(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 343 110 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
13.07.2011 Bulletin 2011/28

(51) Int Cl.:
A63H 1/00 *(2006.01)*

(21) Application number: **10251253.0**

(22) Date of filing: **13.07.2010**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
BA ME RS

(30) Priority: **12.01.2010 JP 2010000124 U**

(71) Applicant: **Tomy Company, Ltd.**
Katsushika-ku
Tokyo (JP)

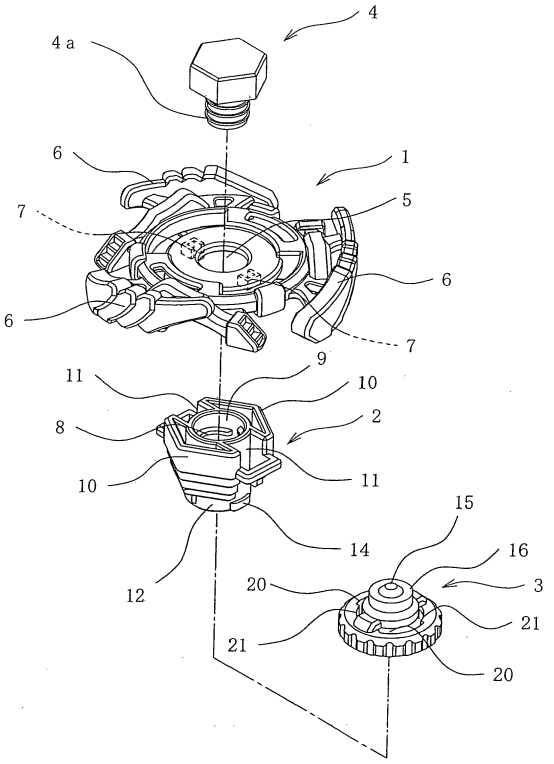
(72) Inventors:
- **Ujita, Haruhisa**
  Tokyo (JP)
- **Maeda, Takeaki**
  Tokyo (JP)

(74) Representative: **Bates, Philip Ian**
Reddie & Grose
16 Theobalds Road
London
WC1X 8PL (GB)

(54) Toy top

(57) A novel toy top capable of changing the operation mode in the course of spinning without replacing a component member constituting the toy top and having a simple structure and a low cost is provided. A toy top (A) to be spun on a playing board (B) with a playing surface (b) curved in a concave mirror shape includes a shaft portion (15) adapted to contact the playing surface (b), wherein the shaft portion (15) has a circumferential surface provided with a friction portion (16) that exhibits a coefficient of friction larger than the shaft portion (15) at the time of contacting the playing surface (b), and the shaft portion (15) has a tip (15a) protruding lower than the friction portion (16).

FIG.2



EP 2 343 110 A2

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a toy top and, more particularly, to a toy top with an operation characteristic on a playing board changed at a point between the first half and the latter half of spinning of the toy top.

2. Description of the Related Art

[0002] Conventionally, a toy top capable of changing an operation mode by rearranging component members was proposed by the assignee of the present application (refer to, for example, Japanese Utility Model Registration No. 3149383) and has been in practical use. This toy top is configured by layering an upper layer member with a function of attacking an opponent toy top, a middle layer member that determines the height of the toy top, and a lower layer member that determines a movement mode of the toy top on a playing board. A number of lower layer members are prepared with shaft bodies having different shapes formed to protrude downward. By the replacement of one of the lower layer members with another one with a shaft body having a shape different from that of the former one, the operation mode on the playing board can be changed.

[0003] Also, a toy top whose operation mode is changed depending on a rotation speed was proposed (refer to, for example, Japanese Utility Model Registration No. 3092120). This toy top is provided therein with a shaft portion having a retractable shaft body inside and a pair of sliding members disposed symmetrically about the shaft body. When these sliding members make a sliding movement outward due to a centrifugal force to move the shaft body downward, a lower end of the shaft body protrudes downward from the shaft portion. Thus, the operation mode is changed in accordance with the size of the outer diameter of each of the shaft portion and the shaft body.

[0004] In the above former conventional toy top, although the operation mode on the playing board can be changed by replacing the lower layer member, the lower layer member thus has to be changed every time the operation mode is changed, and the operation mode cannot be changed in the course of spinning of the toy top. In the above latter conventional toy top, although the operation mode is automatically changed in the course of spinning of the toy top, the number of components is increased to make the structure complex, causing the problems that production cost increases and the production process is more difficult.

SUMMARY OF THE INVENTION

[0005] The present invention has been made in view of the abovementioned problems. Accordingly, it is an object of the present invention to provide a novel toy top capable of changing the operation mode in the course of spinning thereof without replacing a component member constituting the toy top and having a simple structure and a low cost.

[0006] In order to solve the abovementioned problems, according to the present invention, there is provided a toy top that is spun on a playing board with a playing surface curved in a concave mirror shape. The toy top comprises a shaft portion adapted to contact the playing surface, the shaft portion having a circumferential surface provided with a friction portion that exhibits a coefficient of friction larger than the shaft portion at the time of contacting the playing surface, and the shaft portion having a tip protruding lower than the friction portion.

[0007] It is preferable that the shaft portion be formed of a resin or metal, and the friction portion be formed of a rubber.

[0008] It is preferable that the friction portion be formed to have a cylindrical shape and fitted around the shaft portion.

[0009] Preferably, the friction portion has a fitting hole formed to have an inner diameter smaller than an outer diameter of the shaft portion, and the friction portion is fixed to the shaft portion by fitting the shaft portion into the fitting hole of the friction portion.

[0010] It is preferable that the toy top further include an upper layer member with a function of attacking an opponent toy top, a middle layer member determining the height of the toy top, a lower layer member fittedly attached to the middle layer member, and a coupling member coupling together the upper layer member and the middle layer member, wherein the lower layer member is formed to have an inverted truncated-cone shape and has the shaft portion protruding downward.

[0011] According to the present invention, when the friction portion contacts the playing surface at the time of high-speed rotation of the toy top, the friction portion firmly grips the playing surface to make the toy top move around on the playing surface at high speed. In low-speed rotation, the toy top moves to the center of the playing surface in a concave mirror shape to continue rotation with the shaft portion of a small coefficient of friction contacting the playing surface without moving. Therefore, a change in rotation speed changes the operation mode of the toy top without any operation by the user. Even though the toy top has a simple structure, the rotation speed automatically changes the operation mode of the toy top from a dynamic attack mode to a static endurance mode, thereby making it possible to attain a new interesting feature in a match between toy tops.

[0012] In one embodiment of the present invention, the friction portion is formed of a rubber with a large coefficient of friction, and the shaft portion is formed of a resin or metal with a small coefficient of friction. Accordingly, since the friction forces that act at the time of contacting the playing surface significantly differ from each other, a

change of the mode between an attack mode and an endurance mode can be more clearly shown.

[0013] In one embodiment of the present invention, the friction portion is formed to have a cylindrical shape and fitted around the shaft portion, so that the friction portion can be easily fixed, thereby decreasing the number of components so as to simplify the manufacturing process and reduce cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Fig. 1 is a perspective view illustrating an embodiment of a toy top according to the present invention with a playing board having a playing surface on which the toy top is spun;

[0015] Fig. 2 is an exploded perspective view of the toy top shown in Fig 1;

[0016] Fig. 3 is a bottom view showing an upper layer member constituting the toy top;

[0017] Figs. 4A and 4B are a plan view and a bottom view showing a middle layer member constituting the toy top, respectively;

[0018] Fig. 5 is a plan view showing a lower layer member constituting the toy top;

[0019] Figs. 6A to 6C are an exploded bottom-side perspective view, a bottom-side perspective view and a front view partly in section, illustrating the structure of the lower layer member, respectively;

[0020] Figs. 7A to 7D are front views illustrating the process of assembling the toy top;

[0021] Figs. 8A and 8 are diagrams depicting the relation between a shaft portion of the toy top and a playing surface of a playing board; and

[0022] Fig. 9A and 9B are diagrams depicting operation modes of the toy top on the playing board.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0023] Fig. 1 depicts an embodiment of a toy top according to the present invention. This toy top A is caused to be spun by a starter (not shown) on a playing board B with a playing surface b curved in a concave mirror shape, to thereby play a match against another toy top. The toy top A includes an upper layer member 1 provided with a function of attacking the opponent toy top, a middle layer member 2 determining the height of the toy top, a lower layer member 3 determining the operation mode of the toy top on the playing board B, and a coupling member 4 in a screw shape coupling together the upper layer member 1 and middle layer member 2 (see Fig. 2).

[0024] The upper layer member 1 is formed in a disk shape provided at the center thereof with an opening 5 in which the coupling member 4 is inserted. On an outer perimeter surface of the upper layer member 1, attacking portions 6 expanding outward are formed to have a function of contacting the opponent toy top. On a bottom surface of the upper layer member 1, a pair of fitting protrusions 7 protrude downward so as to be symmetrical across the opening 5 (see Fig. 3). With these fitting protrusions 7 fitting in recessed fitting portions 11 of the middle layer member 2 described below, assembling of the upper layer member 1 and the middle layer member 2 is facilitated, and a freeplay in a circumferential direction is eliminated.

[0025] The middle layer member 2 is formed in a cylindrical shape and has an inner wall surface formed with a thread 8 to configure a screw hole 9 into which a screw 4a of the coupling member 4 described later is screwed. Further, an upper outer perimeter surface of the middle layer member 2 swells outward to form a swelling portion 10, which has the pair ot recessed fitting portions 11 symmetrically formed (see Figs. 2 and 4A).

[0026] On a lower end outside surface of a cylindrical portion 12 extending downward from the swelling portion 10 of the middle layer member 2, a pair of engaging protrusions 14 are formed that engage in openings 20 formed on the lower layer member 3 described later (see Figs. 2 and 4B).

[0027] The lower layer member 3 is formed in an inverted truncated-cone shape made of a small coefficient-of-friction material, such as a resin, such as hard plastic, or metal that exhibits a small coefficient of friction in contact with the playing surface b of the playing board B or that causes a small friction force between it and the playing surface b, and includes a shaft portion 15 that is formed so as to protrude downward. This shaft portion 15 is provided on a circumferential surface thereof with a friction portion 16.

The friction portion 16 is made of a rubber material that exhibits a large coefficient of friction in contact with the playing surface b, and is formed in a cylindrical shape provided with a fitting hole 17 at the center thereof (see Fig. 6A). The inner diameter of the fitting hole 17 is formed slightly smaller than the outer diameter of the shaft portion 15 so that with this fitting hole 17 fitting around the shaft portion 15 (shrink fitting), the friction portion 16 can be fixedly attached to the shaft portion 15 (see Fig. 6B). The thickness of the friction portion 16 is formed to be shorter than the length of the shaft portion 15, so that when the friction portion 16 is fixed to the shaft portion, a tip 15a of the shaft portion 15 can be set so as to protrude lower than the friction portion 16 (see Fig. 6C).

[0028] As shown in Fig. 5, the lower layer member 3 has a pair of arc-shaped openings 20 that are symmetrically formed about the outside of the shaft portion 15 and above the shaft portion 15. A part of the inner wall of each of these openings 20 swells radially inward to form an engagement receiving portion 21. After the lower layer member 3 is fitted on the middle layer member 2 from below and is rotated in a circumferential direction, the engaging protrusions 14 of the middle layer member 2 engage with a bottom side of each of the engagement receiving portions 21, thereby fixing the lower layer member 3 to the middle layer member 2.

[0029] When the toy top constructed as above is assembled, the fitting protrusions 7 of the upper layer mem-

ber 1 are first fitted in the recessed fitting portions 11 of the middle layer member 2 (see Fig. 7A).

[0030] Next, as shown in Fig. 7B, the screw 4a of the coupling member 4 is inserted through the opening 5 from above and screwed into the screw hole 9 of the middle layer member 2, thereby fixing the upper layer member 1 to the middle layer member 2. In this state, the upper layer member 1 is brought into pressure contact with the middle layer member 2 by the coupling member 4, so that the upper layer member 1 and the middle layer member 2 are fixed to each other without causing backlash (see Fig. 7C).

[0031] Then, as shown in Fig. 7C, the engaging protrusions 14 formed on the cylindrical portion 12 of the middle layer member 2 are opposed to and inserted into the openings 20 of the lower layer member 3, and then the lower layer member 3 is turned in a circumferential direction relative to the middle layer member 2 to engage the engaging protrusions 14 with a bottom side of each of the engagement receiving portions 21, thereby constructing the toy top A formed of the upper layer member 1, the middle layer member 2, and the lower layer member 3 (see Fig. 7D).

[0032] When the toy top thus assembled is launched by the starter (not shown) so as to rotate or spin at high speed onto an inclined surface portion of the playing surface b of the playing board B (see Fig. 8A), the toy top A rotating at high speed spins upright about the shaft portion 15 due to a gyroscopic effect. Therefore, the corner of the tip of the friction portion 16, together with the shaft portion 15, contact the playing surface b, and the friction portion 16 with a large coefficient of friction functions like a rubber tire. The toy top A firmly grips the playing surface b with the friction portion 16 so as not to slip, thereby moving (revolving) at high speed along an arc on the playing surface b. The higher the rotational speed of the toy top A, the larger the arc along which the toy top A moves becomes. As shown in Fig. 9A, the toy top A makes a large movement on the playing surface b without stopping at one point, and the operation mode is an attack mode in which the toy top A moves of its own accord toward the opponent toy top and contacts it.

[0033] As the rotation speed of the toy top A is lessened, the radius of revolution is decreased, and the toy top A moves to the center of the playing surface b as shown in Fig. 9B. However, as depicted in Fig. 8B, since the friction portion 16 does not contact the playing surface b and the tip 15a of the shaft portion 15 with a small coefficient of friction abuts on the playing surface b at the center of the playing surface b or in the vicinity thereof, the toy top A enters an endurance mode in which the toy top A continues to rotate and stays at one point on the playing surface b without traveling, while waiting for the opponent toy top to come into contact with it.

[0034] As described above, when the toy top A is launched so as to spin at high speed onto the inclined surface portion of the playing surface b of the playing board B, the friction portion 16 is in contact with the playing surface b. Therefore, the friction portion 16 firmly grips the playing surface b without idle running, thereby executing an attack mode in which the toy top A attacks the opponent toy top while revolving at high speed. When the rotation of the toy top A is lessened, the radius of revolution is decreased, and the toy top A soon enters a state in which it rotates at the center of the playing surface b. At this time, since the tip 15a of the shaft portion 15 with a small coefficient of friction abuts on the playing surface b, the operation mode changes to an endurance mode in which rotation continues.

[0035] According to the toy top A of the present invention, a toy top interesting and useful to a player and a manufacturer can be provided even though it has a simple structure in which the shaft portion 15 is provided with the friction portion 16, the toy top being capable of executing an attack mode while spinning at high speed in which the opponent toy top is actively attacked in the first half of operation, and executing an endurance mode while spinning at reduced speed in which an attack from the opponent toy top is waited for in the latter half of operation, thereby changing the operation mode without having to reassemble the components or provide a complex mechanism for detecting the rotation speed and altering the operation mode.

[0036] When the toy top A is launched onto the playing surface b of the playing board B, the operation mode depends on the place where the toy top is launched onto the playing surface b. More particularly, by launching the toy top onto an inclined surface portion of the playing surface, the operation mode can be started with an attack mode, and then be changed to an endurance mode, as described above. Furthermore, by launching the toy top onto the center of the playing surface b, the operation mode can be an endurance mode from the start. Therefore, whether the operation mode is initially started with an attack mode, and is then changed to an endurance mode or the operation mode is started with an endurance mode from the beginning can be determined by where the toy top is launched onto the playing surface b, thereby allowing selection of a strategically-advantageous operation mode.

Claims

1. A toy top (A) to be spun on a playing board (B) with a playing surface (b) curved in a concave mirror shape, **characterized in that**:

   the toy top (A) comprises a shaft portion (15) adapted to contact the playing surface (b), the shaft portion (15) having a circumferential surface provided with a friction portion (16) that exhibits a coefficient of friction larger than the shaft portion (15) at the time of contacting the playing surface (b), and the shaft portion (15) having a tip (15a) protruding lower than the friction portion

(16).

2. The toy top (A) according to claim 1, wherein the shaft portion (15) is formed of a resin or metal, and the friction portion (16) is formed of a rubber.

3. The toy top (A) according to claim 1 or 2, wherein the friction portion (16) is formed to have a cylindrical shape and fitted around the shaft portion (15).

4. The toy top (A) according to claim 3, wherein the friction portion (16) has a fitting hole (17) formed to have an inner diameter smaller than an outer diameter of the shaft portion (15), and the friction portion (16) is fixed to the shaft portion (15) by fitting the shaft portion (15) into the fitting hole (17) of the friction portion (16).

5. The toy top (A) according to one of claims 1 to 4, further comprising an upper layer member (1) with a function of attacking an opponent toy top, a middle layer member (2) determining the height of the toy top (A), a lower layer member (3) fittedly attached to the middle layer member(2), and a coupling member (4) coupling together the upper layer member (1) and the middle layer member(2), wherein the lower layer member (3) is formed to have an inverted truncated-cone shape and has the shaft portion (15) protruding downward.

FIG.1

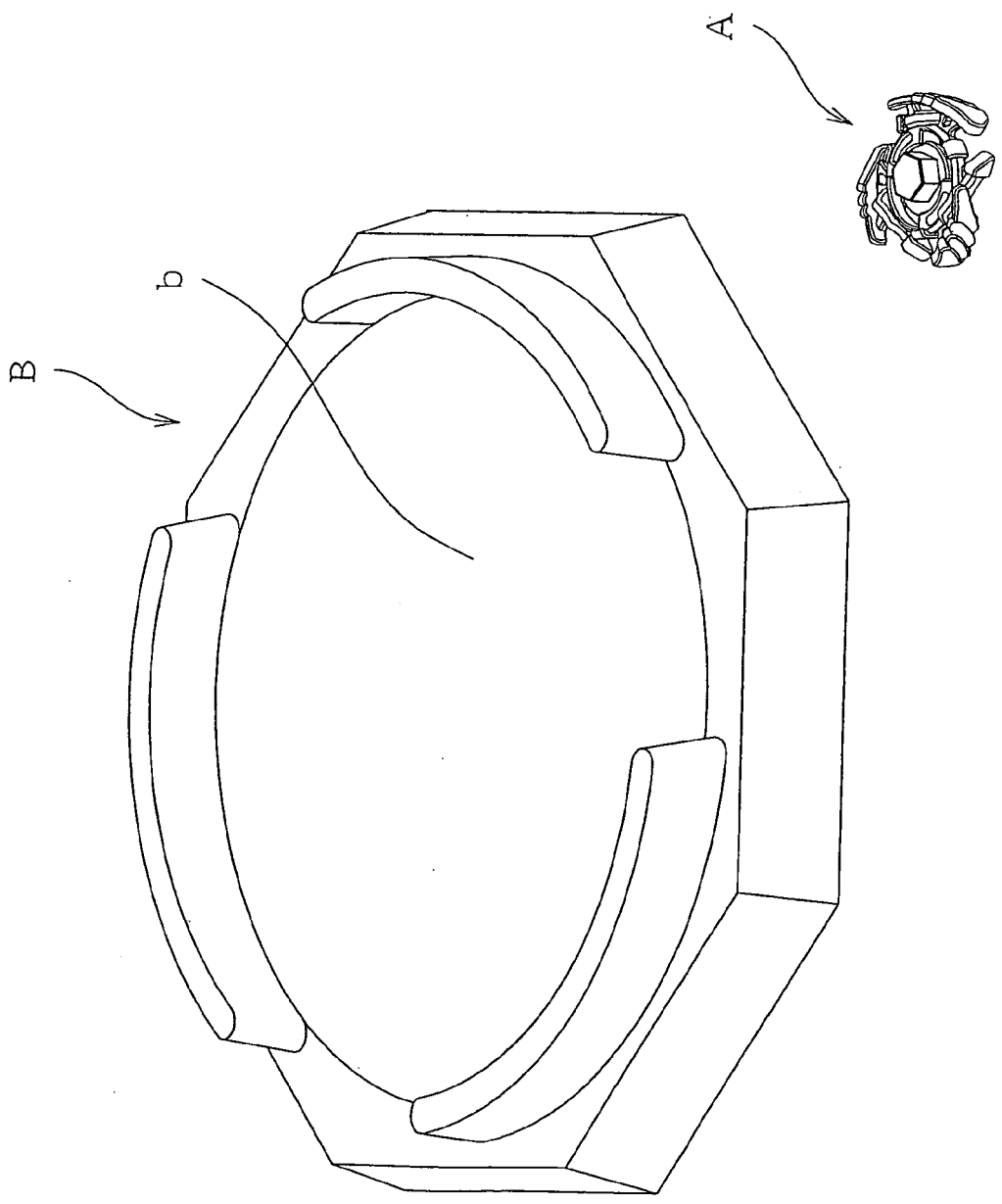
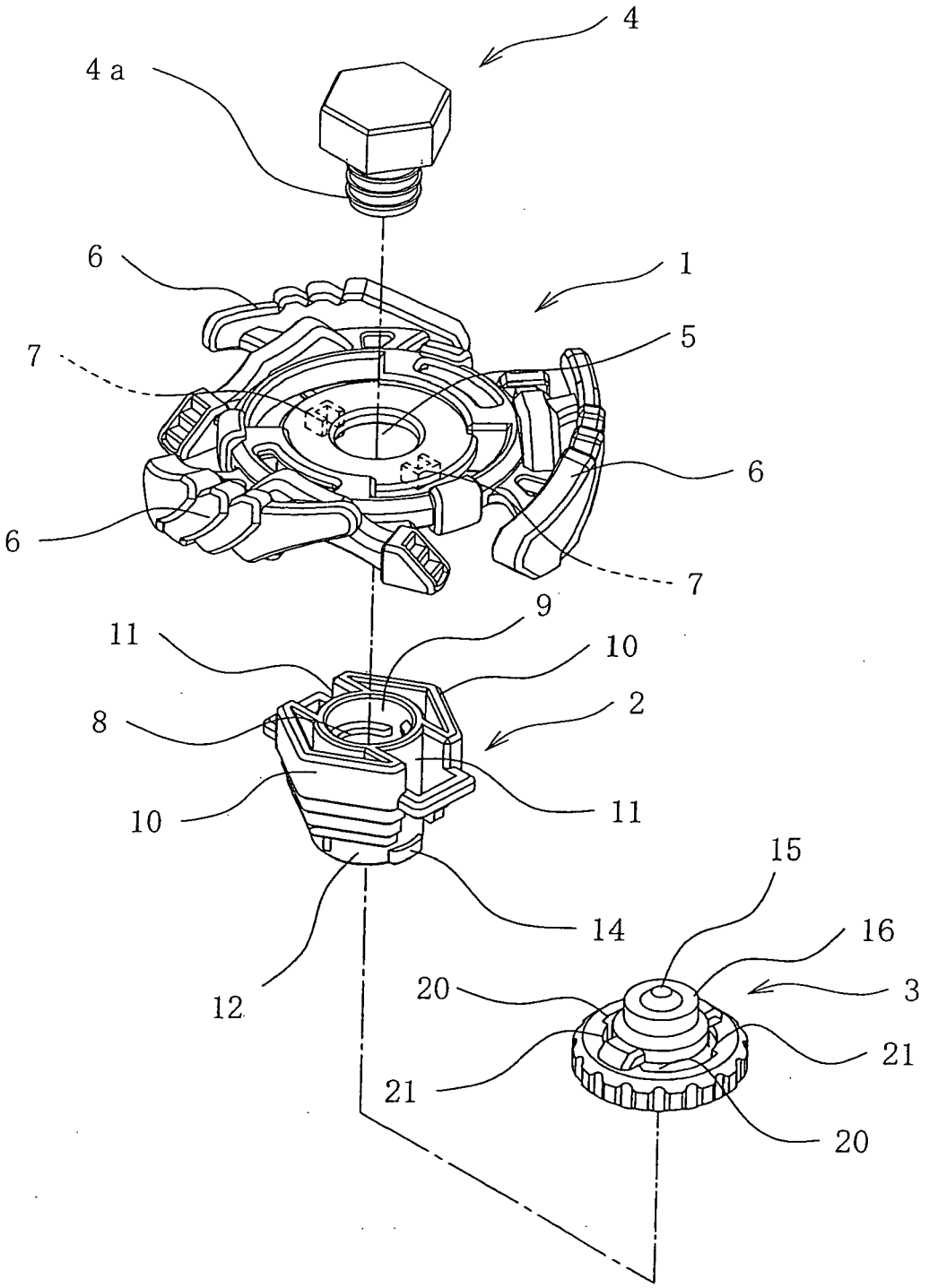


FIG.2



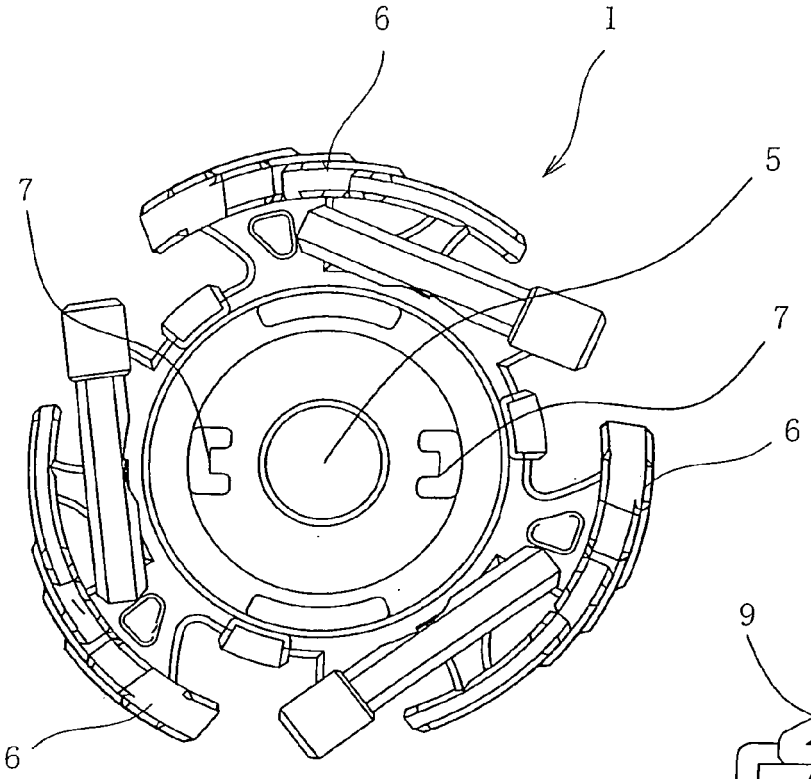


FIG.3

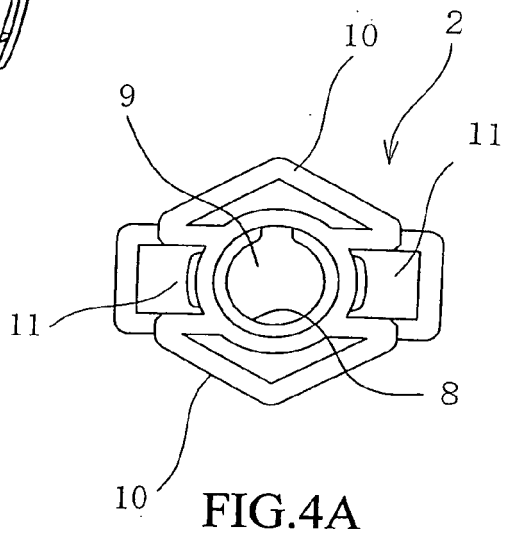


FIG.4A

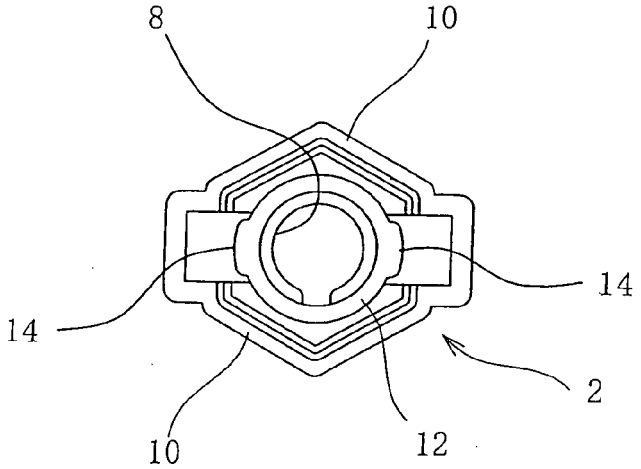


FIG.4B

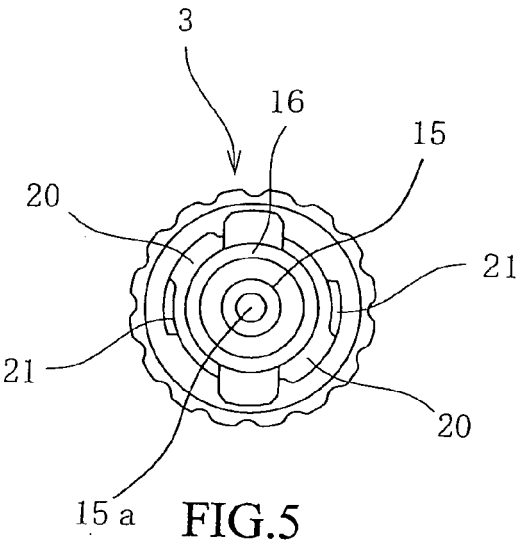


FIG.5

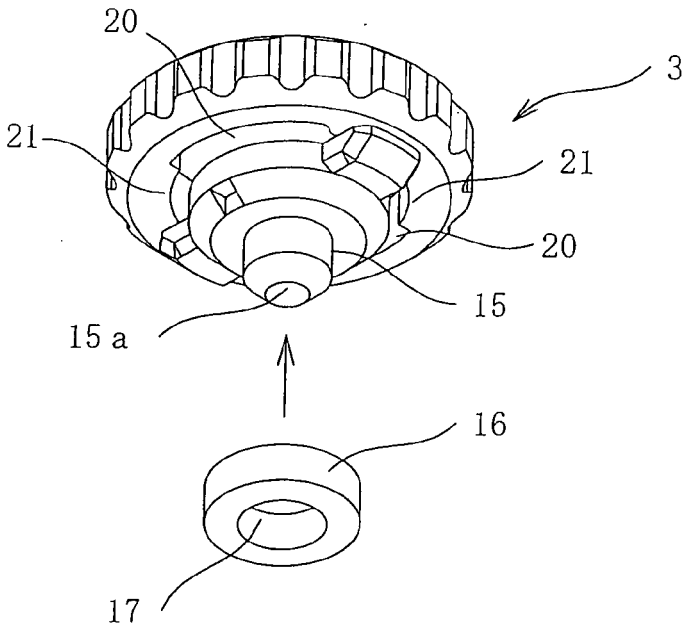


FIG.6A

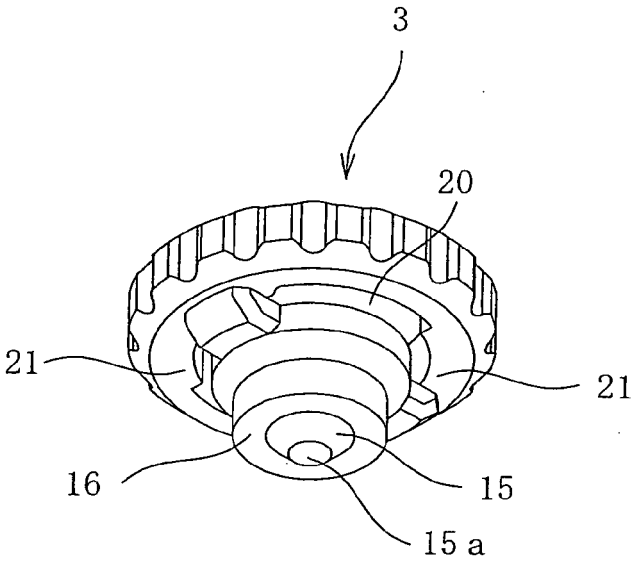


FIG.6B

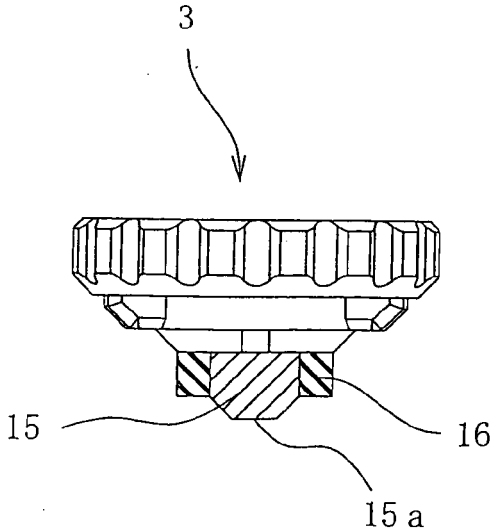


FIG.6C

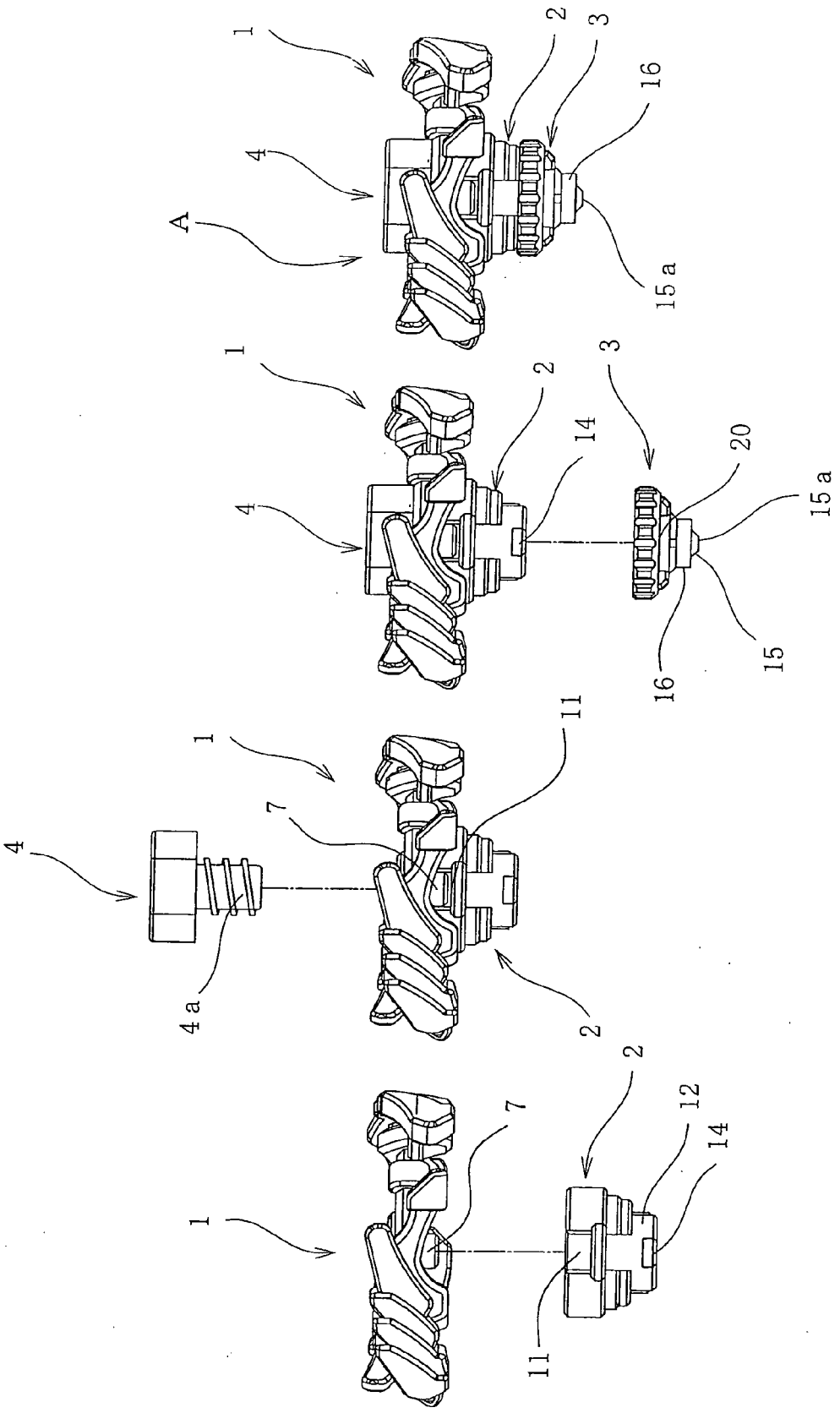


FIG.7D

FIG.7C

FIG.7B

FIG.7A

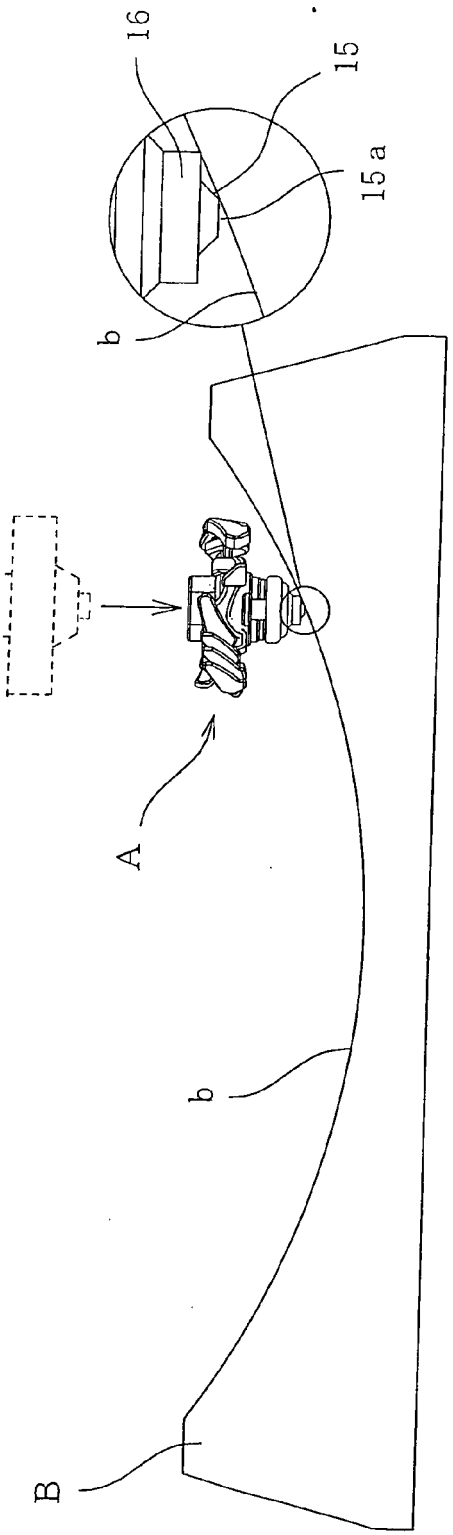


FIG.8A

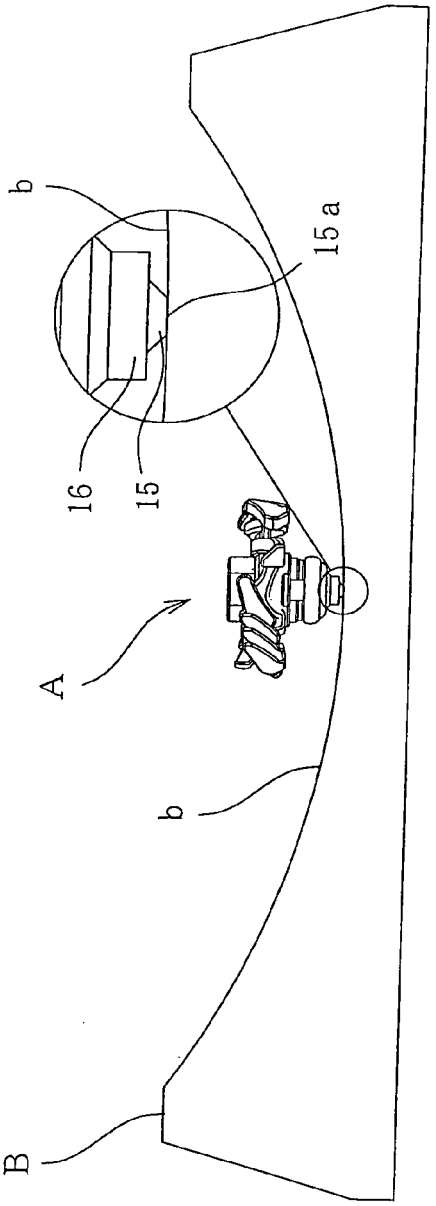


FIG.8B

FIG.9A

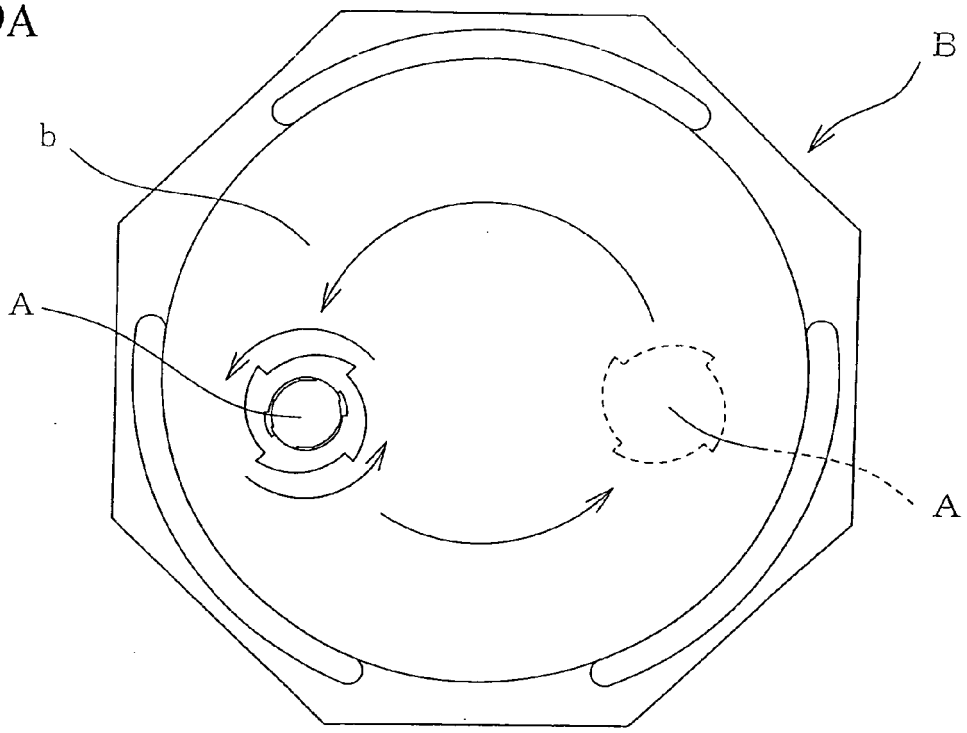
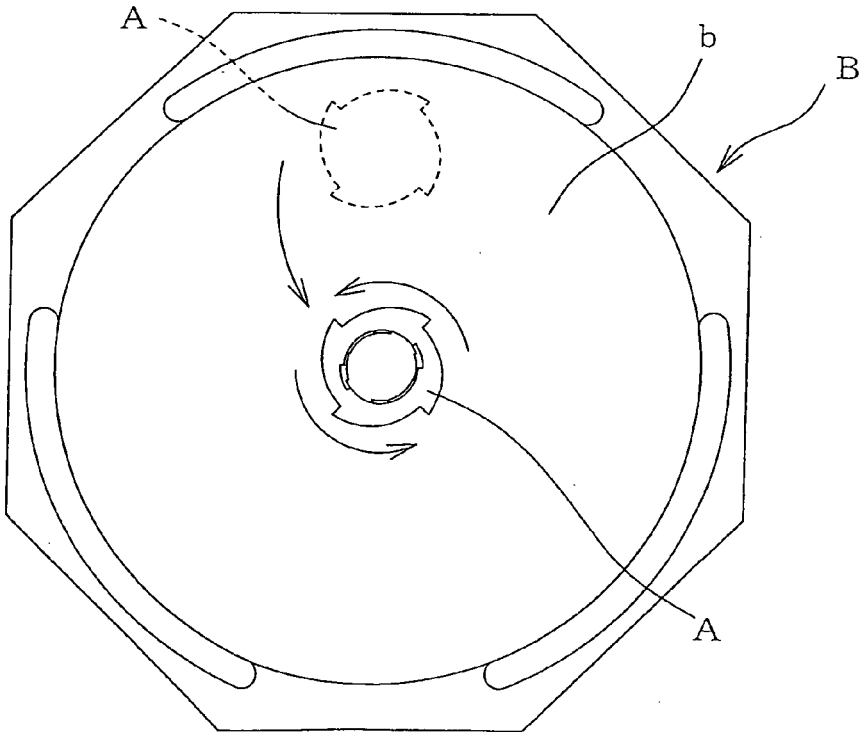


FIG.9B



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 3149383 B **[0002]**
- JP 3092120 B **[0003]**