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Fu et al.(10) **Pub. No.: US 2009/0072681 A1**(43) **Pub. Date: Mar. 19, 2009**(54) **RECEIVING DEVICE**(30) **Foreign Application Priority Data**(75) Inventors: **Chung-Yang Fu**, Taipei City (TW);
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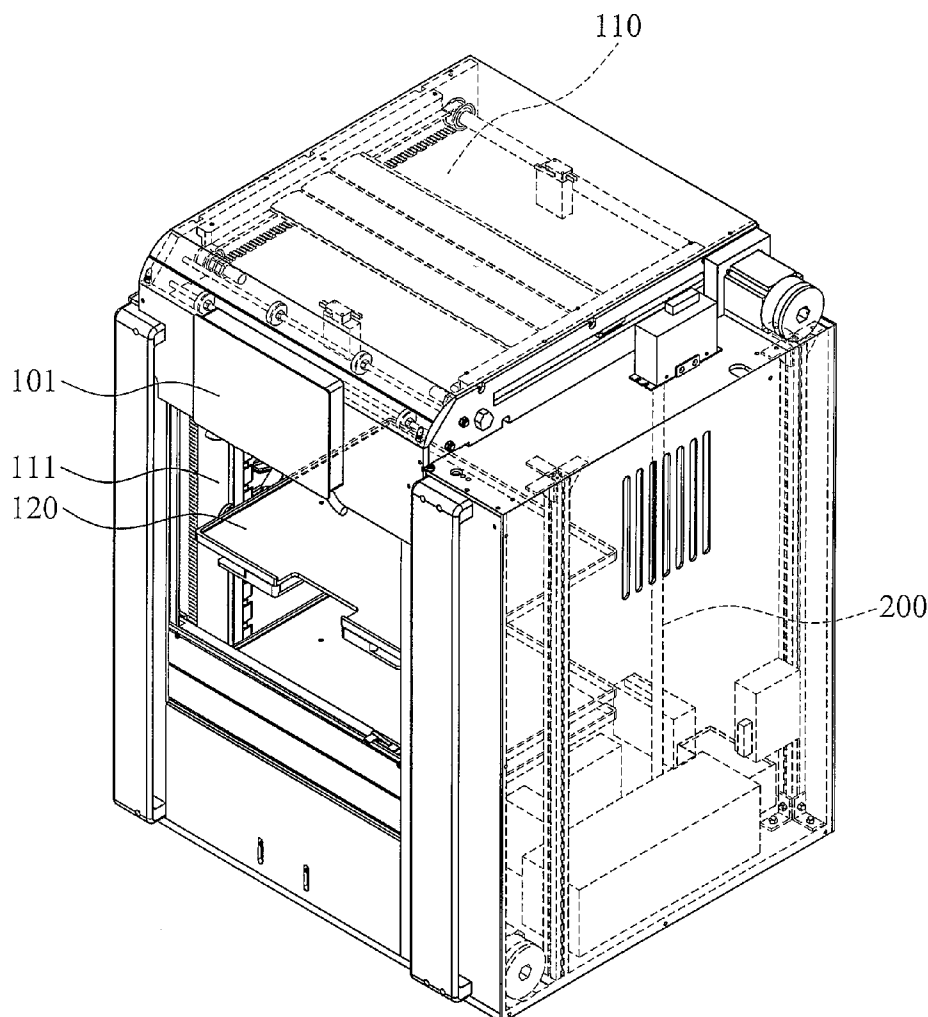
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A47B 45/00 (2006.01)(52) **U.S. Cl.** **312/205**(57) **ABSTRACT**

A receiving device is provided, comprising a chamber, a plurality of spacers, a plurality of positioners and a spacer moving module. The spacers are disposed in the chamber, wherein the spacers define a plurality of receiving spaces. The positioners are disposed in the chamber, wherein the spacers are detachably disposed on the positioners. The spacer moving module is disposed in the chamber, wherein the spacer moving module moves the spacers relative to the positioners to change sizes of the receiving spaces.

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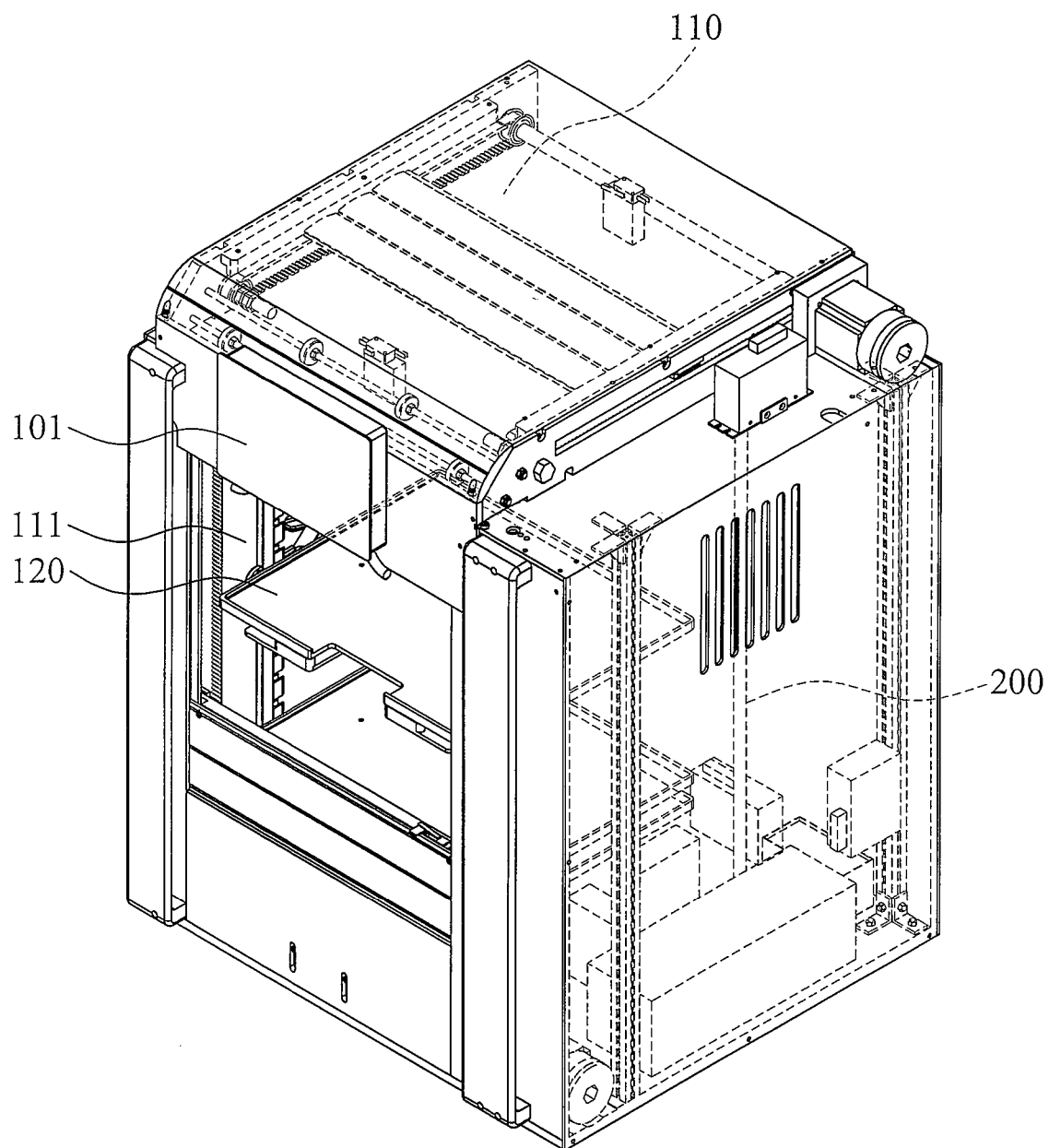
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FIG. 1

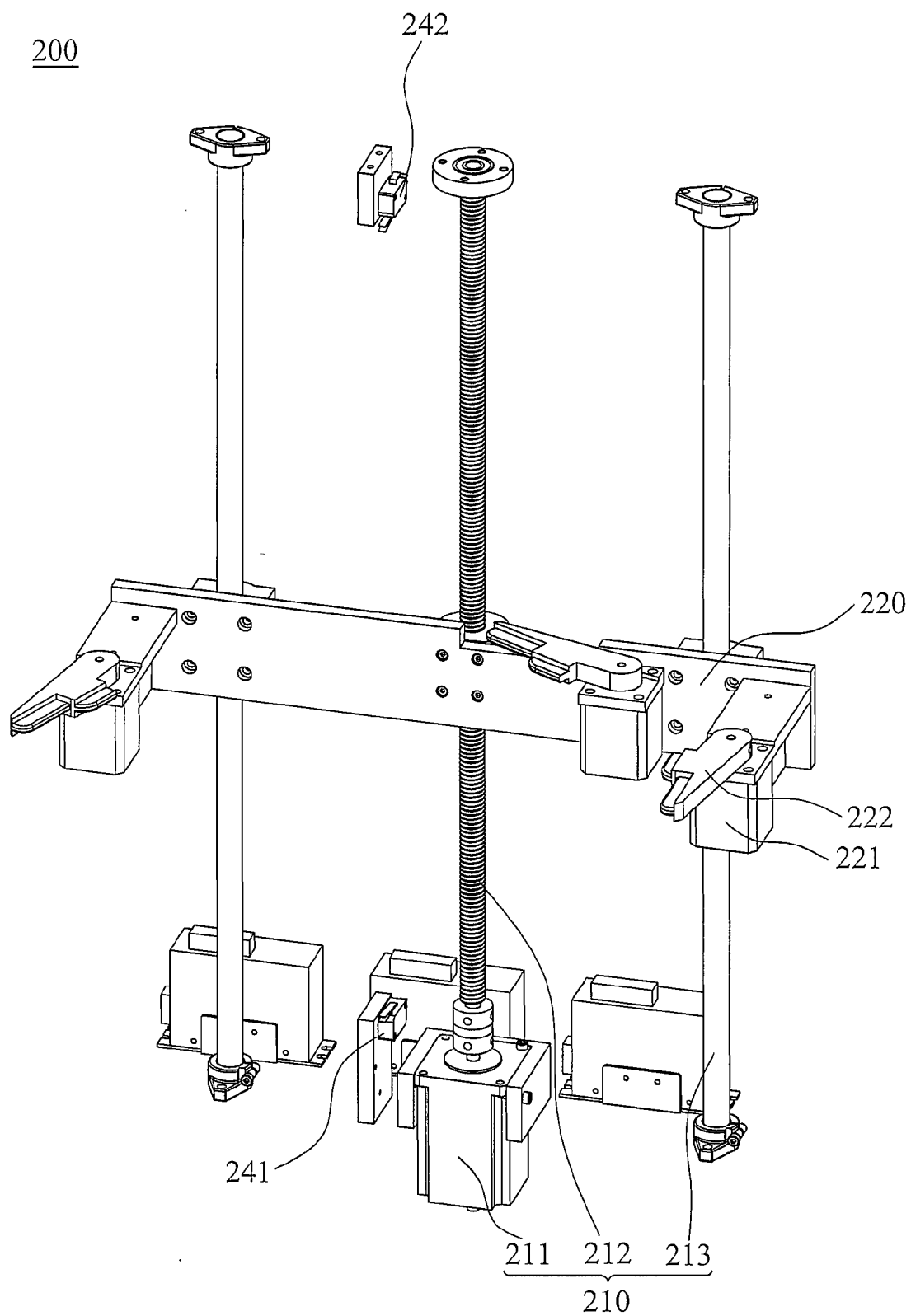


FIG. 2

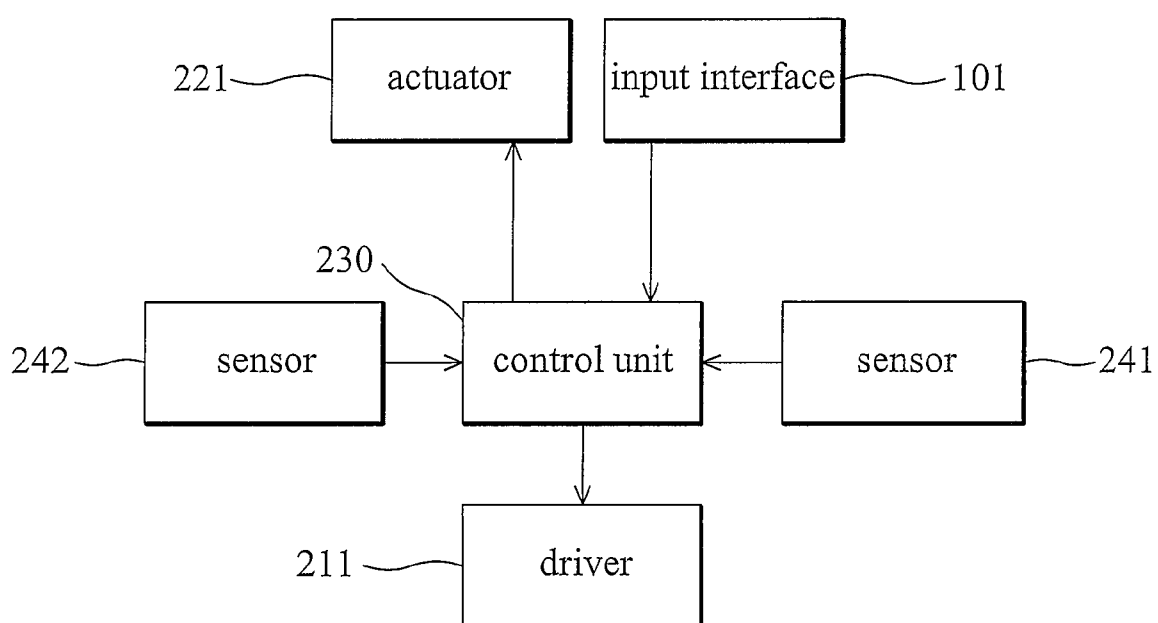


FIG. 3

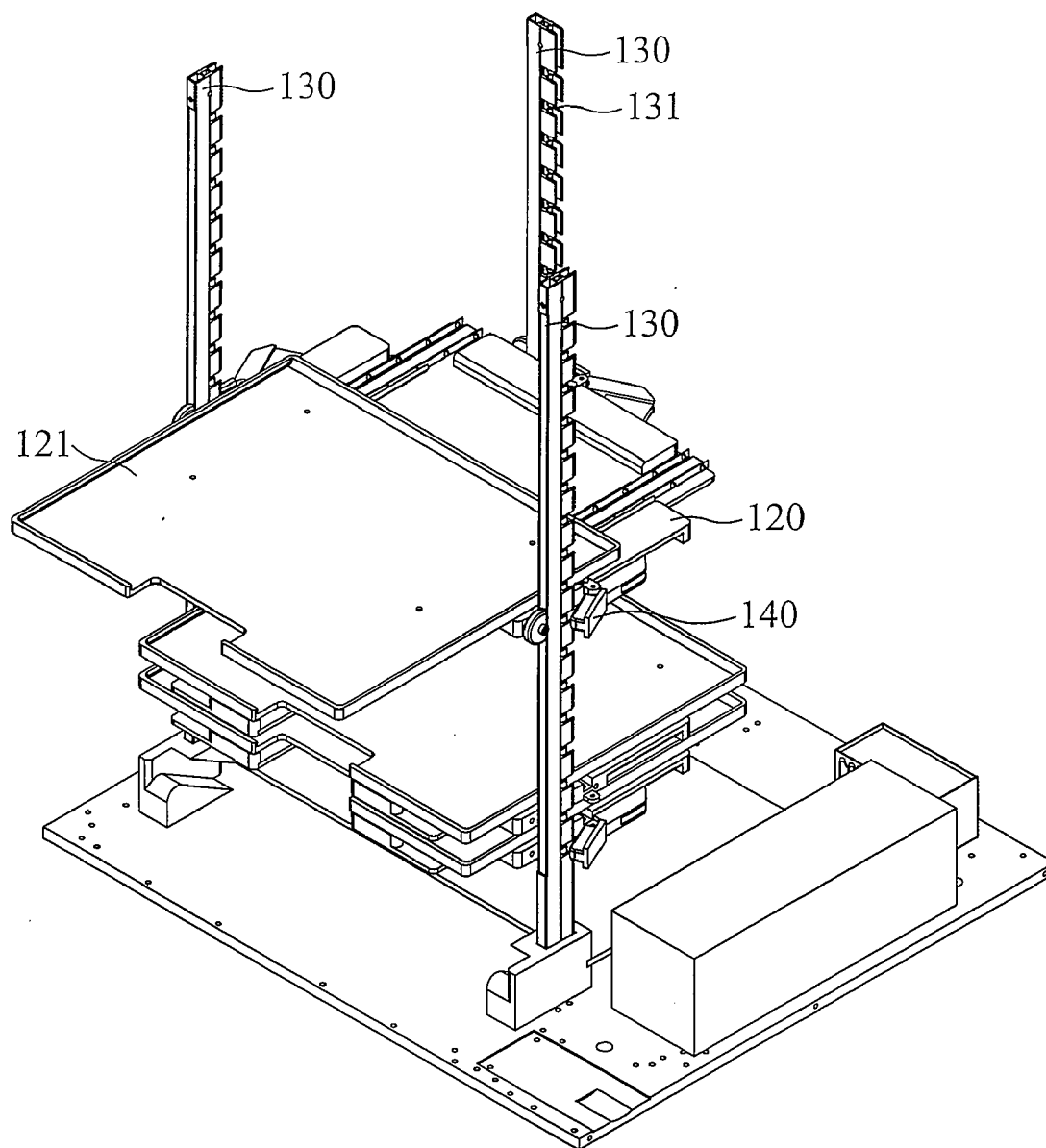


FIG. 4

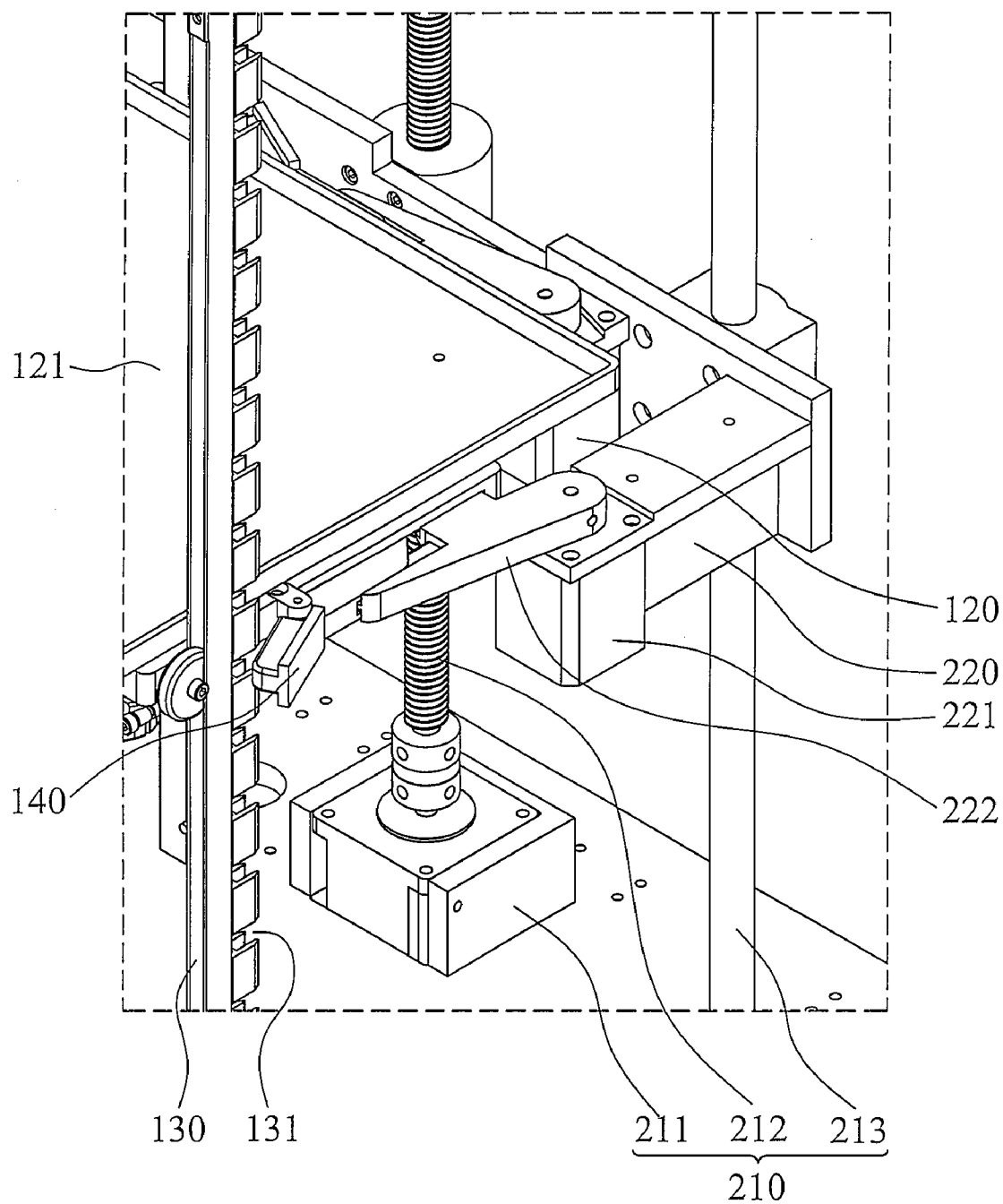


FIG. 5a

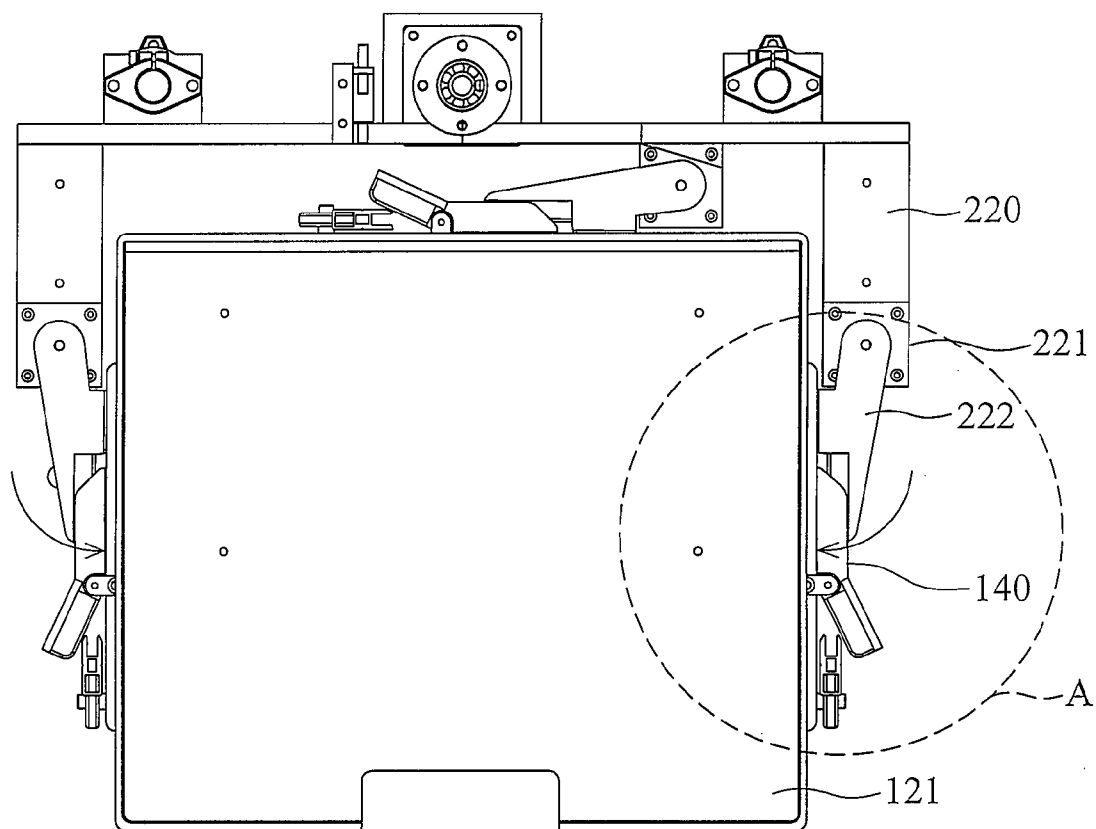


FIG. 5b

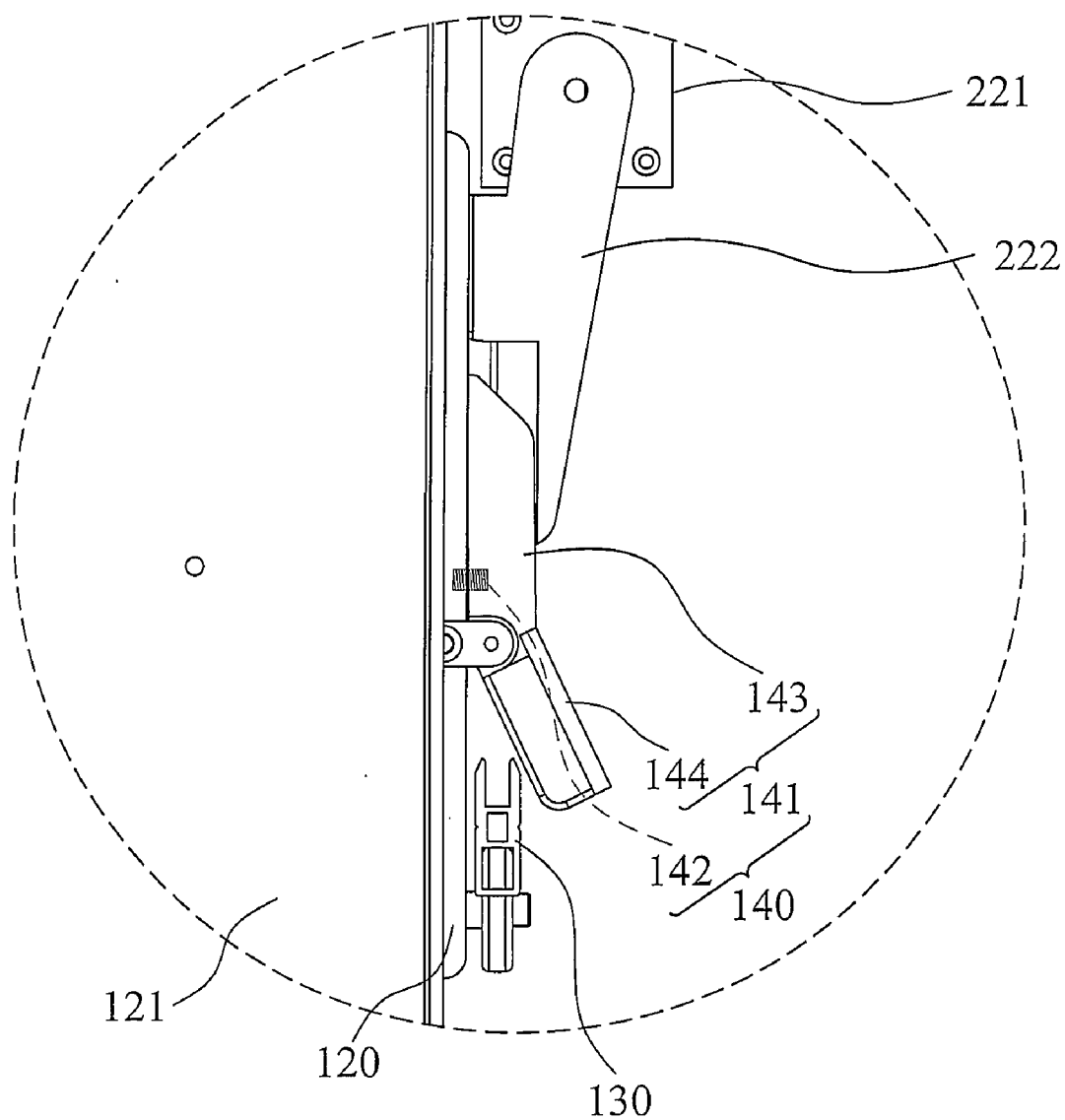


FIG. 5c

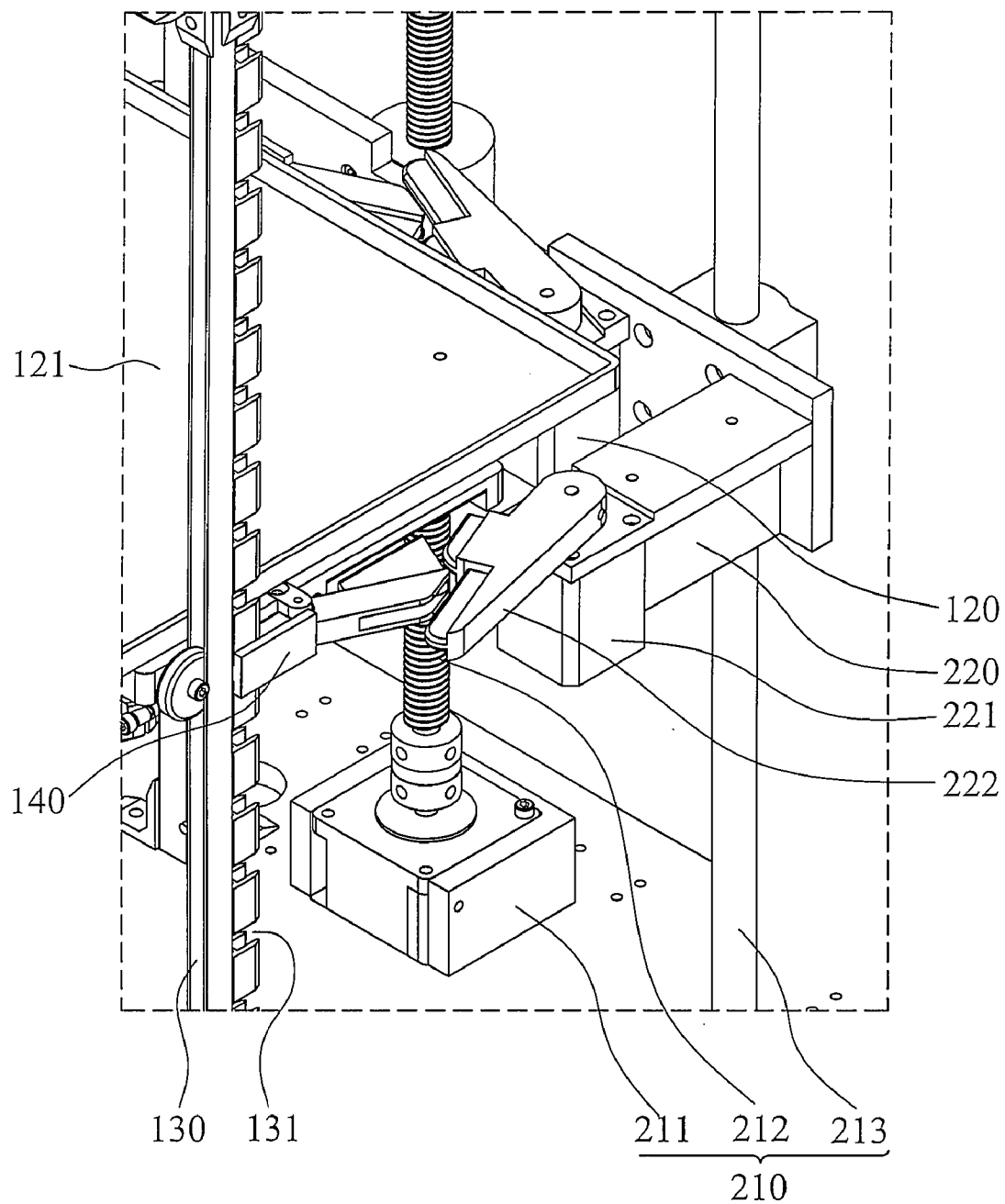


FIG. 6a

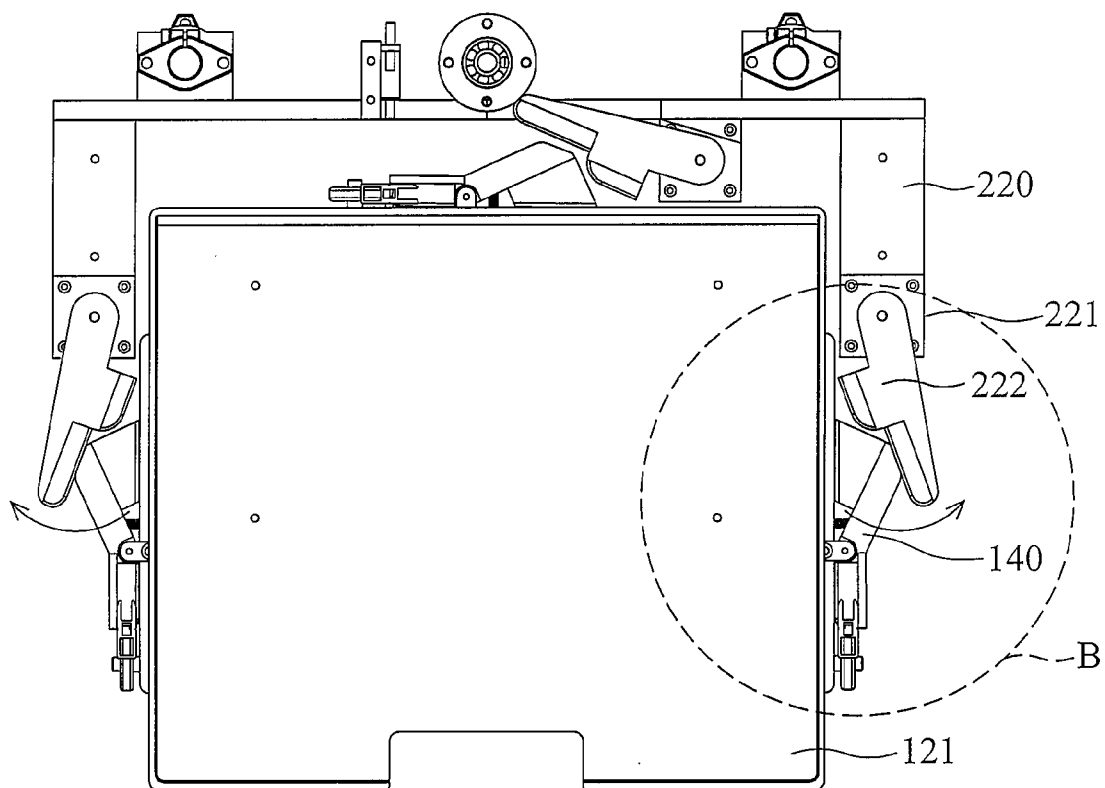


FIG. 6b

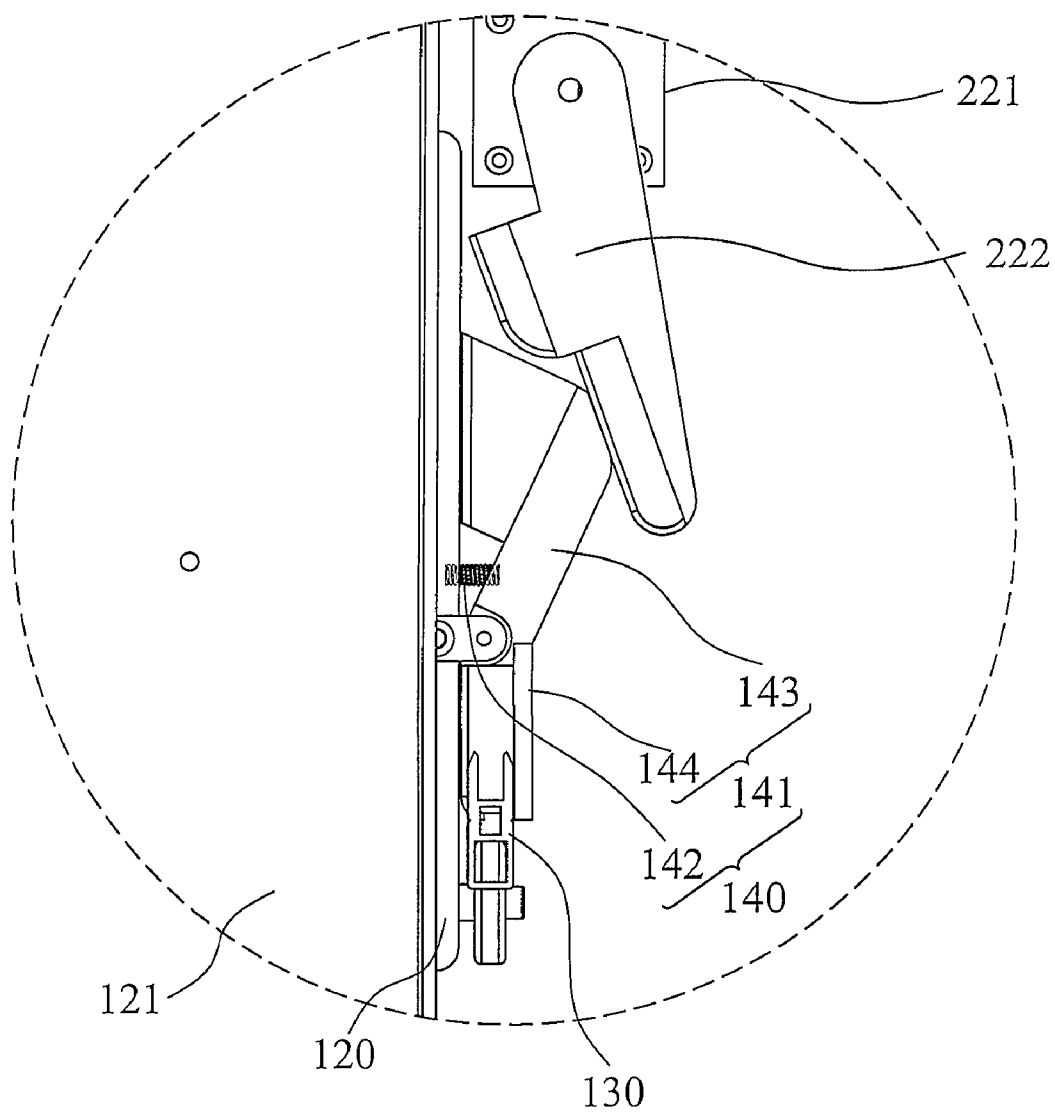


FIG. 6c

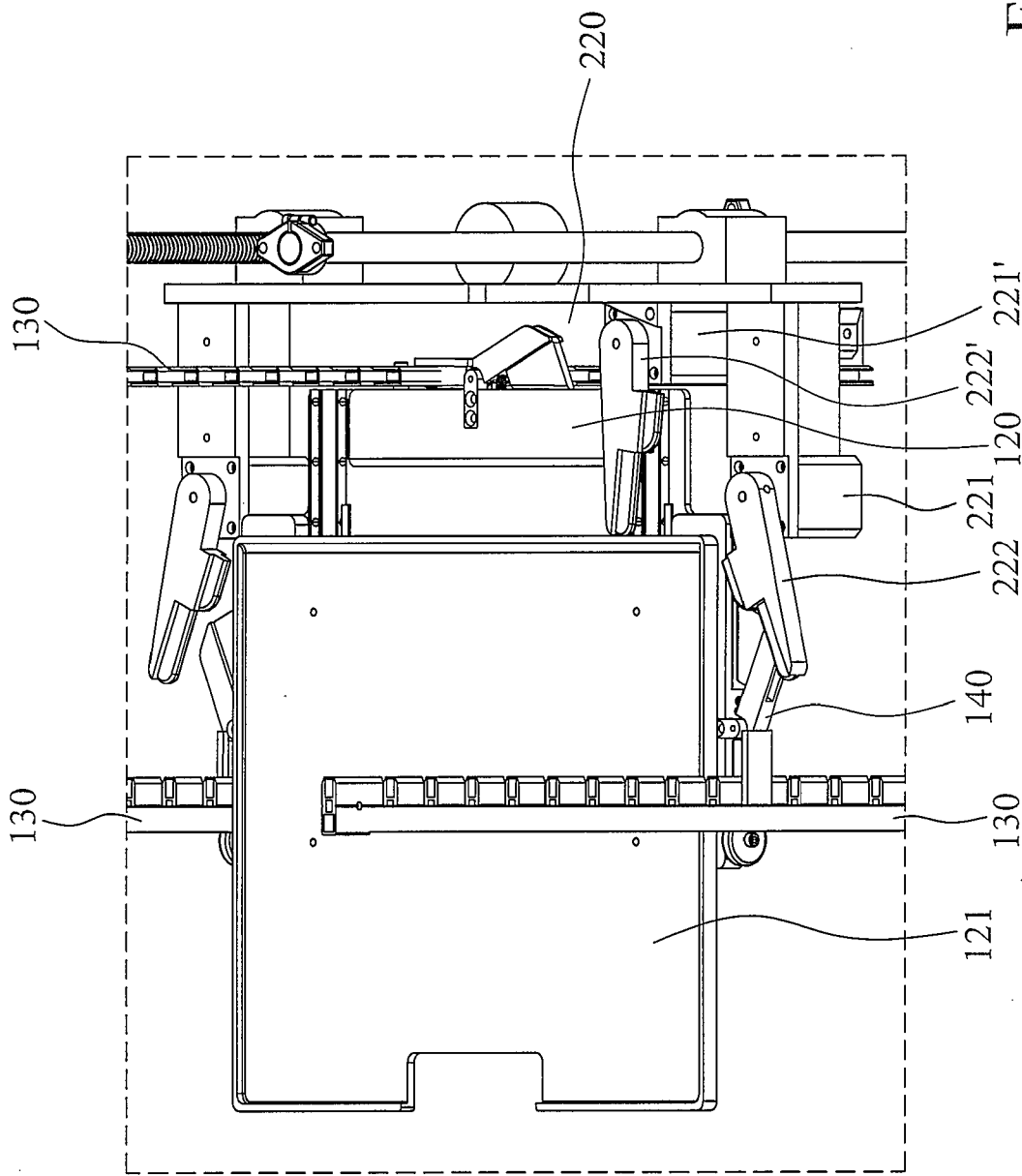


FIG. 7

RECEIVING DEVICE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention relates to a receiving device, and more particularly to a receiving device which automatically changes sizes of receiving spaces thereof.

[0003] 2. Description of the Related Art

[0004] Conventional receiving devices, for example, office cabinets or bookcases, have receiving spaces with fixed sizes. Therefore, large-sized objects or books cannot be received in the fixed sized office cabinets or bookcases.

[0005] Thus, conventional office cabinets or bookcases with changeable sized receiving spaces have been developed. A user can change the sizes of the receiving spaces by manually detaching the spacers and positioning posts which support the spacers. The user changes fixing positions of the positioning posts to change the position of the spacer and the size of the receiving spaces. However, the positioning posts are difficult to be detached from the inner walls of the office cabinet or the bookcase which causes inconvenience to users.

BRIEF SUMMARY OF THE INVENTION

[0006] A detailed description is given in the following embodiments with reference to the accompanying drawings.

[0007] A receiving device is provided, comprising a chamber, a plurality of spacers, a plurality of positioners and a spacer moving module. The spacers are disposed in the chamber, wherein the spacers define a plurality of receiving spaces. The positioners are disposed in the chamber, wherein the spacers are detachably disposed on the positioners. The spacer moving module is disposed in the chamber, wherein the spacer moving module moves the spacers relative to the positioners to change sizes of the receiving spaces.

[0008] In the invention, the spacers are moved automatically to change the sizes of the receiving spaces. The detaching problem of conventional positioning posts is prevented. Additionally, in the invention, the control unit changes the sizes of the receiving spaces according to available space in the receiving device via data inputted by the user. Therefore, the invention saves time, and improves convenience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention can be more fully understood by reading the subsequent detailed description and examples with references made to the accompanying drawings, wherein:

[0010] FIG. 1 shows a receiving device of the invention;

[0011] FIG. 2 shows a detailed structure of a spacer moving module of the invention;

[0012] FIG. 3 is a block diagram of the spacer moving module;

[0013] FIG. 4 shows a detailed structure of spacers and positioners of the invention;

[0014] FIGS. 5a and 5b show wedging units separated from the positioners;

[0015] FIG. 5c is an enlarged view of the portion A of FIG. 5b;

[0016] FIGS. 6a and 6b show the wedging units connected to the positioners;

[0017] FIG. 6c is an enlarged view of the portion B of FIG. 6b; and

[0018] FIG. 7 shows a holding element pushing an extending plate.

DETAILED DESCRIPTION OF THE INVENTION

[0019] The following description is of the best-contemplated mode of carrying out the invention. This description is made for the purpose of illustrating the general principles of the invention and should not be taken in a limiting sense. The scope of the invention is best determined by reference to the appended claims.

[0020] FIG. 1 shows a receiving device 100 of the invention, which comprises a chamber 110, an input interface 101, a plurality of spacers 120, a plurality of positioners (not show) and a spacer moving module 200. The spacers 120 are disposed in the chamber 110, and define a plurality of receiving spaces 111 in the chamber 110. The positioners are disposed in the chamber 110, and the spacers 120 are detachably disposed on the positioners. The spacer moving module 200 is disposed in the chamber 110. The spacer moving module 200 moves the spacers 120 relative to the positioners to change sizes of the receiving spaces 111.

[0021] FIG. 2 shows a detailed structure of the spacer moving module 200. The spacer moving module 200 comprises a moving unit 210 and a holding unit 220. The holding unit 220 holds the spacers. The moving unit 210 moves the holding unit 220. The moving unit 210 comprises an actuating element 211, a rod 212 and rods 213. The actuating element 211 is motor, and the rod 212 is a thread rod. The actuating element 211 is connected to and rotates the rod 212 to move the holding unit 220 on the rod 212. The holding unit 220 is connected to the rods 213 which are smooth rods to limit a moving path of the holding unit 220. In the embodiment of the invention, the actuating element 211 is a stepping motor, which precisely controls position of the holding unit 220.

[0022] The holding unit 220 comprises a plurality of actuators 221 and a plurality of holding elements 222. The actuators 221 actuate the holding elements 222 to hold the spacers. The actuators 221 are motors.

[0023] With reference to FIG. 3, the spacer moving module 200 further comprises a control unit 230. The control unit 230 is electrically connected to the input interface 101, the actuating element 211 and the actuators 221. The control unit 230 controls the actuating element 211 and the actuators 221 according to orders inputted to the input interface 101. With reference to FIG. 2, the spacer moving module 200 further comprises a sensor 241 and a sensor 242. The sensor 241 and the sensor 242 are disposed in the chamber, and electrically connected to the control unit 230. The sensor 241 and the sensor 242 detect a position of the holding unit 220 to prevent the holding unit 220 from extraordinary collision. In the embodiment of the invention, the sensor 241 and the sensor 242 are limit switches.

[0024] FIG. 4 shows a detailed structure of the spacers 120 and the positioners 130. Each spacer 120 comprises a plurality of wedging unit 140. The wedging units 140 are disposed on edges of the spacer 120. The spacer 120 is detachably disposed on the positioners 130 via the wedging units 140. The spacer 120 further comprises an extending plate 121. The extending plate 121 slides on the surface of the spacer 120. Each positioner 130 comprises a plurality of positioning notches 131. The positioning notches 131 are wedged to the wedging unit 140 to fix the spacer 120.

[0025] FIGS. 5a and 5b show the wedging units 140 separated from the positioners 130. FIG. 5c is an enlarged view of the portion A of FIG. 5b, wherein the holding elements 222 press the wedging unit 140. Each wedging unit 140 comprises a lever 141 and an elastic element 142. The lever 141 comprises a wedging portion 144 and a holding portion 143. The holding element 222 presses the holding portion 143 to rotate the lever 141 to a first orientation and separate the wedging portion 144 from the positioner 130 to free the spacer 120.

[0026] FIGS. 6a and 6b show the wedging units 140 connected to the positioners 130. FIG. 6c is an enlarged view of the portion B of FIG. 6b, wherein the holding element 222 is separated from the holding portion 143. The elastic element 142 presses the holding portion 143 to rotate the lever 141 to a second orientation. In the second orientation, the wedging portion 144 enters the positioning notch of the positioner 130 to be fixed thereon.

[0027] In the embodiment of the invention, the elastic elements 142 are springs. The spacers 120 are detachably connected to the positioners by rotating the levers 140 between the first and second orientations.

[0028] With reference to FIG. 7, the extending plate slides on the surface of the spacer 120. When a user accesses an object placed on the extending plate, the control unit moves the holding unit 220 corresponding to the extending plate 121. Then, the actuator 221' behind the extending plate 121 actuates the holding element 222' to push the extending plate 121 forward out of the opening of the chamber allowing the user to access the object placed thereon. After accessing the object, the user pushes the extending plate 121 back into the chamber.

[0029] In the invention, the spacers are moved automatically to change the sizes of the receiving spaces. The detaching problem of conventional positioning posts is prevented. Additionally, in the invention, the control unit changes the sizes of the receiving spaces according to available space in the receiving device via data inputted by the user. Therefore, the invention saves time, and improves convenience.

[0030] While the invention has been described by way of example and in terms of preferred embodiment, it is to be understood that the invention is not limited thereto. To the contrary, it is intended to cover various modifications and similar arrangements (as would be apparent to those skilled in the art). Therefore, the scope of the appended claims should be accorded the broadest interpretation so as to encompass all such modifications and similar arrangements.

What is claimed is:

1. A receiving device, comprising:
 - a chamber;
 - a plurality of spacers, disposed in the chamber, wherein the spacers define a plurality of receiving spaces;
 - a plurality of positioners, disposed in the chamber, wherein the spacers are detachably disposed on the positioners; and
 - a spacer moving module, disposed in the chamber, wherein the spacer moving module moves the spacers relative to the positioners to change sizes of the receiving spaces.
2. The receiving device as claimed in claim 1, wherein the spacer moving module comprises a moving unit and a holding unit, the holding unit holds the spacers, and the moving unit moves the holding unit.

3. The receiving device as claimed in claim 2, wherein the moving unit comprises an actuating element and a rod, and the holding unit is moved on the rod by the actuating element.

4. The receiving device as claimed in claim 3, wherein the actuating element is a motor, the rod is a thread rod, and the actuating element rotates the rod to move the holding unit relative to the rod.

5. The receiving device as claimed in claim 4, wherein the actuating element is a stepping motor.

6. The receiving device as claimed in claim 3, wherein the holding unit comprises at least one actuator and a plurality of holding elements, the actuator actuates the holding elements to hold the spacers.

7. The receiving device as claimed in claim 6, wherein the actuator is a motor.

8. The receiving device as claimed in claim 2, wherein the spacer moving module further comprises a control unit, the control unit is electrically connected to the moving unit and the holding unit to control movements thereof.

9. The receiving device as claimed in claim 8, wherein the spacer moving module further comprises a sensor, disposed in the chamber and electrically connected to the control unit for sensing a position of the holding unit.

10. The receiving device as claimed in claim 9, wherein the sensor is a limit switch.

11. The receiving device as claimed in claim 1, wherein each spacer comprises a plurality of wedging units, the wedging units are disposed on edges of the spacer, and the spacer is detachably disposed on the positioners via the wedging units.

12. The receiving device as claimed in claim 11, wherein each wedging unit comprises a lever and an elastic element, the lever comprises a wedging portion and a holding portion, the lever rotates between a first orientation and a second orientation, the spacer moving module presses the holding portion to separate the wedging portion from the positioner when the lever is in the first orientation, and the elastic element pushes the holding portion to connect the wedging portion to the positioner when the lever is in the second orientation.

13. The receiving device as claimed in claim 12, wherein the elastic element is a spring.

14. The receiving device as claimed in claim 12, wherein each positioner comprises a plurality of positioning notches, and the wedging portion extends into the positioning notches to be connected to the positioner.

15. The receiving device as claimed in claim 12, wherein the spacer moving module comprises a moving unit and a holding unit, the holding unit holds the spacers, and the moving unit moves the holding unit.

16. The receiving device as claimed in claim 15, wherein the holding unit comprises at least one actuator and a plurality of holding elements, the actuator actuates the holding elements to hold the holding portions.

17. The receiving device as claimed in claim 1, wherein each spacer comprises an extending plate, the extending plate is slidably disposed on the spacer.

18. The receiving device as claimed in claim 17, wherein the spacer moving module contacts the extending plate to push the extending plate out of the chamber.

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