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(54) Coin box storage structure.

(57) A coin box storage structure includes a coin box, a safe chamber, a shutter plate, a lock lever, a tumbler mechanism, and a dampening member. The shutter plate is swingably disposed in a lid, has a projection, and opens a coin storage port against a biasing force when the coin box is stored in the safe chamber. The lock lever has a ratchet portion engaged with the projection of the shutter plate to keep closing the coin storage port when the coin box is removed from the safe chamber. The lock lever is pressed and pivoted by the shutter plate when the coin box is stored in the safe chamber. When the lock lever is pivoted by a predetermined angle or less during opening of the lid, the tumbler mechanism reverses the lock lever to disengage the ratchet portion from the projection of the shutter plate to set the shutter plate in a preset state. When the lock lever is pivoted by the predetermined angle or more during storage of the coin box into the safe chamber, this mechanism reverses the lock lever to set the ratchet portion and the projection of the shutter plate in an engagement standby state. The dampening member inhibits to apply a pivot force to the lock lever in an initial period of pivotal movement of the lid and pivots the lock lever in pivotal movement of the lid by an angle exceeding the predetermined angle.

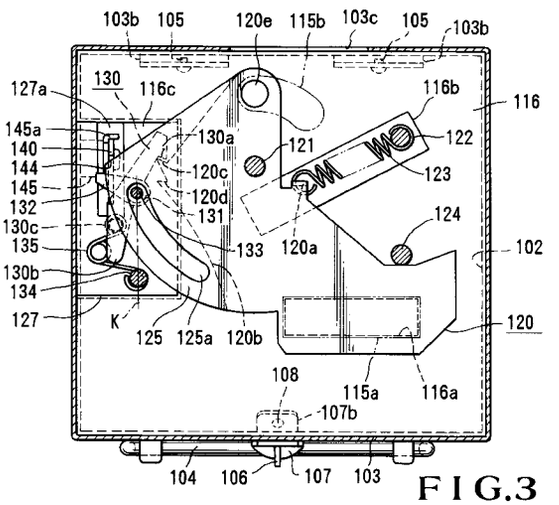

FIG.3

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The present invention relates to a coin box storage structure used for a vending machine or pay telephone.

A coin box storage structure of this type generally has a box-like safe main body having an opening in its upper surface, a lid arranged to close or open the opening of the safe main body and having a storage port in its upper surface to store a coin, and a safe chamber having an opening for loading the safe main body therein and a drop port in its upper surface to drop a coin so as to correspond to the storage port or window. The lid has a shutter plate for opening or closing the storage port and a lock mechanism for locking the shutter plate. When the safe main body is kept loaded in the safe chamber, the shutter plate opens the storage port to allow storage of a coin. When the safe main body is removed from the safe chamber, the lock mechanism locks the shutter plate so as to close the storage port of the shutter plate, thereby preventing illegal removal of a coin from the storage port. When a lock is released to open the lid from the safe main body, the lock mechanism is automatically released. The shutter plate is swung in reloading of the safe main body in the safe chamber to set the storage port in an openable state, i.e., in the preset state.

A coin box having this structure is disclosed in, e.g., Japanese Utility Model Publication No. 53-14233. As shown in Fig. 13, the disclosed coin box structure includes a shutter plate 22, an actuating plate 25, a press plate 29, a lock plate 36, an auxiliary lock lever 39, and an L-shaped lever 32 on a lid base 20. The shutter plate 22 has a window 22a and can pivot about a shaft 23 to open or close a coin storage port 21. The actuating plate 25 can pivot about a shaft 24 to actuate the shutter plate 22. The press plate 29 is fixed on the apparatus main body to press the shutter plate 22 upon insertion of the coin box into the apparatus main body. The lock plate 36 can pivot about a shaft 35 to lock the shutter plate 22 while the window 22a overlaps the coin storage port 21. The auxiliary lock lever 39 can pivot about a shaft 38 to actuate the lock plate 36. The L-shaped lever 32 can pivot about a shaft 31 extending on the actuating plate 25 and cooperates with the press plate 29 to return the shutter plate 22 and the actuating plate 25 to the reset state shown in Fig. 13 when the coin box is removed. When the lock plate 36 for locking the shutter plate 22 opens the lid base 20, a cam portion 39' of the auxiliary lock lever 39 is engaged with a projection formed inside the main body of the coin box to cause the auxiliary lock lever 39 to actuate the lock plate 36. Therefore, the shutter plate 22 is pivoted over a fixed fulcrum clockwise from the state in Fig. 13 and is set in the preset state.

In the conventional coin box storage structure described above, when the base 20 is open to set the shutter plate 22 in the preset state, the projection engaged with the cam portion 39' is fixed on the main body of the coin box. For this reason, an abrupt large force acts on both the auxiliary lock lever 39 of the cam portion 39' and the projection during opening of the base 20, and damage and failures tend to occur.

It is an object of the present invention to provide a coin box storage structure which is almost free from damage and failures in a preset operation of a shutter plate.

It is another object of the present invention to provide a coin box storage structure capable of performing a smooth preset operation of the shutter plate.

In order to achieve the above objects of the present invention, there is provided a coin box storage structure, comprising a coin box having a coin box main body having an opening in an upper surface thereof and a lid pivotal about one edge thereof as a fulcrum to be opened with respect to the coin box main body and having a coin storage port in an upper surface thereof, a safe chamber, having a coin drop port corresponding to the coin storage port, for storing the coin box, a shutter plate, swingably disposed in the lid, having a projection, and applied with a biasing force in a direction to close the coin storage port, for opening the coin storage port against the biasing force when the coin box is stored in the safe chamber, a lock lever having a ratchet portion engaged with the projection of the shutter plate to hold a state of continuously closing the coin storage port when the coin box is removed from the safe chamber, and pressed and pivoted by the shutter plate when the coin box is stored in the safe chamber, a tumbler mechanism for, when the lock lever is pivoted by not less than a predetermined angle during opening of the lid, reversing the lock lever to disengage the ratchet portion from the projection of the shutter plate to set the shutter plate in a preset state, and for, when the lock lever is pivoted by not less than the predetermined angle during storage of the coin box into the safe chamber, reversing the lock lever to set the ratchet portion and the projection of the shutter plate in an engagement standby state, and a dampening member for inhibiting to apply a pivot force to the lock lever in an initial period of pivotal movement of the lid and pivoting the lock lever in pivotal movement of the lid by an angle exceeding the predetermined angle.

Fig. 1 is a front view showing a coin box of a coin box storage structure according to an embodiment of the present invention;

Fig. 2 is a perspective view showing a safe chamber of the coin box storage structure according to the embodiment of the present invention;

Fig. 3 is a sectional view of the coin box taken along the line III - III in Fig. 1;

Fig. 4 is a perspective view showing a shutter plate of the coin box of the coin box storage structure according to the embodiment of the present invention;

Fig. 5 is a side view showing the coin box of the coin box storage structure according to the embodiment of the present invention;

Fig. 6 is a perspective view showing the main part of a lock mechanism of the coin box storage structure according to the embodiment of the present invention;

Figs. 7A and 7B show a state in which a lid of the coin box is started to be opened according to the embodiment of the present invention, in which Fig. 7A is a partially cutaway sectional view thereof, and Fig. 7B is a perspective view showing the main part thereof;

Figs. 8A and 8B show a state in which the lid of the coin box is being opened according to the embodiment of the present invention, in which Fig. 8A is a side view showing the main part thereof, and Fig. 8B is a perspective view showing the main part thereof;

Fig. 9 is a sectional view showing a state in which the lid in the coin box is open according to the embodiment of the present invention;

Figs. 10A and 10B show a state in which the lid of the coin box is closed in a special case according to the embodiment of the present invention, in which Fig. 10A is a sectional view thereof, and Fig. 10B is a perspective view of the main part thereof;

Figs. 11A and 11B show a state in which the coin box is being stored in a safe chamber according to the embodiment of the present invention, in which Fig. 11A is a sectional view thereof, and Fig. 11B is a perspective view of the main part thereof;

Fig. 12 is a sectional view showing a state in which the coin box is kept stored in the safe chamber according to the embodiment of the present invention; and

Fig. 13 is a view for explaining a conventional coin box storage structure.

The present invention will be described with reference to a preferred embodiment. Fig. 1 shows a coin box of a coin box storage structure according an embodiment of the present invention, Fig. 2 shows the overall structure of a safe chamber for storing the coin box shown in Fig. 1, Fig. 3 shows a sectional part between a partition plate and a shutter cover shown in Fig. 1, Fig. 4 shows the coin box when viewed from the lower portion of the shutter plate, Fig. 5 shows the coin box, and Fig. 6 shows its main part.

Referring to Figs. 1 to 5, reference numeral 101 denotes a coin box which comprises a main body 102 having an opening in its upper surface and a lid 103. A handle 104 is pivotally mounted at the central of the front portion of the main body 102. A fixing lock piece 106 having a lock hole 106a is fixed above the handle 104. A pair of stepped pieces 103b of the lid 103 extend backward from the lid 103 and are inserted into a horizontal slit 102 formed at the upper end of the rear portion of the main body 102, thereby constituting a hinge. The lid 103 is pivotal about the slit 102a to be selectively opened or closed with respect to the main body 102. Horizontal slits 103a and 103c each having a predetermined length are formed in the front and rear surfaces of the lid 103, and a funnel-like coin storage port 103d is formed in the upper surface portion of the lid 103.

Reference numeral 107 denotes a metal lock piece having a bent portion 107b at its upper end. The bent portion 107 is inserted into the slit 103a of the lid 103, so that the metal lock piece 107 is swingable about the slit 103a as a fulcrum. The fixing lock piece 106 is inserted into a vertical slit 107a formed at the center of the metal lock piece 107, so that a locking key (not shown) is fixed to the lock hole 106a. The main body 102 is thus closed by the lid 103. A screw 105 fixed at the distal end of the stepped piece 103b facilitates attachment or detachment of the lid 103 during maintenance. A screw 108 mounted at the distal end of the bent portion 107b has a function of preventing the metal lock piece 107 from accidental removal.

Reference numeral 110 denotes a safe chamber formed in the apparatus main body. A coin drop port 111 is formed in the upper surface of the safe chamber 110. Although not shown, a coin storage path for storing an authentic coin in the apparatus main body is formed above the coin drop port 111. The funnel-like coin storage port 103d of the coin box 101 is located below the coin drop port 111. A press plate 112 having a press groove 112a is mounted at the center of the upper end of the rear portion of the safe chamber 110 so as to extend inside the safe chamber 110 in correspondence with the slit 103c of the coin box 101.

A partition plate 115 and a shutter cover 116 are disposed inside the entire surface of the lid 103 to be parallel to each other through a predetermined gap with the upper surface of the lid 103. Coin storage ports 115a and 116a corresponding to the storage port 103d are formed in the partition plate 115 and the shutter cover 116, respectively. An arcuated groove 115b is formed in the partition plate 115, and a rectangular groove 116b and a rectangularly notched window 116c are formed in the shutter cover 116.

A shutter plate 120 is disposed between the partition plate 115 and the shutter cover 116. The shutter plate 120 is pivotally supported by a pin 121 extending on the partition plate 115. The shutter plate 120 is biased counterclockwise (Fig. 3) so as to close the coin storage ports 115a and 116a by means of a spring 123 hooked between an upright portion 120a and a pin 122 extending on the partition plate 115. Pivotal movement of the shutter plate 120 is regulated by a stopper pin 124 extending on the partition plate 115.

An arcuated press portion 120b is formed at the edge portion of one major surface of the shutter plate 120. Two engaging projections 120c and 120d are formed at one end of the press portion 120b. A shutter pin 120e to be fitted in the groove 115b of the partition plate 115 is formed on the other major surface of the shutter plate 120. A shielding portion 125 having an arcuated groove 125a and a thickness smaller than the shutter plate 120 continues outward from the press portion 120b to form a stepped portion integrally with the shutter plate 120 so as to face the notched window 116c of the shutter cover 116. The arcuated groove 125a is formed to face the press portion 120b.

A box-like shutter lock cover 127 having a window 127a is mounted below the notched window 116c of the shutter cover 116. A lock lever 130, a lock cam 140, and a bracket 145, all of which are illustrated in detail in Fig. 6, are disposed in the shutter lock cover 127. The lock lever 130 has a ratchet portion 130a at its one end, a pressed portion 130b at its other end, and a projection 130c on the lower surface between the pressed portion 130b and the central portion thereof. A cylindrical portion 131 extends from the lower center surface. A preset lever portion 132 is integrally formed with the lower end face of the cylindrical portion 131.

The lock lever 130 is pivotally supported such that its cylindrical portion 131 is fitted on a shaft 133 extending on the partition plate 115 and inserted through the groove 125a of the shutter plate 120. The lock lever 130 is biased by a coil spring 135 hooked between a pin 134 extending on the partition plate 115 and the projection 130c. The pin 134 serves as a fixed fulcrum of the spring 135, and the projection 130c serves as a movable fulcrum. The projection 130c serving as the movable fulcrum constitutes a tumbler mechanism selectively moved clockwise or counterclockwise with respect to, as a boundary, a line K connecting the pin 134 and the shaft 133.

The lock cam 140 has a pair of upper and lower regulation end faces 141a and 141b obtained by notching an edge portion at a predetermined angle. A pair of cam surfaces 142a and 142b to form a ridge brought into contact with the preset lever portion 132 are formed in the lock cam 140 toward its distal end portion. The lock cam 140 is swingably supported by the bracket 145 (to be described detail) about a pin 144. The bracket 145 has an upright portion 145a fixed to the inner surface of the main body 102 and serving as a stopper portion engaged with the cam surfaces 142a and 142b. The lock cam 140 is swingable with a play within the range in which the cam surfaces 142a and 142b can be engaged with the upright portion 145a.

The present invention has the above structure, and the operation of this structure will be described below. To recover a coin or the like, when the coin box 101 is removed from the safe chamber 110, the shutter plate 120 is pivoted counterclockwise by a biasing force of the spring 123 and abuts against the stopper pin 124. In this state, the coin storage ports 115a and 116a are closed by the shutter pin 124, and the ratchet portion 130a of the lock lever 130 is engaged with the engaging projection 120c of the shutter plate 116. The shutter plate 120 is locked in this state. The coin box 101 removed from the safe chamber 110 is prevented from illegal removal of a coin through the coin storage ports 115a and 116a.

At this time, the engaging portion between the ratchet portion 130a and the engaging projection 120c is covered with the shielding portion 125 of the shutter plate 120 which faces the notched window 116c of the shutter cover 116. Even if the ratchet portion 130a is forced to be disengaged from the engaging projection 120c by a thin member such as a steel wire through the gap between the coin storage port 103d of the lid 103 and the shutter plate 120, insertion of the thin member is interfered with the shielding portion 125. Therefore, illegal removal of the coin from the coin storage ports 115a and 116a can be prevented.

In this embodiment, the engaging portion between the ratchet portion 130a and the engaging projection 120c is mainly covered with the shielding portion 125. However, to more perfectly prevent illegal removal of coins, the notched window 116c may be entirely covered.

A preset operation of the shutter plate 120 will be described below. To recover coins, as shown in Fig. 7A, a locking key (not shown) is unlocked and removed from the lock hole 106a of the fixing lock piece 106, and the metal lock piece 107 is manually held to open the lid 103. The lock lever 130 pivotally supported by the shaft 133 extending on the partition plate 115 is moved upward accordingly. At this time, in a state wherein the lid 103 is closed, the lower regulation end face 141a of the lock cam 140 is engaged with the upright portion 145a of the bracket 145 by the weight of the lock cam 140, as shown in Fig. 5. When the lid 103 is lifted, the preset level portion 132 abuts against the lower cam surface 142a of the lock cam 140 to pivot the lock cam 140 about the pin 144 counterclockwise by a predetermined angle, as shown in Fig. 7B. When the upper regulation end face 141b is engaged with the upright portion 145a, the pivotal movement of the lock cam 140 is stopped.

As described above, the play is provided to the lock cam 140 such that the cam 140 is pivotal within the predetermined angle. An external force abruptly acting on the preset lever portion 132 at the start of opening of the lid 103 is dampened and absorbed to prevent damage to the preset lever portion 132 and the lock cam 140.

When the lid 103 is continuously opened, the lock lever 130 is pivoted in a direction indicated by an arrow A in Fig. 7B against the coil spring 135, i.e., clock-

wise about the shaft 133 while an edge 132a of the preset lever portion 132 is being slid along the lower cam surface 142a of the lock cam 140 because the pivotal movement of the lock cam 140 is regulated.

When the lid 103 is being opened, and the edge 132a of the preset lever portion 132 reaches the distal end as a boundary between the upper and lower cam surfaces 142a and 142b of the lock cam 140, as shown in Figs. 8A and 8B, the projection 130c serving as the movable fulcrum of the lock lever 130 is located on the boundary line K. When the lid 103 is continuously opened from this state, the movable fulcrum 130c is reversed over the boundary line K. The lock lever 130 is pivoted counterclockwise about the shaft 133. As shown in Fig. 9, the ratchet portion 130a is disengaged from the engaging projection 120c, and the regulation of pivotal movement of the shutter plate 120 is released. The shutter plate 120 is thus set in the preset state. At the same time, the pressed portion 130b of the lock lever 130 abuts against the stepped portion of the press portion 120b of the shutter plate 120. That is, the preset state is automatically set during opening of the lid 103 to recover the coins. At this time, the lock lever 130 is disengaged from the preset lever 132 and returns to the initial state by its weight such that the lower engaging end face 141 abuts against the upright portion 145a of the bracket 145.

After recovery of the coins, when the lid 103 is closed again, the preset lever portion 132 is held in a state of disengagement from the lock cam 140, and the shutter plate 120 is held in the preset state, accordingly, as shown in Fig. 9.

Figs. 10A and 10B show a special state, i.e., a state in which the preset state is released in an open state of the lid 103. For example, even if a coin collector opens the lid 103 and operates the lock lever 130 from the space at the shutter lock cover 127 or the like to release the preset state of the shutter plate 120, the preset state can be set again. This will be described below.

More specifically, upon release of the preset state, the lock lever 130 is reversed, and the edge 132a of the preset lever portion 132 abuts against the upper cam surface 142a of the lock cam 140 returning to the initial position. In this state, when the lid 103 is closed, the lower regulation end face 141a of the lock cam 140 abuts against the upright portion 145a to prevent pivotal movement of the lock cam 140. The preset lever portion 132 is pivoted in the direction indicated by the arrow A, and the lock lever 130 is also pivoted counterclockwise about the shaft 133. The projection 130c serving as the movable fulcrum is moved over the boundary line K in the same manner as described above. The shutter plate 120 is set in the preset state again, as shown in Fig. 9.

In setting the shutter plate 120 in the preset state during opening/closing the lid 103, since the ridge is formed by the cam surfaces 142a and 142b of the lock cam 140 to which one edge 132 of the preset lever portion 132 abuts, the lock lever 130 can be smoothly pivoted.

An operation for storing the coin box 101 in the safe chamber 110 will be described below. When the locking key is locked in the lock hole 106a of the fixing lock piece 106, and the coin box 101 is stored in the safe chamber 110, the press plate 112 of the safe chamber 110 is inserted into the lid 103 through the slit 103c of the lid 103. The press groove 112a of the press plate 112 is engaged with the shutter pin 120e of the shutter plate 120. The shutter plate 120 set in the preset state is pivoted clockwise about the pin 121 against the spring 123. Upon this pivotal movement, the pressed portion 130b of the lock lever 130 which is in contact with the press portion 120b of the shutter plate 120 is also pressed to pivot the lock lever 130 clockwise about the shaft 133. The projection 130c serving as the movable fulcrum reaches the boundary line K. At this time, the preset lever portion 132 is located obliquely downward from the lower cam surface 142a of the lock cam 140, as shown in Fig. 11B.

When the coin box 101 is further pushed inside the safe chamber 110, the projection 130c is moved over the boundary line K, and the lock lever 130 is reversed. The ratchet portion 130a abuts against the press portion 120b of the shutter plate 120 and can be engaged with the engaging portion 120c. As shown in Fig. 12, when the coin box 101 is completely stored in the safe chamber 110, the shutter plate 120 is moved away from the coin storage ports 115a and 116b, so that a coin can be stored therethrough. In this state, therefore, the preset state of the shutter plate 120 is released and held in the current state by the press plate 112.

When the coin box 101 is removed from the safe chamber 110 to recover the coins, the press plate 112 is removed from the lid 103, and the shutter plate 120 is pivoted counterclockwise by the biasing force of the spring 123 to close the coin storage ports 115a and 116a. At the same time, the ratchet portion 130a of the lock lever 130 causes the press portion 120b to slide and engages with the engaging projection 120c, thereby obtaining the state shown in Fig. 3. The engaging projection 120d serves as a supplementary engaging projection arranged if the ratchet portion 130a cannot engage with the engaging projection 120c, thereby allowing the lock lever 130 to perfectly lock the shutter plate 120.

In this embodiment, the play is provided to pivot the lock cam 140 within the range of the predetermined angle. However, the present invention is not limited to this. A similar impact absorption effect can be obtained when the lock cam 140 is biased by an elastic member such as a spring in one direction and pivotal movement of the lock cam 140 is regulated by

this elastic member during opening/closing the lid 103.

The same effect as described above can be obtained when an impact absorption member as of rubber may be adhered to the portion around the lock cam 140 and the upright portion 145a. of the bracket 145.

As has been described above, according to the present invention, the play is provided by the dampening member such as a lock cam and the like between the opening/closing operation of the lid and the pivotal movement of the lock lever, and an impact generated during opening/closing the lid to obtain the preset state of the shutter plate is absorbed by the play. Therefore, the preset state can be smoothly obtained, and damage and failures can be prevented.

Claims

1. A coin box storage structure, comprising:

a coin box (101) having a coin box main body (102) having an opening in an upper surface thereof and a lid (103) pivotal about one edge thereof as a fulcrum to be opened with respect to said coin box main body and having a coin storage port (103d) in an upper surface thereof;

a safe chamber (110), having a coin drop port (111) corresponding to the coin storage port, for storing said coin box;

a shutter plate (120), swingably disposed in said lid, having a projection (120c, 120d), and applied with a biasing force in a direction to close the coin storage port, for opening the coin storage port against the biasing force when said coin box is stored in said safe chamber;

a lock lever (130) having a ratchet portion (130a) engaged with said projection of said shutter plate to hold a state of continuously closing the coin storage port when said coin box is removed from said safe chamber, and pressed and pivoted by said shutter plate when said coin box is stored in said safe chamber;

a tumbler mechanism (130c, 134, 135) for, when said lock lever is pivoted by not less than a predetermined angle during opening of said lid, reversing said lock lever to disengage said ratchet portion from said projection of said shutter plate to set said shutter plate in a preset state, and for, when said lock lever is pivoted by not less than the predetermined angle during storage of said coin box into said safe chamber, reversing said lock lever to set said ratchet portion and said projection of said shutter plate in an engagement standby state; and

a dampening member (140) for inhibiting to apply a pivot force to said lock lever in an initial period of pivotal movement of said lid and pivoting said lock lever in pivotal movement of said lid by an angle exceeding the predetermined angle.

2. A structure according to claim 1, wherein said dampening member comprises a lock cam, fixed on said coin box main body, pivoted during opening of said lid in the initial period of opening of said lid, and regulated to pivot when said lid is open by the angle exceeding the predetermined angle, for converting an opening operation of said lid into a pivotal movement of said lock lever.

3. A structure according to claim 2, further comprising a regulating member (141a, 141b, 145a) for regulating the pivotal movement of said lock cam pivoted by the angle exceeding the predetermined angle.

4. A structure according to claim 2, wherein said lock cam has a ridge-like cam surface (142a) formed along a distal end thereof such that a preset lever portion (132) integral with said lock lever is slid along said cam surface.

5. A structure according to claim 2, wherein said lock cam returns to an initial position by a weight thereof after said shutter plate is set in the preset state by reversing said lock lever.

6. A structure according to claim 2, wherein when said lid is closed while said shutter plate is not set in the preset state, said lock cam converts a closing operation of said lid into the pivotal movement of said lock lever, and when said lock lever is pivoted by the angle exceeding the predetermined angle, said tumbler mechanism reverses said lock lever and sets said shutter plate in the preset state.

7. A structure according to claim 6, wherein said lock cam has a pair of upper and lower ridge-like cam surfaces (142a, 142b) formed along a distal end thereof such that said preset lever portion (132) formed integrally with said lock lever is slid along said cam surfaces during opening/closing of said lid.

8. A structure according to claim 1, wherein said projection of said shutter plate comprises a plurality of projections continuously formed in a pivot direction of said shutter plate.

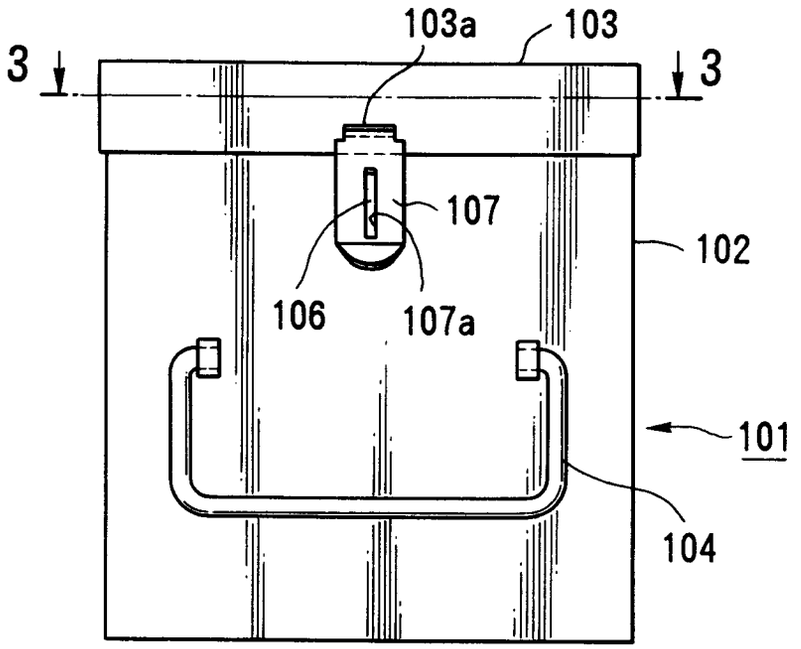


FIG.1

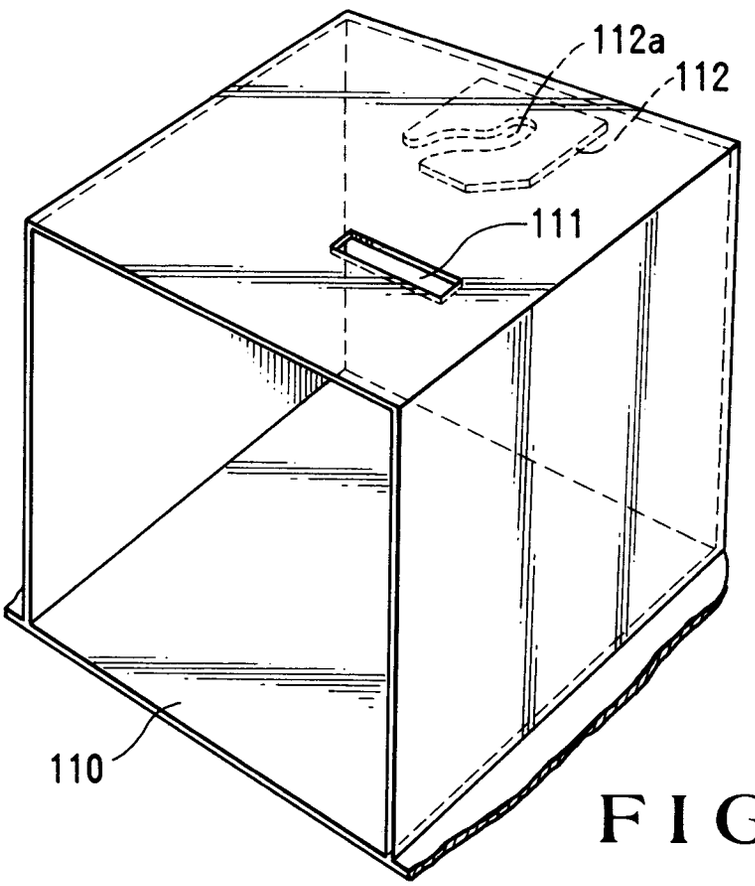
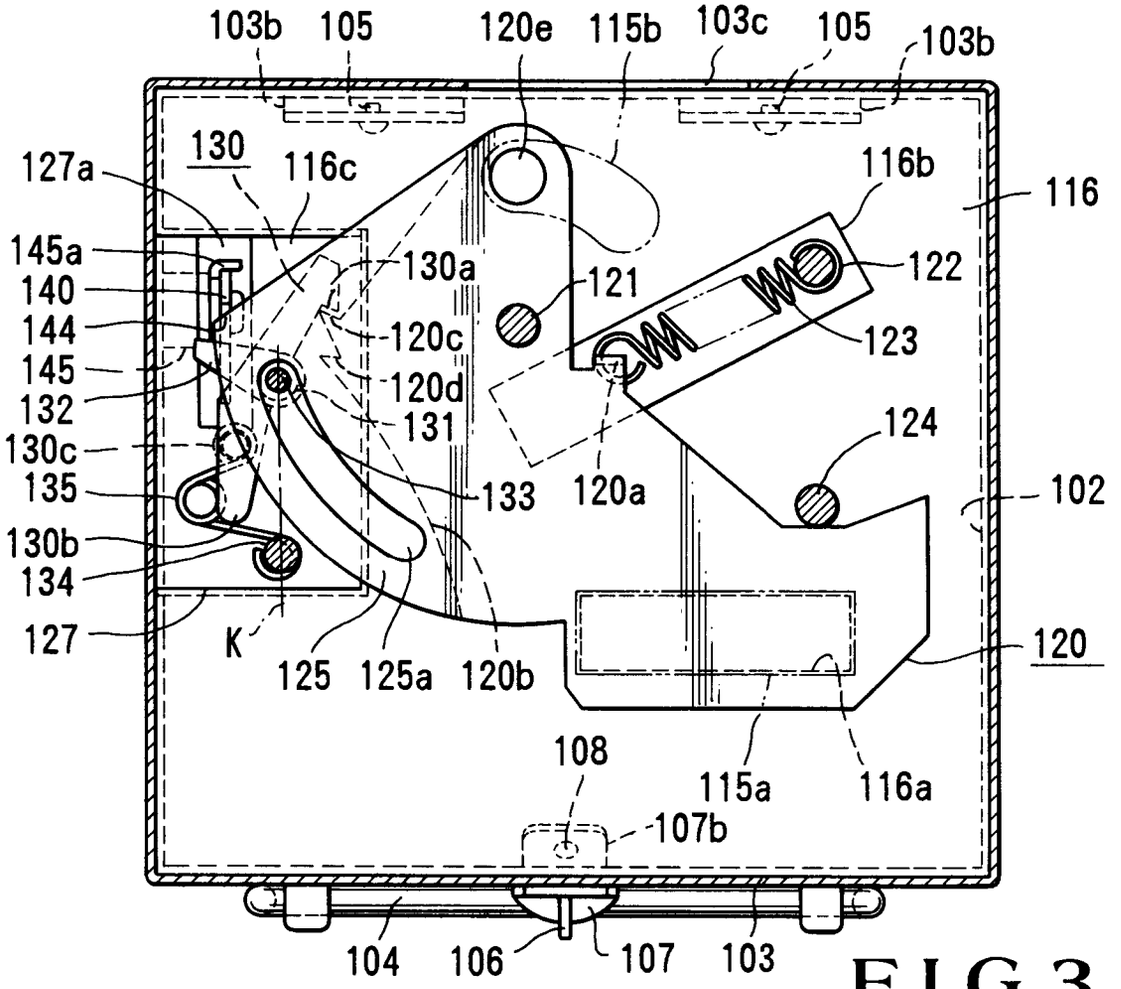


FIG.2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115b
103c
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145a
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120c
123
145
120d
132
131
124
130c
135
133
120a
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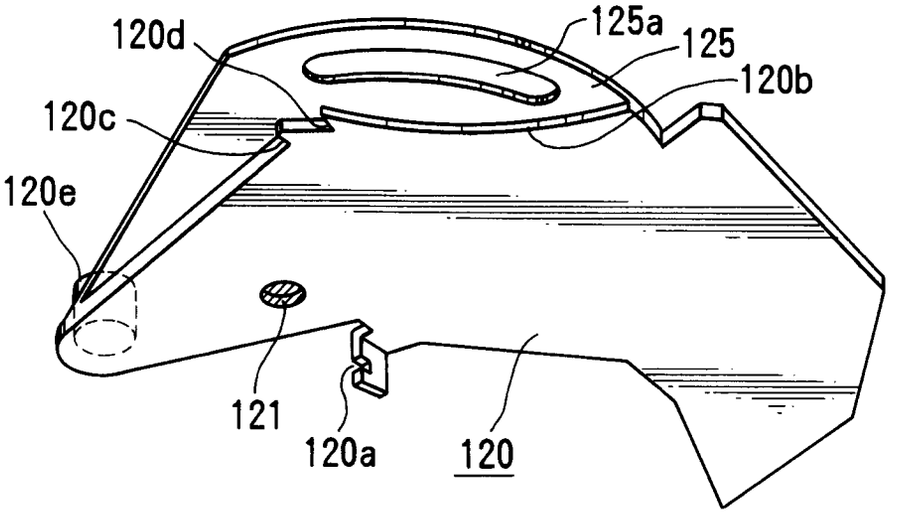
115a
116a
107b
104
106
107
103

FIG.3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120b
120c
120e
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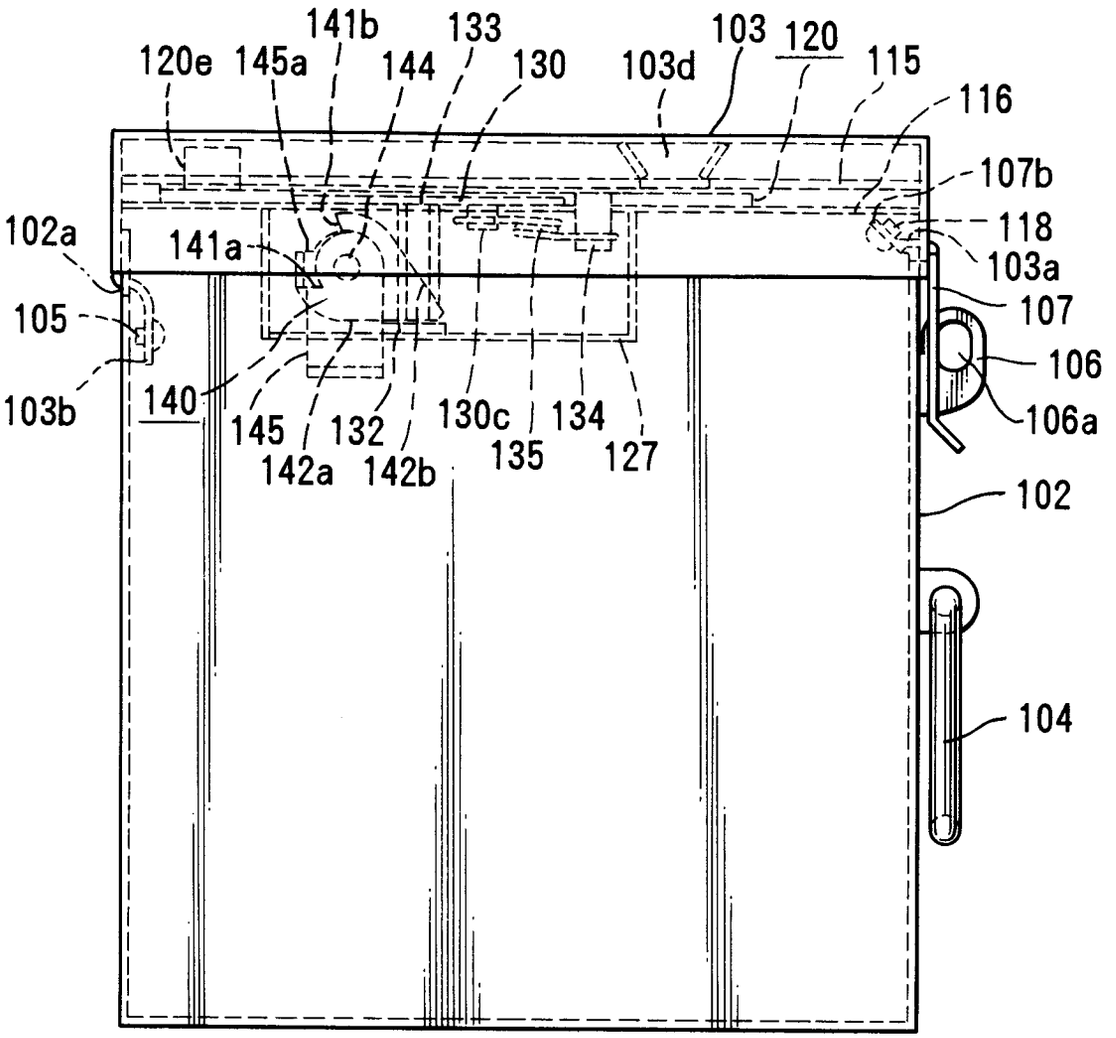
120a
120

FIG.4


141b
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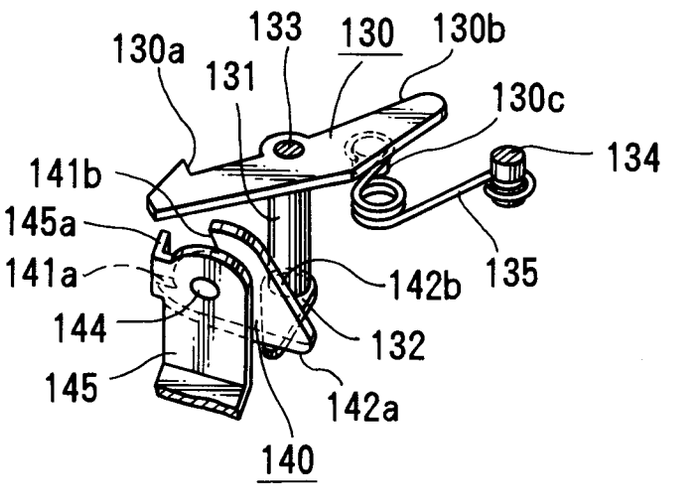
104

FIG.5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142a
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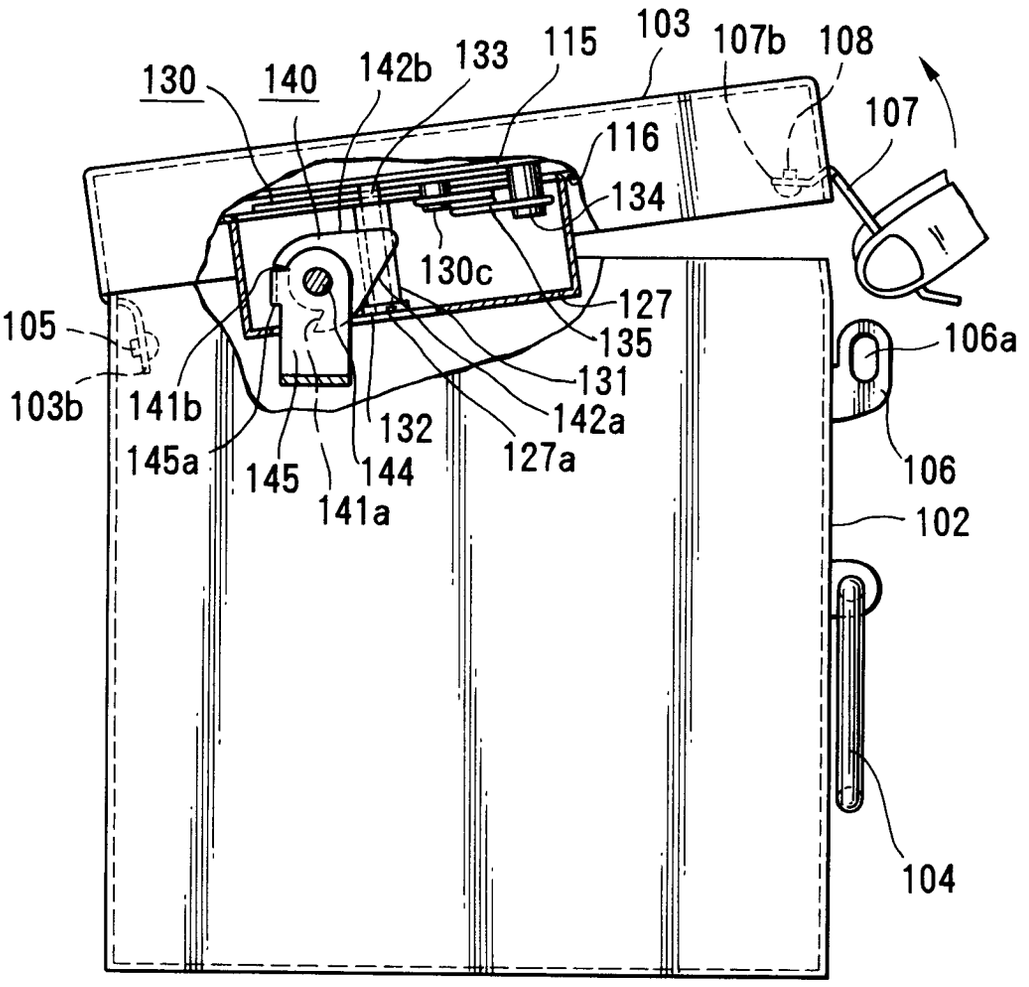
FIG.6


130
140
142b
133
115
103
107b
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116
134
130c
127
135
131
142a
127a
105
103b
141b
145a
145
141a
144
132
106a
106
102
104

FIG.7A

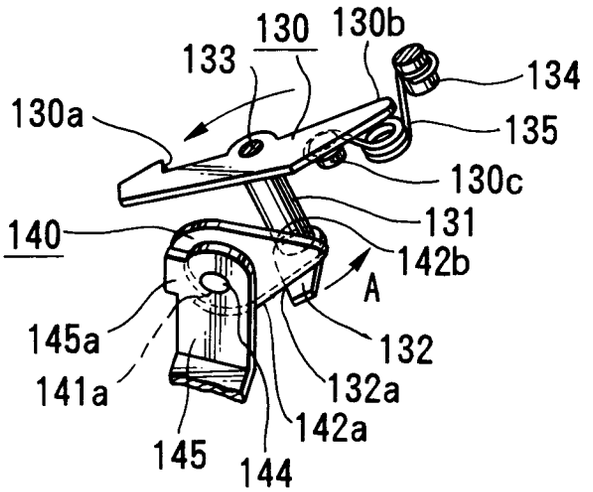
130
130b
133
134
130a
135
130c
131
140
142b
A
145a
132
141a
132a
142a
145
144

FIG.7B

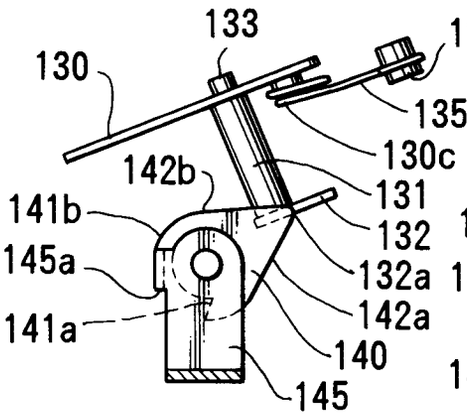

FIG.8A

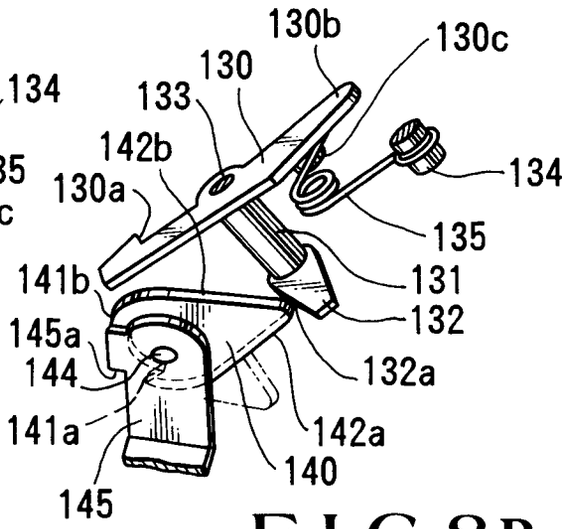

FIG.8B

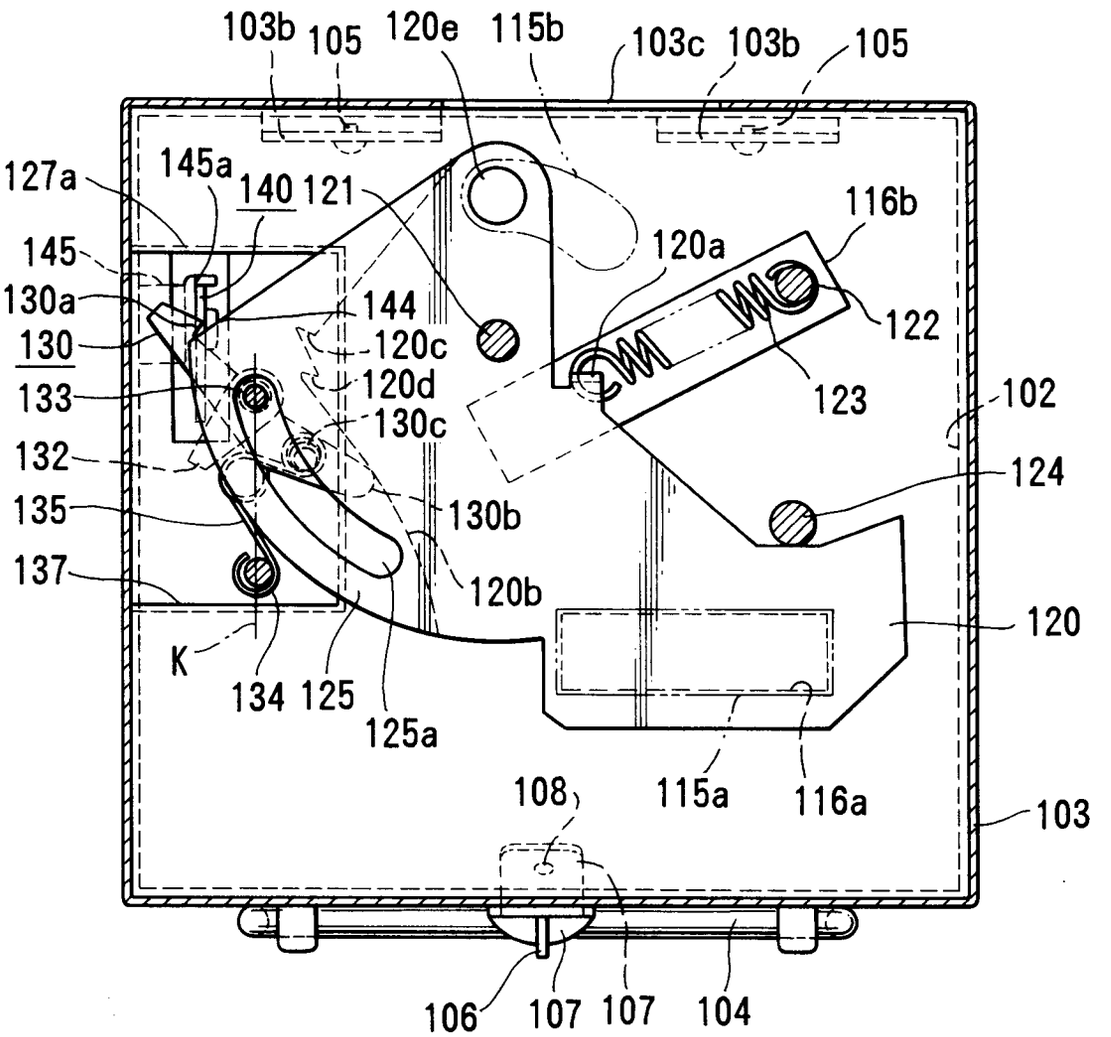

FIG.9

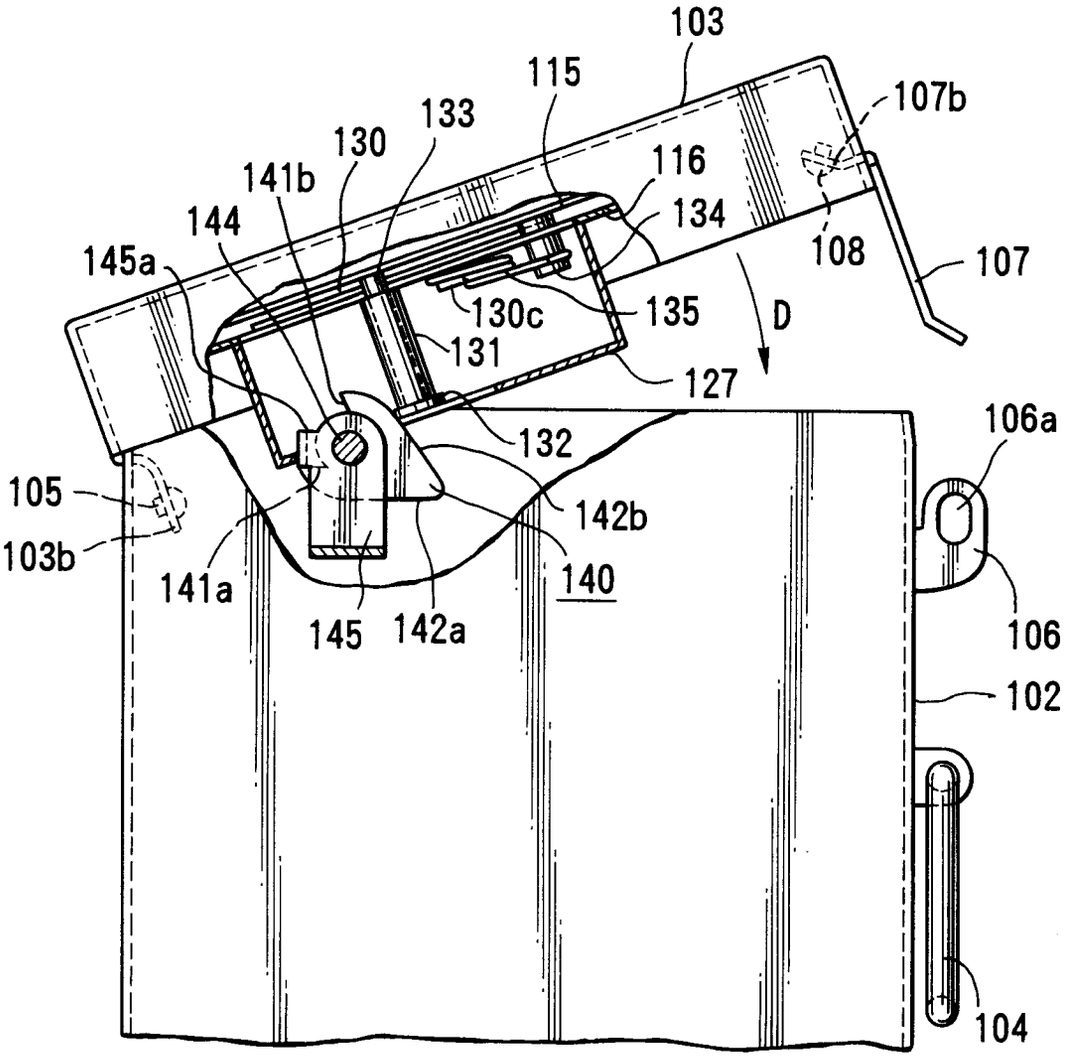

FIG.10A

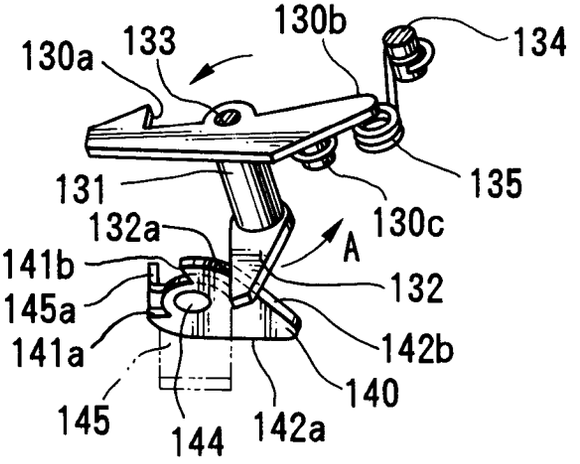

FIG.10B

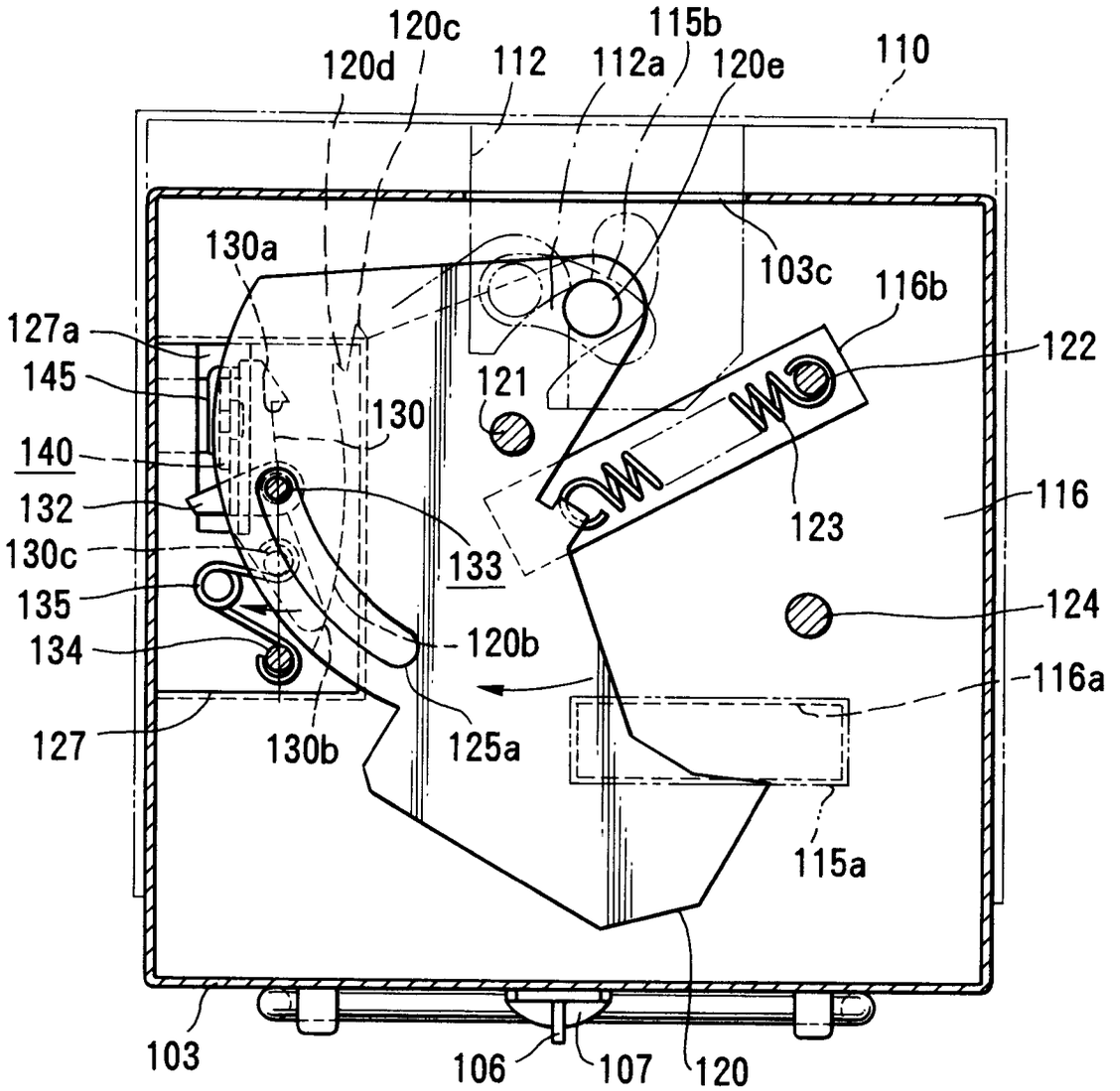

FIG.11A

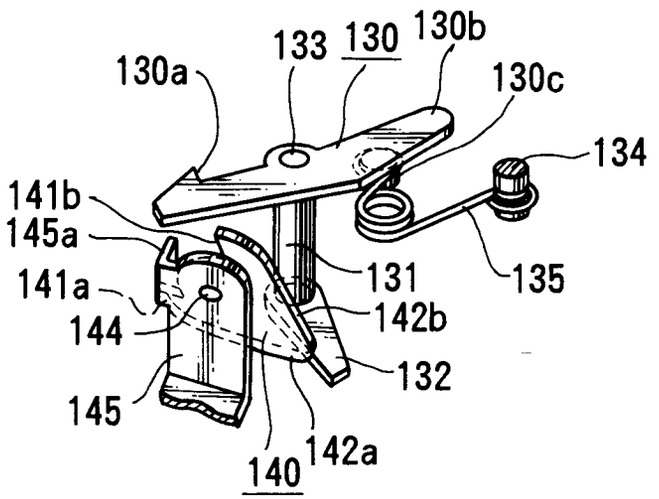

FIG.11B

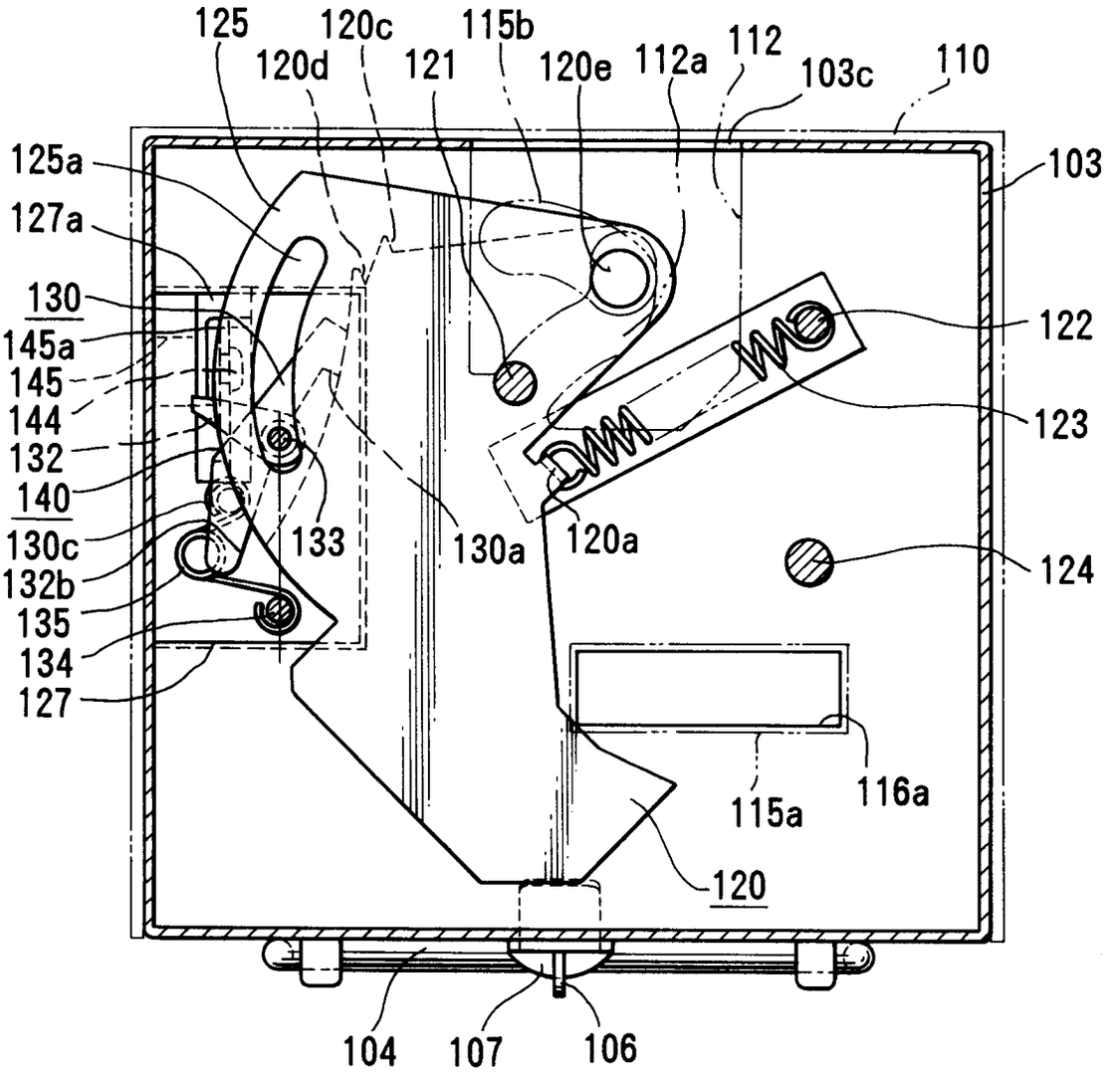
125
120c
115b
120d
121
120e
112a
112
103c
110
125a
103
127a
130
122
145a
145
123
144
132
140
130c
133
130a
120a
124
132b
135
134
127
116a
115a
120
104
107
106

FIG.12

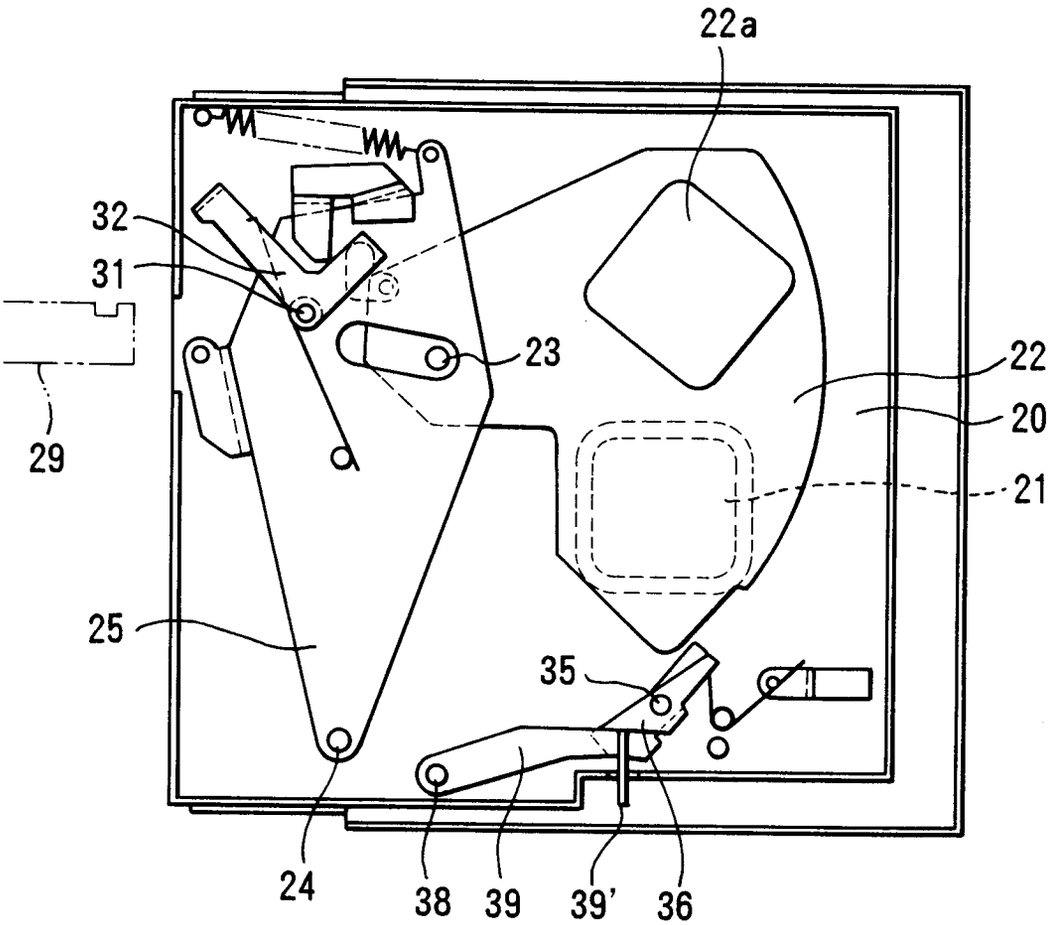

FIG.13
PRIOR ART