piece 23a, the second right bearing piece 23b, and the bearing portion 24 so as to extend substantially in the horizontal direction, and supports the lower pedal 28 in the middle way thereof.

[0043] A first sold-out link 30 is disposed at the right end of the first swing support shaft 28a. As illustrated in FIG. 11, the first sold-out link 30 includes a first sold-out base portion 31, a first sold-out contact portion 32, and a first sold-out pressing portion 33. The first sold-out base portion 31 has a substantially disk-like shape and a penetration hole 31a penetrated by the right end of the first swing support shaft 28a is formed. The first sold-out contact portion 32 extends to the left side from the rear part of the first sold-out base portion 31. The first sold-out pressing portion 33 is formed to protrude to the right side from the bottom of the first sold-out base portion 31. The penetration hole 31a formed in the first sold-out base portion 31 is formed to be larger than the first swing support shaft 28a and is configured such that the first sold-out link 30 can freely move relative to the first swing support shaft 28a.

[0044] The second swing support shaft 29a is an axial member disposed to penetrate the through-holes 22a2, 22b2, ~~23b2~~23a2, 23b2, and 24b formed in the first left bearing piece 22a, the first right bearing piece 22b, the second left bearing piece 23a, the second right bearing piece 23b, and the bearing portion 24 so as to extend in the substantially horizontal direction in an area above the first swing support shaft 28a, and supports the upper pedal 29 in the middle way thereof.

[0045] The lower pedal 28 is a plate-like member and is disposed to be swingable about the central axis of the first swing support shaft 28a by inserting the first swing

23b, where one end thereof is inserted into a stopper pin insertion hole 23b3 of the second right bearing piece 23b and the other end thereof is inserted into a stopper pin insertion hole 24c1 of the bearing portion 24 exposed from the second left bearing piece 23a. The stopper pin 34a is coupled to a pedal link 35 and is movable in the vertical direction in the stopper pin insertion holes 23b3 and 24c1 with the movement in the vertical direction of the pedal link 35. The stopper pin 34a comes in contact with the concave portion 292 of the upper pedal 29 located at the initial position.

[0065] The pedal stopper pin 34b is an axial member which is disposed substantially in the horizontal direction between the bearing portion 24 and the second right bearing piece 23b, where one end thereof is inserted into a pedal stopper pin support groove 24c2 of the bearing portion 24 (which is a long groove extending in the vertical direction similarly to the stopper pin insertion hole 24c1, which is closed by a groove bottom which is a drawn portion denoted by a reference sign 24c1, and which is not illustrated in FIG. 6) and the other end thereof is inserted into a pedal stopper pin support groove 23b4 of the second right bearing piece 23b. The second ~~right~~ left bearing piece 23a is provided with an insertion groove 23a4 so as to expose a pedal stopper pin ~~insertion hole~~ support groove 24c2. The pedal stopper pin 34b is coupled to the pedal link 35 and is movable in the vertical direction in the pedal stopper pin support grooves 23b4 and 24c2 with the movement in the vertical direction of the pedal link 35. The circumferential surface of the pedal stopper pin 34b slides in the pedal stopper pin support grooves 23b4 and 24c2 when the pedal link 35 moves in the vertical direction.

[0066] The stopper shaft 34c is an axial member which is

disposed substantially in the horizontal direction between the bearing portion 24 and the second right bearing piece 23b, where one end thereof is inserted into a stopper shaft insertion hole 24c3 of the bearing portion 24 and the other end thereof is inserted into a through-hole 23b5 of the second right bearing piece 23b. The insertion hole of the stopper shaft 34c is formed in the second right bearing piece ~~23a~~23b. The stopper shaft 34c supports the rotation stopper 36 in the middle way thereof.

[0067] The rotation stopper 36 is disposed between the bearing portion 24 and the second right bearing piece 23b so as to insert the stopper shaft 34c into the insertion hole of the base end thereof and to be swingable about the central axis of the stopper shaft 34c.

[0068] The tip portion of the rotation stopper 36 extends in the outer radial direction of the stopper shaft 34c and is movable forward to and backward from the first product storage passage 13a via the second insertion hole 23 when the rotation stopper swings about the central axis of the stopper shaft 34c.

[0069] The rotation stopper 36 includes a pedal operating shaft 361 so as to insert the pedal operating shaft 361 into a through-hole 36a of the tip portion thereof. The pedal operating shaft 361 is an axial member which is disposed substantially in the horizontal direction and both ends thereof are fitted into the guide grooves 283 of the lower pedal 28.

[0070] A pedal operating spring (not illustrated) is interposed between the rotation stopper 36 and the base 21. The pedal operating spring normally biases the rotation stopper 36 in the forward moving direction to the first product storage passage 13a.

[0071] The rotation stopper 36 is biased in the forward

second sold-out base portion 51. The penetration holes 511a and 512a formed in the second sold-out base portion 51 are formed to be larger than the first swing support shaft 28a' and are configured such that the second sold-out link 50 can freely move relative to the first swing support shaft 28a'.

[0107] The second swing support shaft 29a' is an axial member disposed to penetrate the through-holes 22a2', 22b2', ~~23b2'~~23a2', 23b2', and 24b' formed in the first right bearing piece 22a', the first left bearing piece 22b', the second right bearing piece 23a', the second left bearing piece 23b', and the bearing portion 24' so as to extend in the substantially horizontal direction in an area above the first swing support shaft 28a', and supports the upper pedal 29' in the middle way.

[0108] The lower pedal 28' is a plate-like member and is disposed to be swingable about the central axis of the first swing support shaft 28a' by inserting the first swing support shaft 28a' into the base end thereof.

[0109] The tip portion of the lower pedal 28' extends in an outer radial direction of the first swing support shaft 28a', and can move forward to and backward from the second product storage passage 13b via the first insertion hole 22' and the second insertion hole 23' when the lower pedal swings about the central axis of the first swing support shaft 28a'. That is, the lower pedal 28' is swingably disposed to move forward to and backward from the second product storage passage 13b.

[0110] A lower pedal spring 28b' is interposed between the lower pedal 28 and the base 21'. The lower pedal spring 28b' normally biases the lower pedal 28' in the forward moving direction to the second product storage passage 13b. More specifically, the lower pedal spring

by the dispensing control unit 110. The operation of the product dispensing system 20 will be described below while describing the dispensing control process. In the following description, the product stored in the first product storage passage 13a is also referred to as "first product", and the product stored in the second product storage passage 13b is also referred to as "second product".

[0148] In the dispensing control process, when a command to discharge the first product is issued from the vending machine controller 100 (YES in step S101), the dispensing control unit 110 drives the motor 43 positively (step S102).

[0149] When the motor 43 is driven positively, the output gear 443 to which the driving force of the motor 43 is transmitted via the worm gear 441 and the intermediate gear 442 rotates clockwise in a front view.

[0150] When the output gear 443 rotates clockwise in a front view, the pressing piece 443b of the output gear 443 departs from the contactor 45a of the carrier switch 45. Accordingly, the contactor 45a of the carrier switch 45 is ~~opened~~ released from the pressed state and is switched to the OFF state.

[0151] When the cam portion 443a comes in contact with the base end 461a of the first link lever 461 from the upper side with the rotation of the output gear 443, the first link lever 461 rotates counterclockwise in the front view. When the first link lever 461 rotates counterclockwise, the tip portion 461b moves upward. When the tip portion 461b moves upward in this way, as illustrated in FIGS. 25 to 27, the tip portion comes in contact with the contact piece 351 of the pedal link 35, the pedal link 35 can move upward by a predetermined distance against the biasing force of the link spring 35a, and the pedal link 35 can be held in the state in which the

pedal link moves upward by the predetermined distance while the cam portion 443a comes in sliding contact with the base end 461a.

[0152] In this case, when the first link lever 461 comes in sliding contact with the cam portion 443a, the first link lever is adjusted such that the plane (A) including the portion coming in sliding contact with the cam portion 443a is substantially perpendicular to the plane (B) including its central axis (the central axis of the first link shaft 42e) and a ~~stop~~ central axis of the output gear 443.

[0153] With the upward movement of the pedal link 35, the stopper pin 34a moves upward from the bottom ends of the stopper pin insertion holes 23b3 and 24c1 and the pedal stopper pin 34b moves upward from the bottom ends of the pedal stopper pin support grooves 23b4 and 24c2.

[0154] At this time, since the stopper pin 34a moves upward while coming in contact with the edge wall of the concave portion 292 of the upper pedal 29, the upper pedal 29 moves forward from the initial position against the biasing force of the upper pedal spring. The forward movement of the upper pedal 29 is performed along with the upward movement of the stopper pin 34a. At the time at which the stopper pin 34a reaches the top ends of the stopper pin insertion holes 23b3 and 24c1, the stopper pin comes in contact with the stopper contact portion 293 to regulate the backward movement of the upper pedal 29.

[0155] The upper pedal 29 moving forward comes in contact with a second lowest piece of first product (hereinafter, also referred to as a next product) to regulate downward movement of the next product.

[0156] On the other hand, since the weight of the product coming in contact with the lower pedal 28

maintained at the forward-moved position is applied to the

the control flow, and ends the process. Accordingly, it is determined that the first product is sold out, and thus a sold-out lamp or the like can be lighted to stop vending of the first product.

[0177] On the other hand, when a command to discharge the second product is issued from the vending machine controller 100 (NO in step S101 and YES in step S109), the dispensing control unit 110 drives the motor 43 reversely (step S110).

[0178] When the motor 43 is driven reversely in this way, the output gear 443 to which the driving force of the motor 43 is transmitted via the worm gear 441 and the intermediate gear 442 rotates counterclockwise in a front view.

[0179] When the output gear 443 rotates counterclockwise in a front view, the pressing piece 443b of the output gear 443 departs from the contactor 45a of the carrier switch 45. Accordingly, the contactor 45a of the carrier switch 45 is ~~opened~~ released from the pressed state and is switched to the OFF state.

[0180] When the cam portion 443a comes in contact with the base end 462a of the second link lever 462 from the upper side with the rotation of the output gear 443, the second link lever 462 rotates clockwise in the front view. When the second link lever 462 rotates clockwise, the tip portion 462b moves upward. When the tip portion 462b moves upward in this way, the tip portion comes in contact with the contact piece 351' of the pedal link 35', the pedal link 35' can move upward by a predetermined distance against the biasing force of the link spring 35a', and the pedal link 35' can be held in the state in which the pedal link moves upward by the predetermined distance while the cam portion 443a comes in sliding contact with the base end

462a.

[0181] In this case, when the second link lever 462 comes in sliding contact with the cam portion 443a, not clearly illustrated in the drawing, the second link lever is adjusted such that the plane including the portion coming in sliding contact with the cam portion 443a is substantially perpendicular to the plane including its central axis (the central axis of the second link shaft 42f) and the ~~stop~~ central axis of the output gear 443.

[0182] With the upward movement of the pedal link 35', the stopper pin moves upward and the pedal stopper pin 34b' also moves upward.

[0183] At this time, since the stopper pin moves upward while coming in contact with the edge wall of the concave portion 292' of the upper pedal 29', the upper pedal 29' moves forward from the initial position against the biasing force of the upper pedal spring. The forward movement of the upper pedal 29' is performed along with the upward movement of the stopper pin. At the time at which the stopper pin reaches the top end of the stopper pin insertion hole, the stopper pin comes in contact with the stopper contact portion 293' to regulate the backward movement of the upper pedal 29'.

[0184] The upper pedal 29' moving forward comes in contact with a second lowest piece of second product (hereinafter, also referred to as a next product) to regulate downward movement of the next product.

[0185] On the other hand, since the weight of the product coming in contact with the lower pedal 28' maintained at the forward-moved position is applied to the rotation stopper 36', the rotation stopper 36' starts its backward movement by releasing the regulation of the backward movement due to the upward movement of the pedal

goes upward and is then gradually inclined to the left side as it goes upward.

[0226] According to this configuration, as illustrated in FIG. 32, the output gear 443 rotates counterclockwise in a front view to first cause the second link lever 462 to rotate clockwise in a front view. Accordingly, by causing the pedal link 35' to move upward, discharging of product is performed by the second product discharging device 20b.

[0227] After the second link lever 462 rotates in this way, the cam portion 443a comes in contact with the base end 461a of the first link lever 461 as illustrated in FIG. 33 with the rotation of the output gear. In this case, since the locking portion 461c comes in contact with the left edge portion 471' of the right opening, the rotation of the first link lever 461 about the axis is regulated. Accordingly, as illustrated in FIG. 34, the first link lever 461 is elastically deformed to allow the base end 461a to approach the locking portion 461c and does not interfere with the movement of the cam portion 443a based on the rotation of the output gear 443.

[0228] When the first link lever 461 is elastically deformed in this way, the locking portion 461c is connected to the base end 461a at a position offset obliquely upward to the left side from the first link shaft 42e and thus comes in upward sliding contact with the left edge portion 471'. Since the concave portion 471a is formed in the left edge portion 471', it is possible to suppress a degree of deformation of the locking portion 461c when the first link lever 461 is elastically deformed.

[0229] According to this configuration, since it is possible to suppress a degree of deformation of the locking portion 461c when the first link lever 461 is elastically deformed, it is possible to reduce a stress generated in

normal state, and moves backward from the product storage passage against a biasing force of the biasing unit when the lever member comes in contact with a product passing through the product storage passage.

8. The product discharging device according to claim 1, wherein an axial portion protruding in a front-rear direction is formed at a center of the output gear, and the output gear is disposed to be rotatable about a central axis of the axial portion in a storage space between a unit base and a unit cover by inserting the axial portion into concave portions of the unit base and the unit cover.

9. The product discharging device according to claim 1, wherein the pedal link is normally biased downward by a link spring locked to the pedal link, and

The link lever: allows the pedal link to move downward by the link spring to cause the lower pedal to move forward to the product storage passage while causing the upper pedal to move backward from the product storage passage in a normal state; holds the pedal link in an upward-moved state against a biasing force of the link spring, and causes the lower pedal to move backward from the product storage passage while causing the upper pedal to move forward to the product storage passage when the link lever comes in sliding contact with a cam portion formed in the rotating output gear; and allows the pedal link to move downward by the link spring when the sliding contact with the cam portion is released.