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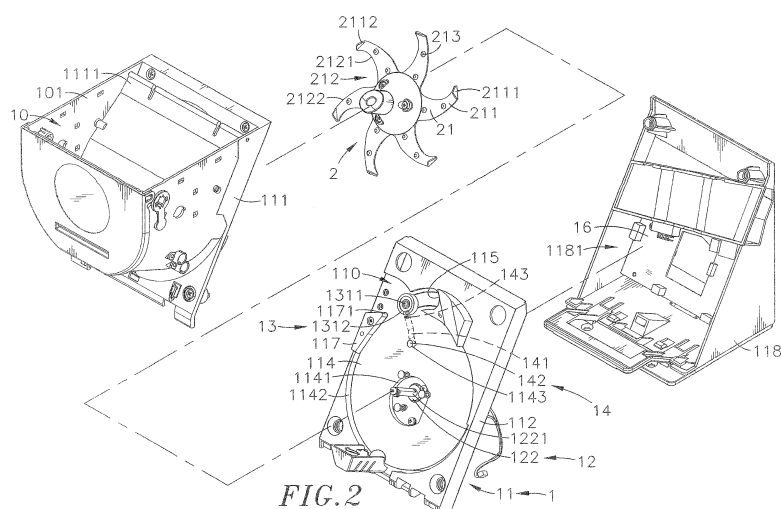
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(54) **COIN HOPPER HAVING AN IMPROVED COIN PUSHING**

(57) A coin hopper includes a hopper body including a housing having an accommodation chamber defined in a funnel-shaped coin box thereof and a coin outlet for guiding coins out of the accommodation chamber individually, a rotating wheel having multiple coin-pushing blades radially and equiangularly extended from a wheel base thereof and a coin-receiving space defined between each two adjacent coin-pushing blades, each coin-pushing blade having an abutment edge extending along one lateral side thereof for stopping one coin in one coin-re-

ceiving space and a pushing edge extending along an opposite lateral side thereof, a power drive adapted for rotating the rotating wheel to let coins be ruffled by the coin-pushing blades and forced into the coin-receiving spaces and then guided by the arc-shaped abutment edges to move out of each coin-receiving space upwardly toward the coin outlet one after another, and a coin-dispensing mechanism including a spring-loaded lever for pushing coins out of the coin outlet individually.



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention:

[0001] The present invention relates to coin dispensing technology and more particularly, to a coin hopper having an improved coin pushing design, which comprises a hopper body having a funnel-shaped coin box in a housing thereof, and a rotating wheel mounted in the funnel-shaped coin box and having coin-pushing blades radially and equiangularly spaced around a wheel base thereof and a coin-receiving space defined between each two adjacent coin-pushing blades, wherein when the rotating wheel is rotated, coins are riffled to fall into the coin-receiving spaces individually, and then pushed into the coin outlet one after another by the coin-pushing blades and coin-receiving spaces for dispensing.

2. Description of the Related Art:

[0002] A coin hopper is a coin counting device designed for use in a coin exchange machine, gambling machine, amusement machine or vending machine for sending out or issuing coins or token one by one. However, coins or token of different thicknesses, sizes and/or shapes may be used in different countries or different machines.

[0003] A conventional coin hopper is known using a motor to rotate a rotating disc for dispensing coins/token. The rotating wheel has a plurality of equiangularly spaced pins. A guide member and a micro switch are respectively mounted in the inner side and outer side of the coin outlet of the coin hopper. During rotation of the rotating wheel, coins/token are pushed one by one by the pins of the rotating wheel toward the coin outlet and then guided out of the coin outlet by the guide member. When one coin/token passes through the coin outlet, it will touch the micro switch, achieving count of the dispensed coin/token. Further, in order to ensure coin hopper operating stability, a coin lever is provided between the rotating wheel and the coin outlet for removing each overlapped coin from the coin being delivered to the coin outlet, avoiding coin jams.

[0004] FIG. 9 illustrates a coin hopper according to the prior art design. As illustrated, the coin hopper **A** comprises a base panel **A1**, a rotating wheel **A2** rotatably mounted at the base panel **A1**, a coin outlet **A10** disposed adjacent to the periphery of the rotating wheel **A2**, a control plate **A3** spaced below the coin outlet **A10** and facing toward the rotating wheel **A2**, a coin ejector **A4** comprising a spring-loaded lever **A41** and disposed at a top side of the coin outlet **A10**, a plurality of pressure plates **A21** arranged on the rotating wheel **A2** and equiangularly spaced around the center thereof, a rib **A211** located at each pressure plate **A21**, and spring members **A22** respectively arranged to support the respective pressure plates **A21**. The control plate **A3** comprises a downward-

ly sloping guide rail **A31**. When the rotating wheel **A2** is rotated counter-clockwise, the rib **A211** of each pressure plate **A21** pushed one respective coin toward the control plate **A3**, causing the coin to be abutted against the guide rail **A31** of the control plate **A3**, and thus, the coin is pushed upwardly along the guide rail **A31** toward the coin outlet **A10**. When the rib **A211** of one pressure plate **A21** is abutted against the guide rail **A31**, the rib **A211** is forced by the guide rail **A31** to compress the respective spring member **A22**, and thus, this rib **A211** can be moved downwardly over the control plate **A3**. At this time, the spring-loaded lever **A41** of the coin ejector **A4** is returned to eject the coin out of the coin hopper **A** through the coin outlet **A10**.

[0005] However, when the rotating wheel **A2** is rotated at a high speed, the rib **A211** at each pressure plate **A21** will be forced to hit the control plate **A3** heavily, and thus, the pressure plate **A21** and the control plate **A3** can wear quickly with use. Further, because the spring members **A22** are frequently compressed and then released by the respective pressure plates **A21**, the problem of stress concentration or elastic fatigue can occur easily, causing failure of the retracting function of the ribs **A211** of the pressure plate **A21** and affecting the coin dispensing operation. Further, the control plate **A3** is normally made from a plastic material to minimize the impact and noises produced upon hitting of coins against the control plate **A3**. However, the control plate **A3** can wear out quickly when frequently rubbed by coins. When the control plate **A3** starts to wear, coins can be not smoothly moved along the guide rail **A31** of the control plate **A3** to the coin outlet **A10**. Replacing the control plate **A3** requires much time and labor, increasing the cost.

[0006] FIG. 10 illustrates a coin dispenser according to the prior art. As illustrated, the coin dispenser is substantially similar to the aforesaid prior art coin hopper with the difference that the rotating wheel **A2** of the coin dispenser has radial rows of abutment blocks **A23** arranged on the front wall thereof to constitute radial series of teeth; the control plate **A3** has a plurality of grooves **A32** concentrically located at an inner side thereof corresponding to the abutment blocks **A23**. During rotation of the rotating wheel **A2**, each radial row of abutment blocks **A23** is forced to move one respective coin toward the control plate **A3**, causing the coin to abut against the guide rail **A31** of the control plate **A3** and then to be moved along the guide rail **A31** upwardly toward the coin outlet **A10**. Further, during rotation of the rotating wheel **A2**, the abutment blocks **A23** are moved through the respective grooves **A32** of the control plate **A3** without interference, and thus, the rotating wheel **A2** can be continuously and smoothly rotated, preventing the ribs **A211** of the pressure plate **A21** from hitting the control plate **A3** to cause structural damage. However, because this design of coin dispenser uses the control plate **A3** to work with the rotating wheel **A2** for controlling the coin moving direction. Friction between the control plate **A3** and coins can still cause the control plate **A3** to wear out, affecting

the coin dispensing operation and leading to a control plate replacement problem. Improvement in this regard is necessary.

SUMMARY OF THE INVENTION

[0007] The present invention has been accomplished under the circumstances in view. It is therefore the main object of the present invention to provide a coin hopper, which comprises a hopper body and a rotating wheel. The hopper body comprises a housing and a power drive. The housing comprises a funnel-shaped coin box, an accommodation chamber defined in the funnel-shaped coin box for accommodating coins to be dispensed, and a coin outlet disposed in communication with the accommodation chamber for guiding coins out of the accommodation chamber individually. The power drive is adapted for rotating the rotating wheel to push coins out of the accommodation chambers into coin outlet individually. The rotating wheel comprises a wheel base pivotally mounted in the housing, a plurality of coin-pushing blades radially and equiangularly extended from the wheel base and a coin-receiving space defined between each two adjacent coin-pushing blades. The coin-pushing blades are curved blades, each having an abutment edge extending along one lateral side thereof and a pushing edge extending along an opposite lateral side thereof. When the rotating wheel is rotated by the power drive, coins are ruffled by the coin-pushing blades of the rotating wheel to fall into the coin-receiving spaces, and then guided by the arc-shaped abutment edges of the coin-pushing blades to move out of each coin-receiving space upwardly toward the coin outlet one after another, achieving coin dispensing. The structural design of the rotating wheel effectively achieves coin dispensing without an extra control plate or back plate. If a plastic control plate or back plate is used, the plastic control plate or back plate can wear out quickly due to friction against coins, leading to coin dispensing problems. Thus, the invention saves much labor and time cost in control plate replacement, enhancing practicability of the coin hopper.

[0008] According to another aspect of the present invention, the base panel comprises a through hole cut through opposing front and back walls thereof at a lower side relative to the coin outlet. The hopper body further comprises a coin ejector mounted at the base panel. The coin ejector comprises a leaf spring having a fixed end and an opposing free end, a fastening member affixing the fixed end of the leaf spring to the back wall of the base panel, and a push member located at the free end of the leaf spring and inserted through the through hole of the base panel and floatably suspended in the circular base. If another coin falls into one coin-receiving space at the time the rotating wheel carries one coin from this coin-receiving space to the coin outlet, the push member will push this intruded coin away from the respective coin-pushing blade, preventing jamming of this intruded coin in the gap between the coin-pushing blade and the base

panel, or an occurrence of a structural damage.

[0009] According to still another aspect of the present invention, if overlapped coins are simultaneously moved by one coin-pushing blade of the rotating wheel, due to that the thickness of the coins is smaller than the height of the coin outlet, a first coin of the overlapped coins can be pushed into the coin outlet and then rapidly ejected out of the coin outlet by the lever of the coin-dispensing mechanism. If a second coin of the overlapped coins is moved with the first coin to the coin outlet, this second coin will be disposed above the height of the coin outlet due to the effect of the thickness of the coin-pushing blades of the rotating wheel, and will then be forced to fall from the surface of the first coin. At this time, the raised bearing portion of the respective coin-pushing blade can touch the second coin or the other coins above the first coin, moving the second coin or the other coins downwardly away from the coin-pushing blades of the rotating wheel. Further, the bevel guide edge of the coin-dispensing strip of each coin-pushing blade can also move the second coin or the other coins downwardly away from the surface of first coin that is been moved into the coin outlet, allowing the first coin to be smoothly moved into the coin outlet and then pushed out of the coin outlet. Thus, the invention effectively prevents the rotating wheel from delivering overlapped coins into the coin outlet to cause jammed coin or coin outlet blockage.

[0010] According to still another aspect of the present invention, the funnel-shaped coin box of the housing of the hopper body defines an opening in communication with the accommodation chamber; the base panel is affixed to the back wall of the funnel-shaped coin box, having a circular recess located at the front wall thereof and facing toward the opening and a guide edge extending along the border of the circular recess; the rotating wheel is pivotally mounted at the center of the circular recess. During rotation of the rotating wheel, each coin-pushing blade of the rotating wheel works with one respective coin-receiving space to move one coin toward the coin outlet. At this time, the coin is peripherally abutted against the guide edge around the border of the circular recess, and thus, this coin is moved toward a coin-dispensing mechanism in the coin outlet. The guide edge around the circular recess imparts less friction resistance to the coin, and the coin can be moved into the coin outlet easily and smoothly. When the lever of the coin-dispensing mechanism is squeezed by the coin, it is biased outwardly. Thereafter, the elastic potential energy of the torsion spring returns the lever, causing the lever to eject the coin rapidly out of the coin outlet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is an oblique top elevational view of a coin hopper in accordance with the present invention.

FIG. 2 is an exploded view of the coin hopper in ac-

cordance with the present invention.

FIG. 3 corresponds to FIG. 2 when viewed from another angle.

FIG. 4 is a schematic drawing of the present invention, illustrating coins moved by the rotating wheel.

FIG. 5 corresponds to FIG. 4, illustrating one coin moved to the coin-dispensing mechanism toward the coin outlet.

FIG. 6 corresponds to FIG. 5, illustrating the lever of the coin-dispensing mechanism biased by the coin.

FIG. 7 corresponds to FIG. 6, illustrating the coin moved over the lever toward the coin outlet.

FIG. 8 corresponds to FIG. 7, illustrating the lever returned, and the coin ejected toward the outside of the coin outlet.

FIG. 9 is a front view of a coin hopper according to the prior art.

FIG. 10 is an oblique top elevational view of a coin dispenser according to the prior art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0012] Referring to FIGS. 1-4, an oblique top elevational view of a coin hopper, an exploded view of the coin hopper, another exploded view of the coin hopper and a schematic drawing illustrating coins moved by the rotating wheel of the coin hopper are shown. The coin hopper comprises a hopper body 1 and a rotating wheel 2.

[0013] The hopper body 1 comprises a housing 11, a power drive 12, a coin-dispensing mechanism 13, a coin ejector 14, a sensor module 15, and a control circuit module 16. The housing 11 comprises a funnel-shaped coin box 111, and a base panel 112 affixed to the funnel-shaped coin box 111. The funnel-shaped coin box 111 comprises an accommodation chamber 10 defining a top opening 101, and an opening 113 located at a back side thereof in communication with the accommodation chamber 10. The base panel 112 comprises a circular recess 114 located at a front wall thereof and facing toward the opening 113 of the funnel-shaped coin box 111, a through hole 1141 cut through opposing front and back walls thereof at the center of the circular recess 114, and a guide edge 1142 extending along the border of the circular recess 114. The power drive 12 comprises a motor 121 mounted at the back wall of the base panel 112 of the housing 11 opposite to the funnel-shaped coin box 111, and a transmission mechanism 122 that comprises a driving shaft 1221 inserted through the through hole 1141 at the center of the circular recess 114 and coupled to and rotatable by the motor 121.

[0014] The housing 11 further comprises a coin outlet 110 defined between the base panel 112 and the funnel-shaped coin box 111, and extended from the circular recess 114 to the outside of the hopper body 1. The base panel 112 further comprises a smoothly curved position-limit slot 115 cut through the opposing front and back walls thereof and disposed in communication with the

inner end of the coin outlet 110 and the circular recess 114, and an axle 116 located at the back wall thereof above the power drive 12. The coin-dispensing mechanism 13 comprises a lever 131 pivotally coupled with its one end to the axle 116, a torsion spring 132 mounted on the axle 116 and stopped with its one end against the base panel 112 and its other end against the lever 131, a pin 1311 extended from an opposite end, namely, the free end of the lever 131 and inserted through the smoothly curved position-limit slot 115, and a bearing 1312 pivotally mounted on the pin 1311. The housing 11 further comprises a baffle 117 located at the base panel 112 at a bottom side of the coin outlet 110 and abutted to the border of the circular recess 114. The baffle 117 has an arched flange 1171 facing toward the bearing 1312 of the coin-dispensing mechanism 13, and defined with the bearing 1312 of the lever 131 a gap that has a width smaller than the size (such as length, width or outer diameter) of the coins 3.

[0015] Further, the base panel 112 of the housing 11 has a through hole 1143 cut through the circular recess 114 at a lower side relative to the coin outlet 110. The coin ejector 14 comprises a leaf spring 141, a push member 142, and a fastening member 143. The leaf spring 141 has opposing fixed end and free end. The fixed end of the leaf spring 141 is affixed to the back wall of the base panel 112 by the fastening member 143. The push member 142 is located at the free end of the leaf spring 141 and extended out of the through hole 1143. The push member 142 is preferably a steel round ball joined to the free end of the leaf spring 141. In actual application, the push member 142 can be a cylindrical or oval-shaped steel member joined to the free end of the leaf spring 141, or a dome-shaped portion integrally formed on the free end of the leaf spring 141.

[0016] Further, coins 3 of the same size and value, or of different sizes and different values can be put in the accommodation chamber 10 of the funnel-shaped coin box 111 of the housing 11. Further, decompression boards 1111 are pivotally mounted in the accommodation chamber 10 of the funnel-shaped coin box 111 to divide the internal holding space of the accommodation chamber 10 into multiple spaces, avoiding excessive concentration of coins 3 and enhancing coin dispensing stability and smoothness. The sensor module 15 is mounted at the back wall of the base panel 112 to face toward the coin outlet 110 for detecting coins 3 that pass through the coin outlet 110. The housing 11 further comprises a hollow back cover 118 jointed to the back wall of the base panel 112. The hollow back cover 118 defines therein a mounting chamber 1181. The sensor module 15 is mounted in the mounting chamber 1181, and electrically coupled with the power drive 12 and the control circuit module 16 for controlling their operation.

[0017] The rotating wheel 2 comprises a wheel base 21 having a raised configuration, and a plurality of coin-pushing blades 211 radially and equiangularly extended from the wheel base 21. The coin-pushing blades 211

are curved blades curving in a counter-clockwise direction, each having a width gradually reducing in direction away from the wheel base **21**. Further, a coin-receiving space **212** is defined between each two adjacent coin-pushing blades **211**. Further, each coin-pushing blade **211** comprises a coin-dispensing strip **2111** perpendicularly extended from the distal end thereof remote from the wheel base **21** and terminating in an inwardly reduced bevel guide edge **2112**, an arc-shaped abutment edge **2121** extending along one lateral side thereof, a smoothly curved pushing edge **2122** extending along an opposite lateral side thereof, and at least one raised bearing portion **213** located at a front surface thereof.

[0018] When assembling the coin hopper of the present invention, position the wheel base **21** of the rotating wheel **2** in the circular recess **114** of the base panel **112** of the housing **11** of the hopper body **1**, and then join the wheel base **21** to the driving shaft **1221** of the transmission mechanism **122** of the power drive **12** so that starting the motor **121** of the power drive **12** can drive the driving shaft **1221** of the transmission mechanism **122** to rotate the rotating wheel **2**. After installation of the rotating wheel **2** in the circular recess **114** of the base panel **112** of the housing **11** of the hopper body **1**, a gap is left between the coin-pushing blade **211** and the guide edge **1142**, and thus, the rotating wheel **2** does not touch the baffle **117** and the coin-dispensing mechanism **13** during its rotation, preventing generation of friction resistance to affect coin dispensing operation. Thereafter, respectively fasten the funnel-shaped coin box **111** and hollow back cover **118** of the housing **11** to the front and back walls of the base panel **112** with screws, keeping the rotating wheel **2** to face toward the opening **113** of the funnel-shaped coin box **111**, and thus, the coin hopper is assembled.

[0019] Referring to FIGS. 5-8, the coin hopper can be used in an automatic vending machine or game machine, or a consumer system designed to provide commodity purchase or consumer services. In application, mount the hopper body **1** in the host of the automatic vending machine, game machine or consumer system, and electrically connect the control circuit module **16** to host with a transmission cable or bus. Further, the coin hopper can also be used independently. With respect to the functions that how the control circuit module **16** controls the motor **121** of the power drive **12** to driven the transmission mechanism **122** in rotating the rotating wheel **2**, and how the sensor module **15** detects the amount, value, authenticity and dispensing of coins are of the known art and not within the scope of the claims of the present invention, no further detailed description in this regard will be necessary.

[0020] When coins **3** are put through the top opening **101** of the housing **11** of the hopper body **1** into the accommodation chamber **10** of the funnel-shaped coin box **111**, coins **3** are cumulated in the accommodation chamber **10**. At this time, turn on the motor **121** of the power drive **12** to drive the transmission mechanism **122** in ro-

tating the rotating wheel **2** clockwise. During rotation of the rotating wheel **2**, coins **3** are ruffled by the coin-pushing blades **211** of the rotating wheel **2** to fall into the coin-receiving spaces **212**, and then guided by the arc-shaped abutment edges **2121** of the coin-pushing blades **211** and the guide edge **1142** around the circular recess **114** to move along the guide edge **1142** around the circular recess **114** upwardly toward the coin-dispensing mechanism **13** in the coin outlet **110** one after another. When one coin **3** is moved along the baffle **117** toward the coin-dispensing mechanism **13**, the centrifugal force created during rotation of the rotating wheel **2** forces the coin **3** to move along the smoothly curved pushing edge **2122** of one coin-pushing blade **211** out of the respective coin-receiving space **212**, and the coin **3** is then pushed by one coin-pushing blade **211** to abut against the bearing **1312** at the lever **131** and the arched flange **1171** of the baffle **117**. At this time, the lever **131** is forced by the coin **3** to bias relative to axle **116**, thereby increasing the gap between the bearing **1312** at the lever **131** and the arched flange **1171** of the baffle **117** for the passing of the coin **3**. After passed through the gap between the bearing **1312** and the arched flange **1171**, the coin **3** enters the coin outlet **110**, and the elastic potential energy of the torsion spring **132** forces the lever **131** to return to its former position, and thus, the coin **3** is stopped against the arched flange **1171** of the baffle **117** and ejected by the bearing **1312** of the lever **131** out of the coin outlet **110** of the housing **11**, achieving a coin dispensing action. The structural design of the coin-pushing blades **211** and coin-receiving spaces **212** of the rotating wheel **2** effectively achieves coin dispensing without an extra control plate or back plate. If a plastic control plate or back plate is used, the plastic control plate or back plate can wear out quickly due to friction against coins **3**, leading to coin dispensing problems. Thus, the invention saves much labor and time cost in control plate replacement, enhancing practicability of the coin hopper.

[0021] During rotation of the rotating wheel **2**, the coin-pushing blades **211** and coin-receiving spaces **212** of the rotating wheel **2** work to push coins **3** individually toward the coin outlet **110** of the housing **11**, the bearing **1312** of the coin-dispensing mechanism **13** is moved with the lever **131** alternatively back and forth to eject every individual coin **3** out of the coin outlet **110**. Even if one coin-receiving space **212** or multiple coin-receiving spaces **212** of the rotating wheel **2** are empty, the coin-pushing blades **211** are continuously rotated with the rotating wheel **2**, the coin-pushing blades **211** can keep pushing coins **3** individually out of the other coin-receiving spaces **212** toward the coin outlet **110**. If another coin **3** is forced to fall into the coin-receiving space **212** during rotation of the rotating wheel **2** to move one coin **3** out of the respective coin-receiving space **212** to the coin outlet **110** individually, this coin **3** will be pushed by the push member **142** of the coin ejector **14** downwardly away from the respective coin-pushing blade **211**, preventing jamming of the coin **3** in the gap between the coin-push-

ing blade **211** and the circular recess **114**, or an occurrence of a structural damage. When one coin-pushing blade **211** touches the push member **142**, the push member **142** will be forced to move back to the inside of the through hole **1143** and to simultaneously compress the leaf spring **141**. After the coin-pushing blade **211** passed over the push member **142**, the elastic potential energy of the leaf spring **141** immediately forces the push member **142** out of the through hole **1143** into a floating condition.

[0022] Further, if overlapped coins **3** are simultaneously moved by one coin-pushing blade **211** of the rotating wheel **2**, due to that the thickness of the coins **3** is smaller than the height of the coin outlet **110**, a first coin **3** of the overlapped coins **3** can be pushed into the coin outlet **110** and then rapidly ejected out of the coin outlet **110** by the lever **131** of the coin-dispensing mechanism **13**. If a second coin **3** of the overlapped coins **3** is moved with the first coin **3** to the coin outlet **110**, this second coin **3** will be disposed above the height of the coin outlet **110** due to the effect of the thickness of the coin-pushing blades **211** of the rotating wheel **2**, and will then be forced to fall from the surface of the first coin **3**. At this time, the raised bearing portion **213** of the respective coin-pushing blade **211** can touch the second coin **3** or the other coins **3** above the first coin **3**, moving the second coin **3** or the other coins **3** downwardly away from the coin-pushing blades **211** of the rotating wheel **2**. Further, the bevel guide edge **2112** of the coin-dispensing strip **2111** of each coin-pushing blade **211** can also move the second coin **3** or the other coins **3** downwardly away from the surface of first coin **3** that is been moved into the coin outlet **110**, allowing the first coin **3** to be smoothly moved into the coin outlet **110** and then pushed out of the coin outlet **110**. Thus, the invention effectively prevents the rotating wheel **2** from delivering overlapped coins **3** into the coin outlet **110** to cause jammed coin or coin outlet blockage.

[0023] In conclusion, the invention provides a coin hopper, which comprises a hopper body **1**, and a rotating wheel **2** that comprises a wheel base **21**, a plurality of curved coin-pushing blades **211** radially and equiangularly spaced around the wheel base **21** and a coin-receiving space **212** defined between each two adjacent coin-pushing blades **211**. When a power drive **12** of the hopper body **1** is started to rotate the rotating wheel **2**, coins **3** in a funnel-shaped coin box **111** of the housing **11** are ruffled by the coin-pushing blades **211** and forced into the coin-receiving spaces **212** individually and then guided by the arc-shaped abutment edges **2121** of the coin-pushing blades **211** to move out of the coin-receiving space **212** upwardly toward the coin outlet **110** one after another for dispensing. The structural design of the rotating wheel **2** can achieve coin dispensing without an extra control plate. If a plastic control plate is used, the plastic control plate can wear out quickly due to friction against coins, leading to coin dispensing problems. Thus, the invention saves much labor and time cost in control plate replacement, enhancing practicability of the coin

hopper.

[0024] It is to be understood that the above-described embodiment of the invention is merely a possible example of implementations, merely set forth for a clear understanding of the principles of the invention, many modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

Claims

1. A coin hopper, comprising a hopper body and a rotating wheel, wherein:

said hopper body comprises a housing, said housing comprising a funnel-shaped coin box, an accommodation chamber defined in said funnel-shaped coin box for accommodating coins to be dispensed and a coin outlet disposed in communication with said accommodation chamber for guiding said coins out of said accommodation chamber individually, and a power drive adapted for rotating said rotating wheel to push said coins out of said accommodation chambers into said coin outlet individually; said rotating wheel comprises a wheel base pivotally mounted in said housing, a plurality of coin-pushing blades radially and equiangularly extended from said wheel base and a coin-receiving space defined between each two adjacent said coin-pushing blades for receiving one said coin, said coin-pushing blades being curved blades curving in a counter-clockwise direction and having a width gradually reducing in direction away from said wheel base, each said coin-pushing blade comprising an abutment edge extending along one lateral side thereof for stopping one said coin in one said coin-receiving space and a pushing edge extending along an opposite lateral side thereof for pushing one said coin out of one said coin-receiving space into said coin outlet during rotation of said rotating wheel.

2. The coin hopper as claimed in claim 1, wherein said hopper body further comprises a base panel affixed to said funnel-shaped coin box of said housing, said base panel comprising a circular recess located at a front wall thereof and facing toward said opening of said funnel-shaped coin box; said rotating wheel is pivotally mounted in said circular recess of said base panel and suspending in said opening of said housing.
3. The coin hopper as claimed in claim 2, wherein said base panel comprises a guide edge extending along

the border of said circular recess for stopping a coin in one said coin-receiving space of said rotating wheel against one said abutment edge.

4. The coin hopper as claimed in claim 2, wherein said base panel further comprises a through hole cut through said circular recess at the center; said power drive comprises a motor mounted at a back wall of said base panel opposite to said funnel-shaped coin box, and a transmission mechanism coupled to and rotatable by said power drive, said transmission mechanism comprising a driving shaft inserted through said through hole of said base panel and coupled with said wheel base of said rotating wheel.
5. The coin hopper as claimed in claim 2, wherein said coin outlet is defined between a border area of said circular recess of said base panel and a back wall of said funnel-shaped coin box of said housing for guiding said coins out of said hopper body individually.
6. The coin hopper as claimed in claim 2, wherein said base panel further comprises a second through hole cut through said circular recess at a lower side relative to said coin outlet; said hopper body further comprises a coin ejector mounted at said base panel, said coin ejector comprising a leaf spring having a fixed end and an opposing free end, a fastening member affixing said fixed end of said leaf spring to the back wall of said base panel, and a push member located at said free end of said leaf spring and inserted through said second through hole of said base panel and suspended in said circular base.
7. The coin hopper as claimed in claim 1, wherein said hopper body further comprises a coin-dispensing mechanism disposed in said housing at an inner side relative to said coin outlet, said coin-dispensing mechanism comprising a lever pivotally connected to said base panel and adapted for pushing each said coin out of said coin outlet, and a torsion spring loaded on said lever for providing an elastic potential energy to said lever.
8. The coin hopper as claimed in claim 7, wherein said base panel of said housing comprises a smoothly curved position-limit slot cut through the opposing front and back walls thereof and extended from an inner end of said coin outlet and the border of said circular recess, and an axle located at the back wall thereof; said lever of said coin-dispensing mechanism has one end thereof connected to said axle; said coin-dispensing mechanism further comprises a pin located at an opposite end of said lever and inserted through said smoothly curved position-limit slot, and a bearing pivotally mounted on said pin and adapted for pushing each said coin out of said coin

outlet.

9. The coin hopper as claimed in claim 8, wherein said housing of said hopper body further comprises a baffle located at the front wall of said base panel at a bottom side of said coin outlet and abutted to the border of said circular recess, said baffle comprising an arched flange facing toward said bearing of said coin-dispensing mechanism and defined with said bearing of said coin-dispensing mechanism a gap for the passing of said coins individually into said coin outlet.
10. The coin hopper as claimed in claim 1, wherein said wheel base of said rotating wheel has a raised configuration; said coin-pushing blades of said rotating wheel are curved blades curving in a counter-clockwise direction; the abutment edge of each said coin-pushing blade is arc-shaped; the pushing edge of each said coin-pushing blade is smoothly curved.
11. The coin hopper as claimed in claim 1, wherein each said coin-pushing blade of said rotating wheel comprises a coin-dispensing strip perpendicularly extended from a distal end thereof remote from said wheel base, said coin-dispensing strip comprising an inwardly reduced bevel guide edge bevel guide edge adapted for pushing one of each two overlapped said coins backwardly out of said coin outlet.
12. The coin hopper as claimed in claim 1, wherein each said coin-pushing blade of said rotating wheel comprises at least one raised bearing portion located at a front surface thereof.

Amended claims in accordance with Rule 137(2) EPC.

1. A coin hopper, comprising a hopper body (1) and a rotating wheel (2), wherein:

said hopper body (1) comprises a housing (11), said housing (11) comprising a funnel-shaped coin box (111), an accommodation chamber (10) defined in said funnel-shaped coin box (111) for accommodating coins (3) to be dispensed and a coin outlet (110) disposed in communication with said accommodation chamber (10) for guiding said coins (3) out of said accommodation chamber (10) individually, and a power drive (12) adapted for rotating said rotating wheel (2) to push said coins (3) out of said accommodation chambers (10) into said coin outlet (110) individually;

said rotating wheel (2) comprises a wheel base (21) pivotally mounted in said housing (11), a plurality of coin-pushing blades (211) radially

- and equiangularly extended from said wheel base (21) and a coin-receiving space (212) defined between each two adjacent said coin-pushing blades (211) for receiving one said coin (3), said coin-pushing blades (211) being curved in a direction opposite to a direction of rotation of the rotating wheel (2) and having a width gradually reducing in direction away from said wheel base (21), each said coin-pushing blade (211) comprising an abutment edge (2121) extending along one lateral side thereof for stopping one said coin (3) in one said coin-receiving space (212) and a pushing edge (2122) extending along an opposite lateral side thereof for pushing one said coin (3) out of one said coin-receiving space (212) into said coin outlet (110) during rotation of said rotating wheel (2), wherein each said coin-pushing blade (211) of said rotating wheel (2) comprises a coin-dispensing strip (2111) perpendicularly extended from a distal end thereof remote from said wheel base (21), said coin-dispensing strip (2111) comprising an inwardly reduced bevel guide edge (2112) adapted for pushing one of each two overlapped said coins (3) downwardly away from the surface of the first coin that is been moved into said coin outlet (110).
2. The coin hopper as claimed in claim 1, wherein said hopper body (1) further comprises a base panel (112) affixed to said funnel-shaped coin box (111) of said housing (11), said base panel (112) comprising a circular recess (114) located at a front wall thereof and facing toward an opening (113) of said funnel-shaped coin box (111); said rotating wheel (2) is pivotally mounted in said circular recess (114) of said base panel (112) and suspended in said opening (113) of said housing (11).
 3. The coin hopper as claimed in claim 2, wherein said base panel (112) comprises a guide edge (1142) extending along the border of said circular recess (114) for stopping a coin (3) in one said coin-receiving space (212) of said rotating wheel (2) against one said abutment edge (2121).
 4. The coin hopper as claimed in claim 2, wherein said base panel (112) further comprises a through hole (1141) cut through said circular recess (114) at the center; said power drive (12) comprises a motor (121) mounted at a back wall of said base panel (112) opposite to said funnel-shaped coin box (111), and a transmission mechanism (122) coupled to and rotatable by said power drive (12), said transmission mechanism (122) comprising a driving shaft (1221) inserted through said through hole (1141) of said base panel (112) and coupled with said wheel base (21) of said rotating wheel (2).
 5. The coin hopper as claimed in claim 2, wherein said coin outlet (110) is defined between a border area of said circular recess (114) of said base panel (112) and a back wall of said funnel-shaped coin box (111) of said housing (11) for guiding said coins (3) out of said hopper body (1) individually.
 6. The coin hopper as claimed in claim 2, wherein said base panel (112) further comprises a second through hole (1143) cut through said circular recess (114) at a lower side relative to said coin outlet (110); said hopper body (1) further comprises a coin ejector (14) mounted at said base panel (112), said coin ejector (14) comprising a leaf spring (141) having a fixed end and an opposing free end, a fastening member (143) affixing said fixed end of said leaf spring (141) to the back wall of said base panel (112), and a push member (142) located at said free end of said leaf spring (141) and inserted through said second through hole (1143) of said base panel (112) and suspended in said circular base.
 7. The coin hopper as claimed in claim 1, wherein said hopper body (1) further comprises a coin-dispensing mechanism (13) disposed in said housing (11) at an inner side relative to said coin outlet (110), said coin-dispensing mechanism (13) comprising a lever (131) pivotally connected to said base panel (112) and adapted for pushing each said coin (3) out of said coin outlet (110), and a torsion spring (132) loaded on said lever (131) for providing an elastic potential energy to said lever (131).
 8. The coin hopper as claimed in claim 7, wherein said base panel (112) of said housing (11) comprises a smoothly curved position-limit slot (115) cut through the opposing front and back walls thereof and extended from an inner end of said coin outlet (110) and the border of said circular recess (114), and an axle (116) located at the back wall thereof; said lever (131) of said coin-dispensing mechanism (13) has one end thereof connected to said axle (116); said coin-dispensing mechanism (13) further comprises a pin (1311) located at an opposite end of said lever (131) and inserted through said smoothly curved position-limit slot (115), and a bearing (1312) pivotally mounted on said pin (1311) and adapted for pushing each said coin (3) out of said coin outlet (110).
 9. The coin hopper as claimed in claim 8, wherein said housing (11) of said hopper body (1) further comprises a baffle (117) located at the front wall of said base panel (112) at a bottom side of said coin outlet (110) and abutted to the border of said circular recess (114), said baffle (117) comprising an arched flange (1171) facing toward said bearing (1312) of said coin-dispensing mechanism (13) and defined with said bearing (1312) of said coin-dispensing mechanism (13).

nism (13) a gap for the passing of said coins (3) individually into said coin outlet (110).

10. The coin hopper as claimed in claim 1, wherein said rotating wheel (2) has a raised configuration; the abutment edge (2121) of each said coin-pushing blade (211) is arcshaped; the pushing edge (2122) of each said coin-pushing blade (211) is smoothly curved.
11. The coin hopper as claimed in claim 1, wherein each said coin-pushing blade (211) of said rotating wheel (2) comprises at least one raised bearing portion (213) located at a front surface thereof.

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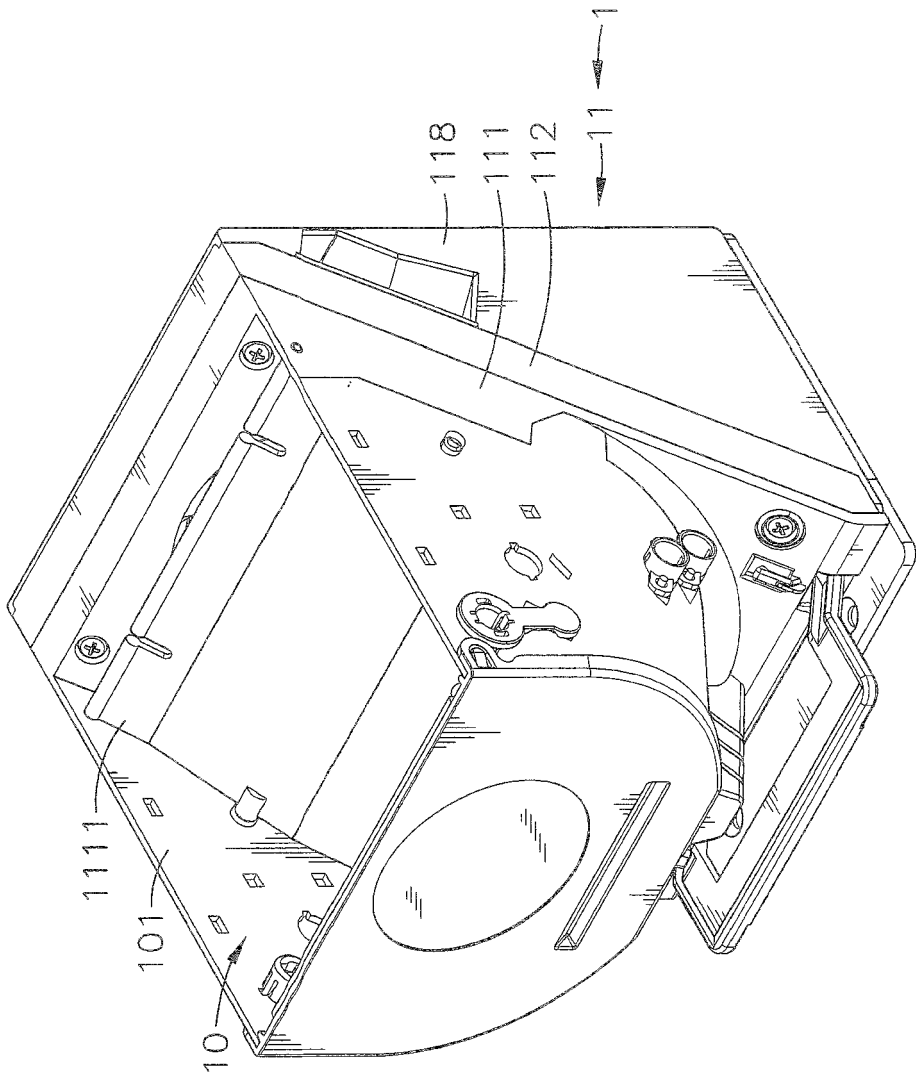
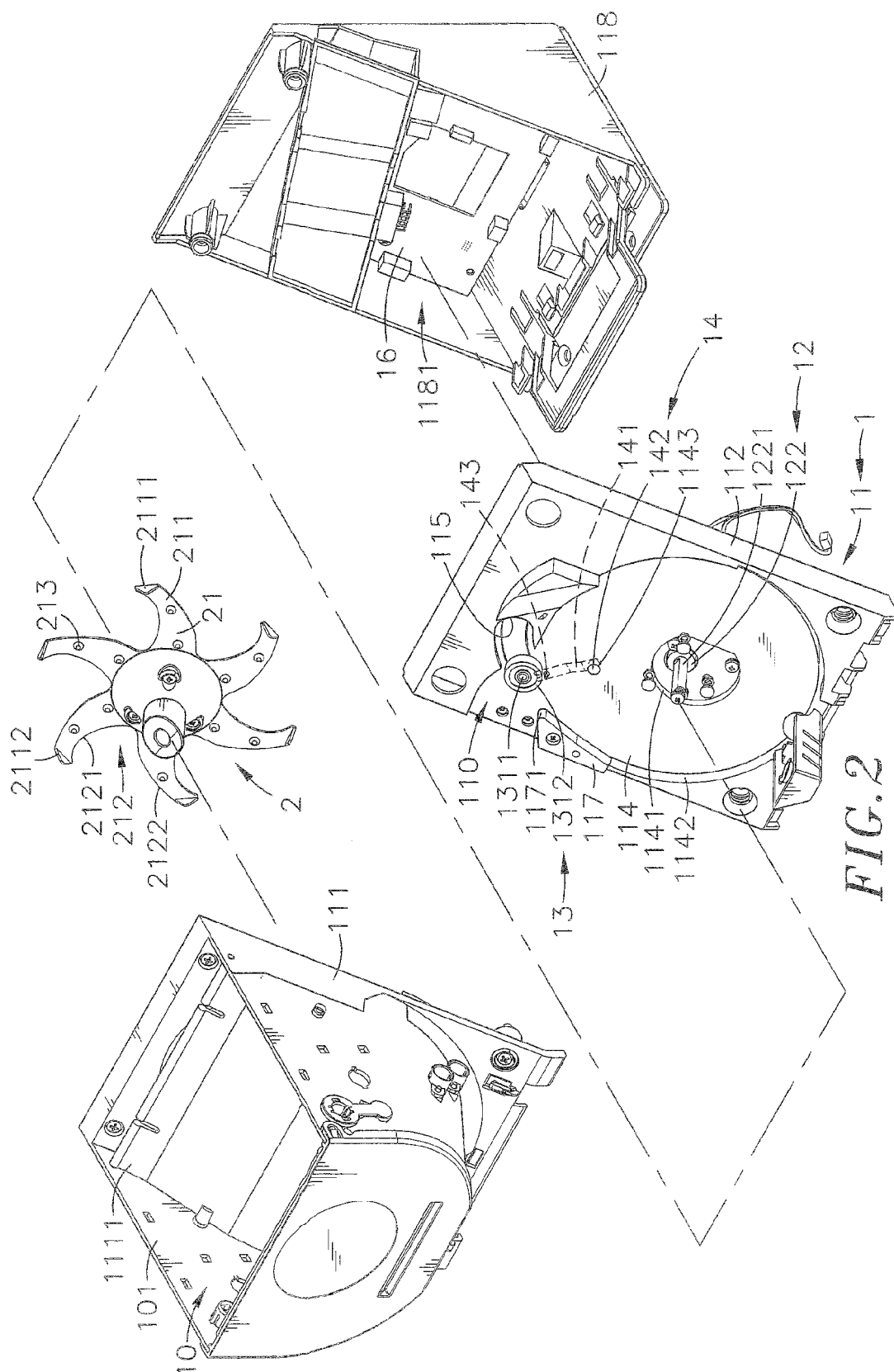


FIG. 1



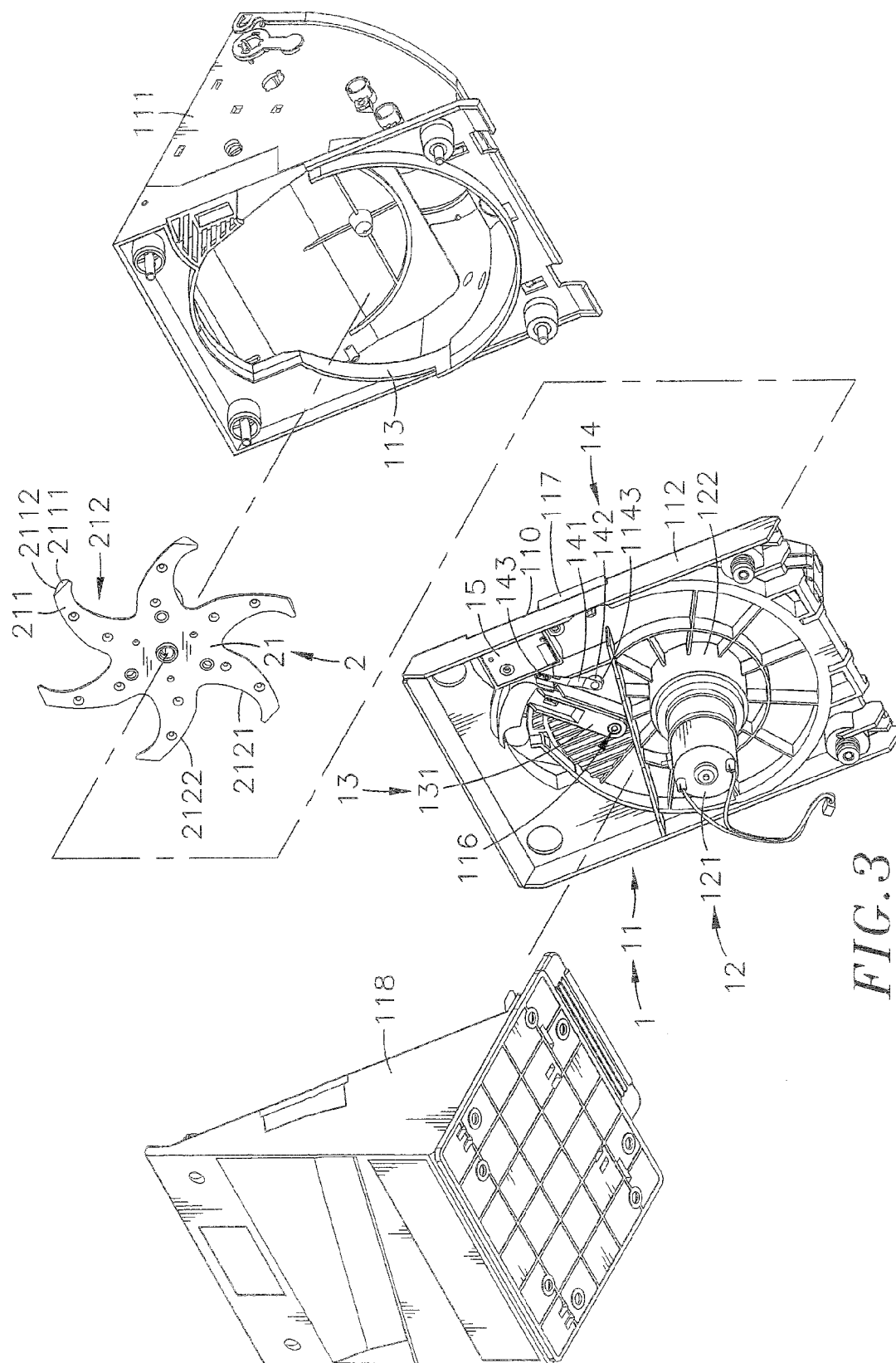


FIG. 3

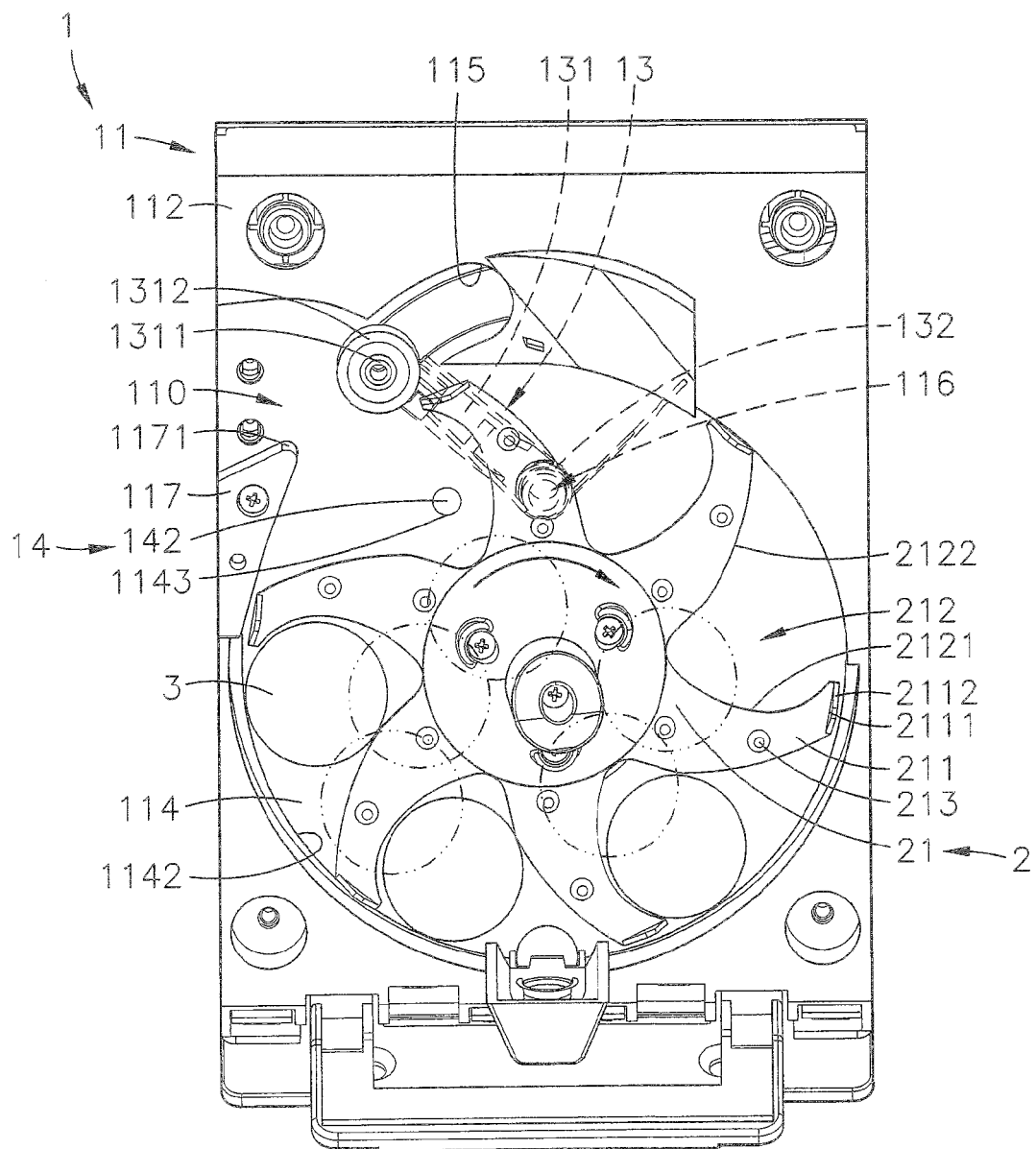


FIG. 4

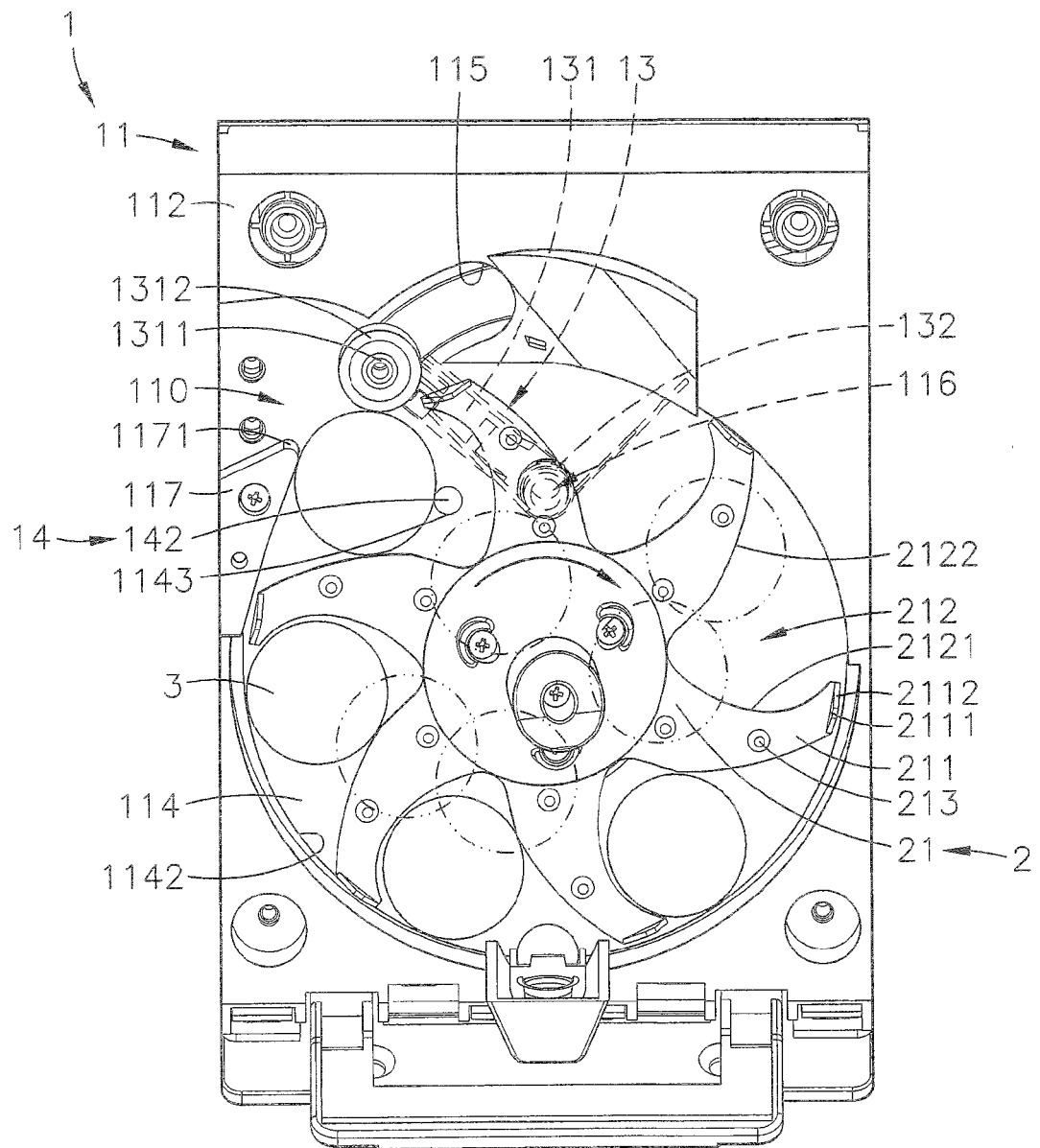


FIG. 5

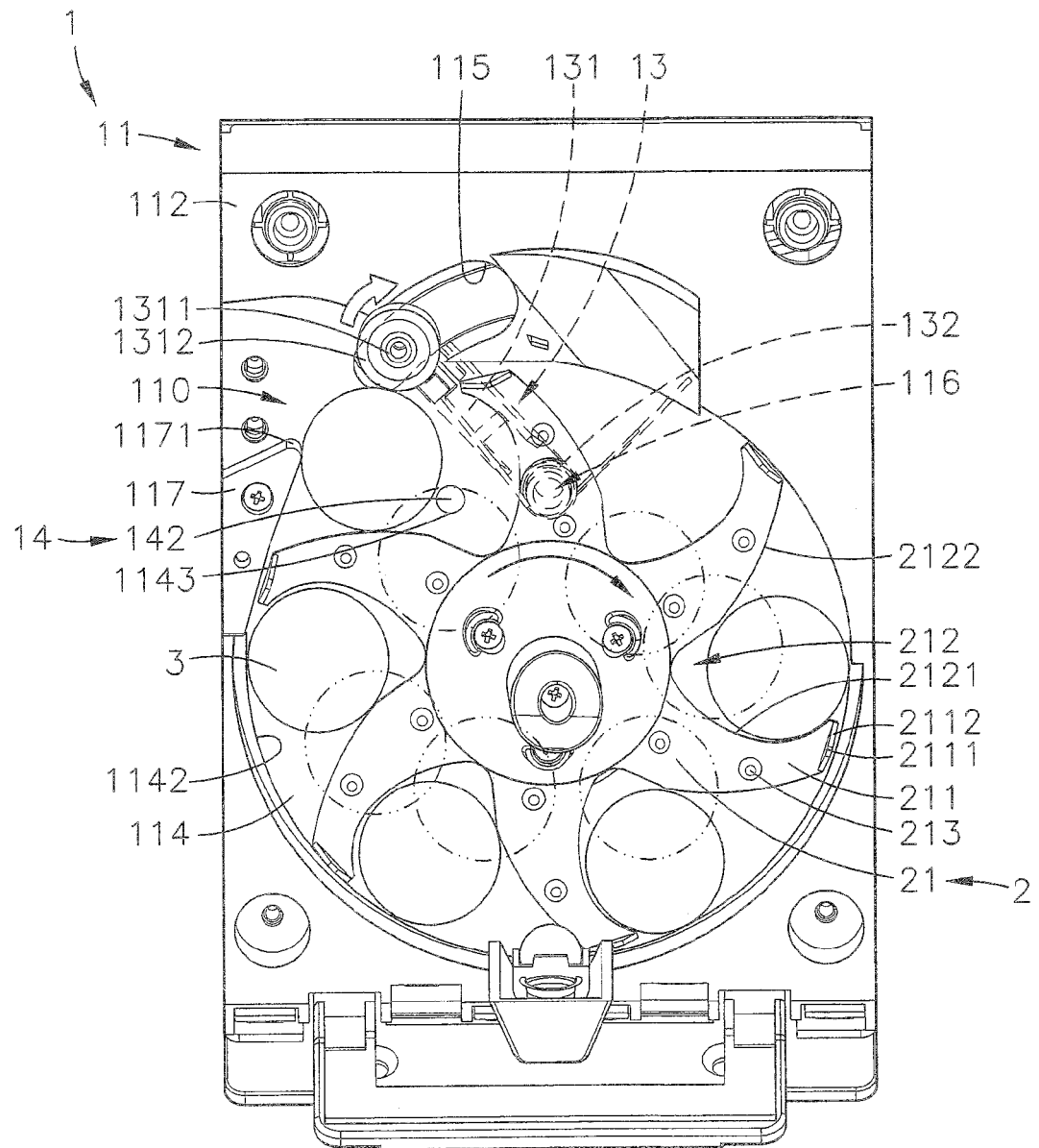


FIG. 6

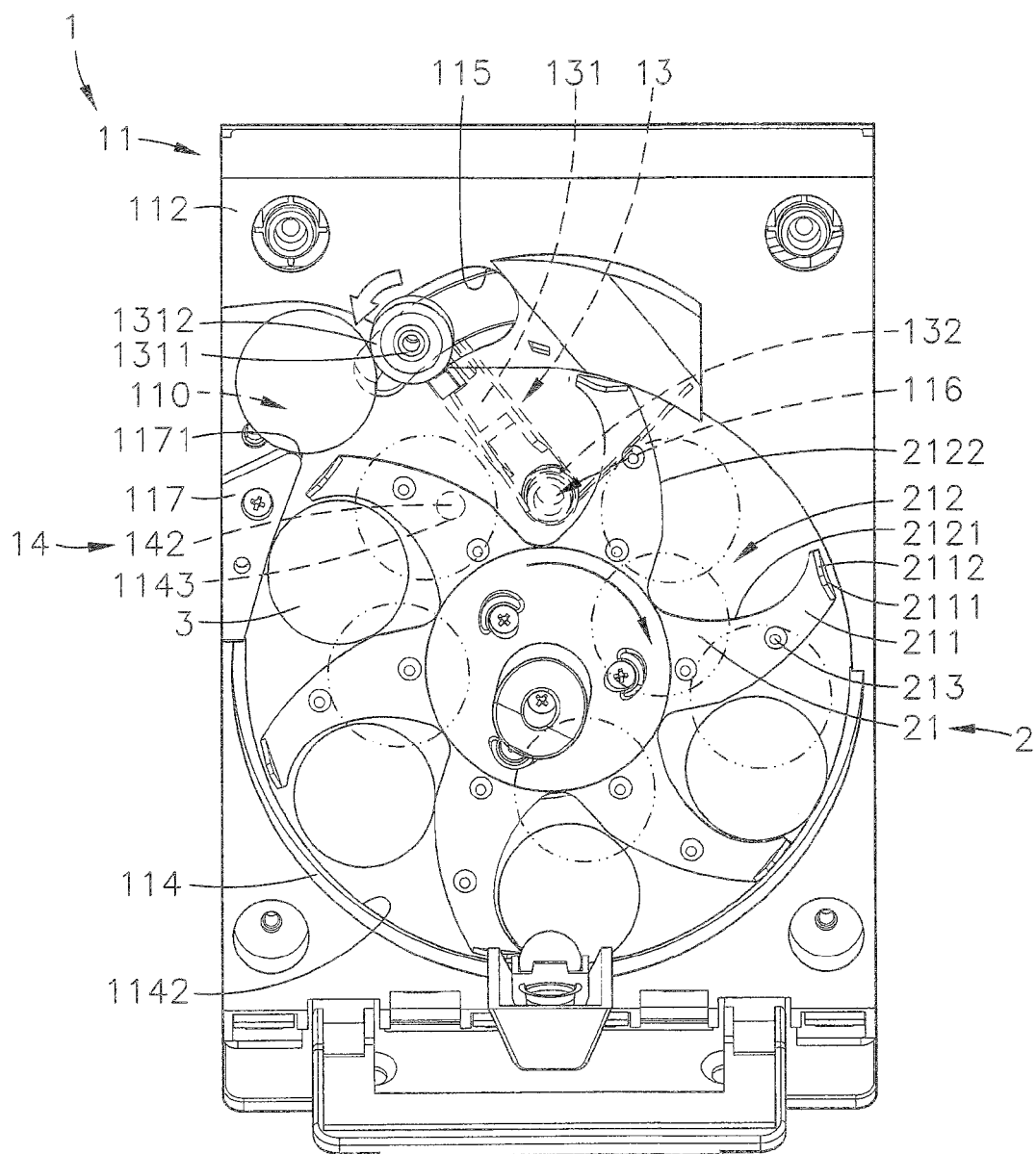


FIG. 7

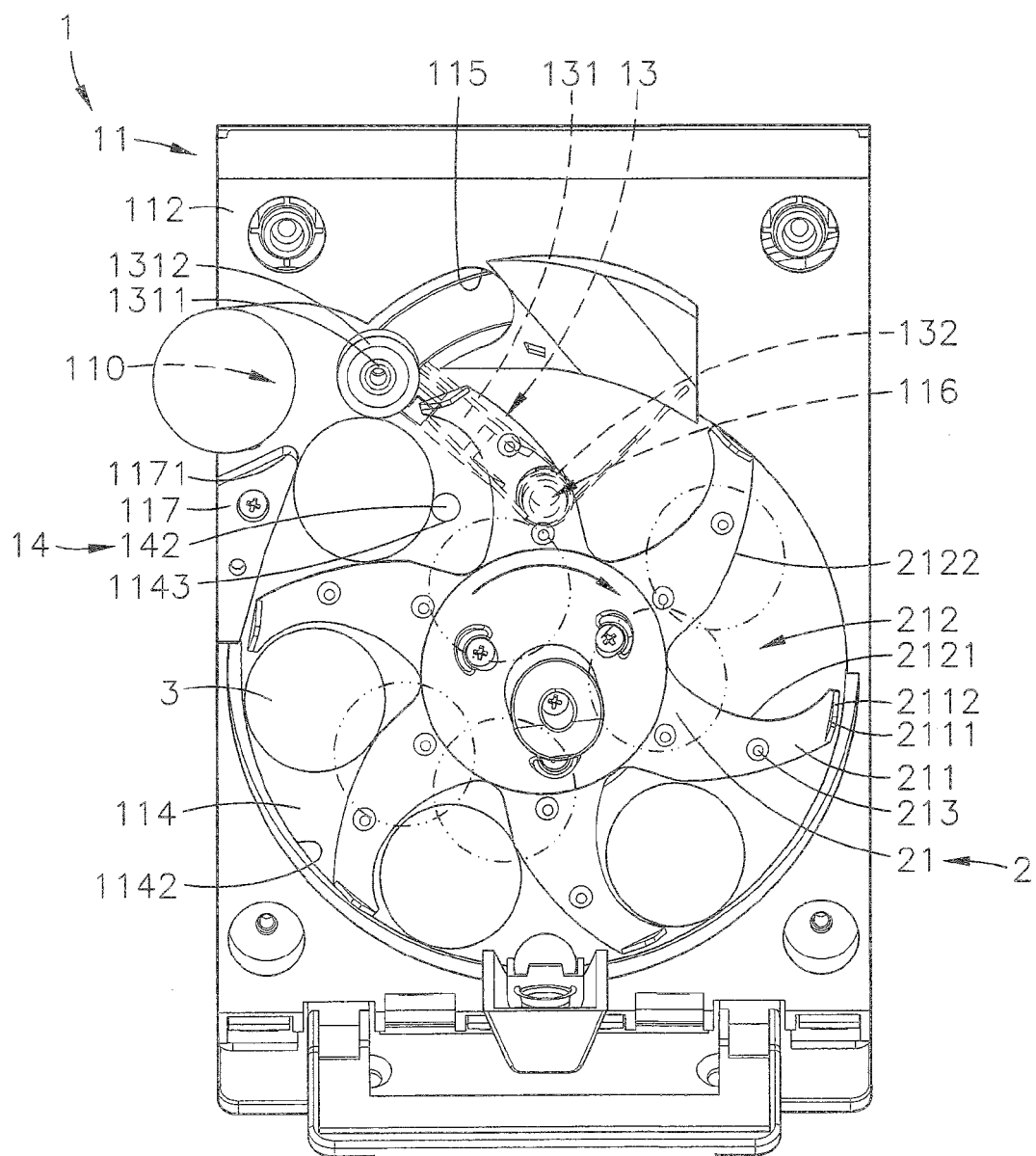
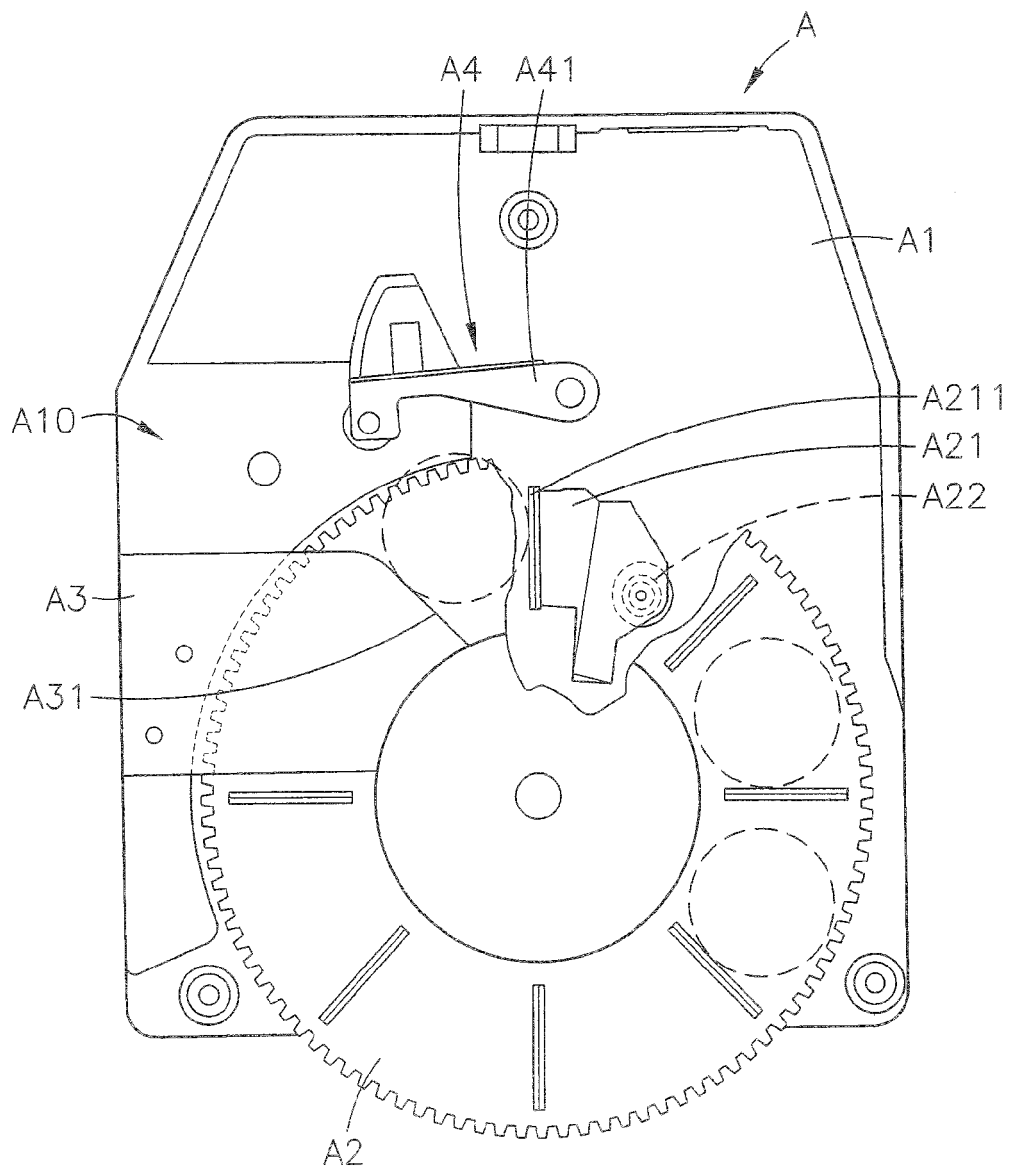
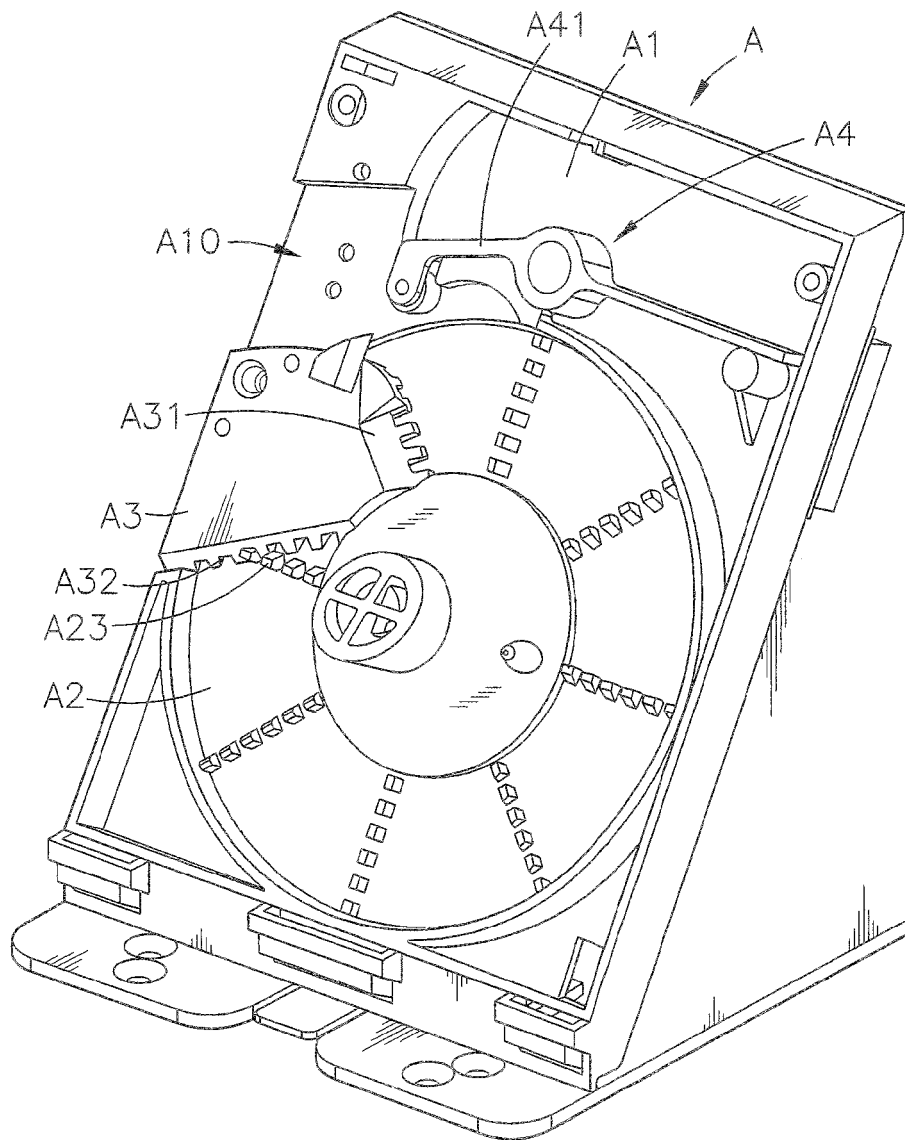


FIG. 8



PRIOR ART
FIG. 9



PRIOR ART
FIG. 10



EUROPEAN SEARCH REPORT

Application Number
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Place of search The Hague		Date of completion of the search 28 October 2015	Examiner Bauer, Sebastian
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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The members are as contained in the European Patent Office EDP file on
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