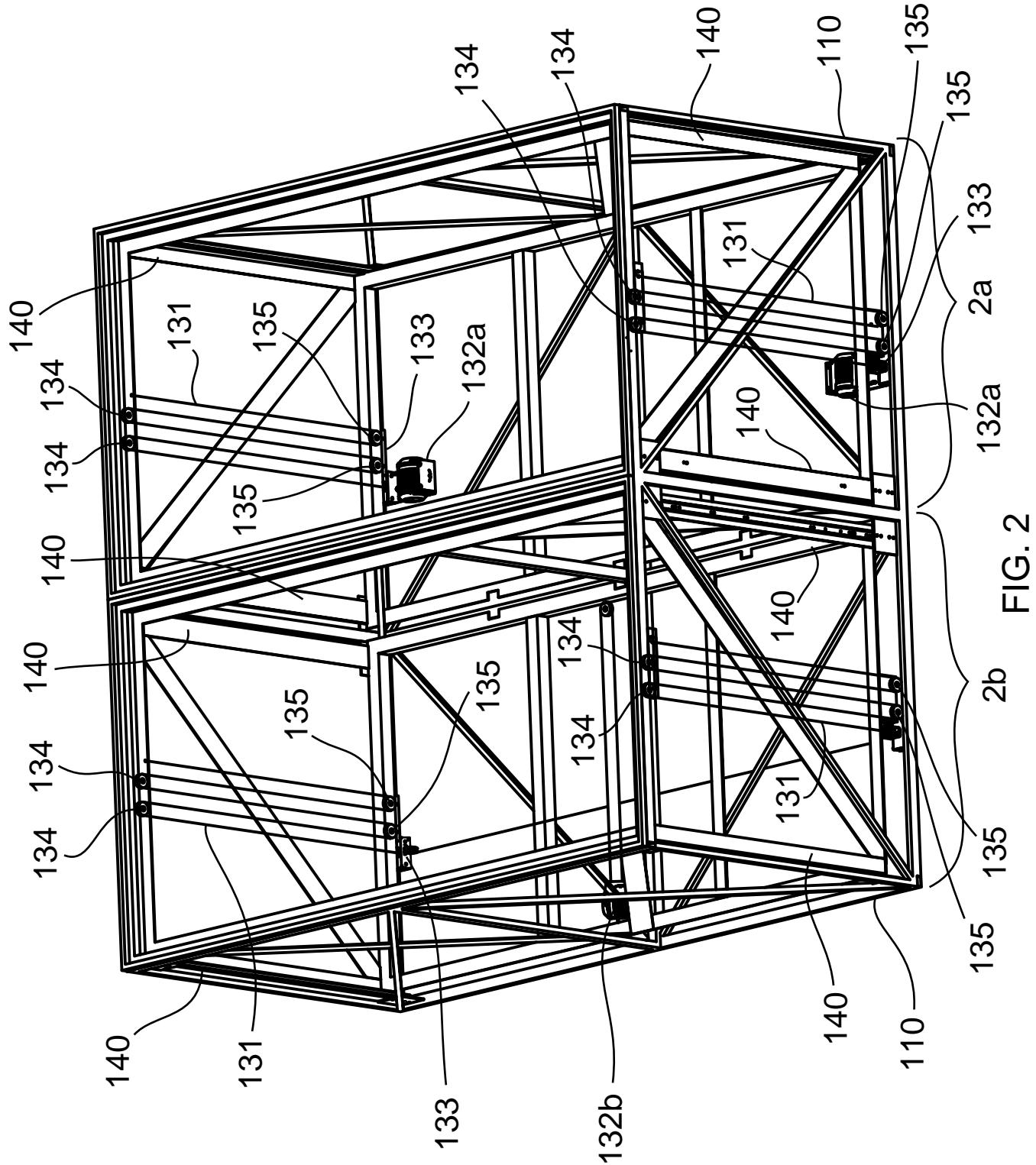
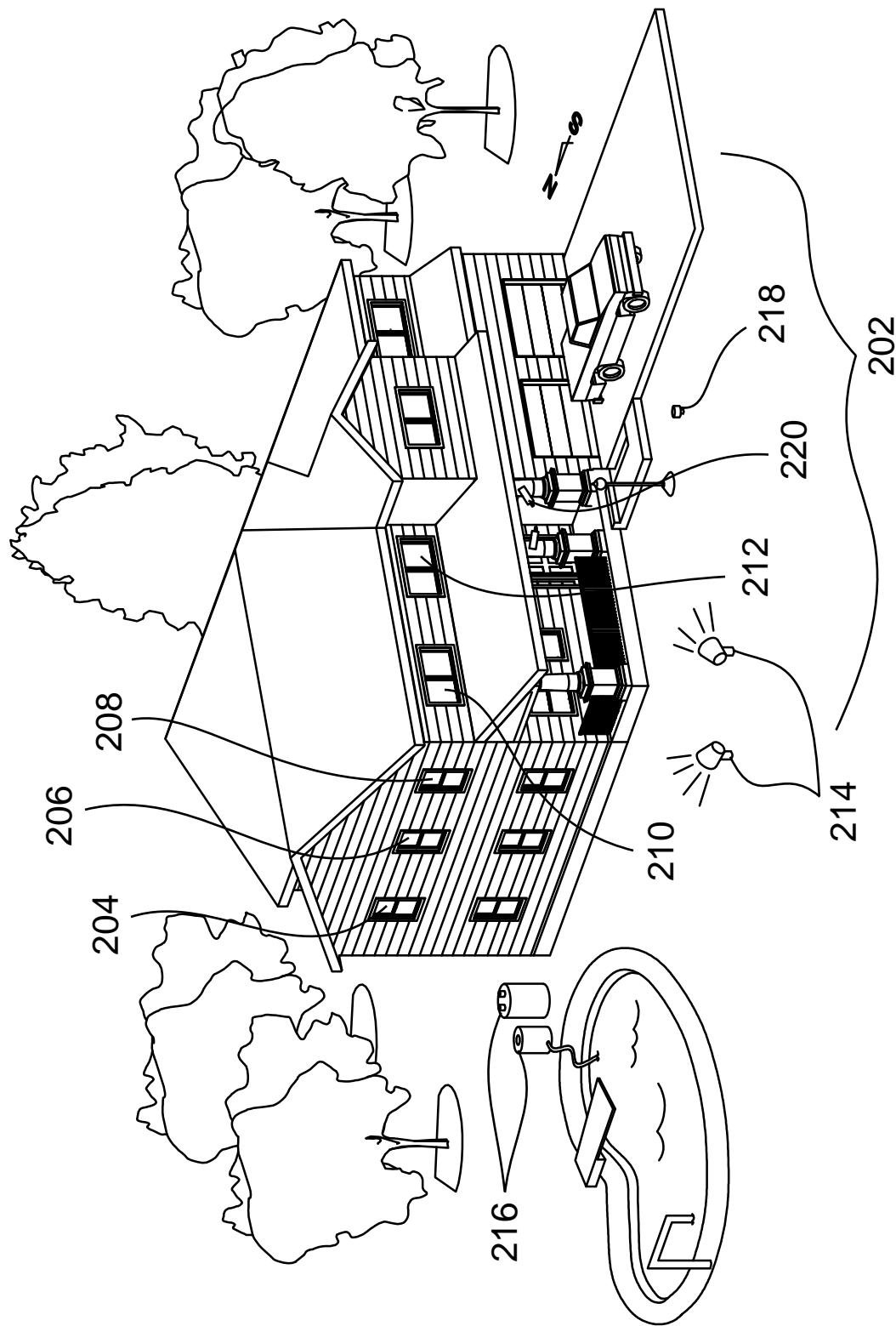


FIG. 2



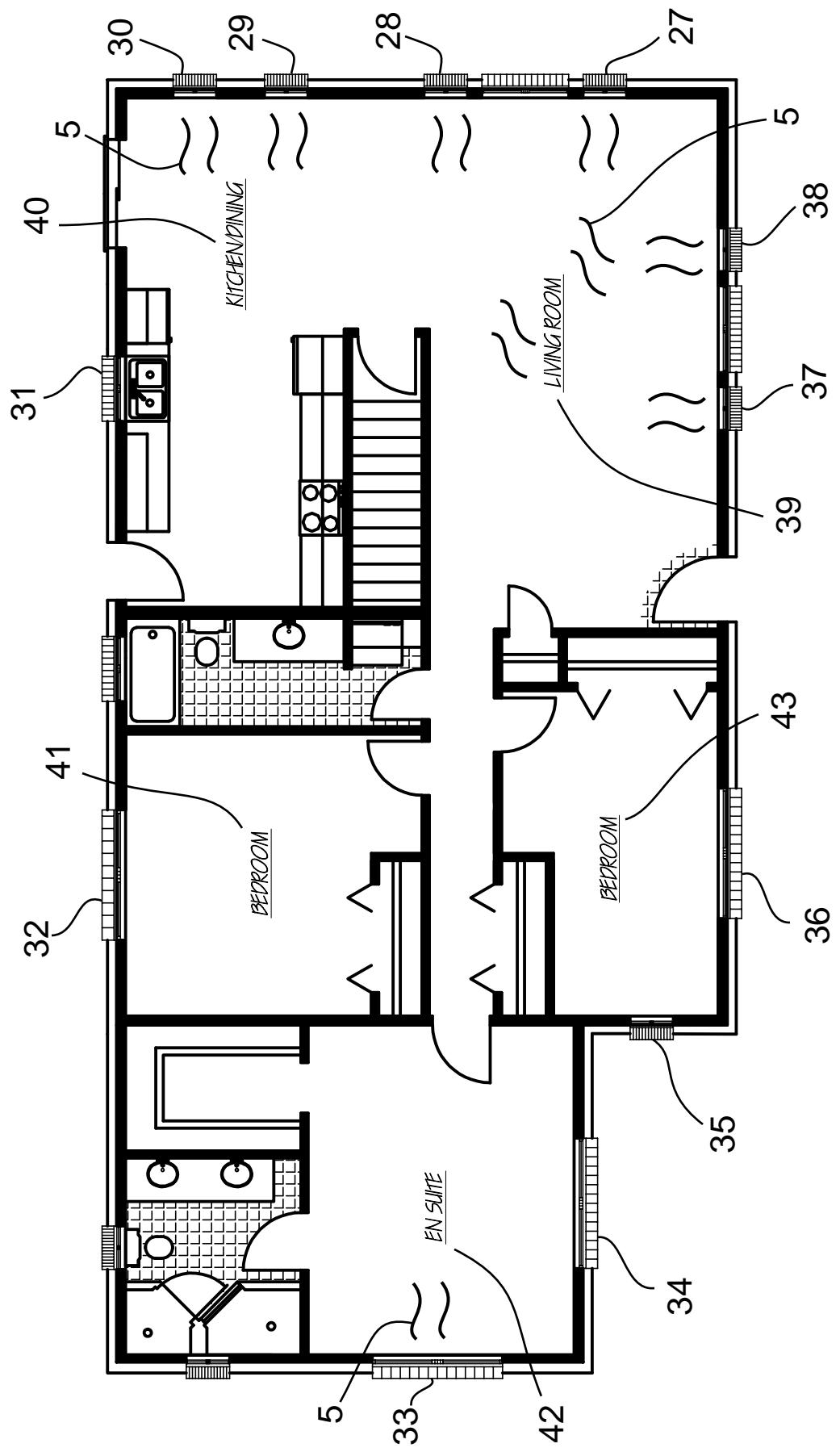


FIG. 4

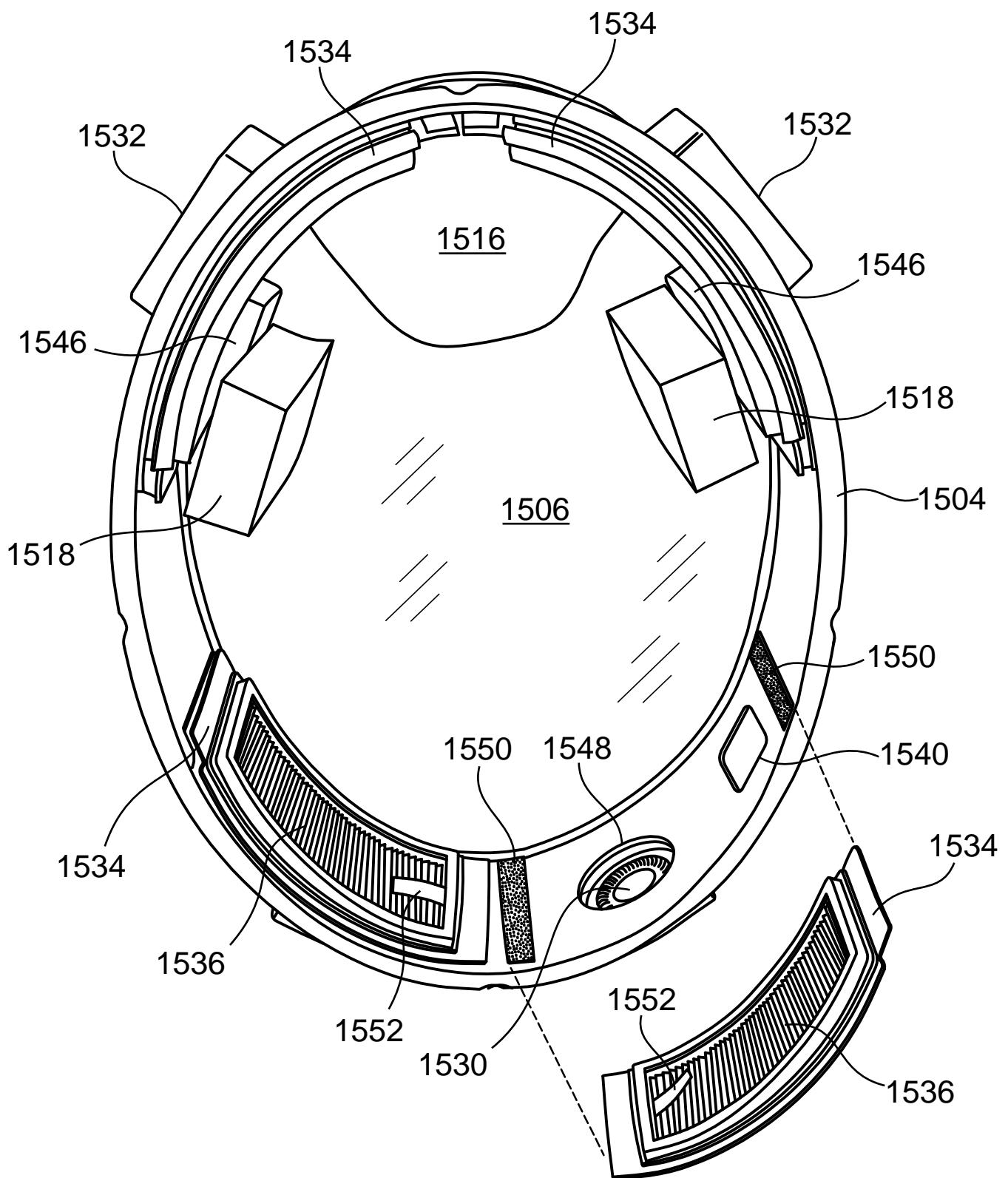


FIG. 18

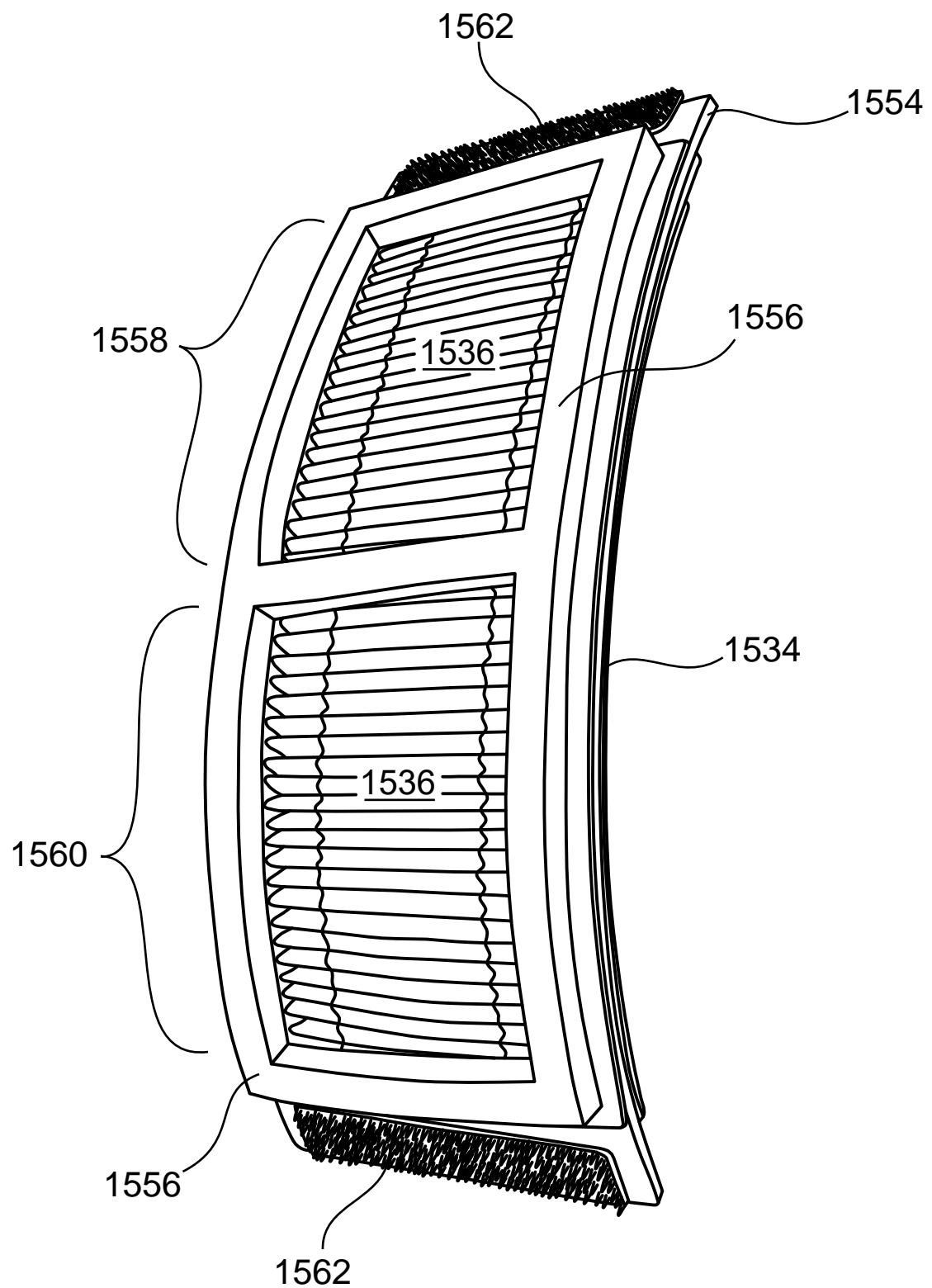
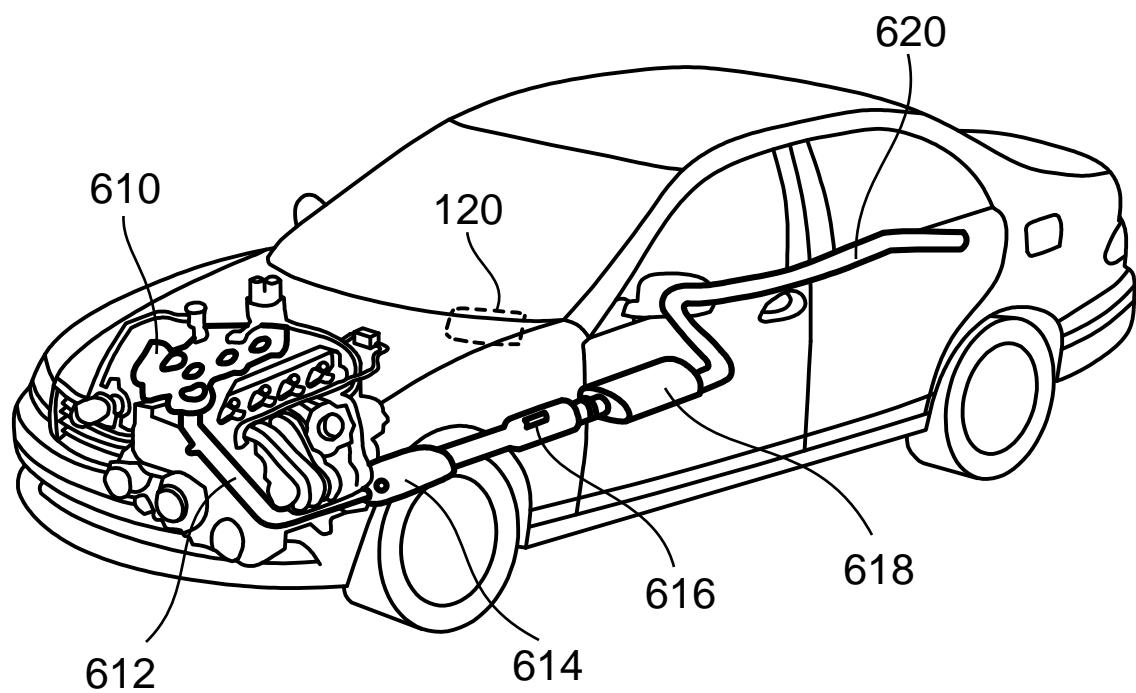
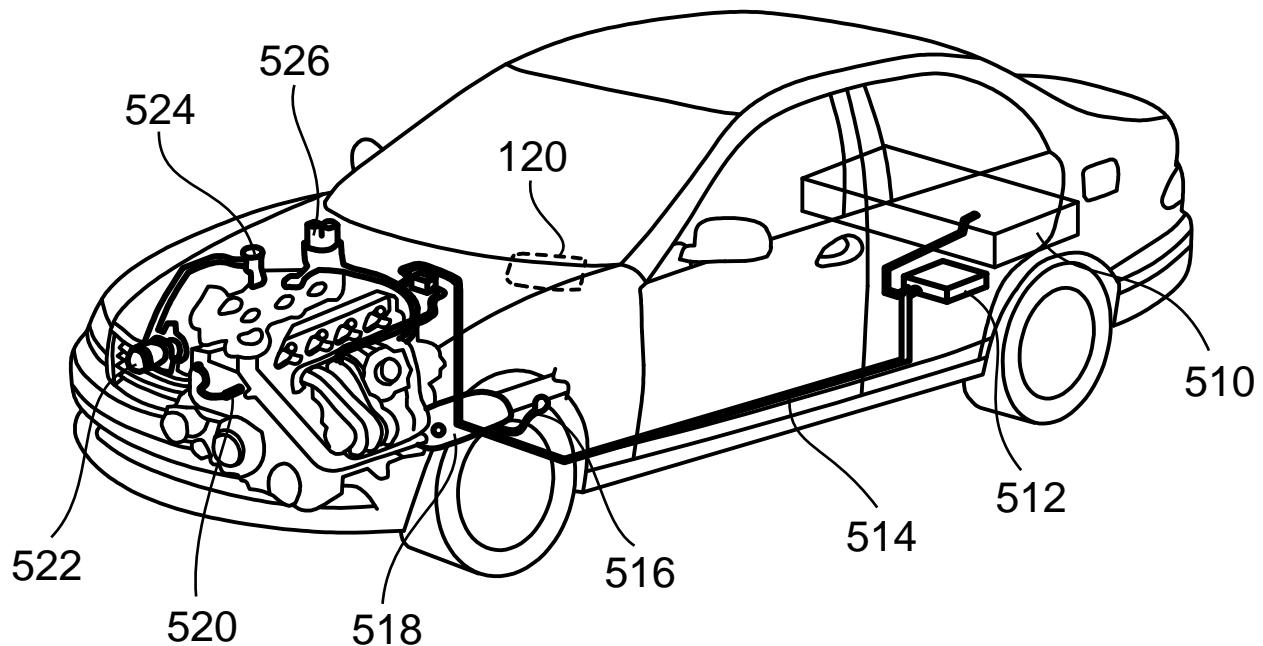


FIG. 19



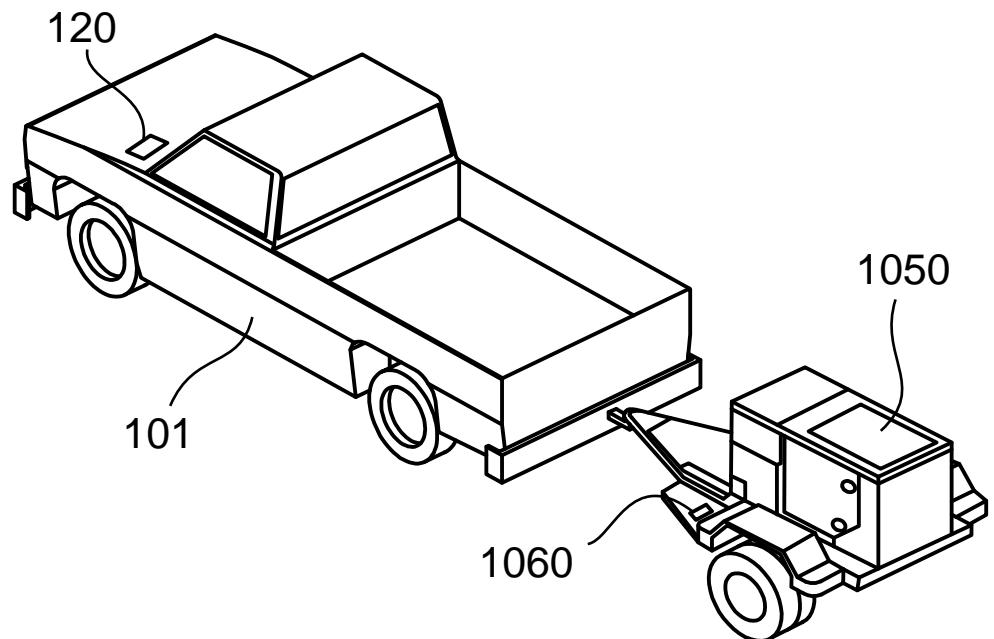


FIG. 10A

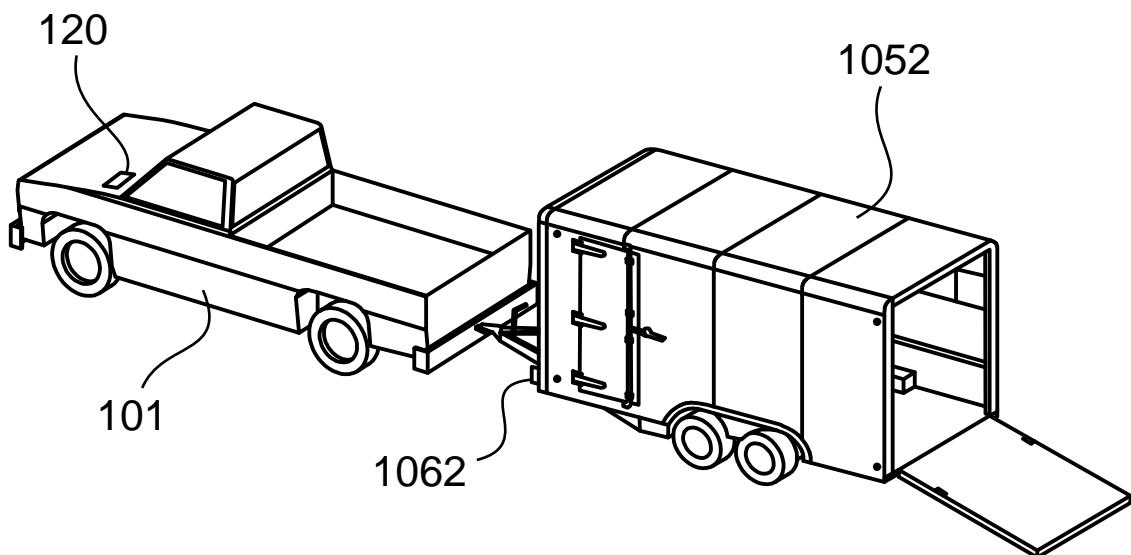


FIG. 10B