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(54) Jumping toy top

(57) A jumping toy top (A) with a simple structure that can repeatedly jump on a playing surface curved in an approximately concave-mirror-like shape of a playing board (B) to make it possible to attack an opponent toy top from above is provided. The jumping toy top (A) includes a toy main body (1), a spinning shaft body (3) having a spinning shaft (51), and a shaft body supporting portion (2) disposed on the toy main body (1) to support the spinning shaft body (3). A distal end of the spinning shaft (51) of the spinning shaft body (3) is formed such that one side (51a) thereof protrudes downward more than the other diametrically opposite side (51b) thereof to configure a contact portion (52) for coming in contact with the playing surface of the playing board (B). When the jumping toy top (A) spins on a central axis (O) of the toy main body (1), the contact portion (52) revolves around the central axis (0) of the toy main body in a circular orbit.

FIG.1A

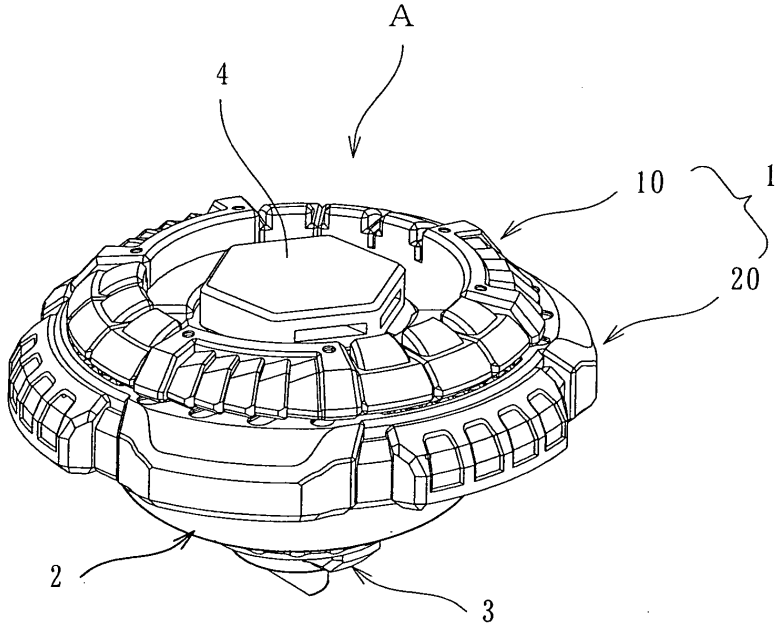

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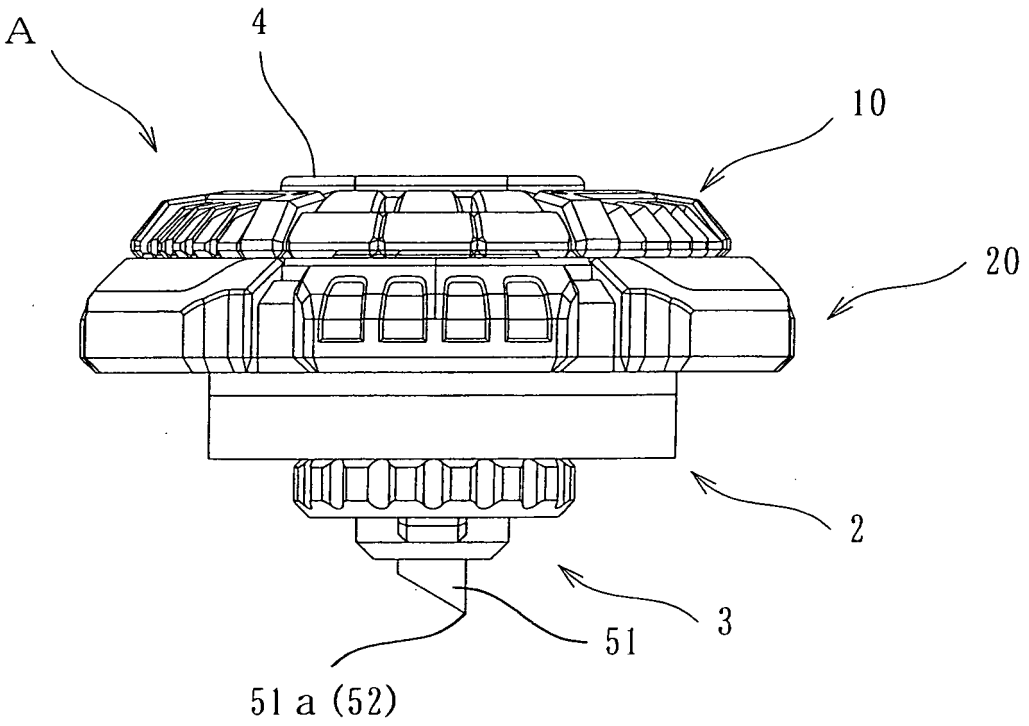
FIG.1B



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a jumping toy top, and in particular to a jumping toy top that jumps repeatedly on a playing board.

2. Description of the Related Art

[0002] Previously, a toy top that jumps on contact with an opponent toy top on a playing board has been proposed by the assignee of the present application (for example, Japanese Utility Model Registration No. 3079301). This toy top includes a jumping mechanism for making the toy top jump upward and an actuation piece protruding outward on an outer surface of a main body of the toy top, in which the jumping mechanism is actuated by the contact of the actuation piece with the opponent toy top.

SUMMARY OF THE INVENTION

[0003] Since the above-described toy top jumps on contact with the opponent toy top to attack the opponent toy top but cannot jump again, there is a problem that the toy top cannot repeatedly attack the opponent toy top.

[0004] The present invention has been made in view of the abovementioned problem. Accordingly, it is an object of the present invention to provide a jumping toy top with a simple structure that can repeatedly jump on a playing board to make it possible to attack an opponent toy top from above.

[0005] In order to solve the abovementioned problem, according to the present invention, there is provided a jumping toy top that is played against an opponent toy top on a playing surface curved in an approximately concave-mirror-like shape of a playing board. The jumping toy top comprises: a toy main body, a spinning shaft body having a spinning shaft, and a shaft body supporting portion disposed on the toy main body to support the spinning shaft body, wherein the spinning shaft of the spinning shaft body has a distal end formed in such a way that one side thereof protrudes downward more than the other side thereof diametrically opposite to the one side to configure a contact portion for coming in contact with the playing surface of the playing board, and the contact portion revolves around a central axis of the toy main body in a circular orbit when the jumping toy top spins on the central axis of the toy main body.

[0006] It is preferable that the shaft body supporting portion include a supporting member for removably supporting the spinning shaft body which is disposed therein so that the spinning shaft body can be attached to and detached from the toy main body via the shaft body supporting portion.

[0007] Further, it is preferable that the supporting member be arranged movably in a direction perpendicular to the central axis of the toy main body relative to the toy main body so that a distance from the central axis of the toy main body to the contact portion can be changed.

[0008] It is preferable that the contact portion be formed at the distal end of the spinning shaft by cutting a columnar part of the spinning shaft obliquely to a central axis thereof. Alternatively, the contact portion may be configured by a shaft piece formed to protrude downward at a position on an outer periphery of a distal end surface of the spinning shaft.

[0009] It is preferable that the spinning shaft body and the supporting member be provided with respective pairs of engaging portions formed point-symmetrically so that the spinning shaft body can be mounted on the supporting member through the pairs of engaging portions selectively in one of a first orientation and a second orientation obtained by a rotation of 180 degrees from the first orientation.

[0010] It is preferable that the shaft body supporting portion include a positioning plate for engaging the supporting member to hold the supporting member at a first position or a second position in a direction perpendicular to the central axis of the toy main body.

[0011] According to the present invention, since the contact portion revolves around the central axis of the toy main body when the jumping toy top is spinning on the central axis of the toy main body, the contact portion is moved from a lower point to a higher point on the curved playing surface to dash against the upper point on the curved playing surface, whereby the jumping toy top jumps up, resulting in that the jumping toy top that can repeat jumping until the jumping toy top stops spinning to repeatedly attack an opponent toy top from above can be realized.

[0012] According to an embodiment of the present invention, the contact portion can be shifted by a distance corresponding to the diameter of the spinning shaft by mounting the spinning shaft body on the supporting member in the different orientations, and thus the diameter of revolution of the contact portion around the central axis of the toy main body can be changed.

[0013] According to an embodiment of the present invention, since the spinning shaft body is also shifted when the supporting member is moved in a direction perpendicular to the central axis of the toy main body, causing the position of the contact portion to change as well, the diameter of revolution of the contact portion around the central axis of the toy main body can be varied to a larger degree.

[0014] According to an embodiment of the present invention, the contact portion can easily be formed with a simple structure by cutting the distal end of the spinning shaft obliquely.

[0015] According to an embodiment of the present invention, the contact portion can easily be formed with a

simple structure by providing a shaft piece protrudingly at one side of the distal end surface of the spinning shaft.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Figs. 1A and 1B are a perspective view and a front view showing an embodiment of a jumping toy top according to the present invention, respectively;

[0017] Fig. 2 is an exploded perspective view of the jumping toy top;

[0018] Fig. 3 is an exploded perspective view showing a constitution of a shaft body supporting portion of the jumping toy top;

[0019] Figs. 4A and 4B are a perspective view of the shaft body supporting portion as viewed from above and a perspective view thereof as viewed from below, respectively;

[0020] Figs. 5A and 5B are a perspective view of a spinning shaft body of the jumping toy top as viewed from below and a bottom view thereof, respectively;

[0021] Figs. 6A and 6B are a perspective view of a spinning shaft body of another form as viewed from below and a bottom view thereof, respectively;

[0022] Figs. 7A to 7D are front views showing an assembling process of the jumping toy top;

[0023] Figs. 8A and 8B are sectional views of a principal part of the jumping toy top, showing a relationship between the shaft body supporting portion and the spinning shaft body;

[0024] Figs. 9A and 9B to Figs. 12A and 12B are bottom views and front views showing a relationship between the shaft body supporting portion and the spinning shaft body, respectively;

[0025] Figs. 13A and 13B are explanatory views showing a relationship between a playing board and the spinning shaft body; and

[0026] Fig. 14 is an explanatory view showing an operating state of the jumping toy top on the playing board.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] Figs. 1A and 1B show an embodiment of a jumping toy top according to the present invention. A jumping toy top A comprises a toy main body 1 which includes a first attacking member 10 and a second attacking member 20 and which is provided with a function of attacking an opponent toy top, a spinning shaft body 3, a shaft body supporting portion 2 for supporting the spinning shaft body 3, and a screw-like joining member 4 for joining the toy main body 1 and the shaft body supporting portion 2 to each other.

[0028] As shown in Fig. 2, the first attacking member 10 is a disk-like member made of synthetic resin and having a fitting hole portion 11 formed in the center thereof in which a fitting portion 22 of the second attacking member 20 described later is fitted. On diametrically opposite sides of the fitting hole portion 11 is formed a pair of engagement recesses 11a for engaging a bridge 22a to perform positioning when the fitting hole portion 11 is fitted on the fitting portion 22 of the second attacking member 20. Further, the first attacking member 10 is formed to have an outer diameter smaller than that of the second attacking member 20, and around a peripheral edge of an upper surface of the first attacking member 10 are formed attacking portions 12 constituted by rugged parts protruding upward with a vertical attacking function of attacking from below in contact with a lower surface of the opponent toy top.

[0029] The second attacking member 20 is a metallic disk-like member having a hexagonal fitting hole portion 21 formed in the center thereof in which is fitted a fitting portion 38 formed on an upper surface of a cover member 30 of the shaft body supporting portion 2 described later, the fitting portion 22 being formed above the fitting hole portion 21. The fitting portion 22 includes the bridge 22a formed in a diametrical direction and a swelling portion 22b formed in a circular shape in the center of the bridge 22a to bulge out, and an opening 24 into which a screw portion 4a of the joining member 4 is inserted is formed in the center of the swelling portion 22b. Further, attacking portions 25 constituted by rugged parts protruding outward with a lateral attacking function of attacking in contact with a side surface of the opponent toy top are formed in an outward-projecting manner on an outer peripheral surface of the second attacking member 20.

[0030] The shaft body supporting portion 2 includes the cover member 30 formed in a disk-like shape, a positioning plate 31, a supporting member 32, and a base member 33.

[0031] The cover member 30 has a cylindrical portion 35 protrudingly formed on the upper surface thereof, and a thread 36 is formed on an inner wall surface of the cylindrical portion 35 to configure a screw hole 37 into which the screw 4a of the joining member 4 described later is screwed. Furthermore, an outer peripheral surface of the cylindrical portion 35 is swelled outward in an approximately hexagonal shape to form a fitting portion 38, and the fitting portion 38 is fitted in the fitting hole portion 21 of the second attacking member 20 to prevent a deviation in a circumferential direction from occurring at the time of joining.

[0032] The positioning plate 31 is formed in an approximately rectangular shape from flexible resin. As shown in Fig. 3, the positioning plate 31 has a central hole formed in a central portion thereof, and on the lower surface thereof engagement recesses 40 and 41 for positioning are formed apart from each other in a longitudinal direction thereof which engage engagement protrusions 43 formed on the supporting member 32. One engagement recess 41 is disposed at one end portion of the positioning plate 31, and the other engagement recess 40 is disposed at about the midpoint between the central hole and the other end portion of the positioning plate 31. In addition, a recessed portion 42 is formed on the positioning plate 31 so as to abut on the central hole, so that the recessed portion 42 permits one engagement protrusion

43 to enter thereinto so as not to be brought into pressure contact with the lower surface of the positioning plate 31 when the other engagement protrusion 43 of the supporting member 32 engages the engagement recess 40. Incidentally, when the other engagement protrusion 43 of the supporting member 32 engages the engagement recess 41, the one engagement protrusion 43 is positioned in the central hole of the positioning plate 31 and is not brought into pressure contact with the lower surface of the positioning plate 31.

[0033] The supporting member 32 is a plate member shorter than the positioning plate 31 and has a cylindrical supporting portion 45 protrudingly formed on a lower surface thereof for supporting the spinning shaft body 3. The supporting portion 45 has a pair of engagement protrusions 46 formed on a lower end of an outer side surface thereof so as to engage with a pair of engagement receiving portions 54 formed on the spinning shaft body 3 described later. The supporting member 32 has the engagement protrusions 43 formed on an upper surface thereof in the vicinity of opposite ends in the longitudinal direction, respectively, so as to selectively engage with the engagement recesses 40 and 41 of the positioning plate 31.

[0034] The base member 33 is formed in a cylindrical shape with a bottom. The base member 33 has an elongated guide hole 47 formed in the bottom thereof through which the supporting portion 45 of the supporting member 32 protrudes to move in a horizontal direction and a guide walls 48 formed on an upper side of the bottom in parallel with a longitudinal direction of the guide hole 47. A distance between the guide walls 48 is set at such a distance as to receive therebetween the positioning plate 31 and the supporting member 32, so that the supporting member 32 can slidably move in the longitudinal direction of the guide hole 47 while being guided by the guide walls 48.

[0035] In the shaft body supporting portion 2 thus constructed, when the supporting member 32 and the positioning plate 31 are received in order within the base member 33, and the cover member 30 is placed on the base member 33 and is fixed by screws 49 as shown in Fig. 3, the shaft body supporting portion 2 can be formed such that the fitting portion 38 for fitting in the fitting hole portion 21 of the second attacking member 20 described above is positioned on an upper surface of the shaft body supporting portion 2 as shown in Fig. 4A, and the supporting portion 45 protruding through the guide hole 47 is positioned on a lower surface thereof as shown in Fig. 4B.

[0036] The spinning shaft body 3 is formed in an approximately truncated-cone shape and has a spinning shaft 51 formed on a lower side thereof so as to protrude downwardly. As shown in Figs. 5A and 5B, the spinning shaft 51 of the spinning shaft body 3 is formed such that one side 51a of a distal end surface of the spinning shaft 51 protrudes downward more than the other side 51b thereof diametrically opposite thereto to configure a contact portion 52 for coming in contact with a playing surface of a playing board B. In this embodiment, the contact portion 52 is formed at the distal end of the spinning shaft 51 by cutting a columnar shaft part of the spinning shaft 51 obliquely to an axis of the shaft part thereof, so that one side 51a protrudes downward more than the other side 51b. Alternatively, the contact portion 52 may be formed in such a manner that the distal end surface of the spinning shaft 51 is formed to be planar and is provided on one side 51a thereof, i.e. at a position on an outer periphery thereof, with a small shaft piece having a hemispherical distal end to protrude therefrom to thereby configure the contact portion 52, as shown in Figs. 6A and 6B.

[0037] As shown in Fig. 5B, a pair of arcuate openings 53 is formed point-symmetrically with respect to an axis of the spinning shaft 51 outside the spinning shaft 51, and part of an inner wall of each opening 53 is protruded toward the spinning shaft 51 to form an engagement receiving portion 54. Thus, when the spinning shaft body 3 is fitted from below onto the supporting portion 45 of the supporting member 32 and is then turned in a circumferential direction, the engagement protrusions 46 of the supporting portion 45 engage the respective engagement receiving portions 54, so that the spinning shaft body 3 can be fixed on the supporting member 32. The pair of engagement receiving portions 54 of the spinning shaft body 3 and the pair of engagement protrusions 46 of the supporting member 32 are formed point-symmetrically, respectively, so that, when the spinning shaft body 3 is mounted on the supporting member 32 while the orientation of the spinning shaft body 3 is rotated by 180 degrees in a horizontal plane from that shown in Fig. 5B, the one side 51a (contact portion 52) of the spinning shaft 51 can be shifted by a distance corresponding to the diameter of the spinning shaft 51 in a horizontal direction relative to the supporting member 32 of the shaft body supporting portion 2. The term "horizontal" used herein means "perpendicular to the axis of the spinning shaft 51 or perpendicular to a central axis O of the toy main body 1".

[0038] When the jumping toy top A thus constructed is assembled, the first attacking member 10 and the second attacking member 20 which constitute the toy main body 1 are selected (see Fig. 7A), the fitting hole portion 11 of the first attacking member 10 is opposed to and fitted on the fitting portion 22 of the second attacking member 20 from above, and the fitting portion 38 of the shaft body supporting portion 2 is fitted into the fitting hole portion 21 of the second attacking member 20 from below (see Fig. 7B).

[0039] Next, the screw 4a of the joining member 4 is inserted from the opening 24 of the second attacking member 20 and is screwed into the screw hole 37 of the shaft body supporting portion 2, so that the toy main body 1 with the first attacking member 10 stacked on the second attacking member 20 is fixed on the shaft body supporting portion 2 (see Fig. 7C). In this state, the first at-

tacking member 10 is brought into pressure contact with the second attacking member 20 and the second attacking member 20 is brought into pressure contact with the shaft body supporting portion 2 by the joining member 4, so that the toy main body 1 and the shaft body supporting portion 2 are fixed to each other without causing backlash.

[0040] Then, the engagement protrusions 46 formed on the supporting portion 45 of the shaft body supporting portion 2 are opposed to and inserted into the openings 53 of the spinning shaft body 3, and the spinning shaft body 3 is turned in a circumferential direction relative to the shaft body supporting portion 2 to engage the engagement protrusions 46 with the engagement receiving portions 54, whereby the jumping toy top A constituted by the toy main body 1, the shaft body supporting portion 2 and the spinning shaft body 3 can be assembled, as shown in Fig. 7D.

[0041] According to the jumping toy top A thus constructed, as shown in Fig. 8A, when the spinning shaft body 3 is forcibly moved to the right relative to the toy main body 1, the supporting member 32 also slides to the right and one engagement protrusion 43 engages the engagement recess 40 of the positioning plate 31, so that the supporting member 32 can be stabilized in a state in which the spinning shaft body 3 has been shifted to the right (first position). At this time, the other engagement protrusion 43 is positioned within the recess 42 of the positioning plate 31. On the other hand, as shown in Fig. 8B, when the spinning shaft body 3 is forcibly moved to the left relative to the toy main body 1, the supporting member 32 also slides to the left and the other engagement protrusion 43 engages the engagement recess 41 of the positioning plate 31, so that the supporting member 32 can be stabilized in a state in which the spinning shaft body 3 has been shifted to the left (second position). At this time, the one engagement protrusion 43 is positioned within the central hole of the positioning plate 31. Thus a distance L of the contact portion 52 of the spinning shaft 51 of the spinning shaft body 3 from a central axis O of the toy main body 1 can be changed.

[0042] In addition, when the spinning shaft body 3 is mounted on the supporting portion 45 of the supporting member 32 on the condition that the orientation of the spinning shaft body 3 has been changed by 180 degrees, the distance from the central axis O of the toy main body 1 to the contact portion 52 of the spinning shaft 51 can be varied from L1 to L4, as shown in from Figs. 9A and 9B to Figs. 12A and 12B. In more particular, Figs. 9A and 9B show a state in which the spinning shaft body 3 is mounted in a first orientation on the supporting member 32 of the shaft body supporting portion 2 and the supporting member 32 is slid to the right relative to the toy main body 1 to position the spinning shaft body 3 at the first position, where the contact portion 52 of the spinning shaft 51 is located at a distance L1 to the right of the central axis O of the toy main body 1. Figs. 10A and 10B show a state in which the spinning shaft body 3 is mounted in a second orientation on the supporting member 32 of the shaft body supporting portion 2 and the supporting member 32 is slid to the right relative to the toy main body 1 to position the spinning shaft body 3 at the first position, where the contact portion 52 of the spinning shaft 51 is located on the central axis O of the toy main body 1 (distance L2=0). Figs. 11A and 11B show a state in which the spinning shaft body 3 is mounted in the first orientation on the supporting member 32 of the shaft body supporting portion 2 and the supporting member 32 is slid to the left relative to the toy main body 1 to position the spinning shaft body 3 at the second position, where the contact portion 52 of the spinning shaft 51 is located at a distance L3 to the left of the central axis O of the toy main body 1. Figs. 12A and 12B show a state in which the spinning shaft body 3 is mounted in the second orientation on the supporting member 32 of the shaft body supporting portion 2 and the supporting member 32 is slid to the left relative to the toy main body 1 to position the spinning shaft body 3 at the second position, where the contact portion 52 of the spinning shaft 51 is disposed at a distance L4 to the left of the central axis O of the toy main body 1. As shown in Figs. 9A and 9B, Figs. 11A and 11B and Figs. 12A and 12B, in the case in which the spinning shaft body 3 is mounted to the shaft body supporting portion 2 such that the contact portion 52 of the spinning shaft 51 is separated from the central axis O of the toy main body 1, when the jumping toy top A is spun on the central axis O of the toy main body 1, the contact portion 52 of the spinning shaft 51 revolves around the central axis O of the toy main body 1 in a circular orbit. The diameter of the revolution of the contact portion 52 around the central axis O of the toy main body 1 can be set in four levels depending on the slide position of the supporting member 32 and the orientation in which the spinning shaft body 3 is mounted to the supporting member 32. Incidentally, in the case shown in Figs. 10A and 10B, since the central axis O of the toy main body 1 and the contact portion 52 of the spinning shaft 51 coincide with each other, the jumping toy top A spins on the contact portion 52 of the spinning shaft 51, and therefore the jumping toy top A can be spun stably without jumping in the same way as an ordinary toy top on the playing board.

[0043] Now, the operating state of the jumping toy top A thus constructed will be explained. In a case in which the jumping toy top A set in the state shown in Figs. 9A and 9B is spun by a top spinning launcher (not shown) on the playing board B of which a playing surface is formed in a concave-mirror-like shape, the toy main body 1 spins on the central axis O as indicated by an arrow R and the contact portion 52 of the spinning shaft 51 revolves around the central axis O as indicated by an arrow S, as shown in Fig. 13A. Therefore, when the contact portion 52 revolves around the central axis O from a state in which the contact portion 52 is in contact with a point of the playing surface of the playing board B, the contact portion 52 dashes more vigorously against an upper point of the playing surface of the playing board B, resulting in

that the jumping toy top A jumps upward, as shown in Fig. 13B. The jumping toy top A also makes a large jump when spinning rapidly, and can make a larger jump in a case in which the distance of the contact portion 52 from the central axis O of the toy main body 1 is large (see Figs. 12A and 12B) since the contact portion 52 dashes more vigorously against the playing surface of the playing board B.

[0044] As described above, since the diameter of revolution of the contact portion 52 around the central axis O of the toy main body 1 can be made large or small by changing the position of the supporting member 32 and/or by changing the mounting orientation of the spinning shaft body 3, the magnitude of jumping of the jumping toy top A can be selected as desired. Further, as shown in Fig. 14, since the jumping toy top A performs jumping repeatedly as long as the jumping toy top A is spinning, and can attack an opponent toy top A' from above if the opponent toy top A' is at a falling point of the jumping toy top A. According to the present invention, a jumping toy top that can jump and attack from above without coming into contact with an opponent toy top unlike a conventional toy top, which is based on an innovative idea, can be realized.

Claims

1. A jumping toy top (A) that is played against an opponent toy top on a playing surface curved in an approximately concave-mirror-like shape of a playing board (B), including a toy main body (1), a spinning shaft body (3) having a spinning shaft (51), and a shaft body supporting portion (2) disposed on the toy main body (1) to support the spinning shaft body (3), **characterized in that**:

   the spinning shaft (51) of the spinning shaft body (3) has a distal end formed such that one side (51a) thereof protrudes downward more than the other side (51b) thereof diametrically opposite to the one side (51a) to configure a contact portion (52) for coming in contact with the playing surface of the playing board (B); and
   the contact portion (52) revolves around a central axis (O) of the toy main body (1) in a circular orbit when the jumping toy top spins on the central axis of the toy main body (1).

2. The jumping toy top (A) according to claim 1, **characterized in that** the shaft body supporting portion (2) includes a supporting member (32) for removably supporting the spinning shaft body (3).

3. The jumping toy top (A) according to claim 2, **characterized in that** the supporting member (32) is arranged movably in a direction perpendicular to the central axis (O) of the toy main body (1) relative to the toy main body (1) so that a distance (L) from the central axis (O) of the toy main body (1) to the contact portion (52) can be changed.

4. The jumping toy top (A) according to any one of claims 1 to 3, **characterized in that** the contact portion (52) is formed at the distal end of the spinning shaft (51) by cutting a columnar part of the spinning shaft (51) obliquely to a central axis thereof.

5. The jumping toy top (A) according to any one of claims 1 to 3, **characterized in that** the contact portion (52) comprises a shaft piece formed on an outer periphery a distal end surface of the spinning shaft (51) to protrude downward.

6. The jumping toy top (A) according to claim 2 or 3, **characterized in that** the spinning shaft body (3) and the supporting member (32) include respective pairs of engaging portions formed point-symmetrically so that the spinning shaft body (3) can be mounted on the supporting member (32) through the pairs of engaging portions selectively in one of a first orientation and a second orientation obtained by a rotation of 180 degrees from the first orientation.

7. The jumping toy top (A) according to claim 3, **characterized in that** the shaft body supporting portion (2) includes a positioning plate (31) for engaging the supporting member (32) to hold the supporting member (32) at a first position or a second position in a direction perpendicular to the central axis (O) of the toy main body (1).

FIG.1A

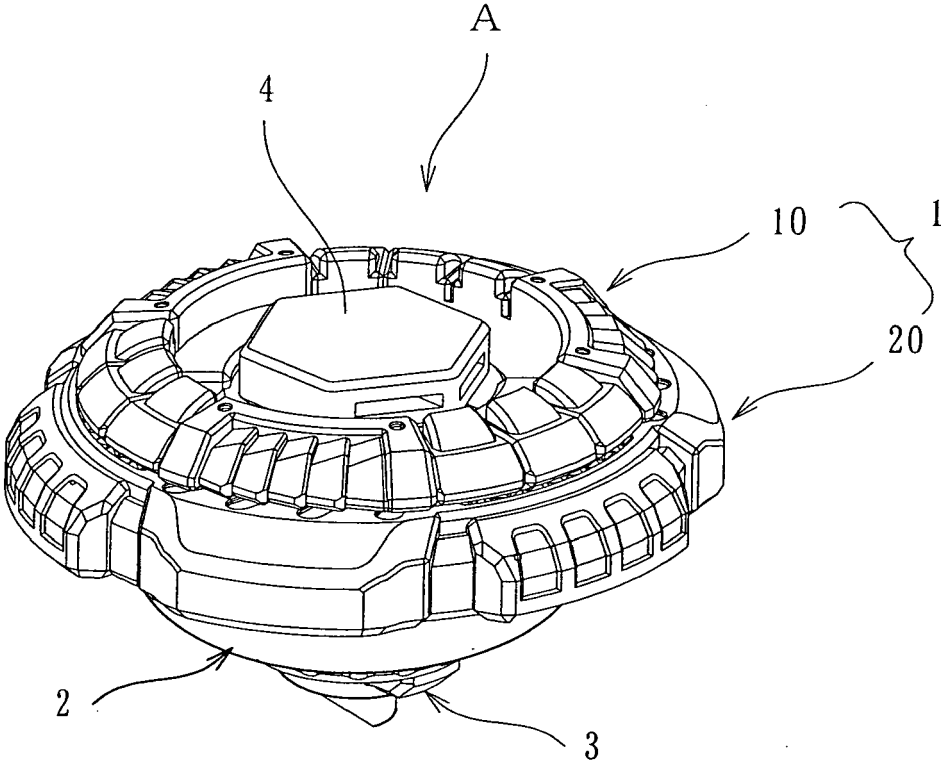


FIG.1B

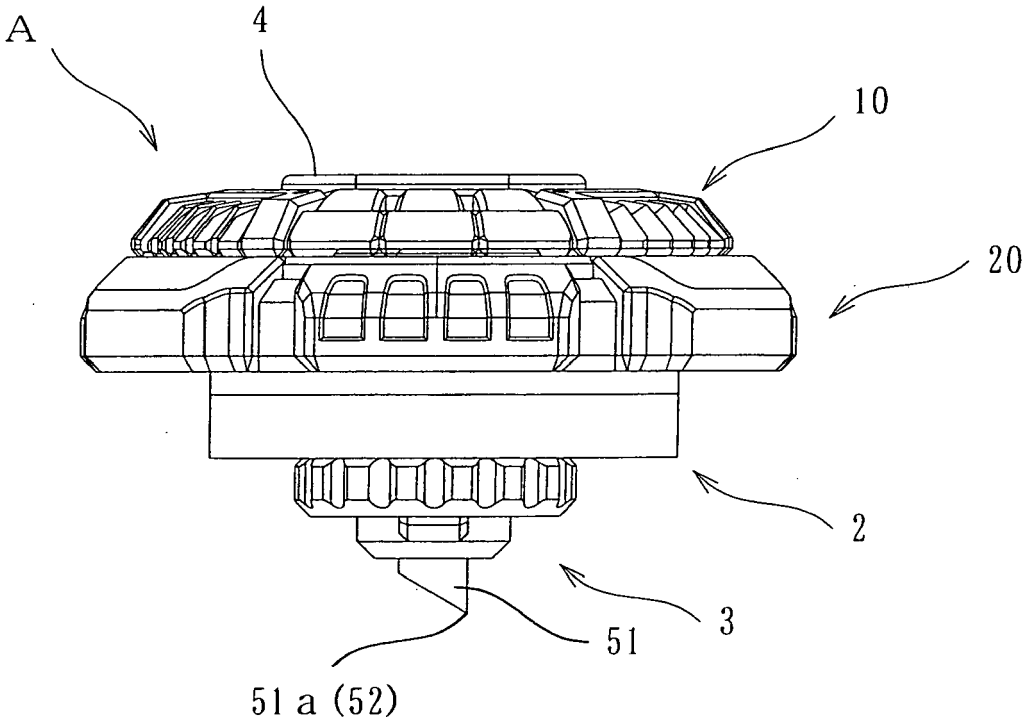
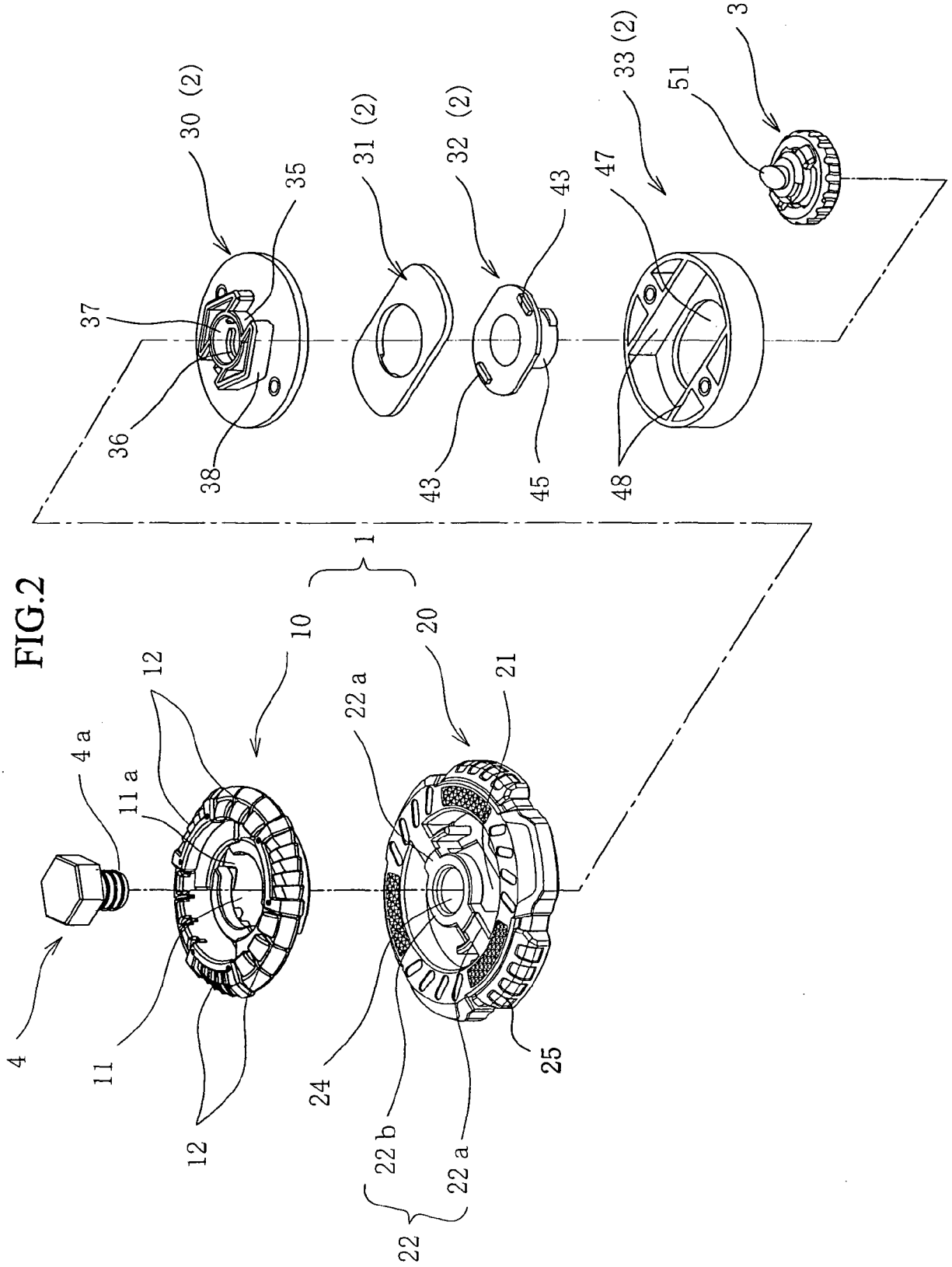


FIG.2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3

FIG.3

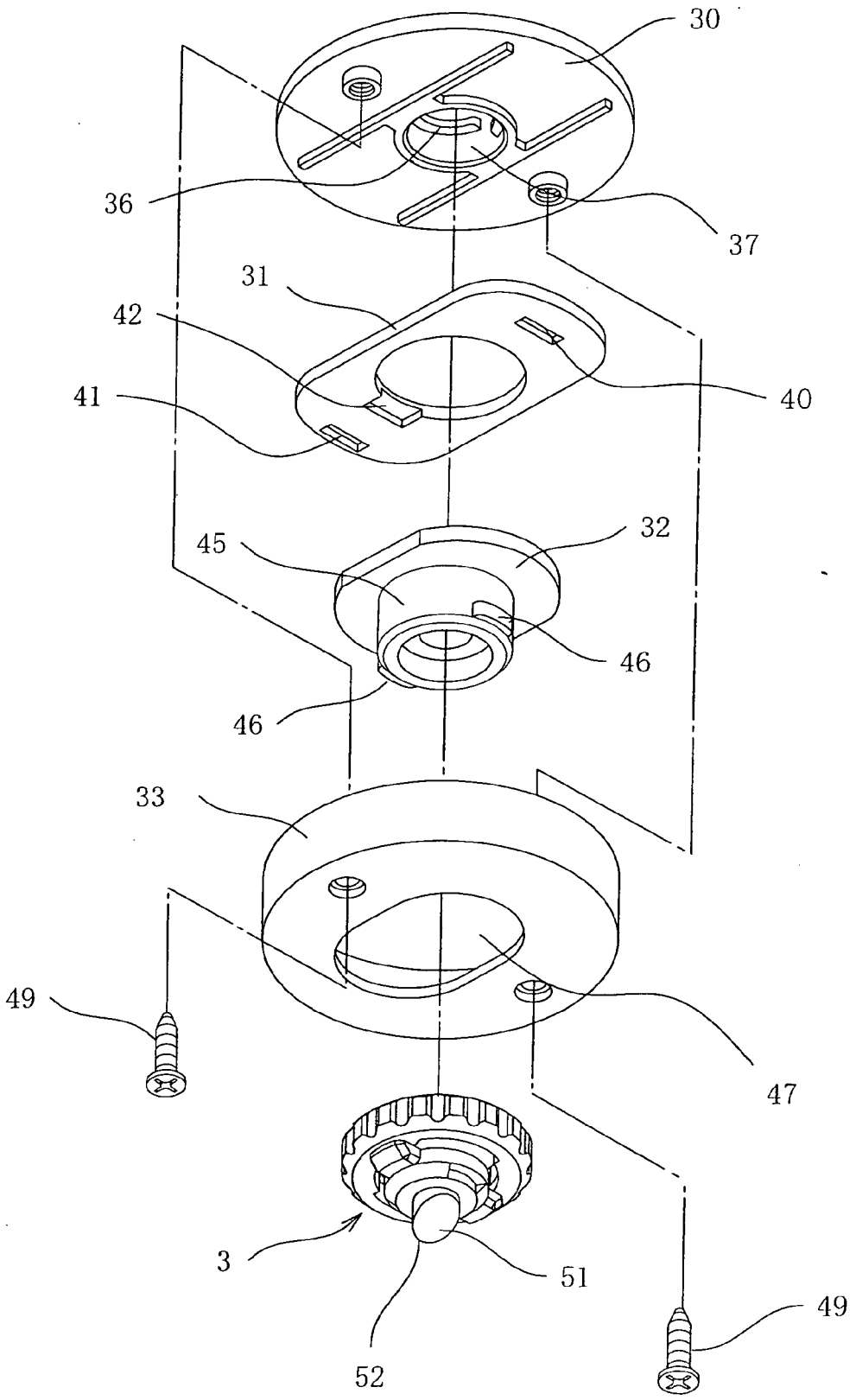


FIG.4A

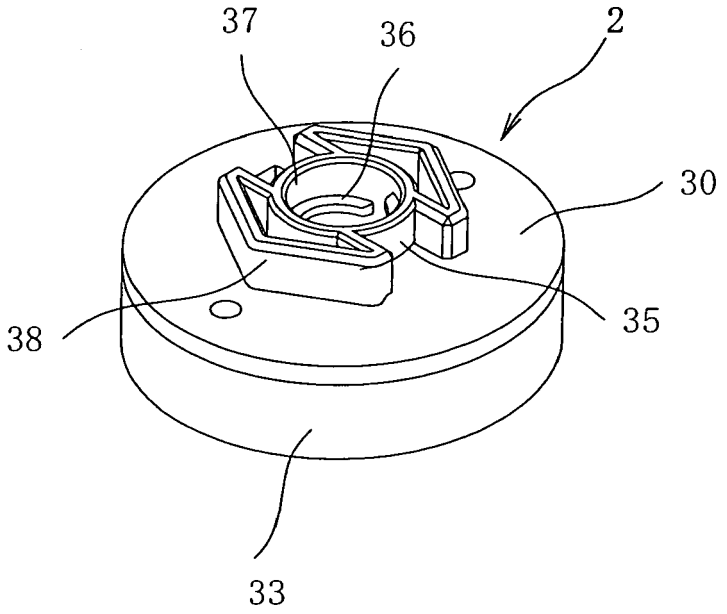


FIG.4B

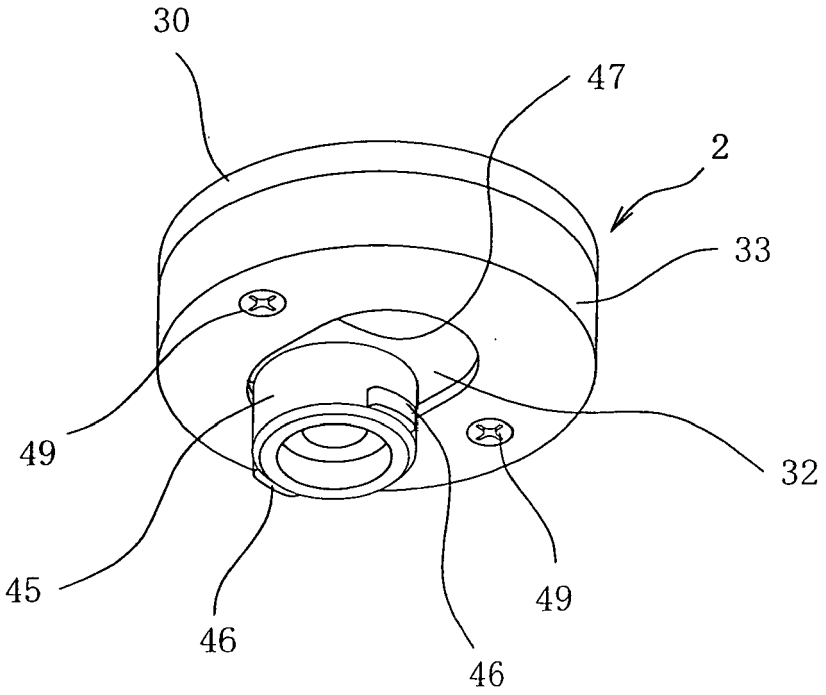


FIG.5A

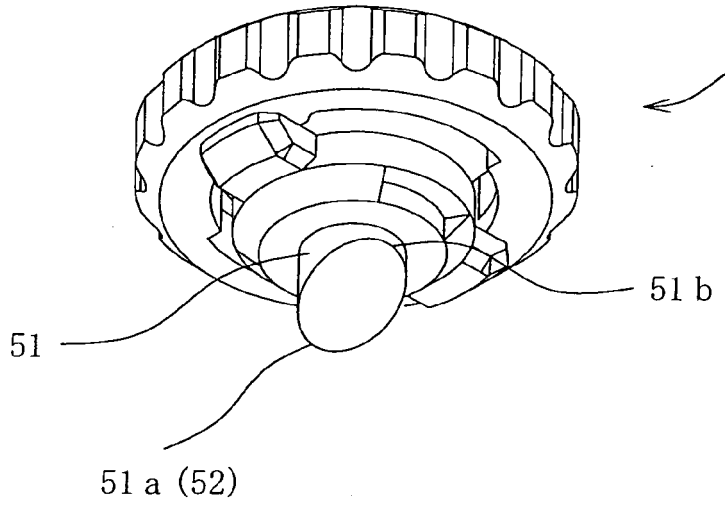


FIG.5B

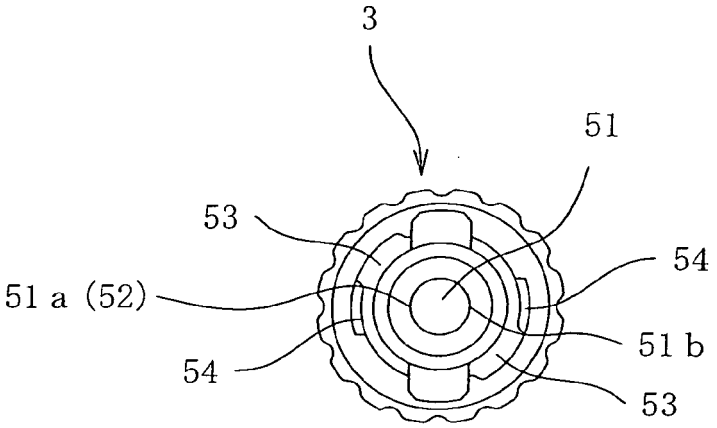


FIG.6A

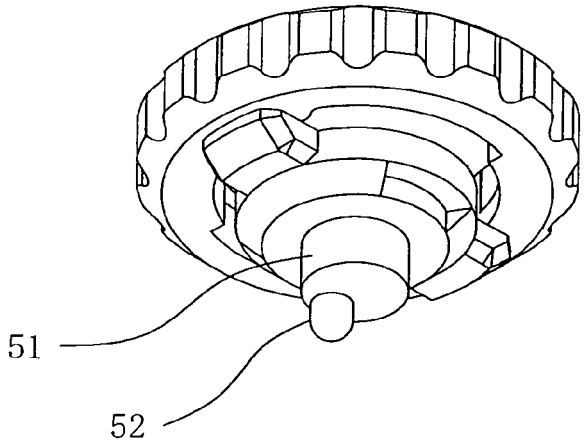
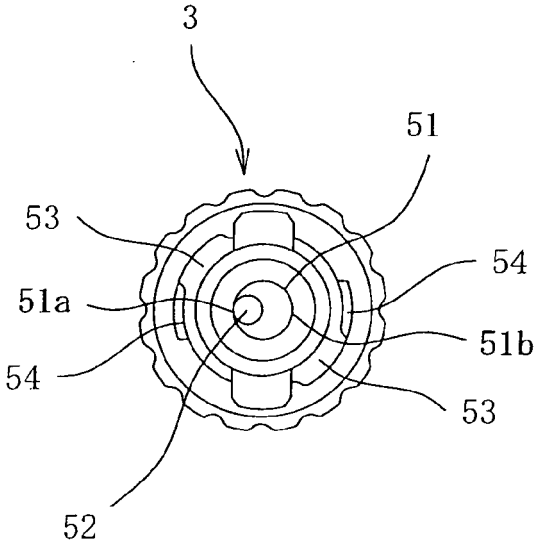


FIG.6B



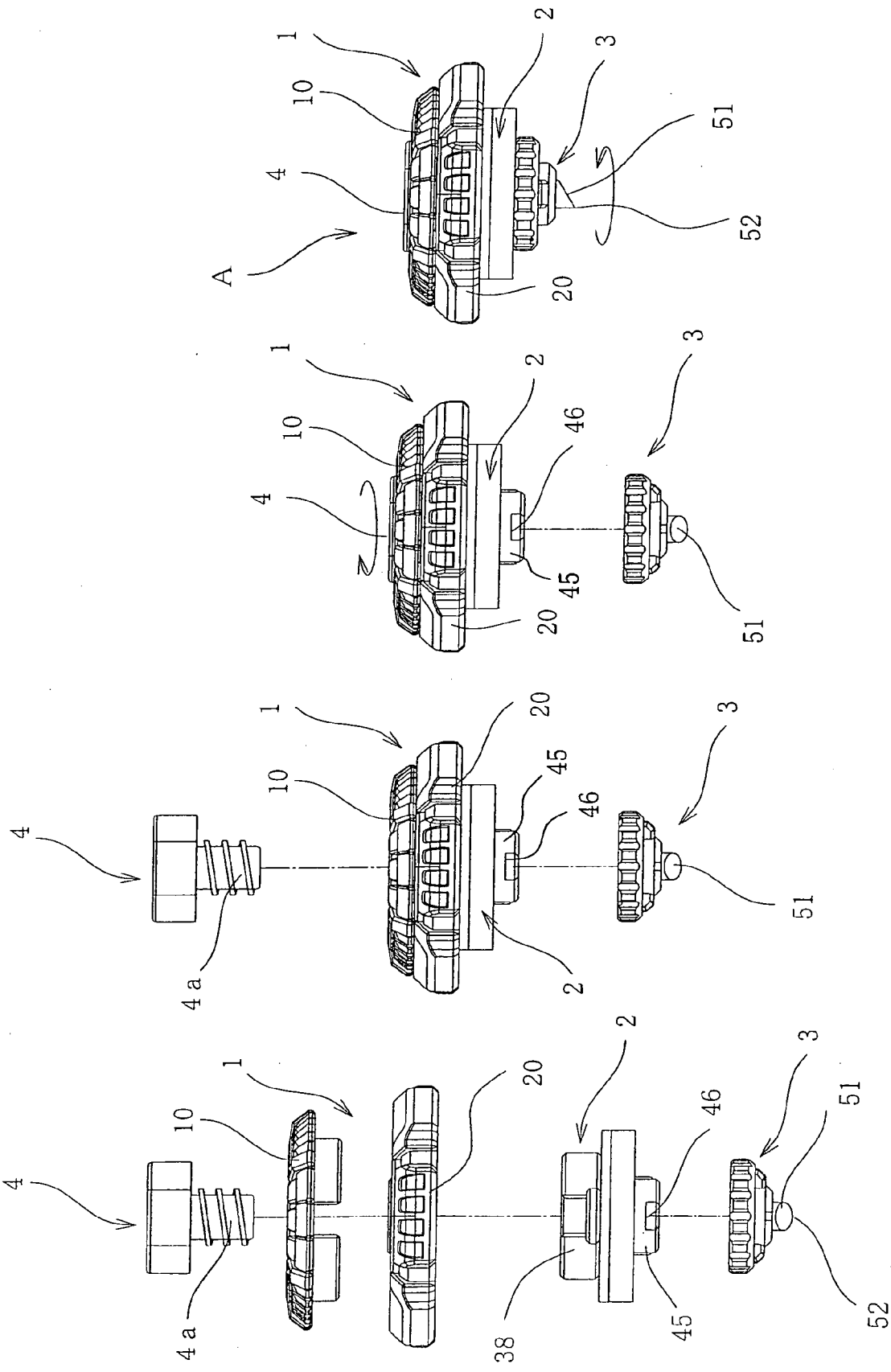


FIG.7A

FIG.7B

FIG.7C

FIG.7D

FIG.8A

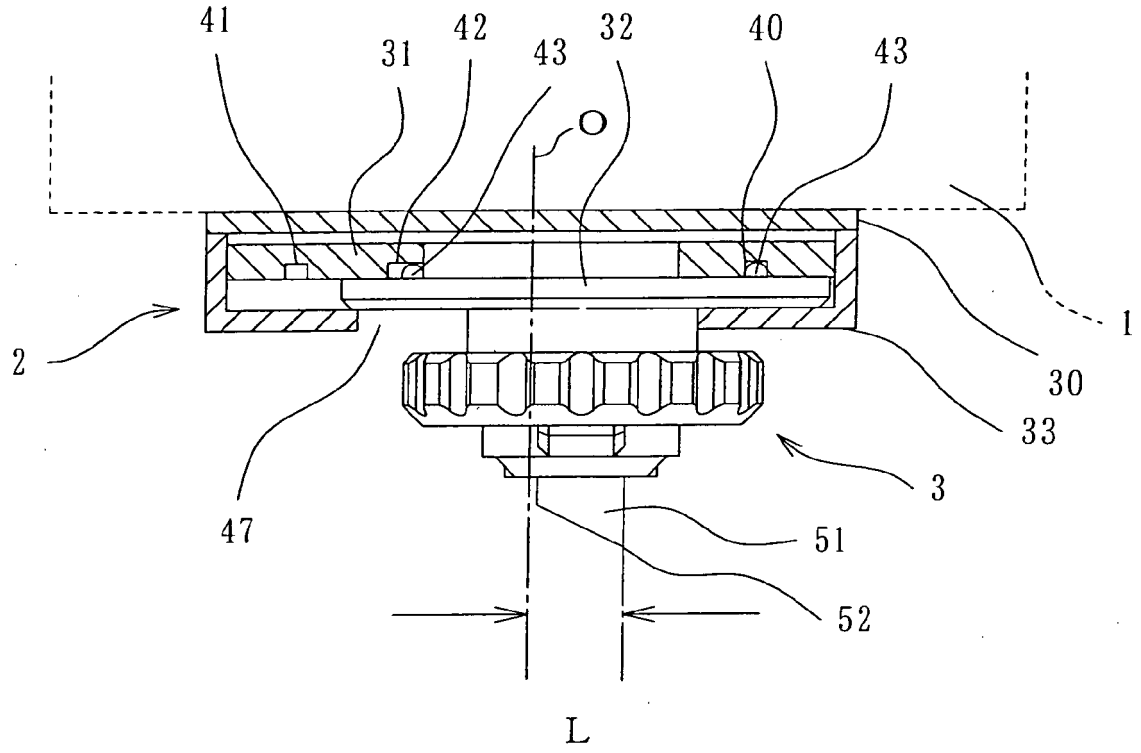

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FIG.8B

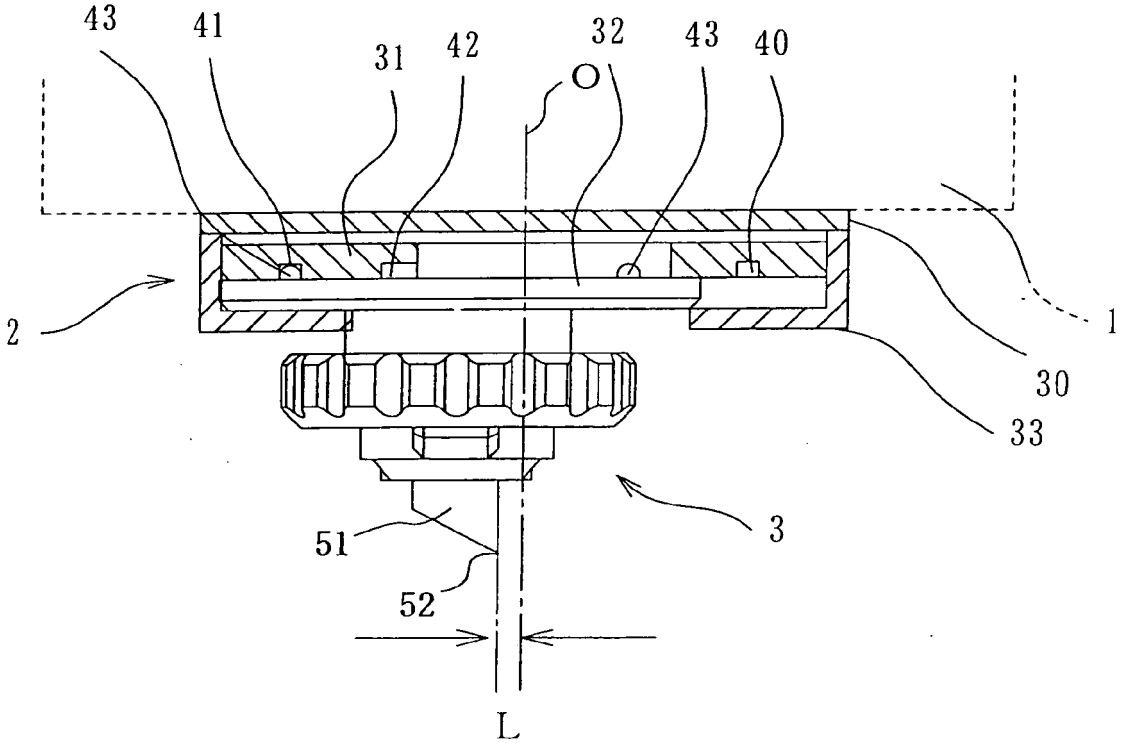
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FIG.9A

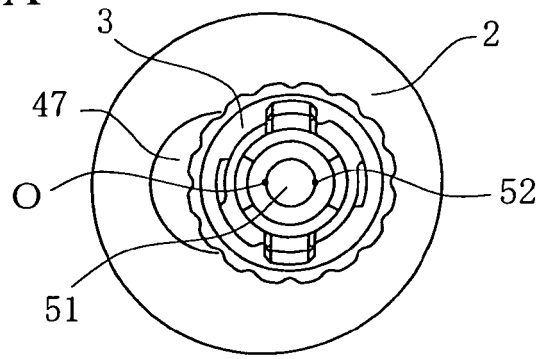


FIG.9B

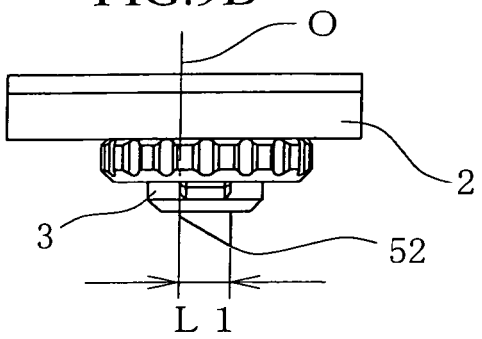


FIG.10A

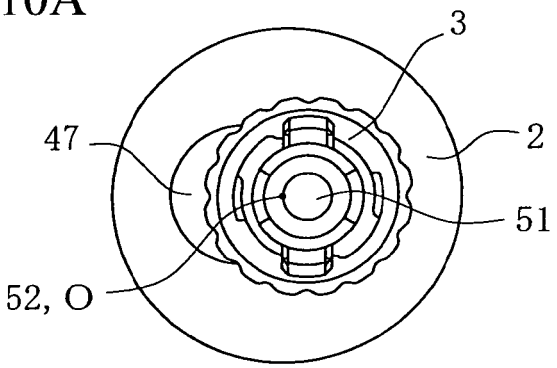


FIG.10B

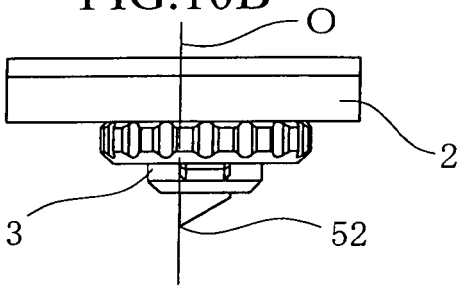


FIG.11A

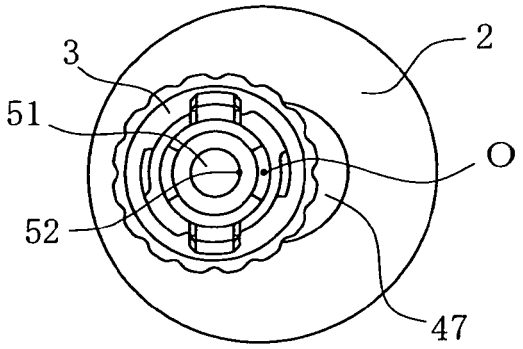


FIG.11B

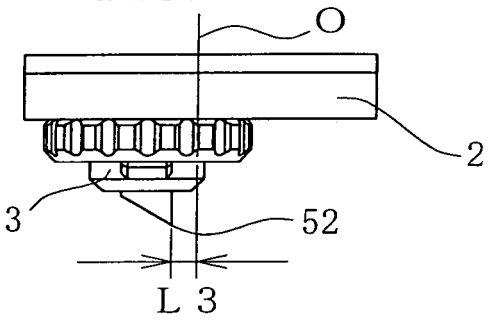


FIG.12A

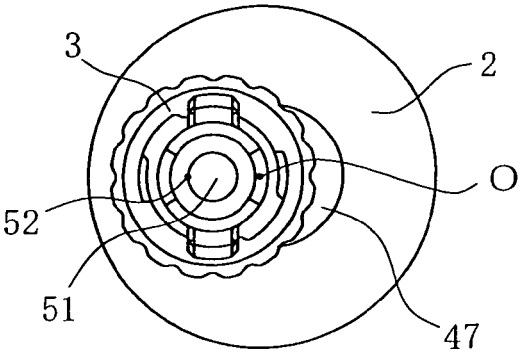
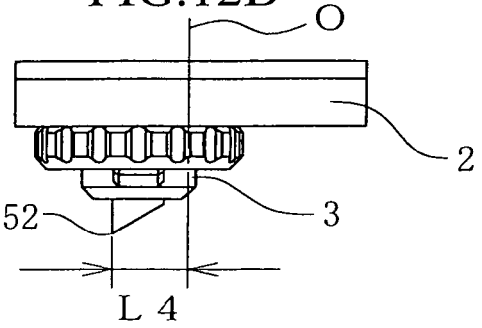


FIG.12B



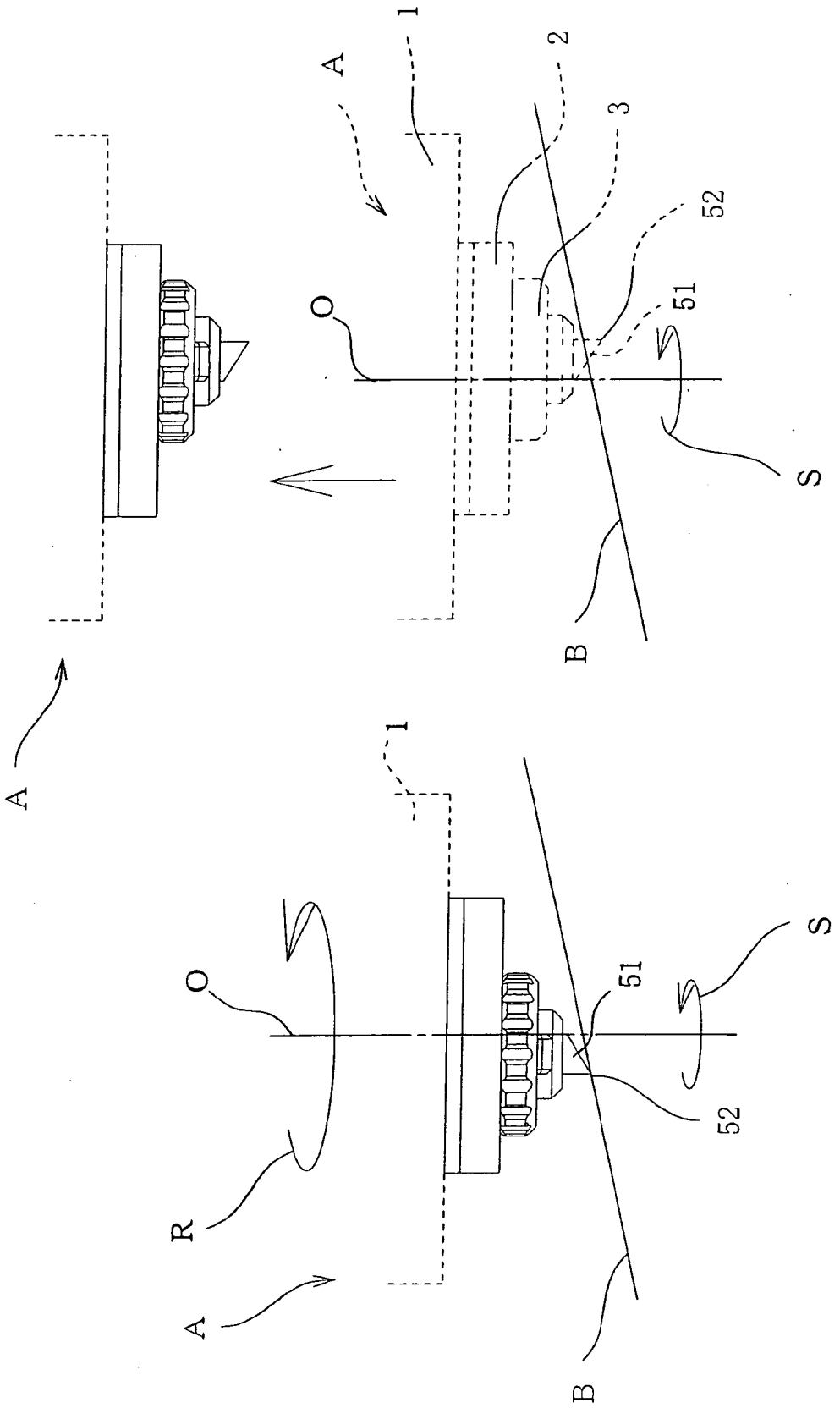
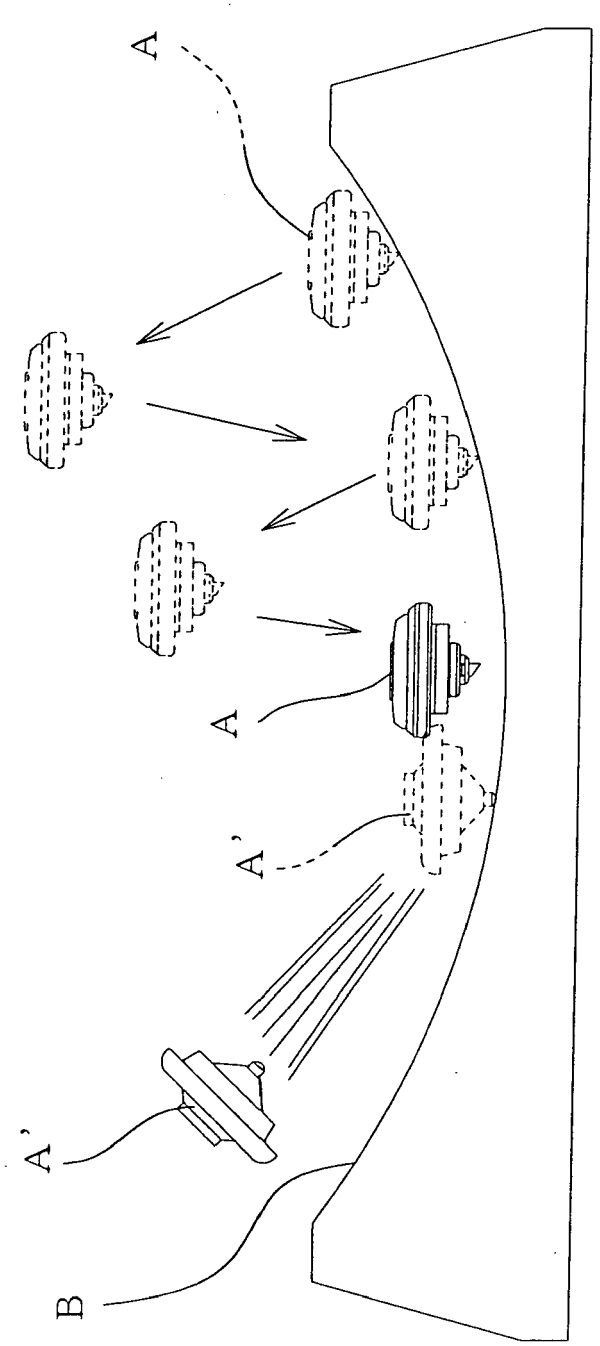


FIG.13B

FIG.13A

FIG.14



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EUROPEAN SEARCH REPORT

Application Number
EP 10 25 0151

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A	US 2002/102907 A1 (OSAWA TAKASHI [JP]) 1 August 2002 (2002-08-01) * paragraphs [0031], [0046] * * figures 7A,8A-8C * -----	1-7	INV. A63H1/16
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			A63H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 September 2010	Turmo, Robert

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