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(54) **A DISPENSER OF COINS AND/OR TOKENS**

(57) The dispenser (E) of coins and/or tokens comprises: a storage chamber (1); a rotatable disc (2) having an operating surface (21) with a series of radial through-slots (23); coin drawing means (3), associated to the rotatable disc (2) at the radial through-slots (23). The drawing means (3) comprise a series of paddles (30) each having a first portion (31) situated below the rotatable disc (2) and hinged about a relative hinge axis and a second portion (32) inserted in a corresponding radial through-slot (23) and having a pushing wall (320). The dispenser comprises guide means (4, 41, 42) for keeping the second portion (32) of the paddles (30) raised up to a position in proximity of a deflecting member (8) and having reached beyond this position enable the paddles (30) to fall by force of gravity and rotate with respect to the hinge axis and so that the second portion (32) lowers through the radial through-slot (23) so as to transit below the deflecting member (8).

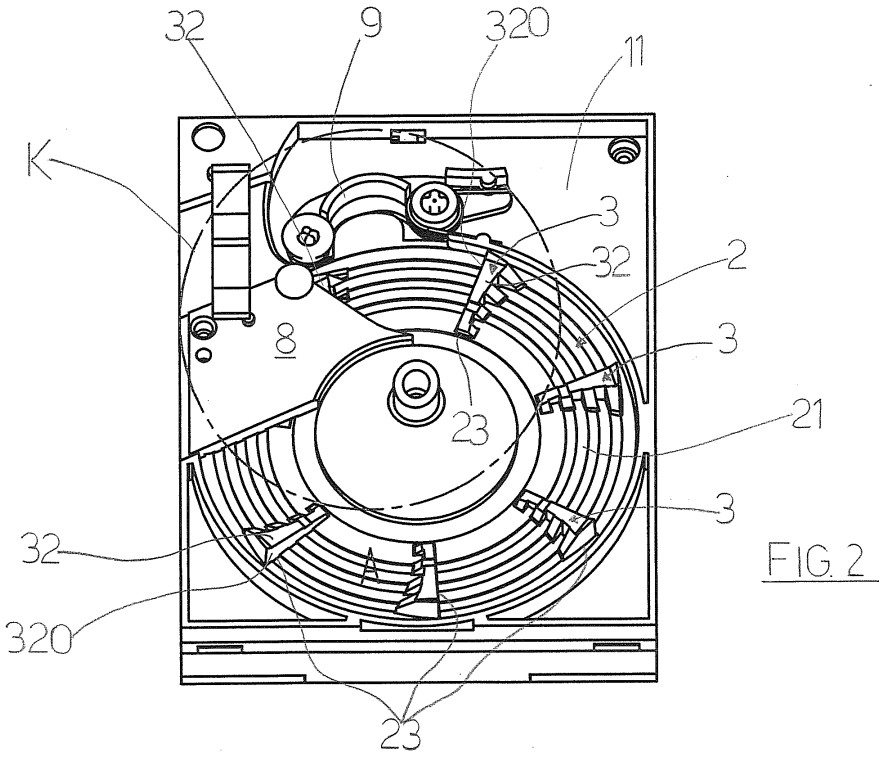

FIG. 2

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Description

DESCRIPTION OF THE INVENTION

[0001] The present invention relates to the particular technical sector relative to coin and/or token dispensers which are installed in automatic distributors of goods and/or services, for dispensing of coins as change-makers or in payment devices and coin exchangers, or slot machines.

[0002] The dispensers are built in such a way as to be able to store, internally thereof, a mass of coins, having a same or different type and denomination, and/or tokens, and to dispense a predetermined quantity, following a specific request, for example as a coin exchange, as change following distribution of a good or service by the relative automatic distributor, or as payment for a win as in the case of a slot machine.

[0003] In this regard, the dispensers comprise a storage chamber of the coins/tokens, coming for example from a relative overlying store, which generally has a truncoconical shape and which comprises an inclined wall on which a disc is rotatably arranged so as to be activatable in rotation about the axis thereof.

[0004] The disc is coupled, by means of suitable coupling means, for example by enmeshing, to a relative motor organ positioned externally of the chamber and activatable to set the disc in rotation about the axis thereof.

[0005] The disc comprises an operating surface and is arranged on the inclined wall so that the operating surface is facing the storage chamber in order to be in contact with the mass of coins or tokens present therein.

[0006] The dispenser further comprises drawing means of the coins/tokens which are associated to the operating surface of the disc and are included to as to be able to draw and convey, when the disc is set in rotation about the axis thereof, single coins/single tokens along a circular pathway.

[0007] With the rotation of the disc, the drawing means draw single coins/tokens along the circular pathway up to a deflecting member, borne projectingly above a sector of the operating surface of the disc, for switching the coin/token out of the disc towards an elastically loaded ejecting member which then pushes the coin/token towards an outlet slot situated on a lateral wall of the dispenser.

[0008] In a first type of known dispensers, such as for example the dispenser described in document EP 1 647 943, the drawing means are constituted by a plurality of rows of teeth which are arranged rigidly and fixedly (for example realised in a single body) radially on the operating surface of the disc and projecting above the operating surface.

[0009] The teeth of each row are arranged radially and along a same radius of the operating surface of the disc; further, the rows of teeth are arranged angularly equidistanced from one another so as to define, between two consecutive rows, a seating, in the form of an angular sector, for receiving a coin/token.

[0010] In this way, when the disc is activated in rotation, each row of teeth can push the coin/token, which is inserted in the seating between two adjacent rows of teeth, towards the deflecting member.

[0011] In turn, the deflecting member is conformed so as to comprise, in the wall facing towards the disc, a series of circular grooves arranged distanced from one another and conformed in such a way as to enable the teeth of the rows of teeth to transit freely along them during the rotation of the disc.

[0012] This type of dispenser, however, presents drawbacks.

[0013] The coins and tokens, according to the type thereof, can comprise knurling and grooves or ridges on the faces thereof; as it is not possible to control the arrangement and orientation of the coins/tokens in the mass of coins present in the storage chamber, and it is therefore not possible to predict how the coins/tokens will be arranged with respect to the operating surface of the disc once activated in rotation; it can happen that the coins/tokens become arranged with the knurling/grooving at the position of a tooth.

[0014] In these cases, the coins/tokens can jam and/or not be correctly drawn towards the deflecting member, or indeed become blocked between the rows of teeth and the deflecting member itself.

[0015] In a second type of known dispensers, such as for example the dispenser described in document EP 957 456, the drawing means are constituted by a series of walls which are mounted at the relative slots present radially on operating surface of the disc and arranged along relative radii, and angularly equidistanced, of the operating surface.

[0016] The walls identify, between them, a sort of wall or seating having dimensions such as to be able to accommodate within them any type of coin or token, whether of minimum diameter or maximum diameter.

[0017] The walls are mounted on corresponding springs which are inserted and arranged internally of the slots so as to push and maintain the walls raised beyond the surface of the disc so that they can draw a coin/token, when the disc is activated in rotation, up to the deflecting member.

[0018] When the rotation of the disc brings the walls to abut against the deflecting member, the deflecting member forces and constrains the walls to lower against the elastic force of the springs in such a way as to enable the springs to transit below the deflecting member.

[0019] Once the wall has passed over the deflecting member, the springs newly push the wall above the operating surface of the disc.

[0020] However this type of dispenser also has various drawbacks, primarily dictated by the complexity of the structure and the difficulty of mounting the various members, in particular the inserting of the springs internally of the relative slots and the predisposing of the walls ther-

eon.

[0021] Further, the springs are subject to wear and therefore require interventions for maintenance and replacement.

[0022] The walls, when brought by the rotation of the disc into the lower part of the storage chamber, are also subjected to the weight of the mass of coins and the circumstance may even arise in which the weight of the mass of coins might be such as to overcome the force of the springs, and therefore push the wall downwards and compromise the effectiveness of the drawing of the coins.

[0023] Lastly, as the wall are raised up to when they strike against the deflecting member, in a case where there are two or more coins, for example smaller-dimension coins, unexpectedly and contemporaneously present in the seating between two adjacent walls, these coins will inevitably be switched towards the ejecting member which will push them towards the outlet slot and therefore the dispenser will dispense more than one coin when it should dispense one.

[0024] The aim of the present invention is therefore to provide a new coin and/or token dispenser that is able to obviate the various above-mentioned drawbacks present in the dispensers of known type as described in the foregoing.

[0025] In particular, a main aim of the present invention is to provide a novel coin and/or token dispenser able to house internally thereof any type of coin or token, whether of minimum or maximum diameter, and to perform dispensing thereof without incurring any jamming problem, or a situation of dispensing of a quantity of coins and tokens different from what is predetermined or desired.

[0026] A further aim of the present invention is to provide a novel coin and/or token dispenser characterised by a particularly functional and reliable structure relating to the mode of drawing the coins/tokens and such as not to require special and frequent maintenance and/or components replacement operations.

[0027] The above-mentioned advantages are obtained according to the contents of the claims.

[0028] The characteristics of the dispenser of coins and/or tokens provided by the present invention are illustrated in the following description, provided by way of non-limiting example with reference to the accompanying tables of drawings:

- figure 1 schematically illustrates a perspective view of the dispenser of coins and/or tokens that is the object of the present invention;
- figure 2 schematically illustrates a front view of the dispenser of figure 1, in which some elements have been removed in order better to evidence other particularly significant components;
- figure 3 is a larger-scale illustration of the detail denoted by letter K of figure 2;
- figure 4 illustrates, in a perspective exploded view, some significant components of the dispenser of the invention;
- figure 5 is also a perspective exploded view of other and further particularly significant components of the dispenser proposed by the present invention;
- figure 6 is a perspective view of a component of the dispenser;
- figure 7 and figure 8 are respective perspective views of a component of the dispenser of the present invention in two respective distinct possible configurations.

[0029] With reference to the appended tables of drawings, reference letter (E) denotes the dispenser of coins and/or tokens that is the object of the present invention in its entirety.

[0030] The dispenser (E) can be installed in automatic dispensers of goods or services, i.e. in payment devices, money-changers, or in slot machines and/or in other like apparatus in which dispensing of coins and/or tokens is required.

[0031] The dispenser (E), such as for example the one schematically illustrated in figure 1, has a box structure internally defining a storage chamber (1) of the coins and/or tokens, in arrival from a relative overlying store (not illustrated), which storage chamber (1) comprises an inclined wall (11).

[0032] The dispenser of coins and/or tokens (E) further comprises a rotatable disc (2) mounted and predisposed on the inclined wall (11) so as to have an operating surface (21) facing towards the storage chamber (1) and activatable in rotation about the relative axis, and having, on the operating surface (21), a series of radial through-slots (23) that are angularly spaced; and coin drawing means (3), associated to the rotatable disc (3), at the radial through-slots (23) and configured and arranged, when the rotatable disc (2) is activated in rotation, for drawing and moving single coins and/or tokens along a circular pathway of movement.

[0033] The dispenser (E) also has, in a known way, a deflecting member (8), predisposed internally of the storage chamber (1) so as to be above a sector of the operating surface (21) of the rotatable disc (2) and so as to be arranged transversally to the circular pathway of movement of the coins and/or tokens so as to deflect the coins/tokens radially externally of the rotatable disc (2); and an elastically-loaded ejecting member (9), which is predisposed externally of the rotatable disc (2) and in proximity of the deflecting member (8) and configured such as to receive the coins/tokens deflected by the deflecting member (8) and to push and direct the coins/tokens towards an outlet slot (6) (visible in figure 1).

[0034] The special characteristics of the dispenser (E) provided by the present invention consist in the fact that:

the coin drawing means (3) comprise a series of paddles (30) predisposed and conformed so as to each have a first portion (31) situated below the rotatable disc (2) and hinged so as to be freely rotatable about a relative hinge axis and a second portion (32) which is instead inserted in a corresponding radial through-slot (23) of the rotatable disc (2), the second portion (32) is conformed so as to have a pushing wall (320) for pushing the coins/tokens,

and in that the dispenser (E) further comprises guide means (4, 41, 42) which are predisposed below the rotatable disc (2), and which are configured and conformed so that when the rotatable disc (2) is activated in rotation, to keep the second portion (32) of the paddles (30) raised with respect to the hinge axis of the first portion (31) of the paddles (30), so that the pushing wall (320) of the second portion (32) remains above the operating surface (21) of the rotatable disc (2) up to a position in proximity of the deflecting member (8), and also configured and conformed so as to enable the paddles (30), once having moved past said position, to fall by force of gravity and rotate with respect to the hinge axis and so that the second portion (32) of the paddles (30) lowers through the radial through-slot (23) of the rotatable disc (2) and the relative pushing wall (320) lowers with respect to the operating surface (21) so as to be able to transit below the deflecting member (8).

[0035] See in particular figure 4, in which the paddles (30) are illustrated.

[0036] As a result of these particular characteristics, i. e. the fact that the paddles (30) are hinged to the first portion (31) thereof below the rotatable disc (2) and that the paddles (30) are arranged in such a way that the second portion (32) having the pushing wall (320) is internal of the radial through-slots (23) of the rotatable disc (2), the guide means (4, 41, 42) can:

firstly, easily guide and maintain the second portion (32) in the raised position with respect to the operating surface of the disc, in order to allow the pushing wall (320) to push and draw a coin during the rotation of the rotatable disc towards the deflecting member,

and, then, to enable the paddle (30) to fall by gravity and rotate about the hinge axis so that the second portion (32) of the paddle (30) can easily, and without creating forces against the action of any spring or elastic organ, move lower with respect to the operating surface (21) of the rotatable disc (2) so as to be able freely to transit below the deflecting member (8) once it has completed its action of drawing a coin against the deflecting member (8).

[0037] In this regard see figures 2 and 3, and in particular figure 3 in which it can be observed that the second portion (32) of the paddle (30) of the drawing means (3) which is rotating and nearing to the deflecting member (8) is in a raised position with respect to the operating surface (21) of the disc (2), so as to be able to draw and push a coin (not illustrated) towards the deflecting member (8), while the second portion (21) of the paddle (30) which is transiting at the deflecting member (8) is in a lowered position with respect to the operating surface (32) of the rotatable disc (2) so as to be able to transit below the deflecting member (8).

[0038] According to the preferred embodiment of the dispenser (E) illustrated in the figures, for example see in particular figures 4 and 5, the guide means (4,41,42) comprise a series of pins (41), each of which is predisposed below the second portion (32) of the series of paddles (30), and a sliding annular cam (42) which is situated and predisposed below the rotatable disc (2) according to a progression such as to be encountered by the pins (41) present below the second portion (32) of the paddles (30) and enable sliding thereof during the rotation of the rotatable disc (2).

[0039] In particular, the annular cam (42) is configured and profiled so as to present:

a first raised annular portion (420), included for keeping the second portion (32) of the paddles (30) raised with respect to the hinge axis of the first portion (31) of the paddles (30) so that the pushing wall (320) of the second portion (32) remains above the operating surface (21) when the pins (41) slide on the first raised annular portion (420) during the rotation of the rotatable disc (2) (situation illustrated in figure 7),

and a second lowered annular portion (421) having an angular extension at least corresponding to the extension of the deflecting member (8) above the rotatable disc (2), included in order to allow the fall by force of gravity and the rotation of the paddles (30) with respect to the hinge axis so that the second portion (32) of the paddles (30) lowers through the radial through-slot (23) of the rotatable disc (2) and the relative pushing wall (320) lowers with respect to the operating surface (21) so as to be able to transit below the deflecting member (8) (situation illustrated in figure 8).

[0040] In greater detail, in a preferred aspect, the annular cam (42) is further configured and conformed so as to have:

an annular connecting portion in descent (422), for connecting the first raised annular portion (420) with the second lowered annular portion (421) lowered (in the rotation direction of the disc), so as to gradually guide the fall by force of gravity and the rotation of the paddles (30) about the hinge axis,

and an annular connecting portion in ascent (423),

for connecting the second lowered annular portion (421) to the first raised annular portion (420) (in the rotation direction of the disc), so as to guide a rotation of the paddles (30) about the hinge axis contrary to the preceding rotation and to return the second portion (32) of the paddles (30) into a position above the operating surface (21) of the rotatable disc (2) once the paddles (30) have transited below the deflecting member (8) during the rotation of the rotatable disc (2) (see for example figure 6 in which the annular cam (42) is illustrated in its entirety with the various relative portions, raised and lowered, and the two connecting portions).

[0041] Other preferred and advantageous aspects of the dispenser (E) of the invention are as follows.

[0042] In a preferred aspect, the second portion (32) of the paddles (30) has a profiled tapered shape so that the pushing wall (320) has a radially tapered shape towards the rotation axis of the rotatable disc (2) (observable in particular in figures 2 and 3) so that when, during the rotation of the rotatable disc (2), the pins (41) slide along the first raised annular portion (420) of the annular cam (42) so as to keep the second portion (32) of the paddle (30) raised with respect to the operating surface (21) of the rotatable disc (2), the internal part of the pushing wall (320) projects from the operating surface (21) by a lower amount than the external part of the pushing wall (320).

[0043] Owing to this particular detail, with the dispenser (E) of the present invention the drawback present in the prior art is avoided, in which two coins, which might inadvertently insert in the space present between two adjacent pushing walls, are contemporaneously ejected from the dispenser, instead of a single coin at a time, as required.

[0044] In fact, because of the special tapered shape of the pushing wall (320), when the pins (41) slide on the annular connecting portion in descent (422) of the annular cam (420), they guide the fall by force of gravity and the rotation of the paddle about the hinge axis, the internal part of the pushing wall (320) lowers below the operating surface (21) of the rotatable disc (2) before the external part of the pushing wall (320).

[0045] In this way, when the pushing wall is drawing two coins towards the deflecting member, the coin arranged inside falls into the storage chamber as the internal part of the pushing wall which was drawing it towards the deflecting member has lowered to below the operating surface of the rotatable disc.

[0046] A further advantageous aspect of the dispenser (E) of the invention consists in the fact that it comprises an auxiliary disc (7) which is predisposed inferiorly of the rotatable disc (2) and a series of support members (70) which are mounted and predisposed on the auxiliary disc (7) according to an annular pathway (see for example figure 4).

[0047] In particular (as illustrated and visible for example in figures 5, 7 and 8), each of the support members (70) comprising a hinge rod (71) constituting and defining the hinge axis for hinging the first portion (31) of the paddles (30).

[0048] The support members (70) are reciprocally angularly predisposed so that when the first end (31) of the paddles (30) is hinged to the hinge rod (71), the second end (32) of the paddles (30) is situated internally of a relative radial through-slot (23) of the rotatable disc (2).

[0049] The dispenser further comprises motor means (80) that are predisposed so as to activate in rotation the rotatable disc (2) and the auxiliary disc (7) in a mutually conjoined and synchronous way so that the second portion (32) of the paddles (30) can remain internally of a relative radial through-slot (23) of the rotatable disc (2) during the rotation thereof.

[0050] For example, the motor means (80) can comprise an actuator organ (not illustrated) for placing a spindle (81) in rotation, which spindle (81) is destined to couple with the rotatable disc (2) and cogged wheels (82) arranged so as to rotate together with the spindle (81) and destined to enmesh with a meshing cogging (not illustrated in the figures) fashioned along an annular edge of the auxiliary disc (7).

[0051] The first portion (31) of the paddles (30) has an arched shape with a recess (35) (visible in particular in figure 5) having dimensions such as to couple in rotation with the hinge rod (71) of the support members (70): owing to this conformation it is possible to simply and effectively hook and unhook the paddles (30) from the support members (70) so that they can be replaced where required.

[0052] The second portion (32) of the paddles (30) has sliding members (38) on the opposite side with respect to the pushing wall (320), which sliding members (38) are tapered towards the operating surface (21) of the rotatable disc (2).

[0053] With this detail, the rotation of the disc facilitates the fall of the coins into the space between two consecutive paddles.

Claims

1. A dispenser (E) of coins and/or tokens, comprising:

a storage chamber (1) for storing coins and/or tokens, having an inclined wall (11);

a rotatable disc (2) mounted and predisposed on the inclined wall (11) so as to have an operating surface (21) facing towards the storage chamber (1) and activatable in rotation about the relative axis, and having, on the operating surface (21), a series of radial through-slots (23) that are angularly spaced,

coin drawing means (3), associated to the rotatable disc (2), at the radial through-slots (23) and predisposed, when the rotatable disc (2) is ac-

tivated in rotation, for drawing and moving single coins and/or tokens along a circular pathway of movement;
a deflecting member (8), predisposed internally of the storage chamber (1) so as to be above a sector of the operating surface (21) of the rotatable disc (2) and so as to be arranged transversally to the circular pathway of movement of the coins and/or tokens so as to deflect the coins/tokens radially towards an outside of the rotatable disc (2);
an elastically-loaded ejecting member (9), predisposed externally of the rotatable disc (2) and in proximity of the deflecting member (8) and configured such as to receive the coins/tokens deflected by the deflecting member (8) and to push and direct the coins/tokens towards an outlet slot (6),
characterised in that the coin drawing means (3) comprise a series of paddles (30) predisposed and conformed so as to each have a first portion (31) situated below the rotatable disc (2) and hinged so as to be freely rotatable about a relative hinge axis and a second portion (32) inserted in a corresponding radial through-slot (23) of the rotatable disc (2), the second portion (32) being conformed so as to have a pushing wall (320) for pushing the coins/tokens, and **in that** it comprises guide means (4, 41, 42), predisposed below the rotatable disc (2), configured and conformed so that when the rotatable disc (2) is activated in rotation, to keep the second portion (32) of the paddles (30) raised with respect to the hinge axis of the first portion (31) of the paddles (30) so that the pushing wall (320) of the second portion (32) remains above the operating surface (21) of the rotatable disc (2) up to a position in proximity of the deflecting member (8) and also configured and conformed so as to enable the paddles (30), once having moved past said position, to fall by force of gravity and rotate with respect to the hinge axis and so that the second portion (32) of the paddles (30) lowers through the radial through-slot (23) of the rotatable disc (2) and the relative pushing wall (320) lowers with respect to the operating surface (21) so as to be able to transit below the deflecting member (8).

2. The dispenser of claim 1, **characterised in that** the guide means (4,41,42) comprise a series of pins (41), each of which is predisposed below the second portion (32) of the series of paddles (30), and a sliding annular cam (42) predisposed below the rotatable disc (2) according to a progression such as to be encountered by the pins (41) present below the second portion (32) of the paddles (30) and enable sliding thereof during the rotation of the rotatable disc (2), the annular cam (42) being configured and profiled so as to have a first raised annular portion (420), so as to keep the second portion (32) of the paddles (30) raised with respect to the hinge axis of the first portion (31) of the paddles (30) so that the pushing wall (320) of the second portion (32) remains above the operating surface (21) when the pins (41) slide on the first raised annular portion (420) during the rotation of the rotatable disc (2), and a second lowered annular portion (421) having an angular extension at least corresponding to the extension of the deflecting member (8) above the rotatable disc (2), in order to allow the fall by force of gravity and the rotation of the paddles (30) with respect to the hinge axis so that the second portion (32) of the paddles (30) lowers through the radial through-slot (23) of the rotatable disc (2) and the relative pushing wall (320) lowers with respect to the operating surface (21) so as to be able to transit below the deflecting member (8).

3. The dispenser of claim 2, **characterised in that** the annular cam (42) is further configured and conformed so as to have an annular connecting portion in descent (422), for connecting the first raised annular portion (420) with the second lowered annular portion (421) so as to gradually guide the fall by force of gravity and the rotation of the paddles (30) about the hinge axis, and an annular connecting portion in ascent (423), for connecting the second lowered annular portion (421) to the first raised annular portion (420), so as to guide a rotation of the paddles (30) about the hinge axis contrary to the preceding rotation and to return the second portion (32) of the paddles (30) into a position above the operating surface (21) of the rotatable disc (2) once the paddles (30) have transited below the deflecting member (8) during the rotation of the rotatable disc (2).

4. The dispenser of claim 3, **characterised in that** the second portion (32) of the paddles (30) has a profiled tapered shape so that the pushing wall (320) has a radially tapered shape towards the rotation axis of the rotatable disc (2) so that when, during the rotation of the rotatable disc (2), the pins (41) slide along the first raised annular portion (420) of the annular cam (42) so as to keep the second portion (32) of the paddle (30) raised with respect to the operating surface (21) of the rotatable disc (2), the internal part of the pushing wall (320) projects from the operating surface (21) by a lower amount than the external part of the pushing wall (320), and so that when the pins (41) slide on the annular connecting portion in descent (422) of the annular cam (420), the internal part of the pushing wall (320) lowers below the operating surface (21) of the rotatable disc (2) before the external part of the pushing wall (320).

5. The dispenser of any one of the preceding claims, **characterised in that** it comprises an auxiliary disc (7) predisposed inferiorly of the rotatable disc (2) and a series of support members (70) predisposed on the auxiliary disc (7) according to an annular pathway, each of the support members (70) comprising a hinge rod (71) defining the hinge axis for hinging the first portion (31) of the paddles (30), the support members (70) being reciprocally angularly predisposed so that when the first end (31) of the paddles (30) is hinged to the hinge rod (71), the second end (32) of the paddles (30) is situated internally of a relative radial through-slot (23) of the rotatable disc (2), and **in that** it comprises motor means (80) predisposed so as to activate in rotation the rotatable disc (2) and the auxiliary disc (7) in a conjoined and synchronous way so that the second portion (32) of the paddles (30) can remain internally of a relative radial through-slot (23) of the rotatable disc (2) during the rotation thereof.

6. The dispenser of the preceding claim, **characterised in that** the first portion (31) of the paddles (30) has an arched form with a recess (35) having dimensions such as to couple in rotation with the hinge rod (71) of the support members (70).

7. The dispenser of the preceding claim, **characterised in that** the second portion (32) of the paddles (30) has sliding members (38) on the opposite side with respect to the pushing wall (320), which sliding members (38) are tapered towards the operating surface (21) of the rotatable disc (2).

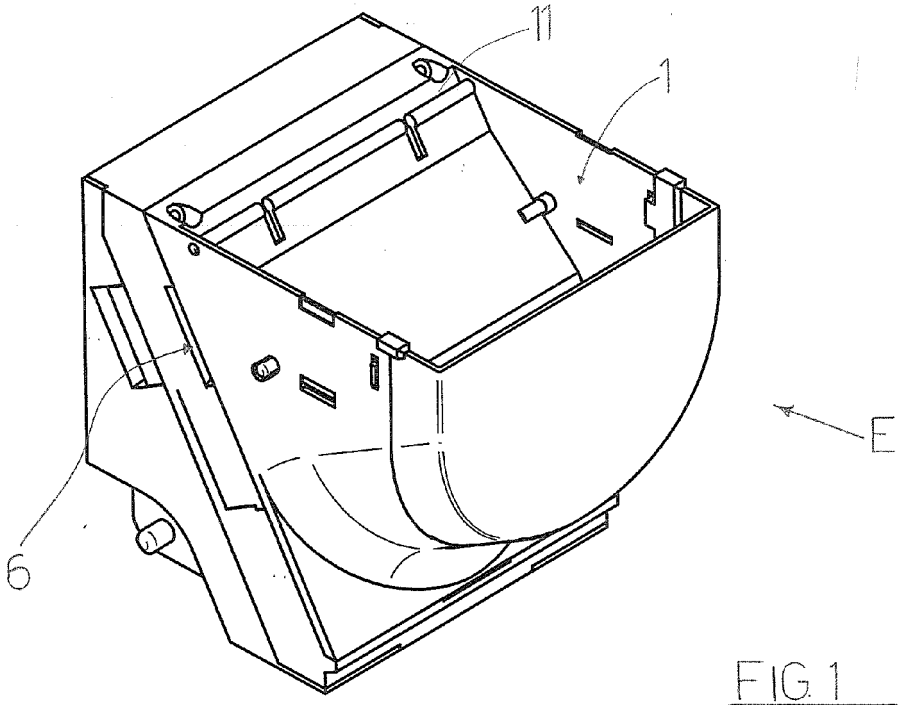


FIG. 1

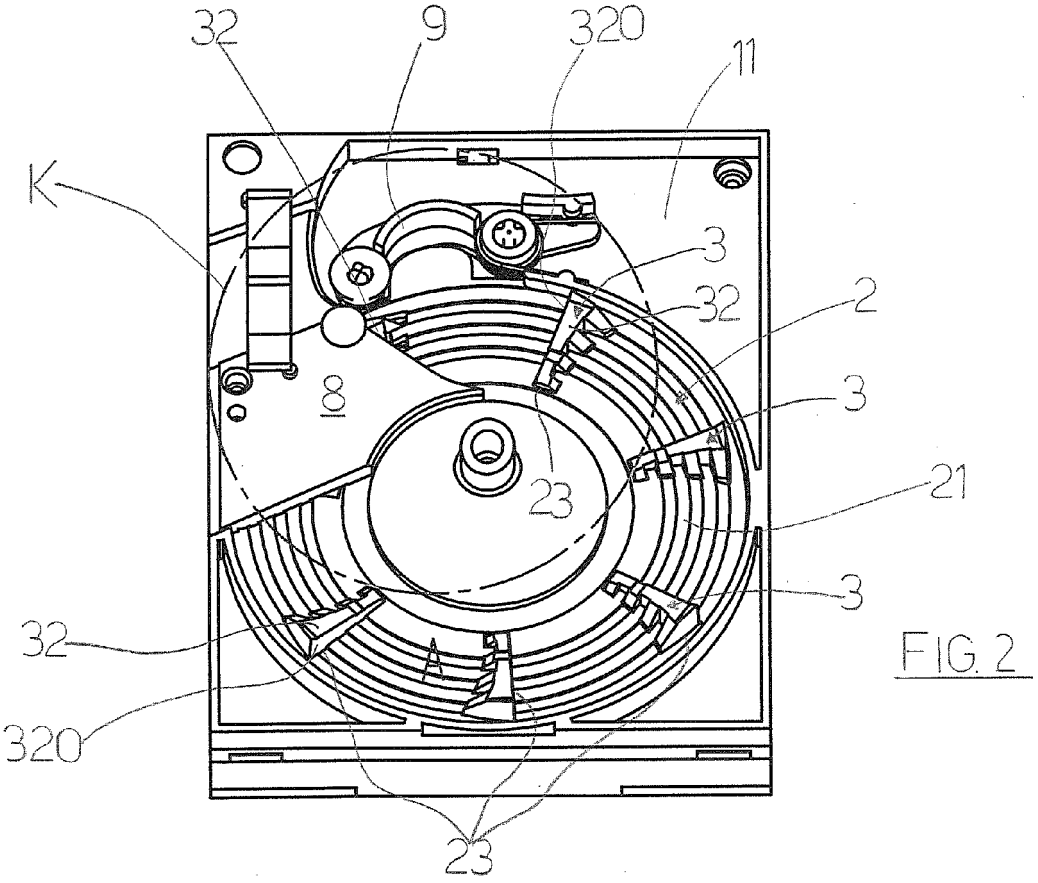


FIG. 2

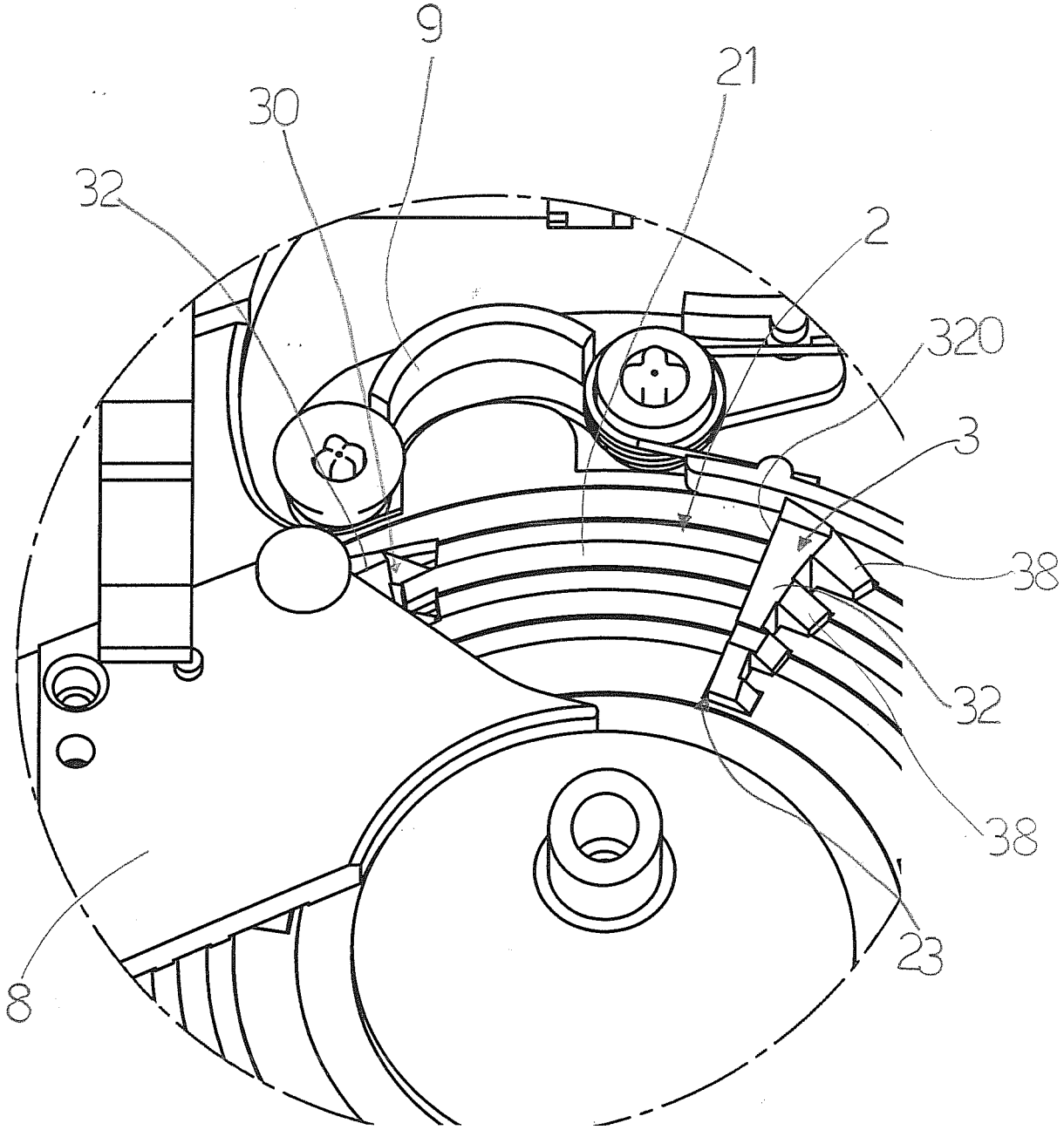


FIG. 3

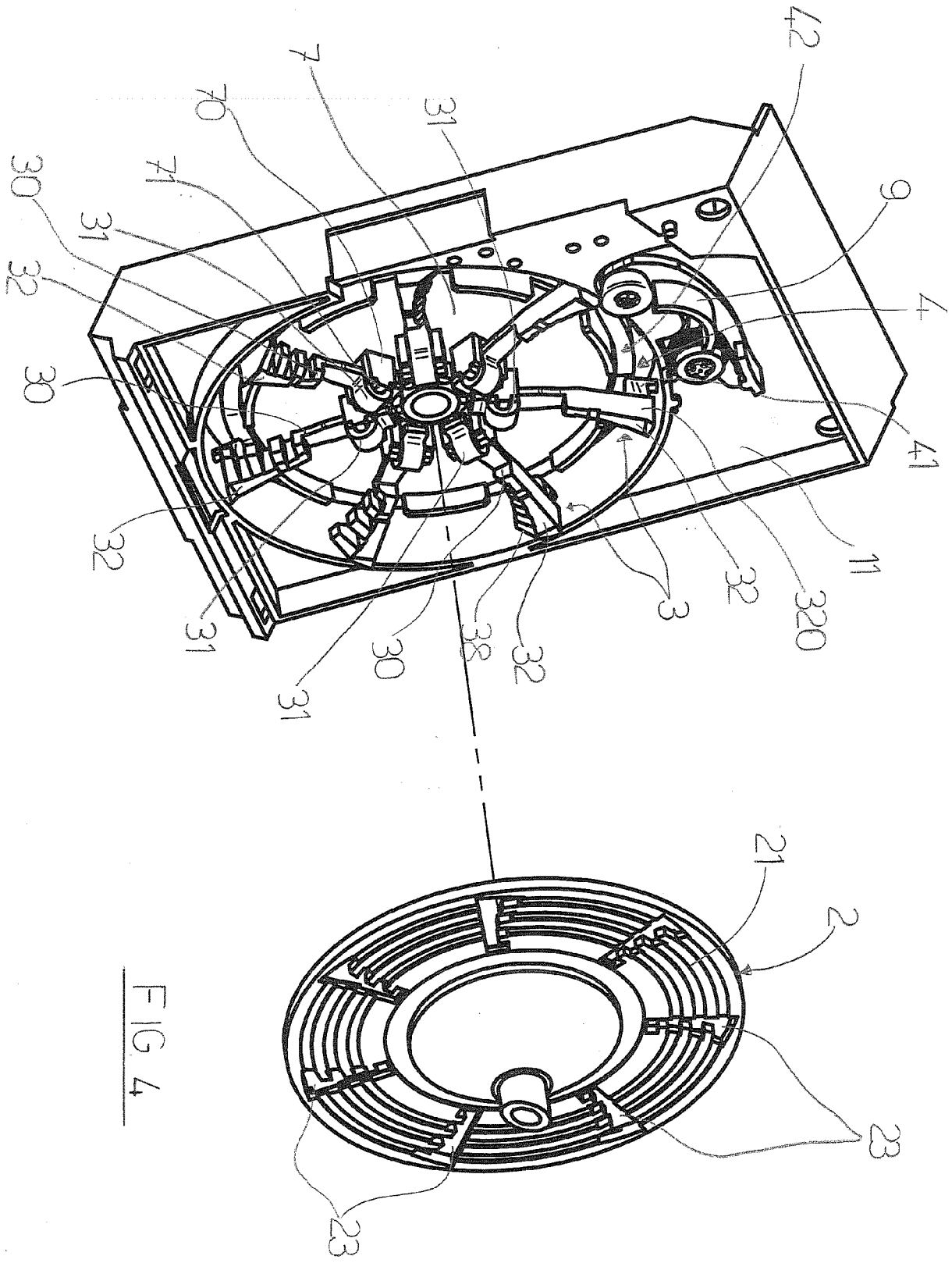


FIG 4

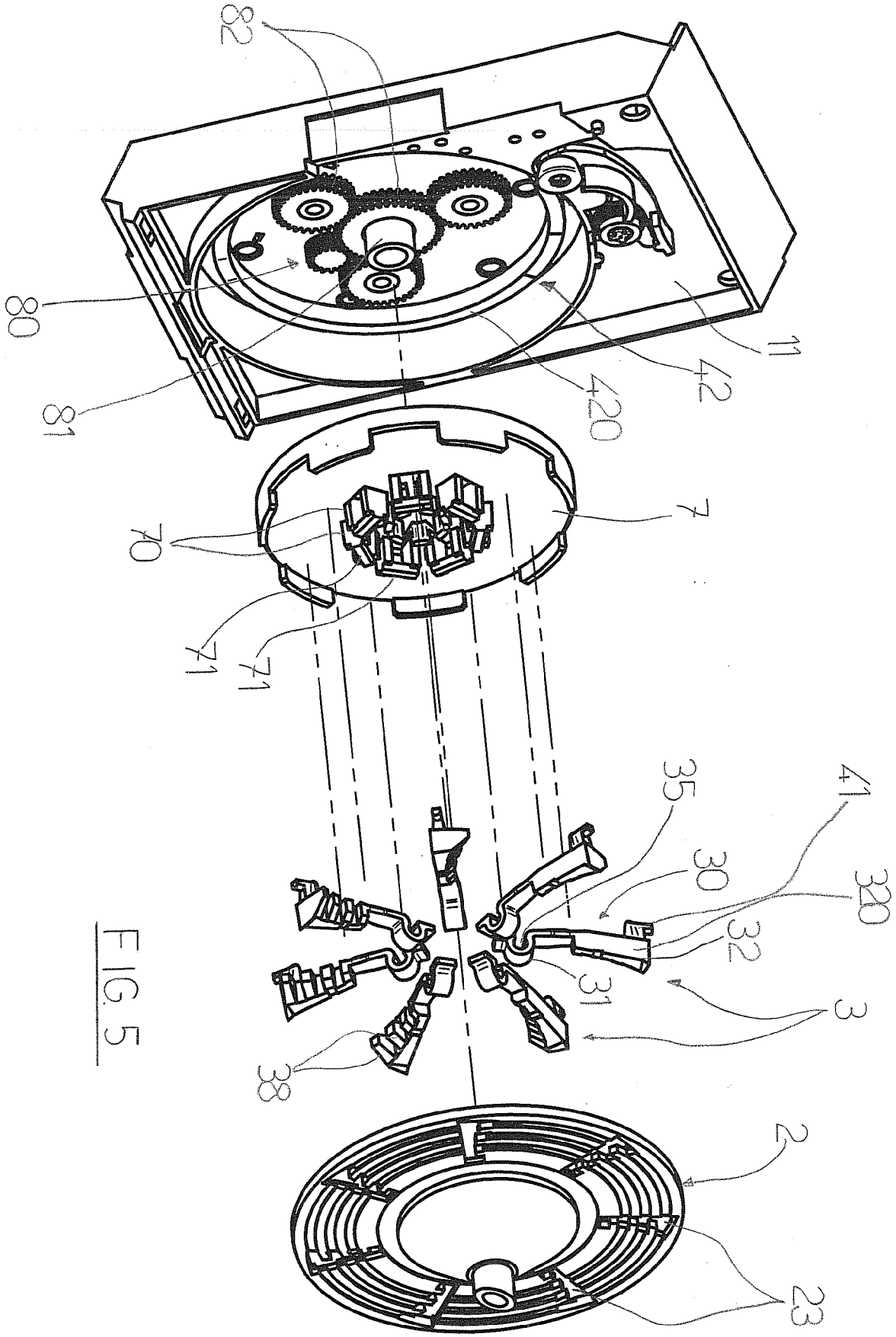


FIG. 5

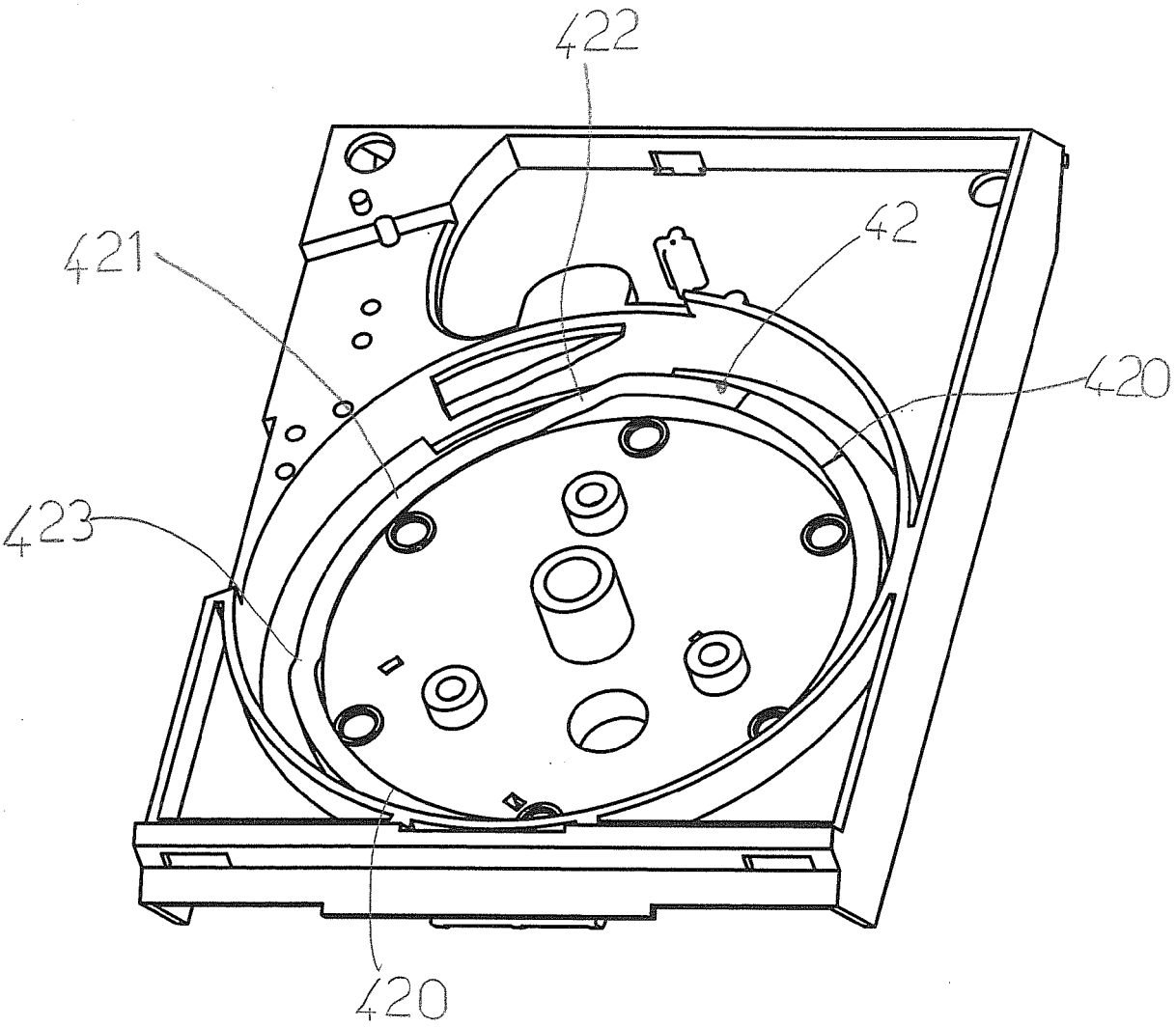
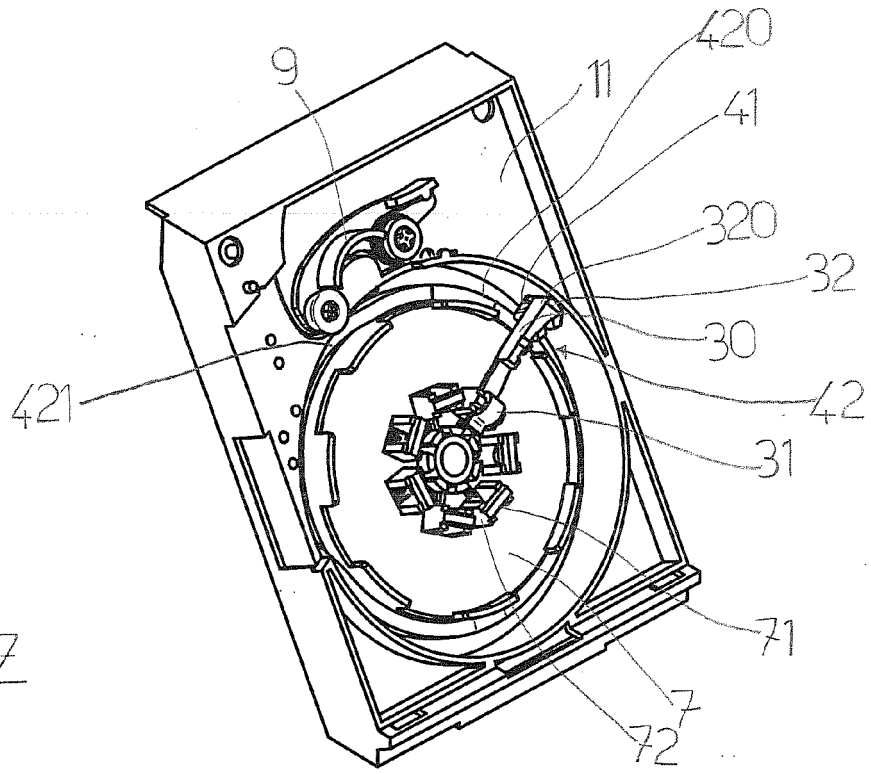


FIG. 6


420
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41
320
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FIG 7

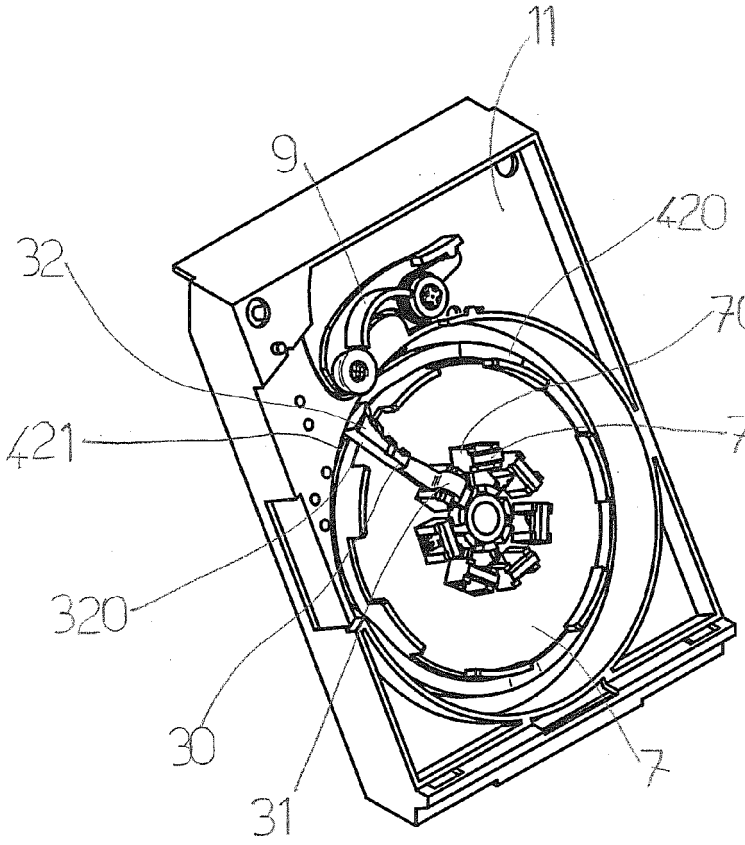
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FIG 8

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EUROPEAN SEARCH REPORT

Application Number
EP 17 19 2272

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