US 20140061227A1

(19) **United States**

(12) **Patent Application Publication**

CHEN et al.

(10) **Pub. No.: US 2014/0061227 A1**

(43) **Pub. Date: Mar. 6, 2014**

(54) **VENDING MACHINE WITH GOODS DRIVING MECHANISM**

(71) Applicants: **HON HAI PRECISION INDUSTRY CO., LTD.**, New Taipei (TW); **HONG FU JIN PRECISION INDUSTRY (WUHAN) CO., LTD.**, Wuhan (CN)

(72) Inventors: **YUN-LUNG CHEN**, New Taipei (TW); **CHUNG CHAI**, New Taipei (TW); **DA-LONG SUN**, Wuhan (CN); **CHUAN LIN**, Wuhan (CN)

(73) Assignees: **HON HAI PRECISION INDUSTRY CO., LTD.**, New Taipei (TW); **HONG FU JIN PRECISION INDUSTRY (WUHAN) CO., LTD.**, Wuhan (CN)

(21) Appl. No.: **13/905,368**

(22) Filed: **May 30, 2013**

(30) **Foreign Application Priority Data**

Sep. 4, 2012 (CN) 2012103216899

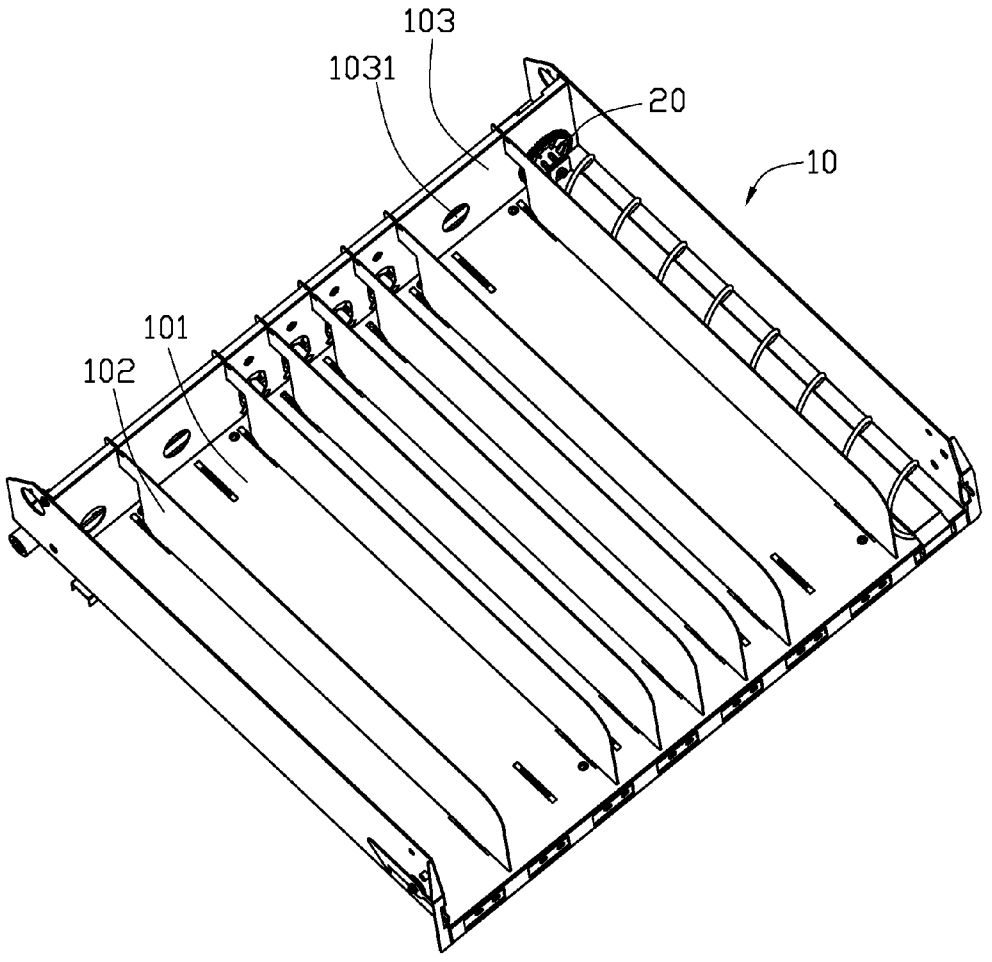
Publication Classification

(51) **Int. Cl.**
A47F 1/12 (2006.01)

(52) **U.S. Cl.**
CPC ***A47F 1/125*** (2013.01)
USPC **221/277**

(57) **ABSTRACT**

A goods driving mechanism for a vending machine includes a driver, an angle adjuster, and a release member. The angle adjuster is detachably secured to the driver and defines a plurality of diametrically-opposed through holes. A tip end of the release member extends through any diametrically-opposed pair of though holes thereby mounting the tip end of the release member to the angle adjuster. The release member is rotatable about its central axis to move goods in a direction along the central axis of the release member driven by the driver, and the starting angle of the release member can be adjusted very easily, to ensure effective delivery of any goods selected by a customer.



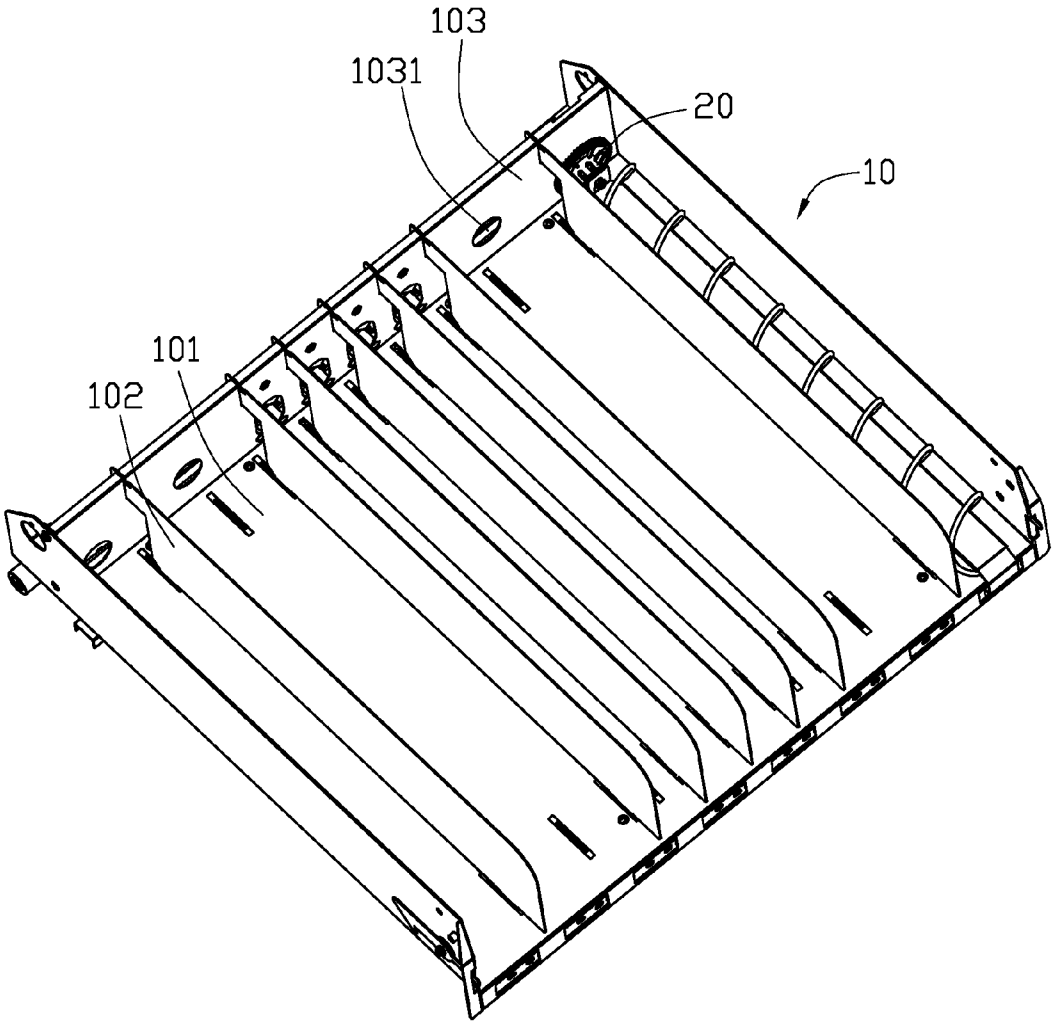


FIG. 1

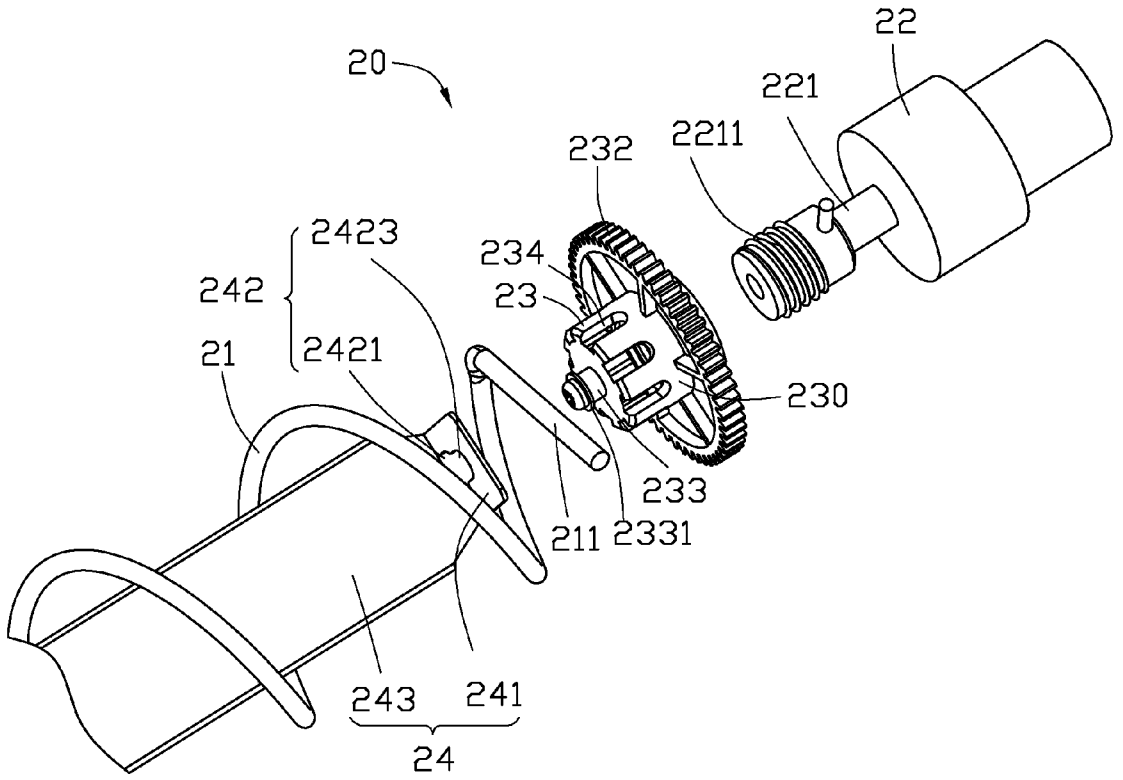

20
22
221
2211
232
2423
234
242
23
21
2421
230
233
211
2331
243
241
24

FIG. 2

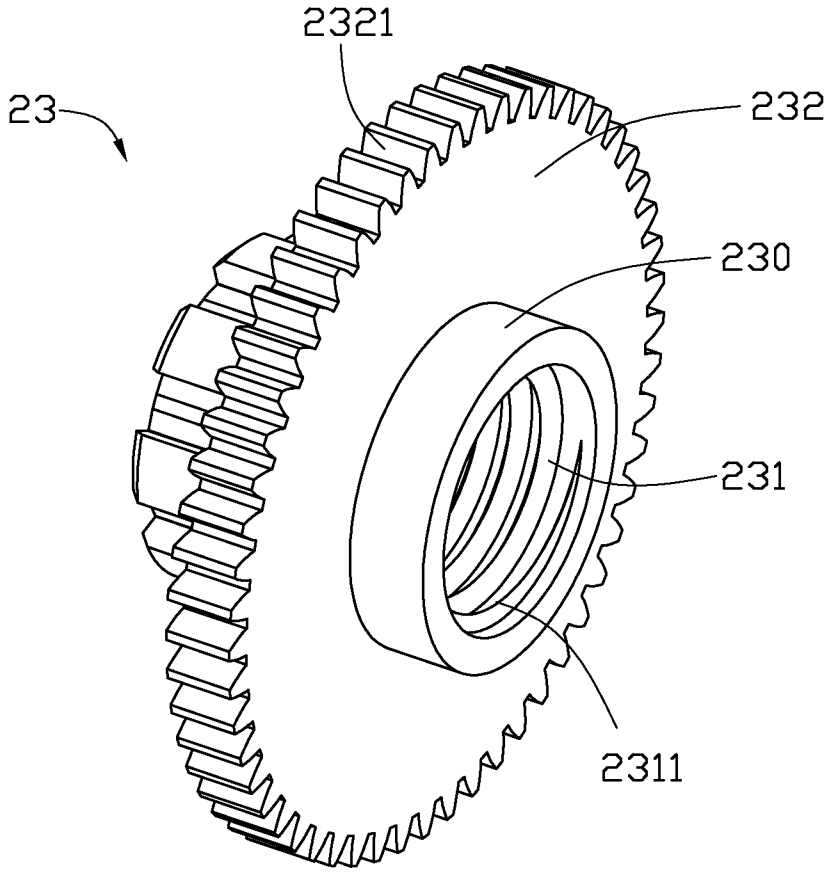


FIG. 3

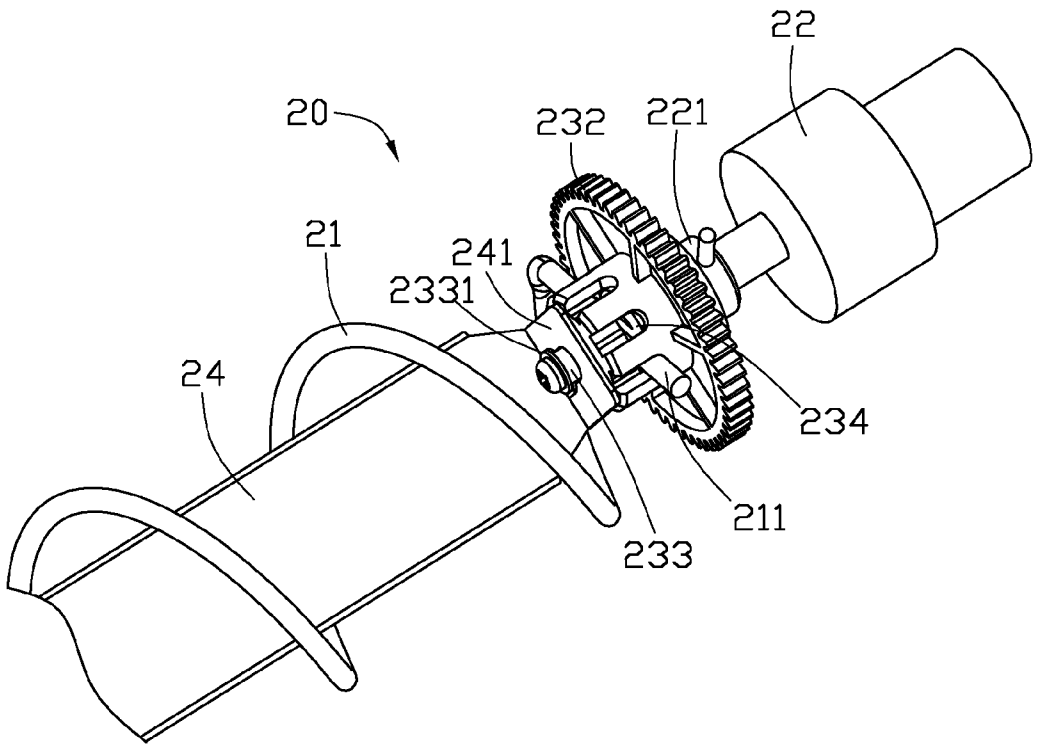


FIG. 4

VENDING MACHINE WITH GOODS DRIVING MECHANISM

BACKGROUND

[0001] 1. Technical Field

[0002] The present disclosure relates to vending machines, and more particularly to a vending machine with a goods driving mechanism.

[0003] 2. Description of Related Art

[0004] Vending machines typically include a stock tray, and the stock tray includes a plurality of separator plates. A plurality of passages is defined between the separator plates for the merchandise to pass along. A release member is located in each of the plurality of passages. When the customer purchases the merchandise from the vending machine, a driver moves the release member to push the merchandise out of the passage. The starting position of the release member may need adjustment to ensure that the merchandise drops into a delivery tray before the permitted movement of the release member is ended. However, when adjusting the position of the release member, the release member, the driver, and the plurality of separator plates need to be detached from the stock tray, which is inconvenient. Therefore, there is room for improvement within the art.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Many aspects of the embodiments can be better understood with reference to the following drawings. The components in the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the embodiments. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views.

[0006] FIG. **1** is an isometric view of a goods driving mechanism and a stock tray in accordance with an embodiment.

[0007] FIG. **2** is an exploded, isometric view of the goods driving mechanism of FIG. **1**.

[0008] FIG. **3** is an isometric view of an angle adjuster of FIG. **2**.

[0009] FIG. **4** is an assembled view of the driving mechanism of FIG. **2**.

DETAILED DESCRIPTION

[0010] The disclosure is illustrated by way of example and not by way of limitation in the figures of the accompanying drawings in which like references indicate similar elements. It should be noted that references to "an" or "one" embodiment in this disclosure are not necessarily to the same embodiment, and such references mean "at least one."

[0011] FIGS. **1** and **2** illustrate an embodiment of a vending machine. The vending machine includes a stock tray **10** and a plurality of goods driving mechanisms **20** secured to the stock tray **10**. In this embodiment, only one goods driving mechanism **20** is described. The goods driving mechanism **20** includes a release member **21**, a driver **22**, an angle adjuster **23**, and a supporting plate **24**. In one embodiment, the release member **21** is a rigid helical coil, and the driver **22** is a motor.

[0012] The stock tray **10** includes a rear plate **103** and a plurality of separator plates **102**. A channel **101** is defined between every two separator plates **102**, for receiving the goods driving mechanism **20**. The plurality of separator plates **102** is substantially parallel to each other and secured to the rear plate **103**. The rear plate **103** defines an installation hole **1031** corresponding to each channel **101**.

[0013] The release member **21** surrounds the supporting plate **24**. Goods (not shown) may be placed on the supporting plate **24** between adjacent coils of the release member **21**. The release member **21** is rotated to move the goods in a direction along a central axis of the release member **21**.

[0014] A rotating shaft **221** is connected to the driver **22**, and a plurality of outer threads **2211** is located on an outer surface of the rotating shaft **221**, for securing the angle adjuster **23**.

[0015] FIGS. **2** and **3** show the angle adjuster **23** includes a securing post **230** and a turntable **232** located on the securing post **230**. A securing hole **231** is defined in a first end of the securing post **230**, along an axis direction of the securing post **230**. A plurality of inner threads **2311** is located on an inner wall of the securing hole **231**, corresponding to the plurality of outer threads **2211**. A plurality of through holes **234** is defined in a second end, opposite to the first end of the securing post **230** and arranged in the peripheral surface of the securing post **230**. Each of the through holes **234** extends through the securing post **230** radial direction and has a diametrically opposite through hole **234**. The plurality of through holes **234** is equidistantly spaced around the securing post **230** and any through hole **234**, and its diametrically opposite counterpart can receive a tip end **211** of the release member **21**. A pivot shaft **233** extends outwards from the second end of the securing post **230**, for hanging the supporting plate **24**. A blocking gasket **2331** is located on a distal end of the pivot shaft **233**, for preventing the disengagement of the supporting plate **24** from the pivot shaft **233**. In one embodiment, the securing post **230** is substantially columnar.

[0016] The turntable **232** is located on outer surface of the securing post **230** and has a same central axis with the securing post **230**. A plurality of teeth **2321** is located on a periphery of the turntable **232**, for conveniently rotating the angle adjuster **23**.

[0017] FIG. **2** shows that, the supporting plate **24** includes an elongated plate body **243** and a hanging tab **241**. The hanging tab **241** extends upwards from one end of the elongated plate body **243**. A hanging hole **242** is defined in the hanging tab **241** for receiving the pivot shaft **233**. The hanging hole **242** includes a wide portion **2421** and a narrow portion **2423** communicating with the wide portion **2421**. In one embodiment, the hanging tab **241** is substantially perpendicular to the elongated plate body **243**, and the plate body **243** is substantially strip-shaped.

[0018] FIG. **4** illustrates that, in assembly, the tip end **211** of the release member **21** selectively extends through two of the plurality of though holes **234**, thereby mounting the tip end **211** of the release member **21** to the angle adjuster **23**. The rotating shaft **221** of the driver **22** extends through the installation hole **1031** and is inserted into the securing hole **231** of the angle adjuster **23**. The rotating shaft **221** is rotated, until a top end of the rotating shaft **221** binds against the tip end **211** of the release member **21**. Thus, the angle adjuster **23** is secured to the rotating shaft **221** of the driver **22**.

[0019] The plate body **243** of supporting plate **24** is received in the release member **21**. The blocking gasket **2331** extends through the wide portion **2421**. The pivot shaft **233** is moved from the wide portion **2421** to the narrow portion **2423**, to hang the supporting plate **24** on the pivot shaft **233**. The goods driving mechanism **20** is thereby secured to the delivery tray **10**.

[0020] In use, the driver **22** rotates the rotating shaft **221**. The angle adjuster **23** is rotated together with the rotating shaft **221**, to rotate the release member **21** about its central axis, and the release member **21** moves the good in the direction along the central axis of the release member **21**, until the goods falls from the end of the supporting plate **24**.

[0021] After repeated delivering of goods, rotating error of the driver **22** may occur such that goods would not be delivered to the end of the supporting plate **24**. The operator may detach the angle adjuster **23** from the rotating shaft **221**, and then the tip end **211** of the release member **21** is drawn out from the angle adjuster **23** and re-inserted into another two of the plurality of through holes **234**, to adjust the starting angle of the release member **21**. The starting angle of the release member **21** is adjustable accordingly, to ensure that all selected goods are well delivered from the supporting plate **24**.

[0022] It is to be understood, however, that even though numerous characteristics and advantages have been set forth in the foregoing description of embodiments, together with details of the structures and functions of the embodiments, the disclosure is illustrative only and changes may be made in detail, especially in the matters of shape, size, and arrangement of parts within the principles of the disclosure to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A goods driving mechanism comprising:
a driver;
an angle adjuster detachably secured to the driver and defining a plurality of through holes; and
a release member comprising a tip end secured to the angle adjuster, and the release member being movable by the driver, about a central axis, to move goods in a direction substantially parallel to the central axis of the release member;
wherein a starting angle of the release member relative to the angle adjuster is changeable, by engaging the tip end of the release member in different diametrically-opposed pair of the plurality of through holes.

2. The goods driving mechanism of claim **1**, wherein a rotating shaft is connected to the driver, the angle adjuster comprises a securing post defining a securing hole, the rotating shaft is engaged in the securing hole and abuts the tip end of the release member, to prevent the release member from disengaging from the angle adjuster.

3. The goods driving mechanism of claim **2**, wherein the plurality of through holes is defined in the periphery of the securing post and communicates with the securing hole.

4. The goods driving mechanism of claim **2**, wherein the rotating shaft comprises a plurality of outer threads, and a plurality of inner threads is located in an inner wall of the securing hole corresponding to the plurality of outer threads.

5. The goods driving mechanism of claim **3**, wherein the angle adjuster further comprises a turntable extending from the securing post, and a plurality of racks is located in periphery of the turntable.

6. The goods driving mechanism of claim **2**, further comprising a supporting plate, wherein the supporting plate hangs on the angle adjuster and is configured to support the goods.

7. The goods driving mechanism of claim **6**, wherein the supporting plate comprises a plate body, and the release member surrounds the plate body and is configured to be rotated relative to the plate body.

8. The goods driving mechanism of claim **7**, wherein the supporting plate further comprises a hanging tab defining a hanging hole, a pivot shaft extends from the securing post, and the pivot shaft is received in the hanging hole, to hang the supporting plate on the pivot shaft.

9. The goods driving mechanism of claim **8**, wherein the hanging tab extends from the plate body, and the hanging tab is substantially perpendicular to the plate body.

10. The goods driving mechanism of claim **8**, wherein a blocking gasket is located on a distal end of the pivot shaft, the hanging hole comprises a wide portion and a narrow portion communication with the wide portion, and the blocking gasket extends through the wide portion to engage the pivot shaft in the narrow portion.

11. A vending machine comprising:
a stock tray, and
a goods driving mechanism secured to the stock tray, the goods driving mechanism comprising:
a driver;
an angle adjuster detachably secured to the driver and defining a plurality of through holes; and
a release member comprising a tip end secured to the angle adjuster, and the release member being rotatable driven by the driver about a central axis to move goods in a direction substantially parallel to the central axis of the release member;
wherein a starting angle of the release member relative to the angle adjuster is changeable by engaging the tip end of the release member in different diametrically-opposed pair of the plurality of through holes.

12. The vending machine of claim **11**, wherein a rotating shaft is connected to the driver, the angle adjuster comprises a securing post defining a securing hole, the rotating shaft is rotatably engaged in the securing hole and abuts the tip end of the release member, to prevent the release member from disengaging from the angle adjuster.

13. The vending machine of claim **12**, wherein the plurality of through holes is defined in the securing hole and extends along an axis direction of the securing post.

14. The vending machine of claim **12**, wherein a plurality of outer threads is defined in the rotating shaft, and a plurality of inner threads is located in an inner wall of the securing hole corresponding to the plurality of outer threads.

15. The vending machine of claim **13**, wherein the angle adjuster further comprises a turntable extending from the securing post, and a plurality of racks is located in periphery of the turntable.

16. The vending machine of claim **12**, further comprising a supporting plate, wherein the supporting plate hangs on the angle adjuster and is configured to support the goods.

17. The vending machine of claim **16**, wherein the supporting plate comprises a plate body, the release member surrounds the plate body and moves the goods out of the plate body.

18. The vending machine of claim **17**, wherein the supporting plate further comprises a hanging tab defining a hanging hole, a pivot shaft extends from the securing post, and the pivot shaft is received in the hanging hole, to hang the supporting plate on the pivot shaft.

19. The vending machine of claim **18**, wherein the hanging tab extends from the plate body, and the hanging tab is substantially perpendicular to the plate body.

20. The vending machine of claim **18**, wherein a blocking gasket is located on a distal end of the pivot shaft, the hanging

hole comprises a wide portion and a narrow portion communication with the wide portion, the blocking gasket extends through the wide portion to engage the pivot shaft in the narrow portion.

* * * * *