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(54) **THROW TYPE COMPACT RECONNAISSANCE ROBOT**

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CPC .. B62K 3/007; B60K 7/0007; A61G 2203/14; B62D 11/183; B60R 16/04
USPC 180/65.51, 218, 6.48, 6.5, 68.5
See application file for complete search history.

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(57) **ABSTRACT**

Provided is a throw-type compact reconnaissance robot, which is used for military purposes or counter-terrorism and is capable of ensuring a long operational time as well as drop safety by efficient spatial layout of a battery. The throw-type compact reconnaissance robot includes a cylindrical body (**100**) with a camera (**140**), drivers (**200**) made up of two tires (**270**) that are disposed on opposite sides of the body (**100**) and is drivable individually, and battery units (**300**) supplying power used to operate the robot and disposed in inner spaces of the tires (**270**) of the drivers (**200**) on the opposite outermost sides of the robot.

10 Claims, 9 Drawing Sheets

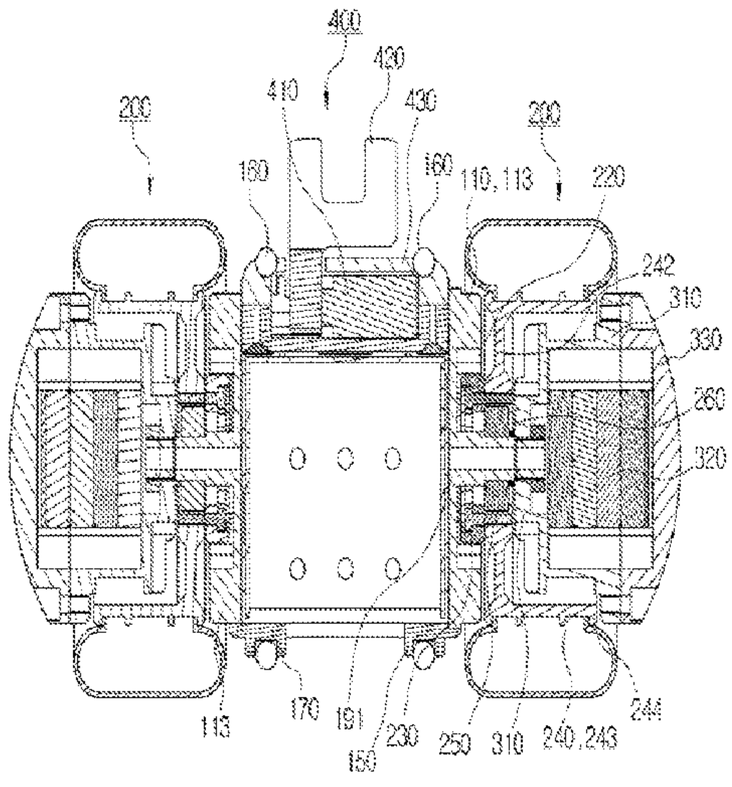

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FIG.1

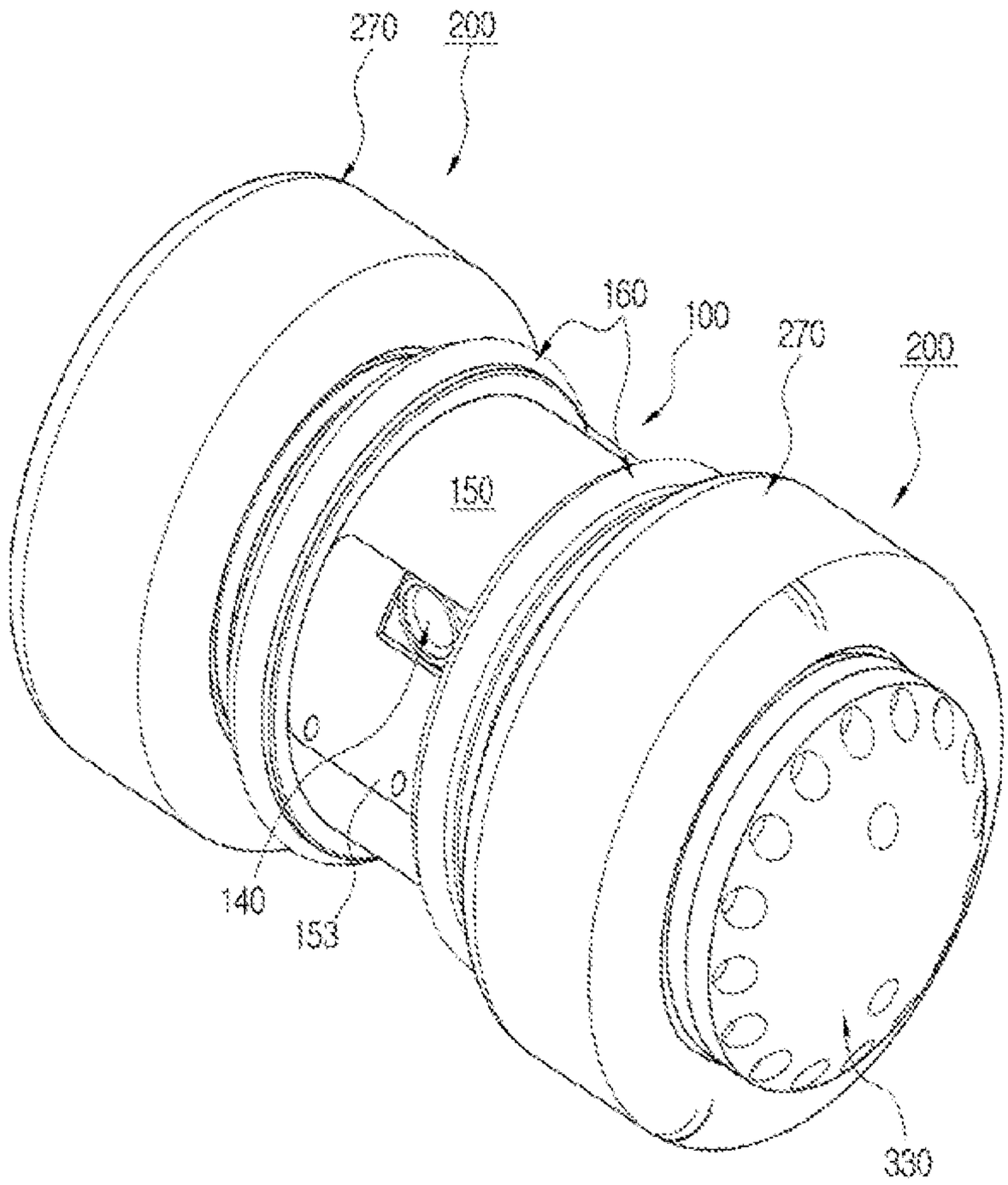


FIG. 2A

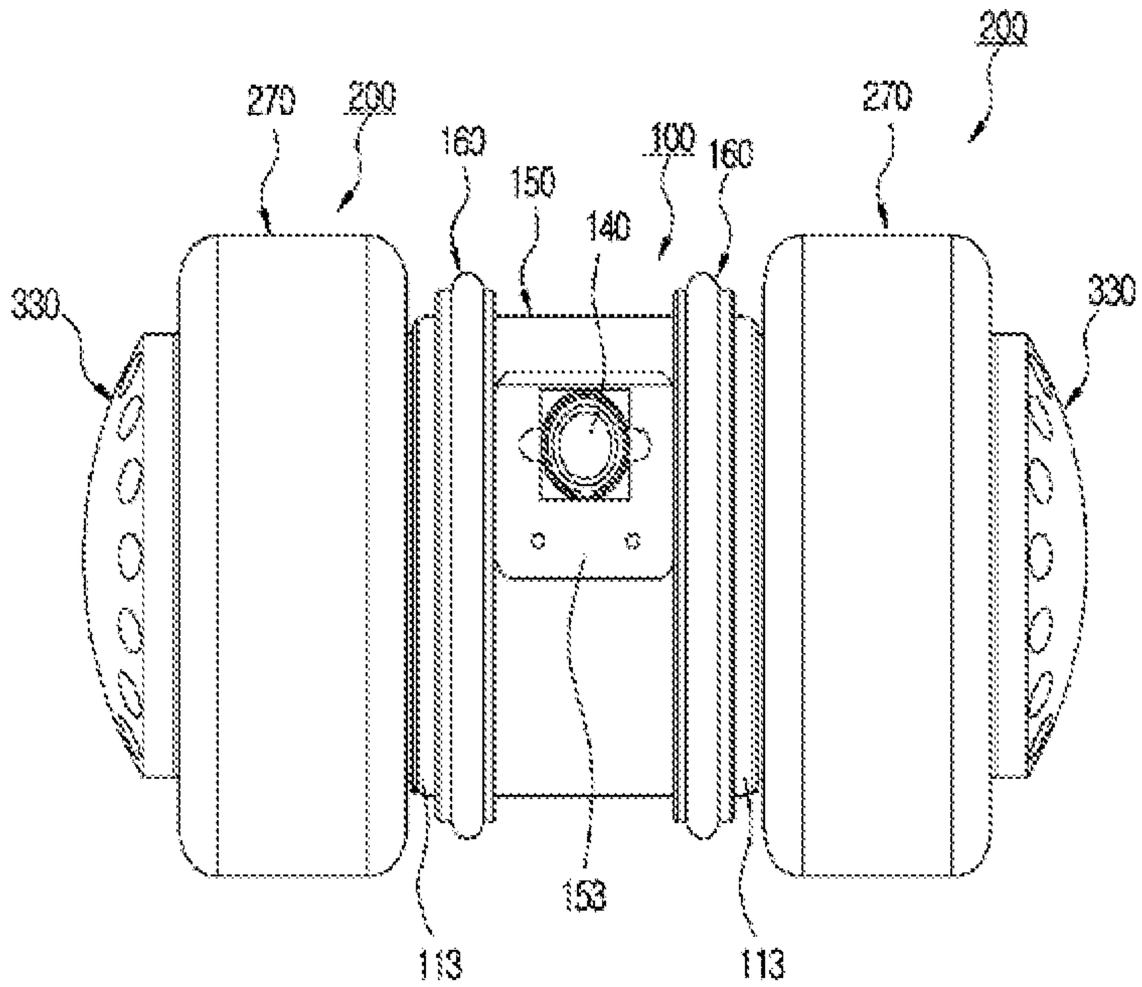

270
200
160
150
140
100
160
270
200
330
330
153
113
113

FIG. 2B

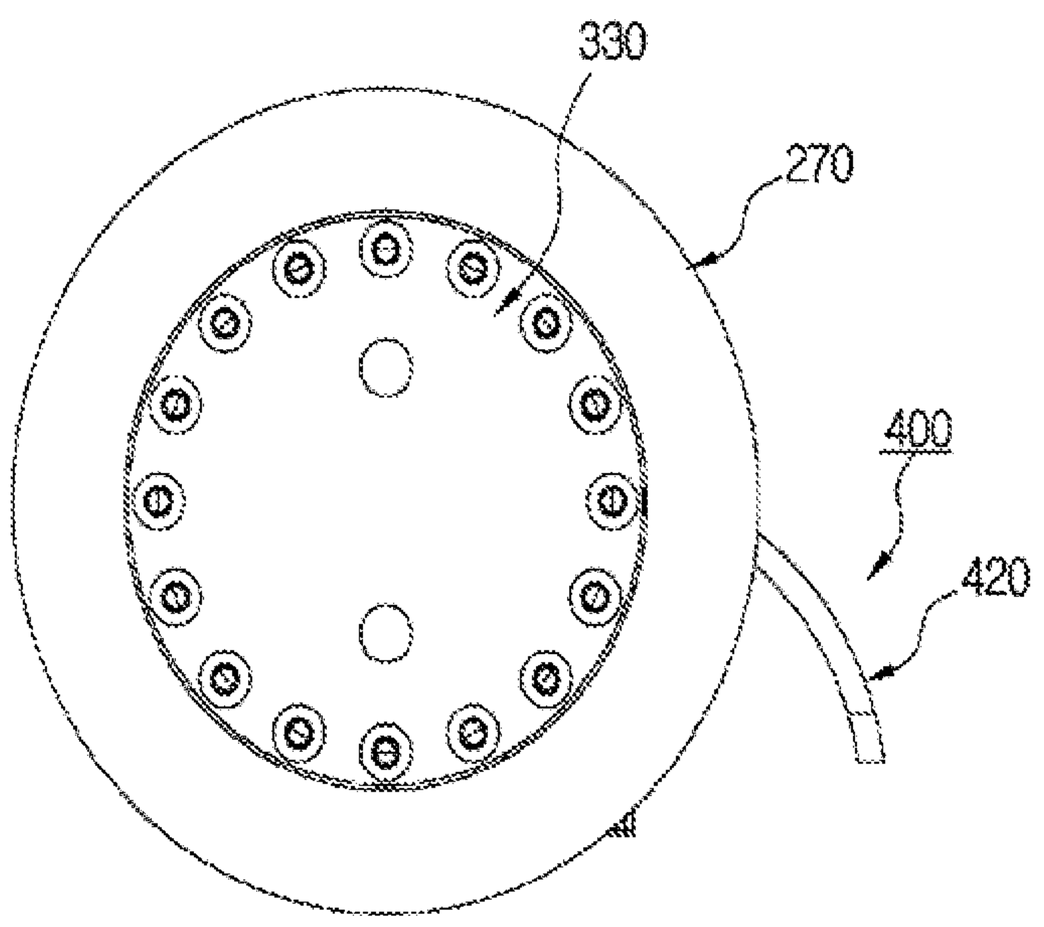

330
270
400
420

FIG. 2C

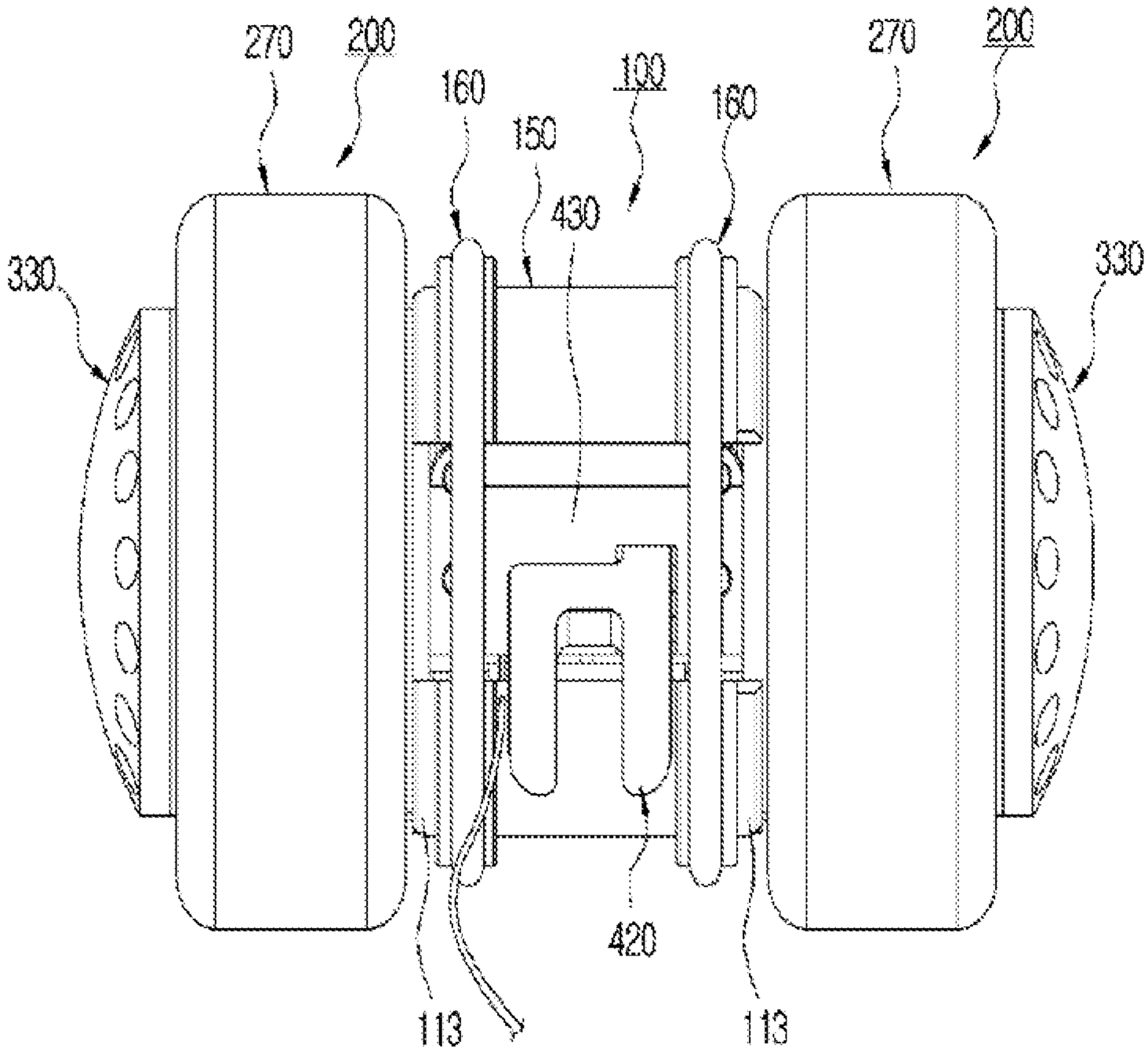


FIG. 3

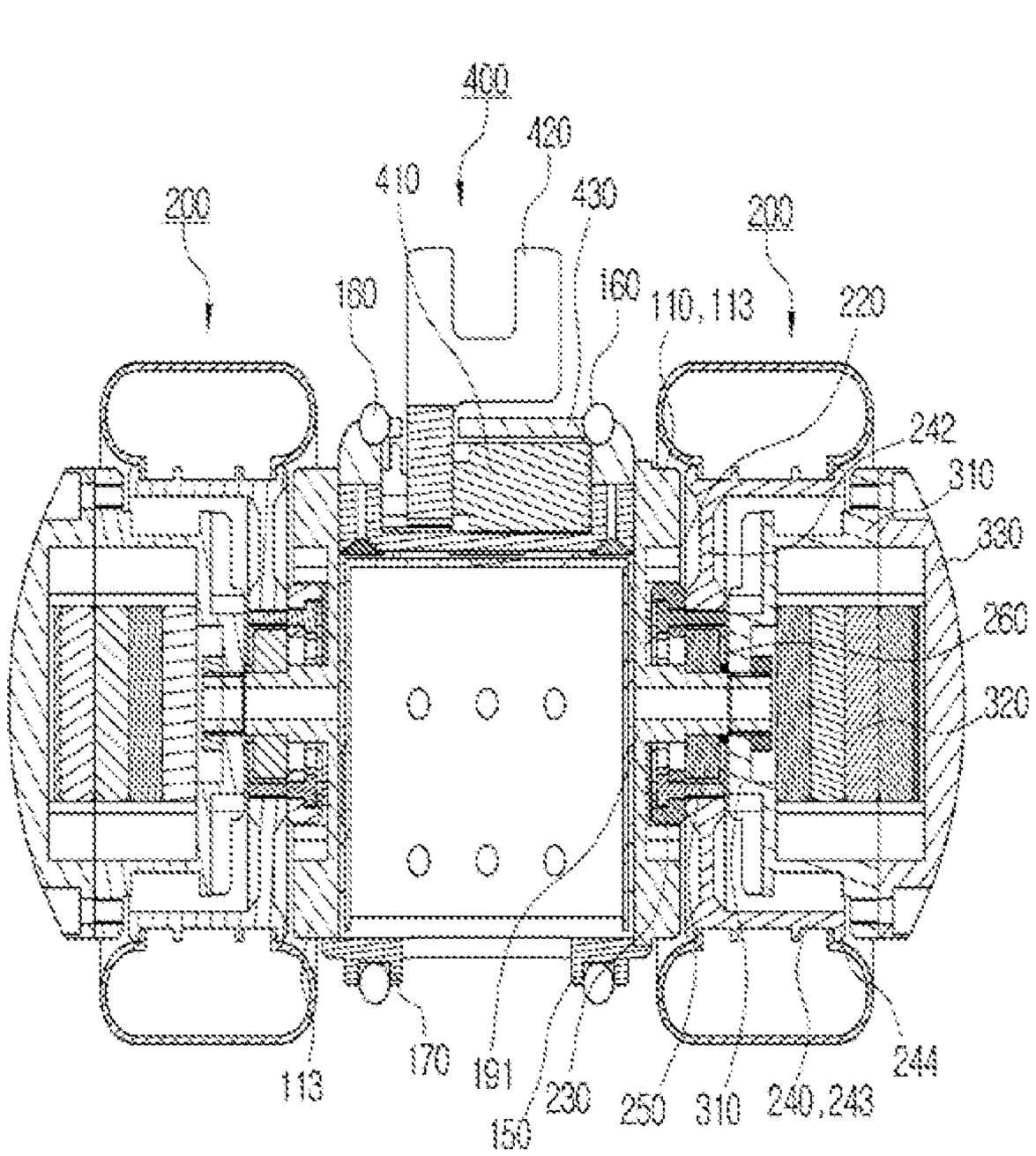

400
420
410
430
200
200
160
160
110,113
220
242
310
330
260
320
113
170
191
230
150
250
310
240,243
244

FIG.4

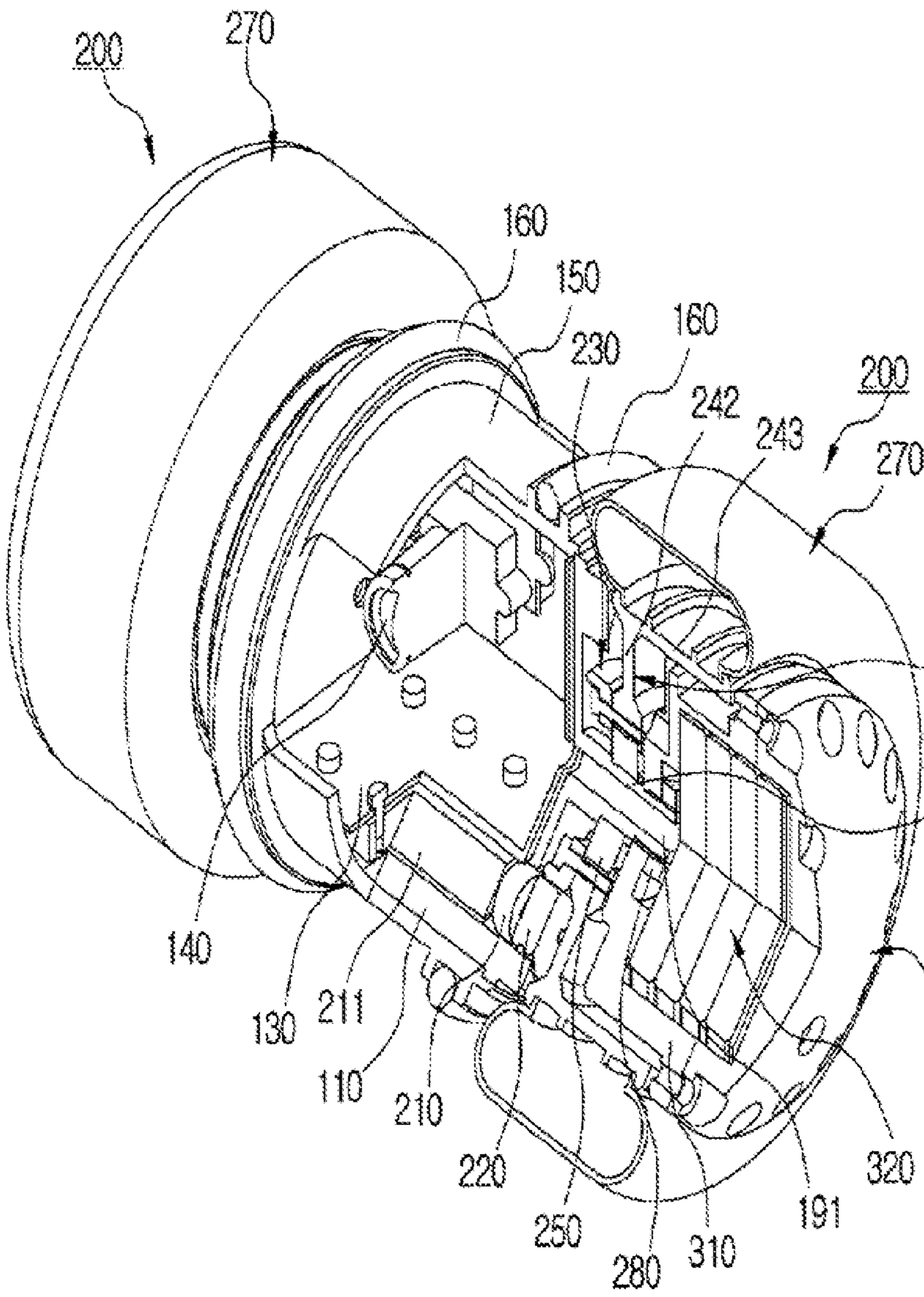

200
270
160
150
160
230
242
243
200
270
240
190
140
330
130
211
110
210
220
250
280
310
191
320

FIG.5

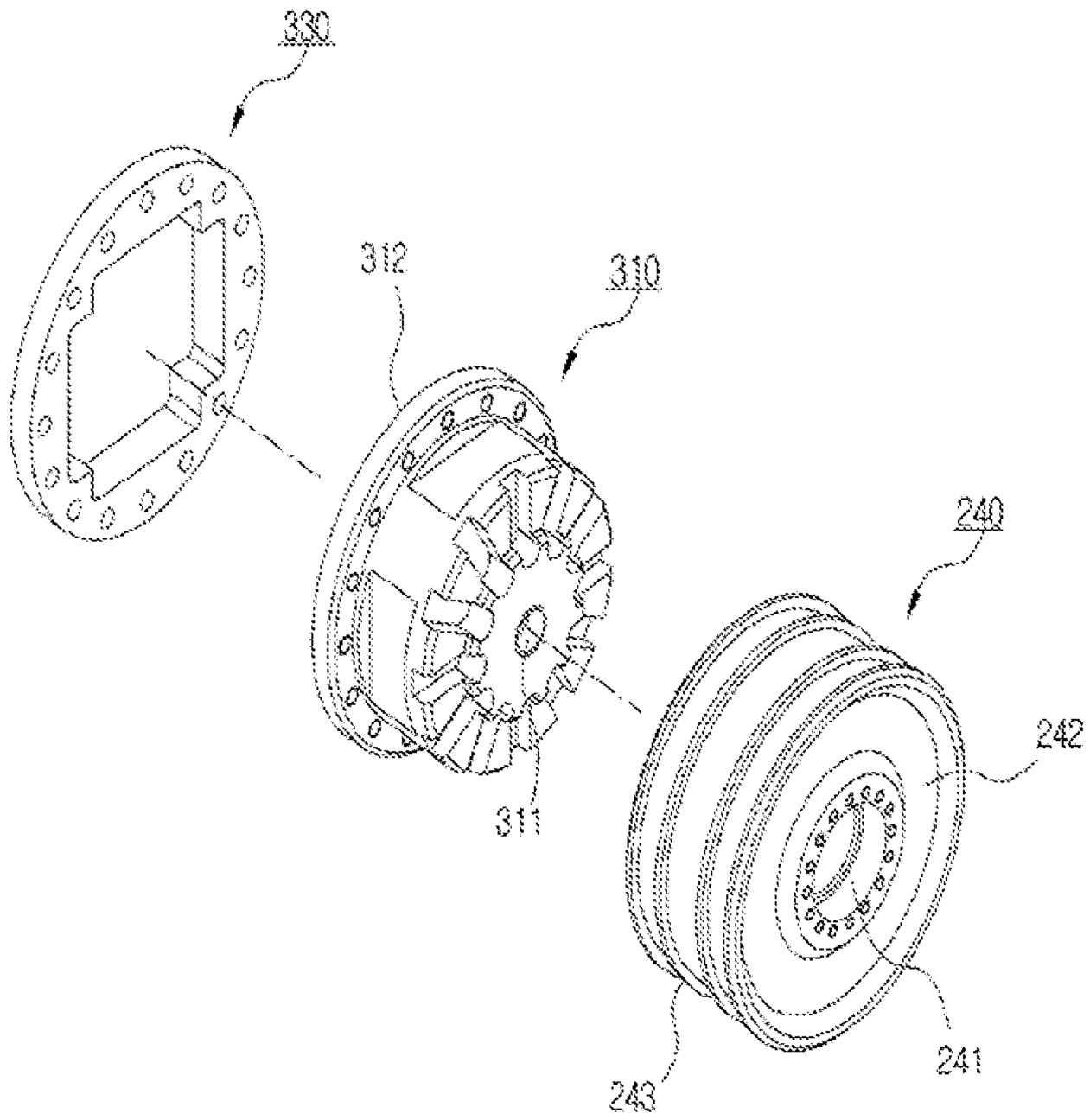


FIG.6

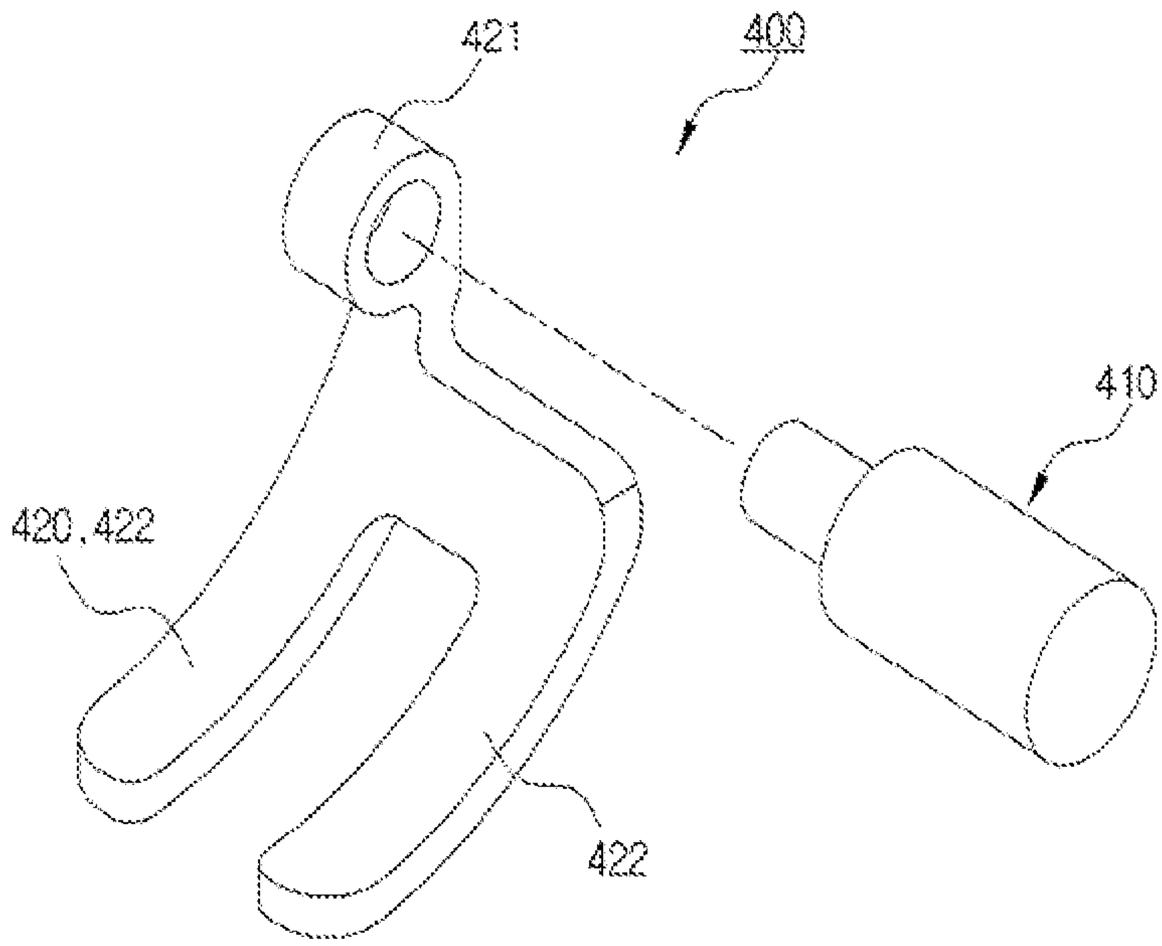


FIG. 7A

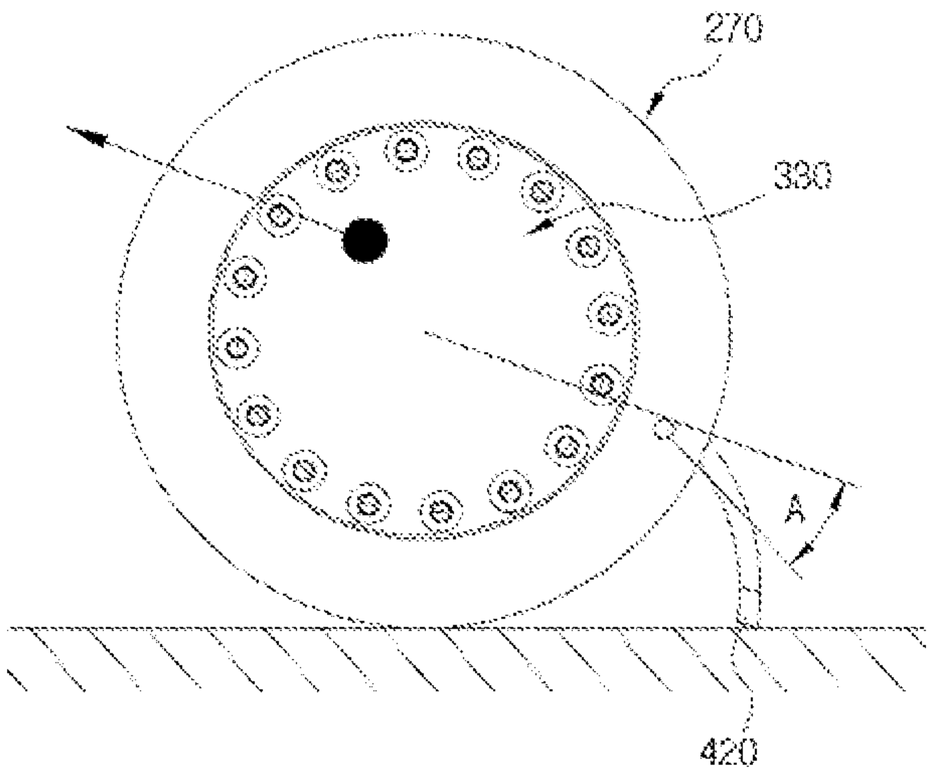


FIG. 7B

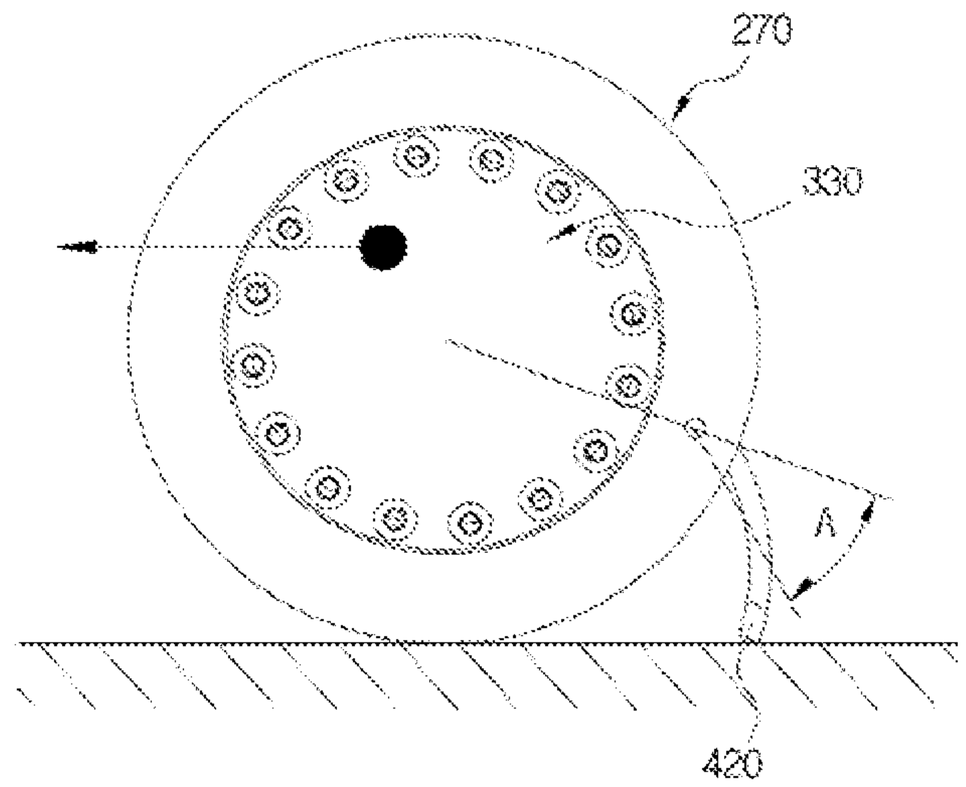
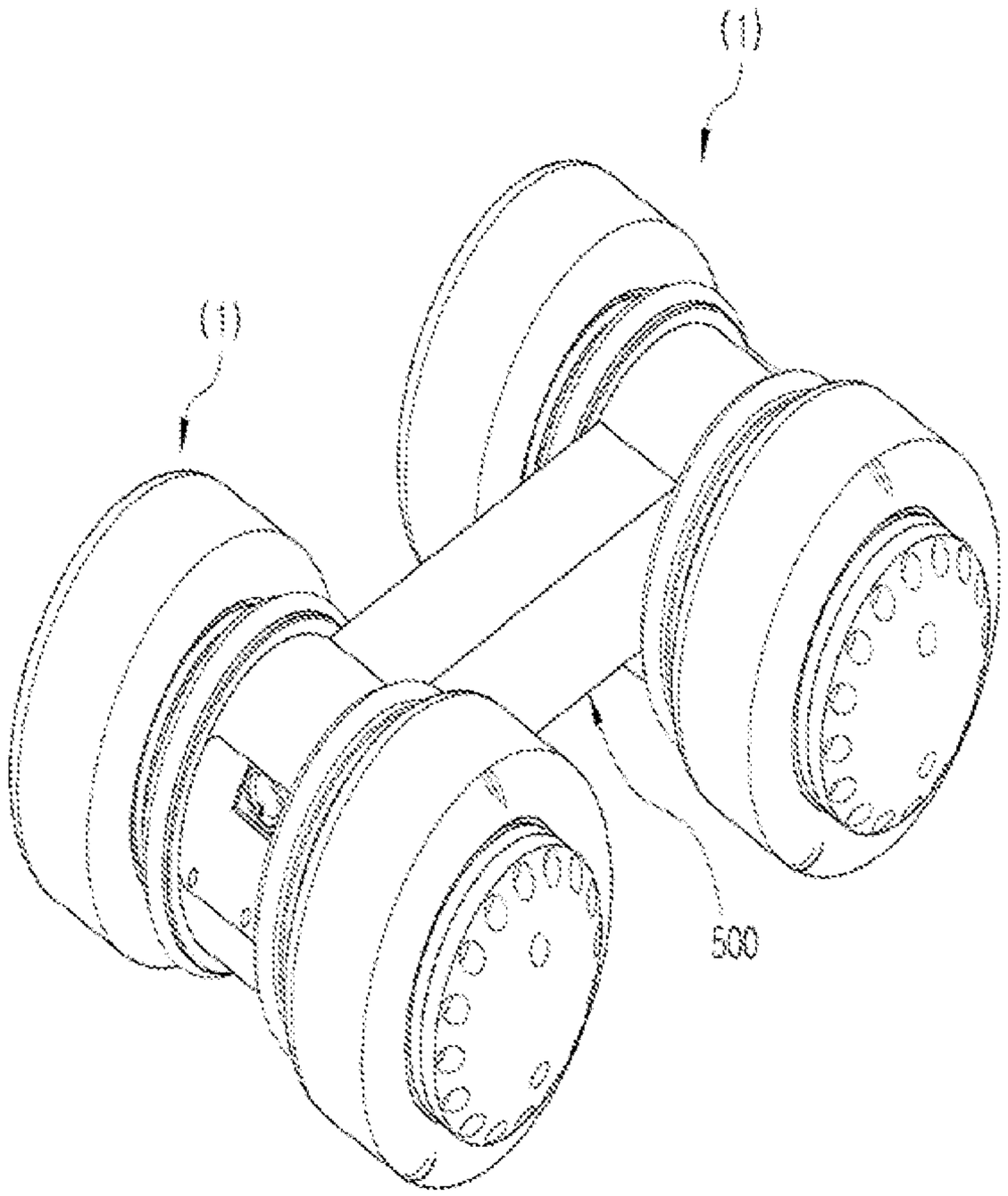


FIG.8



THROW TYPE COMPACT RECONNAISSANCE ROBOT

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates, in general, to a throw-type compact reconnaissance robot used for military purposes or counter-terrorism and, more particularly, to a throw-type compact reconnaissance robot capable of ensuring a long operational time as well as drop safety by efficient spatial layout of a battery.

2. Description of the Related Art

With the rapid progress of worldwide urbanization, war assumes an aspect of street fighting. Although war does not necessarily break out, a variety of crimes and terrorism take place around us at unexpected times and in unforeseen places. In the event of such incidents occurring, it is essential to grasp the initial situation for rapid and suitable countermeasures. Most of the spots where the incidents take place frequently do not permit easy access by soldiers, policemen, or rescuers, so that the situation becomes worse or damage is heightened.

For this reason, when the chaser of the enemy or offender encounters an uncertain building or space whose interior is unknown during a chase, reconnaissance robots are frequently used to be able to rapidly check the status of the interior.

Such reconnaissance robots have low mobility due to a relatively large size. Furthermore, under conditions where the robots cannot gain access due to a narrow passage or a natural disaster, the robots cannot be used in a timely manner.

To solve this problem, throw-type reconnaissance robots that are designed to be thrown by hand or by a throwing machine have recently been developed. These robots overcome the existing problem with regard to accessibility or agility. However, the robots should be light and compact enough to be thrown, which causes difficulty in spatial arrangement. Thus, only a compact battery can be mounted, so that the robots are restricted by operational time.

Further, the compact reconnaissance robots secure smooth infiltration due to their low height, but they have difficulty in carrying out reconnaissance at a desired height. Failure of parts of the reconnaissance robot caused by a drop shock when the robot is thrown becomes an important problem in interfering with the popularization of the throw-type reconnaissance robots.

SUMMARY OF THE INVENTION

Accordingly, the present invention has been made keeping in mind the above problems occurring in the related art, and an objective of the present invention is to provide a throw-type compact reconnaissance robot capable of providing sufficient battery capacity so as to be able to ensure a long operational time, securing drop stability, and easily adjusting the viewing angle of a camera.

In order to achieve the above objective, according to one aspect of the present invention, there is provided a throw-type compact reconnaissance robot, which comprises: a cylindrical body with a camera; drivers made up of two tires that are disposed on opposite sides of the body and can be driven individually; and battery units supplying power used to operate the robot and disposed in inner spaces of the tires of the drivers on opposite outermost sides of the robot.

Here, each driver may include a cylindrical driving wheel; each tire may be fitted on an outer side of the driving wheel in a radial direction; and each battery unit may be disposed in an inner space of the cylindrical driving wheel.

Further, each driver may include a cylindrical driving wheel and a wheel driving motor, and the driving wheel and the wheel driving motor may be geared to transmit a driving force.

Each tire may be filled therein with air or a sponge so as to be able to absorb a shock when dropped.

Each battery unit may include a cylindrical battery housing, a battery mounted in the battery housing, and a battery housing cover.

Here, the battery housing and battery housing cover may be each formed of ultrahigh molecular weight polyethylene.

Further, the body may include a frame in which electric parts are mounted, and a shield cover that surrounds the frame and has a shape of a C-shaped thin plate.

The frame and the shield cover of the body may have rubber rings fitted around them.

Each rubber ring may include a metal wire as an antenna embedded therein so that the metal wire is connected to a circuit board for telecommunication mounted in the body and functions as the antenna when remote control is performed by radio.

The body may include a tail mounted on a rear surface thereof.

The tail may be adjusted in angle by a tail driving motor so as to be able to adjust a viewing angle of the camera.

According to another aspect of the present invention, there is provided a throw-type compact reconnaissance robot, which is connected to another throw-type compact reconnaissance robot using a connector member, in an internal connecting space of which a battery, an electric part, etc. are mounted as needed.

Here, the body may further include a repeater for telecommunication.

According to the present invention, the throw-type compact reconnaissance robot can secure sufficient space for the battery to be operated for a long time, sufficiently absorb a shock when dropped to ensure stability, and simply adjust a viewing angle of the camera.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objectives, features and other advantages of the present invention will be more clearly understood from the following detailed description when taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a perspective view showing an entire throw-type compact reconnaissance robot according to a first exemplary embodiment of the present invention;

FIG. **2**A shows the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention in front view;

FIG. **2**B shows the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention side view;

FIG. **2**C shows the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention rear views;

FIG. **3** is a cut top plan view showing the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention;

FIG. **4** is a cutaway perspective view showing the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention;

FIG. **5** is a partial exploded view showing a battery mounting space of the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention;

FIG. **6** is a perspective view showing a viewing angle adjustor of a camera of the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention;

FIG. **7** is a side view for explaining a function of adjusting a viewing angle of the camera of the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention; and

FIG. **8** is a perspective view showing a throw-type compact reconnaissance robot according to a second exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The invention will be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. FIG. **1** is a perspective view showing an entire throw-type compact reconnaissance robot according to a first exemplary embodiment of the present invention. FIG. **2**A shows the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention in front view. FIG. **2**B shows the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention side view. FIG. **2**C shows the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention rear view. FIG. **3** is a cut top plan view showing the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention. FIG. **4** is a cutaway perspective view showing the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention. FIG. **5** is a partial exploded view showing a battery mounting space of the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention. FIG. **6** is a perspective view showing a viewing angle adjustor of a camera of the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention. In addition, FIG. **7** is a side view for explaining a function of adjusting a viewing angle of the camera of the throw-type compact reconnaissance robot according to the exemplary embodiment of the present invention, and FIG. **8** is a perspective view showing a throw-type compact reconnaissance robot according to a second exemplary embodiment of the present invention.

In the following description, the parts that are similar to those of the prior art and are not required to understand the technical idea of the present invention will not be described, but the technical idea and scope of the present invention are not limited thereto.

First, the geometry of the throw-type compact reconnaissance robot **1** according to the first embodiment of the present invention will be schematically described with reference to FIGS. **1** and **2**A to **2**C.

The throw-type compact reconnaissance robot **1** is generally characterized by a body **100** including a camera **140** and drivers **200** made up of two tires **270** that are disposed on opposite sides of the body **100** and can be driven individually.

The body **100** is provided with a camera viewing angle adjustor **400** having a tail **420** on the side opposite the camera **140**. The camera viewing angle adjustor **400** has a function of adjusting a viewing angle of the camera **140**, and a function of ensuring that the entire robot **1** can move relative to the ground by preventing the body **100** from being rotated by a driving force of the tires **270** when the robot **1** moves forward or backward by the drivers **200** having the tires **270**.

Battery units **300**, in each of which a battery **320** is mounted, are provided in the axial centers of the drivers **200** on outer sides of the respective tires **270**. Each battery unit **300** is protected by a battery housing cover **330**.

The body **100** is covered with a shield cover **150** enclosing a frame **110**. The shield cover **150** is fixed by two rubber rings **160**. These rubber rings **160** will be described below in connection with configuration and effects thereof.

Next, an internal structure of the throw-type compact reconnaissance robot **1** will be described in detail with reference to FIGS. **3** and **4**.

The throw-type compact reconnaissance robot is characterized in that the body **100** is made in a relatively small size and has the camera **140**, that the drivers **200** are made up of the two tires **270** that are disposed on the opposite sides of the body **100** and can be driven individually, and that the battery units **300** are disposed in inner spaces of the respective drivers **200** on the outermost sides of the robot to supply power used for the operation of the robot.

In the throw-type compact reconnaissance robot **1**, the body **100** functions as a main structure holding most electric parts and has rigidity. The body **100** includes the hollow frame **110** that is made of aluminum and forms a basic frame, the camera **140**, and a C-shaped thin shield cover **150** that encloses the camera **140** and a circuit board **130**. Further, the circuit board **130** is placed in a mounting space **120** that is an empty inner cavity of the frame **110** and is enclosed by the shield cover **150**, and drives and controls the camera **140** and a wheel driving motor **210** of each driver **200**.

The frame **110** is formed of aluminum, and includes a bottom plate **112** and disc-like side plates **113** that are vertically installed on opposite sides of the bottom plate **112** and support a support shaft **190**. The bottom plate **112** and the two side plates **113** vertically installed on the opposite sides of the bottom plate define the mounting space **120** in which the circuit board **130** is placed.

A tail seat **111** to which the camera viewing angle regulator **400** is attached is additionally provided in the rear of the frame **110**.

The camera **140** picking up the internal space of a building and the circuit board **130** controlling the camera are mounted in the mounting space **120**. The embodiment describes only the camera **140** or the circuit board **130**. If necessary, a repeater for radio telecommunication (not shown) and a control circuit (not shown) controlling the repeater may be mounted along with or apart from the camera **140**, and they can increase a remote control distance by relaying a user control signal of another robot **1** that is thrown at the same time. For example, two throw-type compact reconnaissance robots **1** are simultaneously thrown, wherein the radio repeater mounted on one of them so as to be able to move and control the other to a distance. Thereby, it is possible to produce an effect of increasing a reconnaissance distance twice or more.

In addition to the camera **140** mounted in the frame **110**, various sensors such as a flame sensor or a gas sensor may be additionally mounted to increase an applicable range. Fur-

ther, a flash apparatus, an infrared generator, etc. may be mounted to enhance a quality of pickup image.

The support shaft **190** on which the drivers **200** and the battery units **300** are supported is disposed on the side plates **113** on the opposite sides of the frame **110**. The support shaft **190** is provided with an axial hole **191** in an axial direction thereof so that a power line of each battery **320** is connected to the circuit hoard **130**. The support shaft **190** is provided with a step around which a bearing **250** of each driving wheel **240** (see FIG. **3**), and a groove in which a wheel spacer **260** of each driver **200** is inserted on an outer side of the step. Further, each battery unit **300** is supported on the support shaft **190** in such a manner that a case hole **311** of a battery housing **310** of each battery unit **300** is fitted around the support shaft **190**. To this end, the support shaft **190** is provided with threads on an outer side thereof so that a wheel fixing nut **280** can be fastened (see FIG. **3**). The battery housing **310** of each battery unit **300** is inserted around the support shaft **190**, and is supported on the wheel spacer **260** on one side thereof and by a fastening nut on the other side.

The shield cover **150** protects the circuit board **130**, the camera **140**, and the electromagnetic devices such as the wheel driving motor **210**, all of which are mounted in the frame **110**, and is formed of ultrahigh molecular weight polyethylene in the form of a C-shaped thin plate. The shield cover **150** may be formed of a lightweight, durable plastic material that is easily available from the market. The throw-type compact reconnaissance robot of the present invention has a high possibility of getting a drop shock when thrown, and thus needs to be prepared for this possibility through use of the ultrahigh molecular weight polyethylene material.

The shield cover **150** includes a camera hole **152** through which a lens part of the camera **140** protrudes. The shield cover **150** may further include a camera protecting cover **153** to cover the camera hole **152** as needed. The camera protecting cover **153** is fastened by typical fastening members so as to be able to cover the camera hole **152** excluding the protrusion of the camera **153**.

After all the electric parts to be mounted in the mounting space **120** of the frame **110** are mounted, the mounting space **120** is covered with the shield cover **150**. The shield cover **150** has the form of a C-shaped thin plate, is covered to enclose the bottom plate **112** of the frame **110** with opposite outer circumferences thereof fitted to outer circumferences of the side plates **113**. Further, the shield cover **150** is supported on the opposite sides thereof by two rubber rings **160**, and is preferably provided with ring grooves **170** in which the rubber rings **160** can be placed.

Each rubber ring **160**, by which the shield cover **150** is surrounded and fixed to the frame **110**, plays an important role in reducing the drop shock when the throw-type compact reconnaissance robot of the present invention is thrown or launched to a scouting place. Further, the shield cover **150** is fixed by the flexible rubber rings **160** rather than by rigid fastening members such as bolts, so that the flexible rubber rings **160** do not only prevent the drop shock from being transferred to the internal electric parts but also reduce a weight or volume of the throw-type compact reconnaissance robot.

If necessary, each rubber ring **160** may also be provided with a space in which an antenna can be installed. In detail, when each rubber ring **160** surrounds and fastens the shield cover **150** with a metal wire capable of serving as an antenna embedded therein so that the metal wire is automatically connected to an antenna connector of the circuit board **130**, the telecommunication is possible.

Two driving motor mounts **180**, in which the two left-hand and right-hand wheel driving motors **210** are mounted, are provided at a lower portion of the bottom plate **112** of the frame **110**. The driving motor mounts **180** may further include fixing members **211** for the wheel driving motors **210** as needed (see FIG. **4**).

Each driver **200** includes the wheel driving motor **210**, the driving wheel **240** that is fixed to the support shall **190** of the frame **110**, generates power, substantially takes charge of forward and backward movement, and in which the battery unit to be described below is mounted, and the tire **270**.

The wheel driving motors **210** are provided with motor spur gears **220** on a power shaft thereof that are fitted into the driving motor mounts **180** of the frame **110** on the opposite sides of the frame, respectively. The motor spur gears **220** are connected to wheel spur gears **230** respectively, which are mounted on wheel bases **242** of the driving wheels **240** by fastening members, thereby transmitting the power.

Each driving wheel **240** includes the disc-like wheel base **242** having a wheel hole **241** and a cylindrical extension rib **243** around which the tire **170** is fitted. The wheel hole **241** is formed so as to have such a size that a bearing **250**, which is fitted between the support shaft **190** and the driving wheel **240** and provides rolling friction, is fitted. The wheel base **242** is provided with fastening holes, through which the wheel spur gear **230** is fastened, around an outer circumference of the wheel hole **241** (see FIG. **5**).

The cylindrical extension rib **243** is formed along an outer circumference of the disc-like wheel base **242**. The extension rib **243** forms the space, in winch the battery unit **300** is mounted, along with the wheel base **242**. The extension rib **243** is provided with a tire seat **244**, around which the tire **270** can be fitted on a radially outer side thereof.

It is more advantageous that each tire **270** is formed so as to have a spatial area in which air can be filled as shown in FIGS. **3** and **4** in terms of reducing the drop shock when the robot **1** is thrown to hit the ground. The spatial area of the tire **270** may be filled with a sponge instead of the air in order to reduce the drop shock.

The tire **270** preferably has a diameter larger than that of the frame **100** of the body **100** or the shield cover **150** in terms of reducing the drop shock or ensuring the mobility.

The tire **270** is preferably formed of a rubber material in terms of reducing rolling noise when driven. Further, it is advantageous that the tire **270** is provided with small protrusions or various embossments on an outer surface thereof in terms of ensuring smoother movement on the ground in a slippery monitoring space. When the tire **270** is formed of the rubber material in this way, it is advantageous because slip can be prevented when the robot is thrown by hand instead of a launch machine (not shown).

The two spur gears **220** and **230** are used to connect the wheel driving motor **210** and the driving wheel **240** of the throw-type compact reconnaissance robot **1**. When the wheel driving motor **210** and the driving wheel **240** are separated from each other in this way, it is preferable because the drop shock when the robot is thrown to hit the ground is prevented from directly influencing the motor. In this case, a gear ratio between the motor spur gear **220** and the wheel spur gear **230** may be adjusted, so that torque and speed of the robot can be arbitrarily adjusted.

Further, the present invention employs only the two wheel driving motors **210**, and thus has an advantage in which the free movement, the low consumption of power, and the long-term operation are possible compared to the related art using four wheel driving motors. Further, the wheel driving motors are configured to be easily mounted and demounted without a

complicated mechanism, so that a function of reducing the internal weight of the driving wheel **240** and a function of relieving a shock are realized.

Next, the battery unit **300** of the present invention will be described in detail with reference to FIGS. **3** to **5**.

The battery unit **300** of the throw-type compact reconnaissance robot **1** of the present invention includes a battery housing **310** that has a substantially cylindrical shape and is open to one side thereof. The battery housing **310** is provided with case hole **311** in the bottom thereof into which the support shaft **190** of the body **100** is fitted, and a battery **320** is placed in a battery mounting space **312** that is an internal space. The entire battery housing **310** including the battery **320** is held in the inner space of the cylindrical driving wheel **240**.

The open side of the battery housing **310** is closed by a battery housing cover **330** after the battery **320** is mounted. The closure of the battery housing cover **330** is preferably makes good use of fastening members such as bolts in order to secure convenience of exchanging the battery **320**.

The throw-type compact reconnaissance robot **1** of the present invention has an advantage in that it can be operated for a long time because the battery space is sufficiently secured using the internal space of the driving wheel **240** of the tire **270**. Further, the batteries **320**, each of which has relatively heavy weight, are disposed on the opposite outermost sides of the robot **1** having the shape of an approximately straight line, thereby providing dynamic stability when the robot **1** falls down or moves forwards in a rough monitoring space.

Further, the battery **320** is mounted on the outermost side of the robot so as to provide easy access using the battery housing cover **330**, so that it is easily mounted and demounted, which leads to various applications.

Further, the battery housing cover **330**, one surface of which has an approximately spherical shape, has a function of absorbing the drop shock when the robot **1** hits the ground, and an effect of preventing the robot from standing to one side.

Among the components of the present invention, the driving wheel **240**, the battery housing **310**, and the battery housing cover **330** are preferably formed of ultrahigh molecular weight polyethylene in order to sufficiently absorb the drop shock, and the motor spur gear **220** and the wheel spur gear **230** are preferably formed of acetal as a typical material.

Next, the camera viewing angle adjustor **400** of the throw-type compact reconnaissance robot **1** of the present invention will be described in detail with reference to FIGS. **3** and **6**.

The camera viewing angle adjustor **400** of the present invention includes a tail **420** that is mounted on a tail seat **111** of the frame **110** of the body **100** and substantially adjusts a viewing angle of the camera by rotation, and a tail driving motor **410** that rotates the tail **420** relative to the body **100**. The tail **420** is formed of aluminum, and has a joint hole **421** into which the tail driving motor **410** is fitted and a tail extension part **422**. The tail extension part **422** may be formed in various shapes as needed, in addition to the shape shown in FIG. **6**.

The tail driving motor **410** is selected from step motors so as to be able to precisely adjust an angle.

The tail **420** is folded in contact with the body **100** when the robot is thrown, and thus is protected by the rubber tires **270** and is unfolded at a proper angle when the robot falls down and is driven normally.

The tail **420** makes stable movement possible when the two driving wheels **240** are driven. For example, in the case where the tail **420** is not provided, the robot **1** fails to move forward by relative rotation between the body **100** and the driving wheels **240** in spite of rotation of the wheel driving motors **210**. The tail **420** functions to adjust the viewing angle of the camera using the tail driving motor **410** as well as to increase a height to which the robot passes through an obstacle. FIG. **7** shows an example where, as a rotational angle of the tail **420** is changed from A to A', the viewing angle of the camera is changed (see an arrow directed in a forward direction). When the throw-type compact reconnaissance robot has been made compact in order to be easily thrown, the robot has encountered a problem in that the viewing angle become narrow. As such, it is essential to adjust the viewing angle of the camera as in the present invention. In the present invention, the viewing angle of the camera is adjusted using the tail **420** that is essential for the forward movement of the cylindrical robot, so that the effects of reducing cost and weight can be achieved at the same time.

Next, a throw-type compact reconnaissance robot according to a second embodiment of the present invention will be described in detail with reference to FIG. **8**.

The throw-type compact reconnaissance robot of the present invention may be designed as a reconnaissance robot having four wheels by connecting two modular stand-alone robots **1**.

This connection makes use of a connector member **500** provided specially. To this end, the frame **110** of the body **100** is provided with a fastening area on one side thereof to which the connector member **500** is fastened. Thus, the connection is made by fastening members such as typical bolts. An additional electric part for mounting a high-performance camera may be mounted in an internal connecting space **510** of the connector member **500** which is secured by this connection. Further, this connection makes it possible to drive the robot at a little bit large obstacle terrain and at a rough terrain and to increase the operational time when the battery **320** is additionally installed in the connecting space **510**.

When the two robots are interconnected in this way, unnecessary parts such as the wheel driving motors **210** may be removed from one of the robots, for instance the robot **1** located behind in FIG. **8** for the purpose of cost reduction.

Next, the operation of the throw-type compact reconnaissance robot **1** of the present invention will be described.

First, in the state where the tail **420** of the camera viewing angle adjustor **400** mounted on the reconnaissance robot **1** of the present invention is folded toward the body **100**, the reconnaissance robot **1** is surrounded or not by a separate protector (not shown), and then is launched to an area to be reconnoitered by a separate launch machine (not shown) or is thrown to an area to be reconnoitered by hand.

The thrown reconnaissance robot **1** gets a drop shock when it hits the ground. The throw-type compact reconnaissance robot **1** of the present invention is configured so that the tires **270** absorb the shock to a high level. Thus, the shock transferred to the circuit board **130** and the camera **140** housed in the body **100** is reduced. Further, the drop shock is reduced by the rubber rings **160** surrounding the shield cover **150**. In addition, since the driving wheels **240** as well us the battery housing **310** and battery housing cover **330** surrounding the battery **320** are formed of ultrahigh molecular weight polyethylene strong to the shock, the throw-type compact reconnaissance robot **1** is much strong to the shock.

The robot **1** reaching a reconnoitering space unfolds the tail **420** to a proper angle using the tail driving motor **410**, thereby completing the preparation for movement. The tail **420** is unfolded to prevent the rotation of the body **100** so as to maintain a predetermined angle with respect to the ground. Thereby, the movement caused by the rotation of the driving

wheels **240** is possible. The turnabout and the forward and backward movements are freely possible by the operation of the two stand-alone wheel driving motors **210**.

If necessary, the tail driving motor **410** is driven to adjust the angle of the tail **420** with respect to the body **100**, so that it is possible to adjust the viewing angle of the camera **140**.

The throw-type compact reconnaissance robot **1** of the present invention secures sufficient space for the battery **320** in the driving wheel **240**, so that it can be made compact and significantly increase its operational time.

Although exemplary embodiments of the present invention have been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A throwing compact reconnaissance robot comprising:

a cylindrical body with a camera;

[drivers**]** *a driving part comprising* made up of two tires that are disposed on opposite sides of the body and can be driven individually; and

battery units supplying power used to operate the robot and disposed in inner spaces of the tires of the drivers on opposite outermost sides of the robot,

wherein the body includes a frame in which electric parts are mounted and a shield cover that surrounds the frame and has a shape of a C-shaped thin plate, the frame and the shield cover of the body have rubber rings *which are* fitted around them *and by which the shield cover is surrounded and fixed to the frame*, and each rubber ring includes a metal wire serving as an antenna embedded therein so that the metal wire is connected to a circuit board for telecommunication mounted in the body and functions as the antenna when remote control is performed by radio.

2. The throwing compact reconnaissance robot as set forth in claim **1**, wherein: each driver includes a cylindrical driving wheel; each tire is fitted on an outer side of the driving wheel in a radial direction; and each battery unit is disposed in an inner space of the cylindrical driving wheel.

3. The throwing compact reconnaissance robot as set forth in claim **1**, wherein: each driver includes a cylindrical driving wheel and a wheel driving motor; and the driving wheel and the wheel driving motor are geared to transmit a driving force.

4. The throwing compact reconnaissance robot as set forth in claim **1**, wherein each tire is filled therein with air or a sponge so as to be able to absorb a shock when dropped.

5. The throwing compact reconnaissance robot as set forth in claim **1**, wherein each battery unit includes a cylindrical battery housing, a battery mounted in the battery housing, and a battery housing cover.

6. The throwing compact reconnaissance robot as set forth in claim **5**, wherein the battery housing and battery housing cover are each formed of supramolecular polyethylene.

7. The throwing compact reconnaissance robot as set forth in claim **1**, wherein the body includes a tail mounted on a rear surface thereof.

8. The throwing compact reconnaissance robot as set forth in claim **7**, wherein the tail is adjusted in angle by a tail driving motor so as to be able to adjust a viewing angle of the camera.

9. The throwing compact reconnaissance robot as set forth in claim **1**, wherein the robot is connected to another throwing compact reconnaissance robot using a connector member, in an internal connecting space of which a battery, an electric part**[**, etc.**]** are mounted as needed.

10. The throwing compact reconnaissance robot as set forth in claim **1**, wherein the body further includes a repeater for telecommunication.

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