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## (54) FIDGET SPINNER CAPABLE OF FUNCTIONING AS DUAL-LEVEL RUBIK'S CUBE

(57) Provided is a fidget spinner (10) including two middle pieces (20, 30) and eight corner pieces (70, 80). The two middle pieces (20, 30) are connected while being pivotally rotatable relative to each other. One side middle piece (20, 30) has therein a bearing (60) whereby the two middle pieces (20, 30) rotate about a first axis (A1) together. The eight corner pieces (70, 80) are paired and pivotally disposed at four corners of the two middle pieces (20, 30) such that each middle piece (20, 30) drives four said corner pieces (70, 80) to rotate about the first axis (A1) together. Each pair of corner pieces (70, 80) together rotate about a second axis (A2) perpendicular to the first axis (A1) to thereby rotate pivotally relative to the two middle pieces (20, 30). Therefore, the fidget spinner (10) can function as a dual-level Rubik's Cube with diverse playing rules and greater appeal.

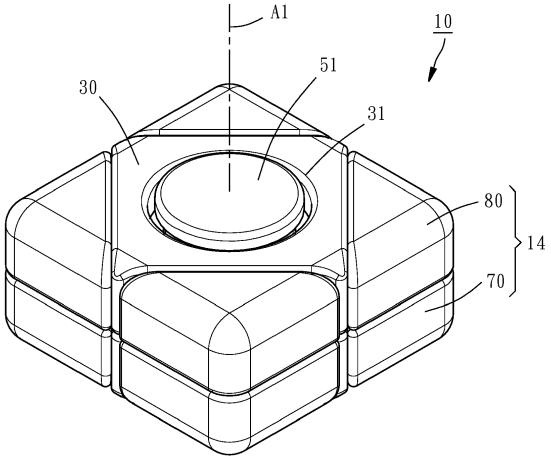


FIG. 1

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## Description

BACKGROUND OF THE INVENTION

1. Technical Field

**[0001]** The present disclosure relates to fidget spinners and, more particularly, to a fidget spinner capable of functioning as a dual-level Rubik's Cube.

2. Description of Related Art

**[0002]** A fidget spinner, a toy which is all the rage at the moment, essentially comprises a top proper. A bearing is centrally disposed in the top proper. Two protective covers are disposed at two ends of the bearing, respectively. A player pinches the two protective covers with two fingers and then rotates the top proper. Owing to the bearing, the top proper spins between the player's two fingers. However, the aforesaid playing rule is so monotonous that the player's enthusiasm for the fidget spinner ebbs very soon.

**[0003]** To give the fidget spinner greater appeal, CN207076098U discloses a five-axis one-level Rubik's Cube which comprises a central piece, five middle pieces and five adjacent pieces. The central piece has a central rotating shaft. Two finger pinching disks are disposed at two ends of the central rotating shaft, respectively. The Rubik's Cube can function as a fidget spinner whenever the player pinches the pinching disks with two fingers. The central piece has five coplanar axle heads aligned in a radiating manner. The five middle pieces are rotatably disposed on the five axle heads, respectively. The five adjacent pieces are each engagingly disposed between the two adjacent middle pieces. Therefore, if a middle piece and two adjacent pieces rotate together by 90 degrees, another adjacent middle piece and another adjacent piece can still rotate together by 90 degrees, thereby simulating the playing rule of Rubik's Cube. However, being monolayered, the five-axis one-level Rubik's Cube has a playing rule and variations thereof which are subject to limitations, and thus its appeal remains unimproved.

BRIEF SUMMARY OF THE INVENTION

**[0004]** It is an objective of the present disclosure to provide a fidget spinner capable of functioning as dual-level Rubik's Cube with diverse playing rules and thus greater appeal.

**[0005]** In order to achieve the above and other objectives, the fidget spinner of the present disclosure comprises a middle component, a central component and corner piece components.

**[0006]** The middle component has a first middle piece and a second middle piece which are pivotally rotatable relative to each other; hence, the first and second middle pieces rotate about a first axis relative to each other. The first middle piece has a first axial hole centrally disposed therein and penetrates two opposing sides thereof, whereas the second middle piece has a second axial hole centrally disposed therein and penetrates two opposing sides thereof, allowing the first axial hole and the second axial hole to be coaxially in communication with each other. The first middle piece has first arcuate chambers peripherally disposed thereon. The first arcuate chambers are arranged annularly and equidistantly relative to the first axial hole. The second middle piece has second arcuate chambers peripherally disposed thereon. The second arcuate chambers are arranged annularly and equidistantly relative to the second axial hole. Any said first arcuate chamber and any said second arcuate chamber are connected in a one-to-one manner to form a pivotal connection chamber.

**[0007]** The central component has a first central element, a second central element and a bearing. The first central element has a first disk and a first axial rod connected to the first disk. The first disk is disposed at one end of the first axial hole of the first middle piece. The second central element has a second disk and a second axial rod connected to the second disk. The second disk is disposed at one end of the second axial hole of the second middle piece. The second axial rod is connectedly disposed at the first axial rod of the first middle piece. The bearing is supported by the first axial rod of the first central element and the second axial rod of the second central element, allowing the first and second middle pieces to rotate together about the first axis.

**[0008]** Each corner piece component has a first corner piece and a second corner piece. The first and second corner pieces are connected. The first corner piece has a first arcuate portion. The first arcuate portion of the first corner piece is disposed in the first arcuate chambers of the first middle piece such that the first corner piece rotates about the first axis together with the first middle piece. The second corner piece has a second arcuate portion disposed in the second arcuate chamber of the second middle piece such that the second corner piece rotates about the first axis together with the second middle piece. The first arcuate portion of the first corner piece and the second arcuate portion of the second corner piece are connected to jointly form a pivotal connection portion. The pivotal connection portions of the corner piece components are pivotally, rotatably disposed in the pivotal connection chamber of the middle component, and thus the corner piece component can rotate about a second axis perpendicular to the first axis relative to the middle component.

**[0009]** Therefore, the fidget spinner of the present disclosure can function as a dual-level Rubik's Cube with diverse playing rules and greater appeal.

**[0010]** Preferably, the bearing of the central component is disposed in the first axial hole of the first middle piece as well as supported by the first axial rod of the first central element and the second axial rod of the second central element. The first middle piece has first ex-

tension chambers peripherally disposed thereon. The first extension chambers horizontally extend outward in the directions from the centers of the first arcuate chambers and away from the second middle piece, respectively. The second middle piece has second extension chambers peripherally disposed thereon. The second extension chambers horizontally extend outward in the directions from the centers of the second arcuate chambers and away from the first middle piece, respectively. The first extension chambers are opposite the second extension chambers in a one-to-one manner. A first magnetic element is disposed in each first extension chamber and in each second extension chamber. A second magnetic element is disposed in each first corner piece and in each second corner piece. Therefore, when the second magnetic elements are attracted and attached to the first magnetic elements, the corner piece components are positioned in place but are not rotatable inappropriately relative to the middle component.

**[0011]** Preferably, the first middle piece extends outward from the wall of the first axial hole integrally and radially to form a stop flange, whereas the first axial rod of the first central element has a large diameter portion connected to the first disk and a small diameter portion connected to the large diameter portion. The junction of the large diameter portion and the small diameter portion defines a shoulder portion. A rod hole is disposed in the second axial rod of the second central element. The small diameter portion of the first axial rod of the first central element is penetratingly disposed at the rod hole. The bearing has an inner ring, an outer ring and balls disposed between the inner and outer rings. The inner ring of the bearing is fitted to the small diameter portion of the first axial rod of the first central element, pressed and disposed between the shoulder portion of the first central element and the end surface of the second axial rod of the second central element. The outer ring of the bearing presses against the stop flange of the first middle piece, allowing the bearing to be positioned in place.

**[0012]** Preferably, the first middle piece extends integrally therefrom toward a lateral side of the second middle piece, along the axis of the first axial hole, and toward the second middle piece to form a first ring portion. The first ring portion has a screw hole. The second middle piece extends outward from the wall of the second axial hole integrally and radially to form a second ring portion. The second ring portion of the second middle piece is rotatably fitted to the first ring portion of the first middle piece. The middle component further has a gasket and a screw. The gasket presses against the first ring portion of the first middle piece and the second ring portion of the second middle piece. The gasket has a through hole. The screw passes through the through hole of the gasket and is fastened to the screw hole of the first ring portion of the first middle piece, allowing the first and second middle pieces to be rotatably put together.

**[0013]** Preferably, each first corner piece has a first stop portion connected to the first arcuate portion. Each second corner piece has a second stop portion connected to the second arcuate portion. The first stop portion of each first corner piece and the second stop portion of each second corner piece are connected to form a stop piece. The outer diameter of the stop piece is greater than the outer diameter of the pivotal connection chamber. Therefore, the stop piece interferes with the rim of the pivotal connection chamber so as to prevent separation of the corner piece components from the first middle piece.

**[0014]** Fine structures, features, assembly or operation of the fidget spinner of the present disclosure are illustrated by embodiments and described below. However, persons skilled in the art understand that the description below and the specific embodiments are illustrative of the present disclosure rather than restrictive of the claims of the present disclosure.

## BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

**[0015]**

FIG. 1 is a perspective view of a fidget spinner of the present disclosure.

FIG. 2 is a partial exploded view of the fidget spinner of the present disclosure.

FIG. 3 is another partial exploded view of the fidget spinner of the present disclosure.

FIG. 4 is a top view of the fidget spinner of the present disclosure.

FIG. 5 is a cross-sectional view taken along line 5-5 of FIG. 4.

FIG. 6 is a cross-sectional view taken along line 6-6 of FIG. 4.

FIG. 7 is a lateral view of the fidget spinner of the present disclosure, showing a first magnetic element and a second magnetic element are attracted and attached to each other.

FIG. 8 is similar to FIG. 7, showing that the first magnetic elements and the second magnetic elements are spaced apart from each other.

FIG. 9 is another perspective view of the fidget spinner of the present disclosure, showing a first middle piece and a second middle piece which rotate relative to each other.

FIG. 10 is a top view of FIG. 9.

FIG. 11 is yet another perspective view of the fidget spinner of the present disclosure, showing four corner piece components rotatable by 90 degrees relative to a middle component.

FIG. 12 is a top view of FIG. 11.

FIG. 13 is yet another perspective view of the fidget spinner of the present disclosure, showing that different patterns are formed on the outer surface of the middle component and the outer surfaces of the corner piece components, respectively.

DETAILED DESCRIPTION OF THE INVENTION

**[0016]** Direction-related terms used herein, including embodiments and claims, must be interpreted in a manner based on the directions depicted in the accompanying drawings. Furthermore, identical reference numerals used in the embodiments and the accompanying drawings denote identical or similar components or structural features thereof.

**[0017]** Referring to FIG. 1, FIG. 2 and FIG. 5, a fidget spinner 10 of the present disclosure comprises a middle component 11, a central component 13 and corner piece components 14 (four in this embodiment).

**[0018]** The middle component 11 has a rectangular first middle piece 20 and a rectangular second middle piece 30.

**[0019]** The first middle piece 20 has a first axial hole 21, four first arcuate chambers 22 and four first extension chambers 23. The first axial hole 21 is centrally disposed in the first middle piece 20 and penetrate inner and outer lateral sides of the first middle piece 20. Referring to FIG. 3, the four first arcuate chambers 22 are centrally disposed on four lateral sides of the first middle piece 20, respectively, and thus the four first arcuate chambers 22 are arranged annularly and equidistantly relative to the first axial hole 21. The four first extension chambers 23 are centrally disposed on four lateral sides of the first middle piece 20, respectively, and are in communication with the four first arcuate chambers 22, respectively. The first extension chambers 23 horizontally extend outward in the directions from the centers of the first arcuate chambers 22 and away from the second middle piece 30, respectively. Referring to FIG. 2, the first middle piece 20 further has a first ring portion 24 and a stop flange 26. The first ring portion 24 extends integrally outward from the first middle piece 20 toward a lateral side of the second middle piece, along the axis of the first axial hole 21, and toward the second middle piece 30. The first ring portion 24 has two screw holes 25. The stop flange 26 extends outward from the wall of the first axial hole 21 integrally and radially.

**[0020]** The second middle piece 30 has a second axial hole 31, four second arcuate chambers 32 and four second extension chambers 33. The second axial hole 31 is centrally disposed in the second middle piece 30 and penetrate inner and outer lateral sides of the second middle piece 30. Referring to FIG. 3, the four second arcuate chambers 32 are centrally disposed on four lateral sides of the second middle piece 30, respectively, and thus the four second arcuate chambers 32 are arranged annularly and equidistantly relative to the second axial hole 31. The four second extension chambers 33 are centrally disposed on the four lateral sides of the second middle piece 30, respectively, and are in communication with the four second arcuate chambers 32, respectively. The second extension chamber 33 horizontally extend outward in the directions from the centers of the second arcuate chambers 32 and away from the first middle piece 20, respectively. Referring to FIG. 2, the second middle piece 30 has a second ring portion 34. The second ring portion 34 extends outward from the wall of the second axial hole 31 integrally and radially.

**[0021]** Referring to FIG. 2 and FIG. 5, during the assembly process, the second ring portion 34 of the second middle piece 30 is fitted onto the first ring portion 24 of the first middle piece 20. Then, the user presses a gasket 35 against the first ring portion 24 of the first middle piece 20 and the second ring portion 34 of the second middle piece 30 simultaneously, and then passes two screws 37 through two through holes 36 of the gasket 35 to thereby fasten the two screws 37 to the screw holes 25 of the first ring portion 24 of the first middle piece 20, so as to finish putting the first middle piece 20 and the second middle piece 30 together. Afterward, the first middle piece 20 and the second middle piece 30 can rotate about a first axis A1 relative to each other. Referring to FIG. 3, the four first arcuate chambers 22 and the four second arcuate chambers 32 are connected, respectively, in a one-to-one manner, to jointly form a round pivotal connection chamber 12.

**[0022]** The central component 13 has a first central element 40, a second central element 50 and a bearing 60.

**[0023]** The first central element 40 has a first disk 41 and a first axial rod 42. Referring to FIG. 2 and FIG. 5, the first axial rod 42 has a large diameter portion 43 and a small diameter portion 44. One end of the large diameter portion 43 is connected to the first disk 41. The other end of the large diameter portion 43 is connected to the small diameter portion 44. Therefore, the junction of the large diameter portion 43 and the small diameter portion 44 defines a shoulder portion 45.

**[0024]** The second central element 50 has a second disk 51 and a second axial rod 52. Referring to FIG. 2 and FIG. 5, one end of the second axial rod 52 is connected to the second disk 51, and the second axial rod 52 has a rod hole 53.

**[0025]** The bearing 60 has an inner ring 61, an outer ring 62 and balls 63 disposed between the inner ring 61 and the outer ring 62.

**[0026]** To carry out the assembly process in the presence of the middle component 11, as shown in FIG. 2 and FIG. 5, the bearing 60 is placed in the first axial hole 21 of the first middle piece 20. The outer ring 62 of the bearing 60 presses against the stop flange 26 of the first middle piece 20. Then, the small diameter portion 44 of the first axial rod 42 of the first central element 40 passes through the inner ring 61 of the bearing 60 and is inserted into the rod hole 53 of the second axial rod 52 of the second central element 50 such that the inner ring 61 of the bearing 60 is pressed and disposed between the shoulder portion 45 of the first axial rod 42 of the first central element 40 and the end surface of the second axial rod 52 of the second central element 50, thereby positioning the bearing 60 in place. Therefore, upon completion of the assembly process, the first disk 41 of the

first central element 40 is located at one end of the first axial hole 21 of the first middle piece 20, whereas the second disk 51 of the second central element 50 is located at one end of the second axial hole 31 of the second middle piece 30. When the user pinches the first disk 41 and the second disk 51 with two fingers, the first middle piece 20 and the second middle piece 30 rotate about the first axis A1 together because of the bearing 60.

**[0027]** The four corner piece components 14 are disposed at four corners of the middle component 11, respectively. Each corner piece component 14 has a first corner piece 70 and a second corner piece 80, as shown in FIG. 2 and FIG. 3.

**[0028]** A first arcuate portion 71 and an arcuate first stop portion 72 are disposed on a lateral side of the first corner piece 70. The first stop portion 72 is connected to the terminal end of the first arcuate portion 71. The outer diameter of the first stop portion 72 is greater than the outer diameter of the first arcuate portion 71 and the outer diameters of the first arcuate chambers 22 of the first middle piece 20.

**[0029]** A second arcuate portion 81 and an arcuate second stop portion 82 are disposed on a lateral side of the second corner piece 80. The second stop portion 82 is connected to the terminal end of the second arcuate portion 81. The outer diameter of the second stop portion 82 is greater than the outer diameter of the second arcuate portion 81 and the outer diameters of the second arcuate chambers 32 of the second middle piece 30.

**[0030]** To carry out assembly in the presence of the middle component 11, as shown in FIG. 3 and FIG. 6, before putting the first middle piece 20 and the second middle piece 30 together with the two screws 37, the user embeds the first arcuate portion 71 of the first corner piece 70 and the second arcuate portion 81 of the second corner piece 80 in the first arcuate chambers 22 of the first middle piece 20 and the second arcuate chambers 32 of the second middle piece 30, respectively. Afterward, the user puts the first middle piece 20 and the second middle piece 30 together according to the aforesaid steps, and then the first corner piece 70 and the second corner piece 80 are arranged side by side. At this point in time, the first corner piece 70 and the second corner piece 80 rotate about the first axis A1 together with the first middle piece 20 and the second middle piece 30, respectively (as shown in FIG. 9 and FIG. 10). Referring to FIG. 2 and FIG. 3, the first arcuate portion 71 of the first corner piece 70 and the second arcuate portion 81 of the second corner piece 80 are connected to form a round pivotal connection portion 15 such that the first corner piece 70 and the second corner piece 80 are pivotally connected to the pivotal connection chamber 12 of the middle component 11 because of the pivotal connection portion 15, thereby allowing the corner piece components 14 to rotate about a second axis A2 perpendicular to the first axis A1 relative to the middle component 11 (as shown in FIG. 11 and FIG. 12). Referring to FIG. 2, FIG. 3 and FIG. 6, the first stop portion 72 of the first corner piece 70 and the second stop portion 82 of the second corner piece 80 are connected to form a round stop piece 16 whereby the first corner piece 70 and the second corner piece 80 interfere with the rim of the pivotal connection chamber 12 of the middle component 11, so as to prevent the corner piece components 14 from loosening.

**[0031]** To enable the corner piece components 14 to be positioned in place and thus not inappropriately rotated. A first magnetic element 17 (for example, a magnet) is disposed in each first extension chamber 23 of the first middle piece 20 and in each second extension chamber 33 of the second middle piece 30, as shown in FIG. 3. Each corner piece component 14 further has a first cover plate 73 and a second cover plate 83. The first cover plate 73 has a first plate body 74 and a first arm portion 75 connected to the first plate body 74. The second cover plate 83 has a second plate body 84 and a second arm portion 85 connected to the second plate body 84. The first plate body 74 and the second plate body 84 are connected and disposed between the first corner piece 70 and the second corner piece 80. The first arm portion 75 and the second arm portion 85 are inserted into the first corner piece 70 and the second corner piece 80, respectively. A second magnetic element 18 (for example, a magnet) is disposed in the first arm portion 75 and in the second arm portion 85. Therefore, when the second magnetic elements 18 are attracted and attached to the first magnetic elements 17, as shown in FIG. 7, and in consequence the corner piece components 14 are positioned in place but not inappropriately rotated relative to the middle component 11. As soon as the external force exerted on the corner piece components 14 overcomes the attractive force under which the first magnetic elements 17 are attracted and attached to the second magnetic elements 18, the corner piece components 14 rotate relative to the middle component 11, as shown in FIG. 8 (FIG. 8 shows that the corner piece components 14 rotate by 90 degrees relative to the middle component 11.)

**[0032]** Therefore, the fidget spinner 10 of the present disclosure offers various playing rules described below. As shown in FIG. 1 and FIG. 4, the first middle piece 20 and the second middle piece 30 are aligned at the same angle such that the first corner piece 70 and the second corner piece 80 are arranged side by side. Afterward, the user pinches the first disk 41 and the second disk 51 with two fingers, allowing the middle component 11 and the corner piece components 14 to rotate together about the first axis A1. Referring to FIG. 9 and FIG. 10, the second middle piece 30 is rotated by 45 degrees relative to the first middle piece 20 such that the first corner piece 70 and the second corner piece 80 are spaced apart from each other. Afterward, the user pinches the first disk 41 and the second disk 51 with two fingers such that the middle component 11 and the corner piece components 14 rotate together about the first axis A1. Referring to FIG. 11 and FIG. 12, the first middle piece 20 and the second middle piece 30 are aligned at the same angle.

Afterward, the user rotates the corner piece components 14 by 90 degrees relative to the middle component 11 and then pinches the first disk 41 and the second disk 51 with two fingers, allowing the middle component 11 and the corner piece components 14 to rotate together about the first axis A1.

**[0033]** The fidget spinner 10 of the present disclosure can function as a dual-level Rubik's Cube, that is, either allowing continuous rotation of the first middle piece 20 and four first corner pieces 70 and continuous rotation of the second middle piece 30 and four second corner pieces 80, relative to each other, to occur (as shown in FIG. 9 and FIG. 10), or allowing one or more said corner piece components 14 to rotate continuously relative to the middle component 11 (as shown in FIG. 11 and FIG. 12).

**[0034]** In conclusion, the fidget spinner 10 of the present disclosure can function as a dual-level Rubik's Cube with diverse playing rules and greater appeal. Referring to FIG. 13, the outer surface of the middle component 11 and the outer surfaces of the corner piece components 14 form patterns 90, 92 in different colors or with different textures, thereby allowing the fidget spinner 10 in operation to be visually attractive.

## Claims

**1.** A fidget spinner (10), **characterized by** comprising:

a middle component (11) having a first middle piece (20) and a second middle piece (30), allowing the first middle piece (20) and the second middle piece (30) to be connected and rotate about a first axis (A1) relative to each other, the first middle piece (20) having a first axial hole (21) centrally disposed therein and penetrating two opposing sides thereof, the second middle piece (30) having a second axial hole (31) centrally disposed therein and penetrating two opposing sides thereof, allowing the first axial hole (21) and the second axial hole (31) to be coaxially in communication with each other, the first middle piece (20) having first arcuate chambers (22) peripherally disposed thereon, the first arcuate chambers (22) being arranged annularly and equidistantly relative to the first axial hole (21), the second middle piece (30) having second arcuate chambers (32) peripherally disposed thereon, the second arcuate chambers (32) being arranged annularly and equidistantly relative to the second axial hole (31), the first arcuate chambers (22) being connected to the second arcuate chambers (32), respectively, in a one-to-one manner to form a pivotal connection chamber (12);

a central component (13) having a first central element (40), a second central element (50) and a bearing (60), the first central element (40) having a first disk (41) and a first axial rod (42), the first disk (41) being connected to an end of the first axial rod (42) and disposed at an end of the first axial hole (21) of the first middle piece (20), the second central element (50) having a second disk (51) and a second axial rod (52), the second disk (51) being connected to an end of the second axial rod (52) and disposed at an end of the second axial hole (31) of the second middle piece (30), the second axial rod (52) being connectedly disposed at the first axial rod (42) of the first central element (40), the bearing (60) being supported by the first axial rod (42) of the first central element (40) and the second axial rod (52) of the second central element (50), thereby allowing the first middle piece (20) and the second middle piece (30) to rotate about the first axis (A1) together; and

corner piece components (14) each having a first corner piece (70) and a second corner piece (80), with the first and second corner pieces (70, 80) arranged side by side, the first corner piece (70) having a first arcuate portion (71) disposed in the first arcuate chamber (22) of the first middle piece (20), allowing the first corner piece (70) to rotate about the first axis (A1) together with the first middle piece (20), the second corner piece (80) having a second arcuate portion (81) disposed in the second arcuate chamber (32) of the second middle piece (30), allowing the second corner piece (80) to rotate about the first axis (A1) together with the second middle piece (30), wherein the first arcuate portion (71) of the first corner piece (70) of any said corner piece component (14) and the second arcuate portion (81) of the second corner piece (80) of the corner piece component (14) are connected and thereby together form a pivotal connection portion (15),

wherein the pivotal connection portions (15) of the corner piece components (14) are pivotally, rotatably disposed in the pivotal connection chamber (12) of the middle component (11), allowing the corner piece components (14) to rotate about a second axis (A2) perpendicular to the first axis (A1) relative to the middle component (11).

**2.** The fidget spinner (10) of claim 1, wherein the first middle piece (20) has first extension chambers (23) peripherally disposed thereon, the first extension chambers (23) extend outward from the first arcuate chambers (22) in a direction away from the second middle piece (30), respectively, the second middle piece (30) has second extension chambers (33) peripherally disposed thereon, the second extension chambers (33) extend outward from the second ar-

cuate chambers (32) in a direction away from the first middle piece (20), respectively, the first extension chambers (23) are opposite the second extension chambers (33), respectively, in a one-to-one manner, a first magnetic element (17) is disposed in any one of the first extension chambers (23) and in any one of the second extension chambers (33), a second magnetic element (18) is disposed in any one of the first corner pieces (70) and in any one of the second corner pieces (80), wherein, when any said second magnetic element (18) is attracted and attached to any said first magnetic element (17), the corner piece components (14) are positioned in place and thereby no longer rotate relative to the middle component (11).

**3.** The fidget spinner (10) of claim 2, wherein each said corner piece component (14) further has first cover plates (73) and second cover plates (83), the first cover plates (73) each have a first plate body (74) and a first arm portion (75) connected to the first plate body (74), the second cover plates (83) each have a second plate body (84) and a second arm portion (85) connected to the second plate body (84), the first plate body (74) and the second plate body (84) are connected and disposed between the adjacent first and second corner pieces (70, 80), such that the first arm portion (75) and the second arm portion (85) are inserted into one said first corner piece (70) and one said second corner piece (80), respectively, and one said second magnetic element (18) is disposed in the first arm portion (75) and in the second arm portion (85).

**4.** The fidget spinner (10) of any one of claims 1-3, wherein the bearing (60) of the central component (13) is disposed in the first axial hole (21) of the first middle piece (20) and supported by the first axial rod (42) of the first central element (40) and the second axial rod (52) of the second central element (50).

**5.** The fidget spinner (10) of claim 4, wherein the first middle piece (20) has a stop flange (26), the stop flange (26) extends radially outward from the wall of the first axial hole (21), the first axial rod (42) of the first central element (40) has a large diameter portion (43) connected to the first disk (41) and a small diameter portion (44) connected to the large diameter portion (43), a junction of the large diameter portion (43) and the small diameter portion (44) defines a shoulder portion (45), the second axial rod (52) of the second central element (50) has a rod hole (53), wherein the bearing (60) has an inner ring (61), an outer ring (62) and balls (63) disposed between the inner ring (61) and the outer ring (62), the inner ring (61) of the bearing (60) is fitted to the small diameter portion (44) of the first axial rod (42) of the first central element (40), pressed and disposed between the shoulder portion (45) of the first central element (40) and an end surface of the second axial rod (52) of the second central element (50), and the outer ring (62) of the bearing (60) presses against the stop flange (26) of the first middle piece (20).

**6.** The fidget spinner (10) of claim 4, wherein the first middle piece (20) has a first ring portion (24), the first ring portion (24) integrally extends outward from the first middle piece (20) toward a lateral side of the second middle piece (30) and along the axis of the first axial hole (21) toward the second middle piece (30), the first ring portion (24) has a screw hole (25), wherein the second middle piece (30) has a second ring portion (34), the second ring portion (34) extends outward from the wall of the second axial hole (31) integrally and radially, the second ring portion (34) is rotatably fitted to the first ring portion (24) of the first middle piece (20), the middle component (11) has a gasket (35) and a screw (37), the gasket (35) presses against the first ring portion (24) of the first middle piece (20) and the second ring portion (34) of the second middle piece (30), and the gasket (35) has a through hole (36), allowing the screw (37) to pass through the through hole (36) of the gasket (35) and be fastened to the screw hole (25) of the first ring portion (24) of the first middle piece (20).

**7.** The fidget spinner (10) of claim 4, wherein the first corner pieces (70) each have a first stop portion (72) disposed at the first arcuate portion (71), the second corner pieces (80) each have a second stop portion (82) disposed at the second arcuate portion (81), the first stop portion (72) and the second stop portion (82) are connected to form a stop piece (16), and the outer diameter of the stop piece (16) is greater than the outer diameter of the pivotal connection chamber (12) of the middle component (11), allowing the stop piece (16) and the rim of the pivotal connection chamber (12) to interfere with each other.

**8.** The fidget spinner (10) of any one of claims 1-3, wherein the first middle piece (20) has a stop flange (26), the stop flange (26) extends radially outward from the wall of the first axial hole (21), the first axial rod (42) of the first central element (40) has a large diameter portion (43) connected to the first disk (41) and a small diameter portion (44) connected to the large diameter portion (43), a junction of the large diameter portion (43) and the small diameter portion (44) defines a shoulder portion (45), the second axial rod (52) of the second central element (50) has a rod hole (53), the bearing (60) has an inner ring (61), an outer ring (62) and balls (63) disposed between the inner ring (61) and the outer ring (62), the inner ring (61) of the bearing (60) is fitted to the small diameter portion (44) of the first axial rod (42) of the first central element (40), pressed and disposed between the

shoulder portion (45) of the first central element (40) and an end surface of the second axial rod (52) of the second central element (50), allowing the outer ring of the bearing (60) to press against the stop flange (26) of the first middle piece (20).

**9.** The fidget spinner (10) of any one of claims 1-3, wherein the first middle piece (20) has a first ring portion (24), the first ring portion (24) integrally extends outward from the first middle piece (20) toward a lateral side of the second middle piece (30) and along the axis of the first axial hole (21) toward the second middle piece (30), the first ring portion (24) has a screw hole (25), the second middle piece (30) has a second ring portion (34), the second ring portion (34) extends outward from the wall of the second axial hole (31) integrally and radially, the second ring portion (34) of the second middle piece (30) is rotatably fitted to the first ring portion (24) of the first middle piece (20), the middle component (11) further has a gasket (35) and a screw (37), the gasket (35) presses against the first ring portion (24) of the first middle piece (20) and the second ring portion (34) of the second middle piece (30), and the gasket (35) has a through hole (36), allowing the screw (37) to pass through the through hole (36) of the gasket (35) and be fastened to the screw hole (25) of the first ring portion (24) of the first middle piece (20).

**10.** The fidget spinner (10) of any one of claims 1-3, wherein the first corner pieces (70) each have a first stop portion (72) disposed at the first arcuate portion (71), the second corner pieces (80) each have a second stop portion (82) disposed at the second arcuate portion (81), the first stop portion (72) and the second stop portion (82) are connected to form a stop piece (16), and the outer diameter of the stop piece (16) is greater than the outer diameter of the pivotal connection chamber (12) of the middle component (11), allowing the stop piece (16) and the rim of the pivotal connection chamber (12) to interfere with each other.

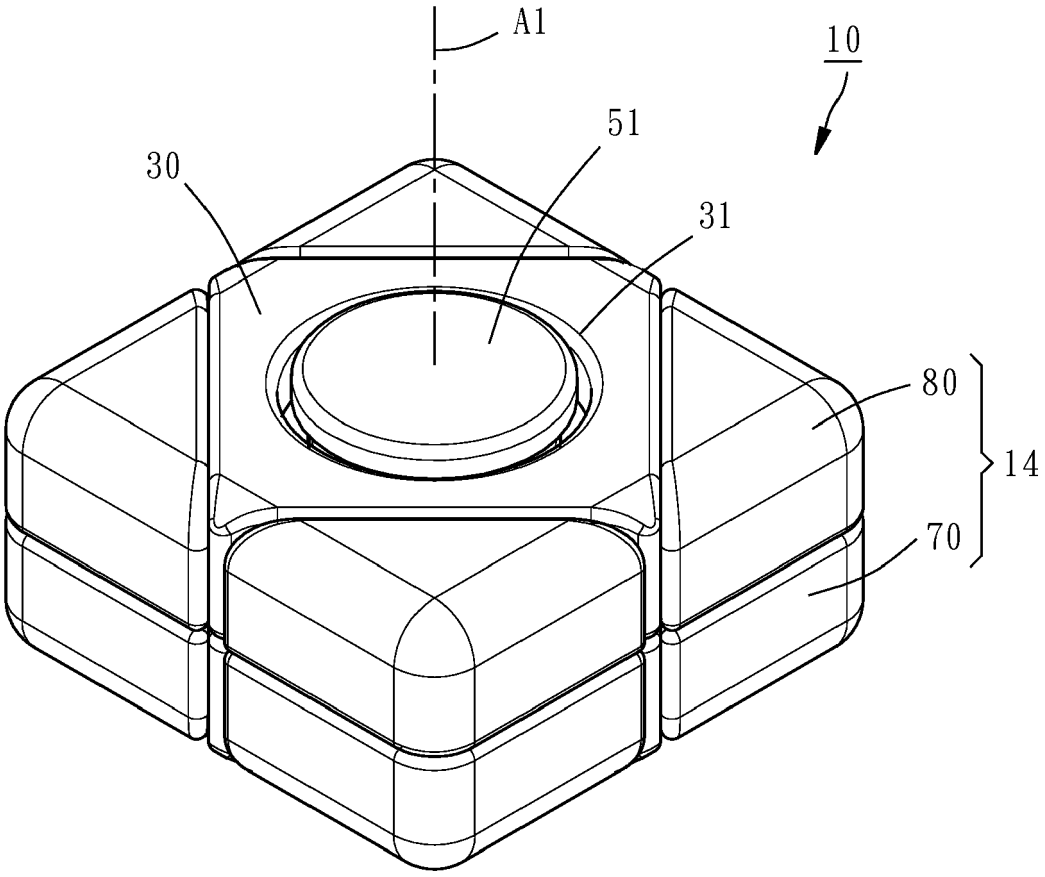


FIG. 1

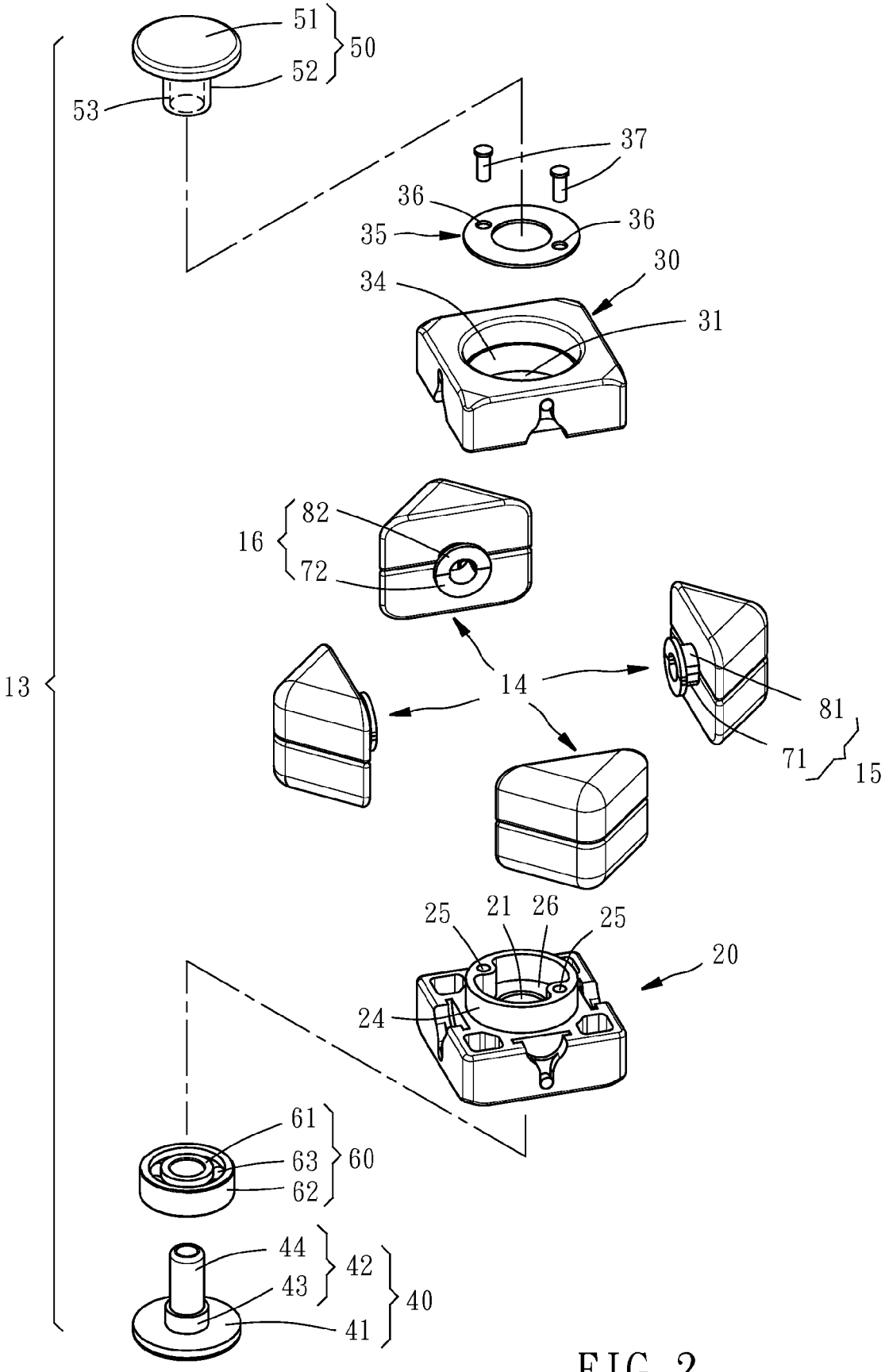
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FIG. 2

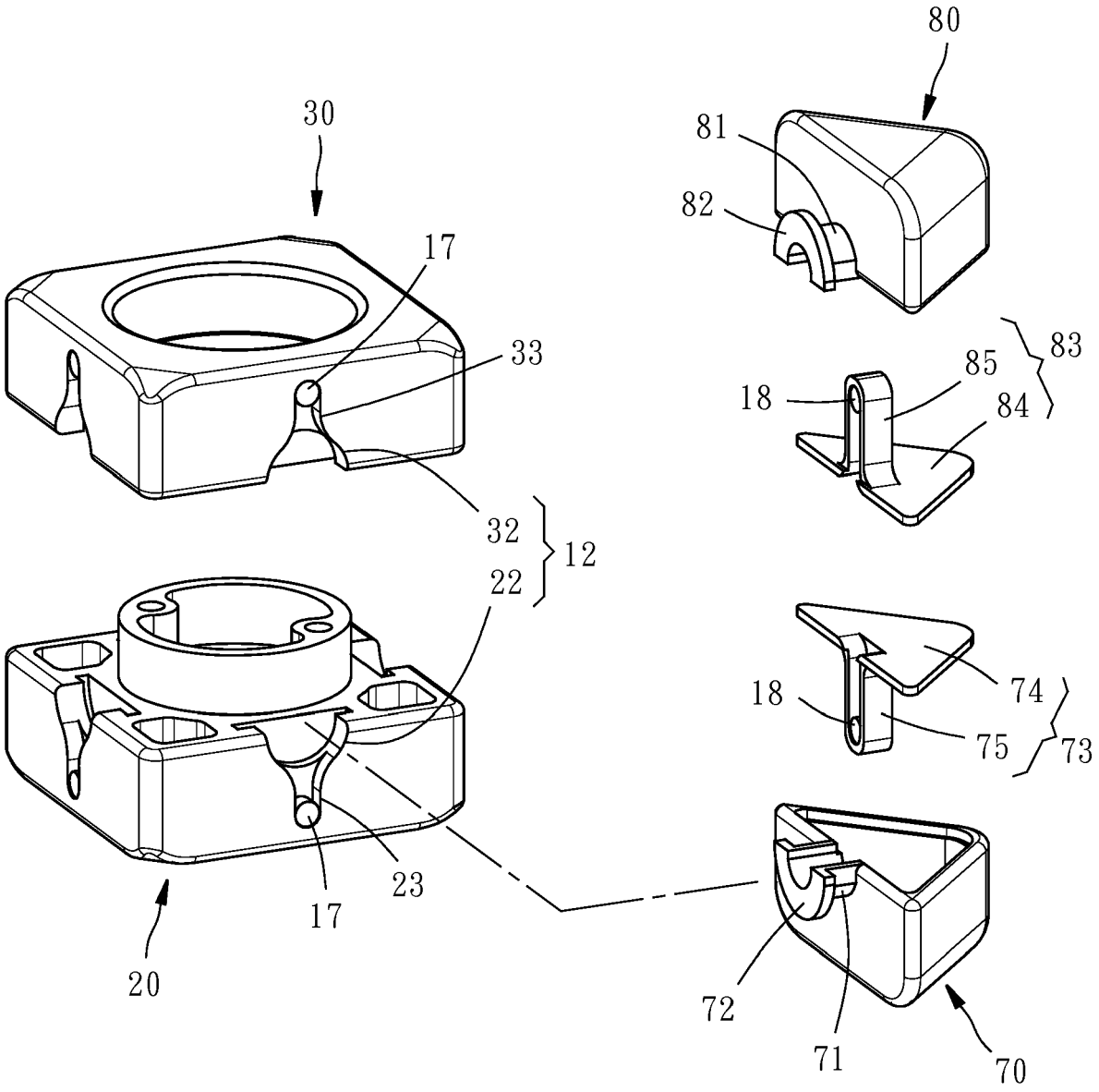


FIG. 3

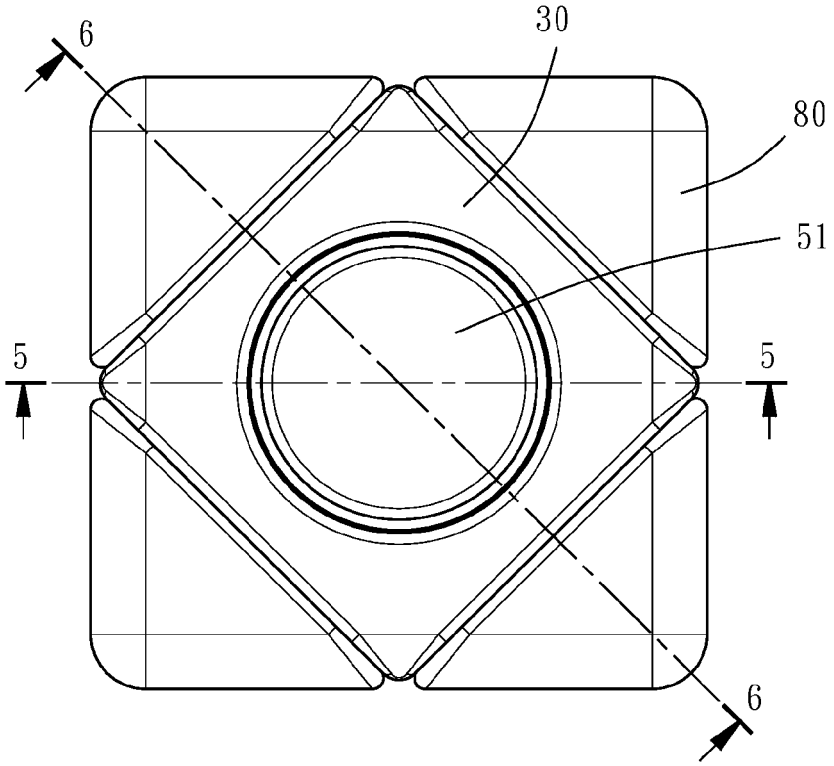
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FIG. 4

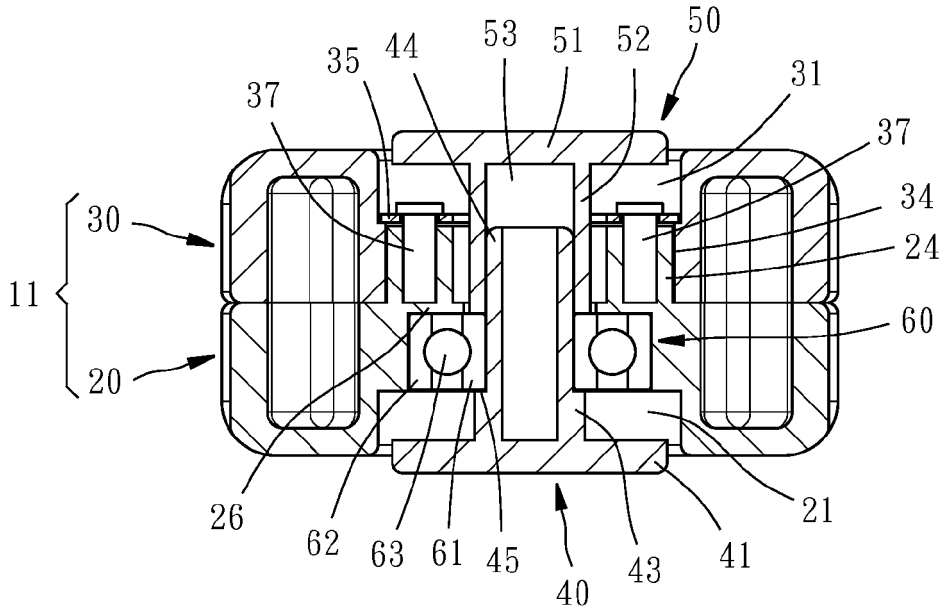
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FIG. 5

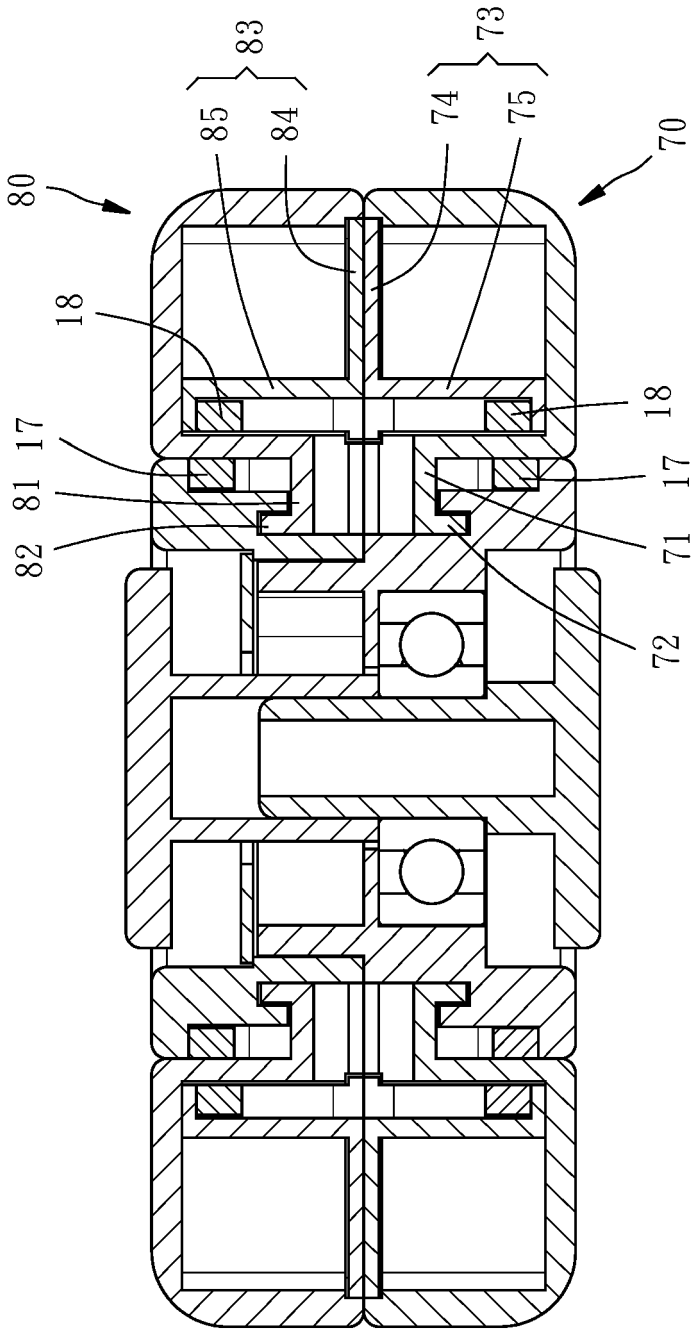


FIG. 6

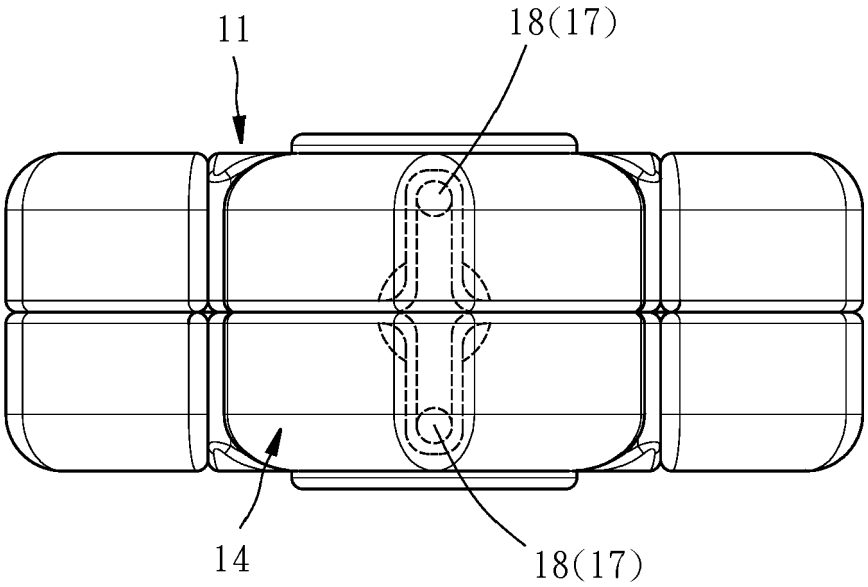


FIG. 7

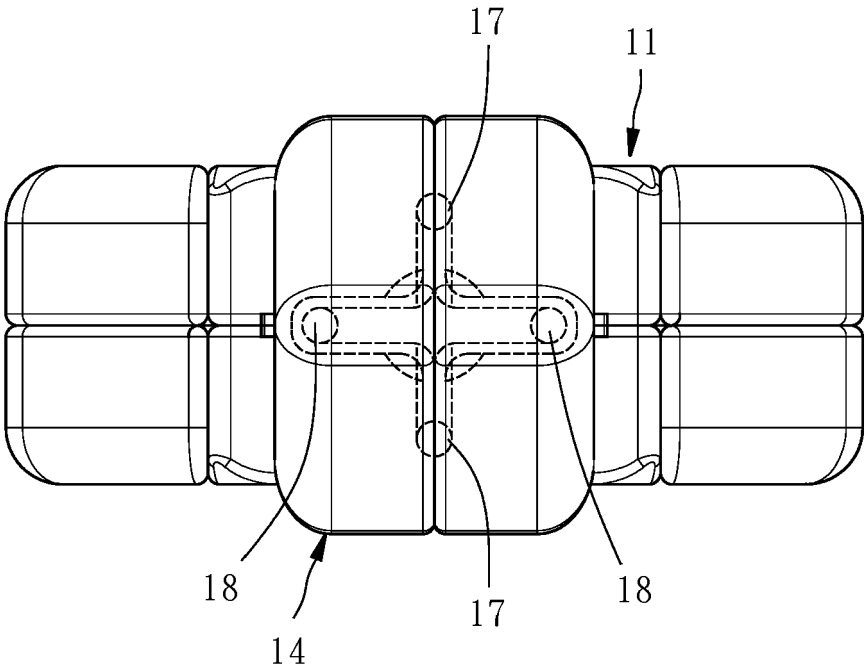


FIG. 8

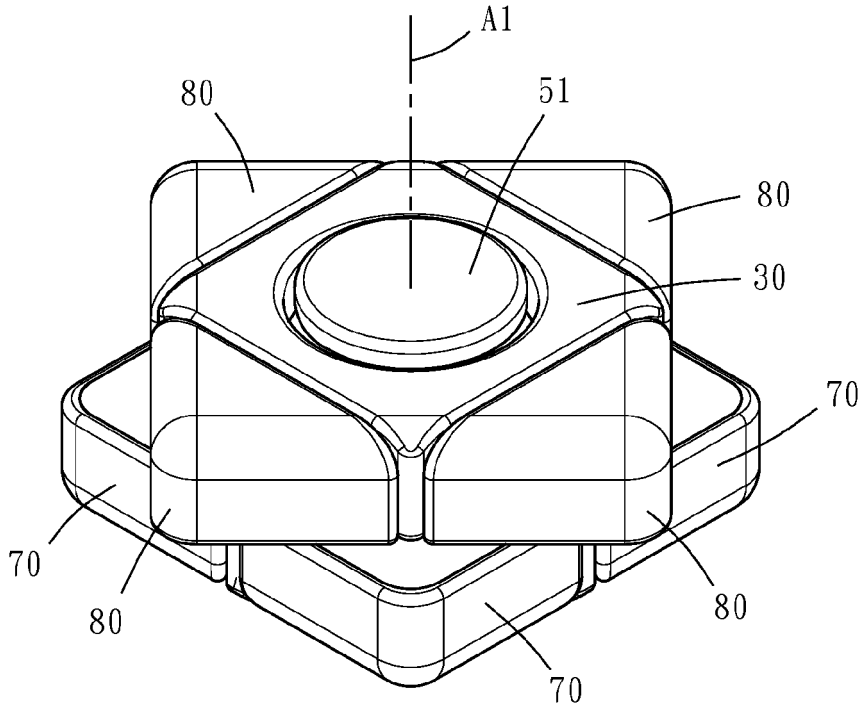


FIG. 9

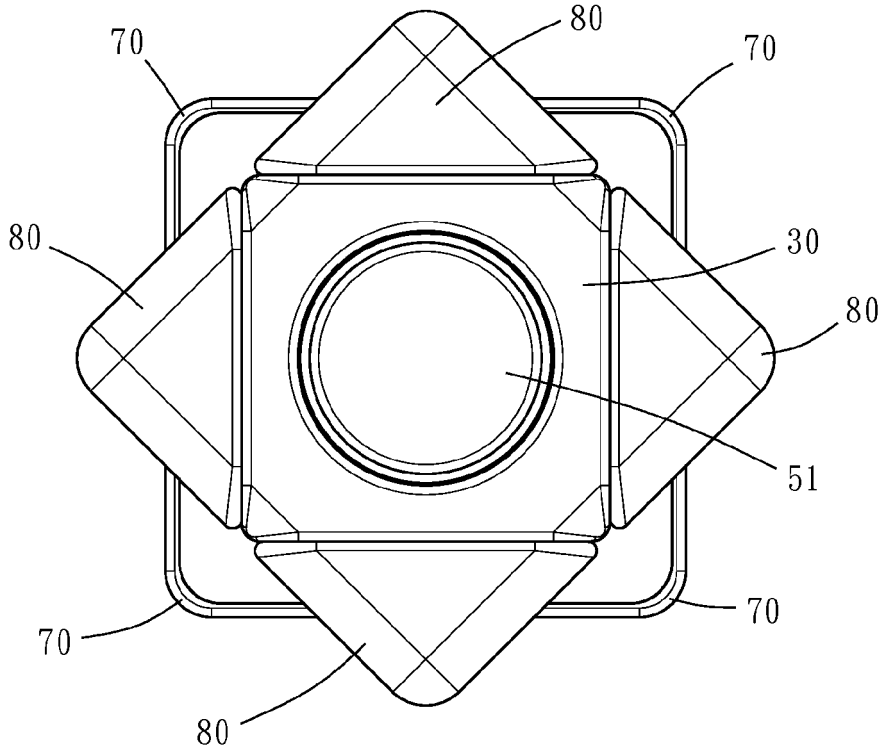


FIG. 10

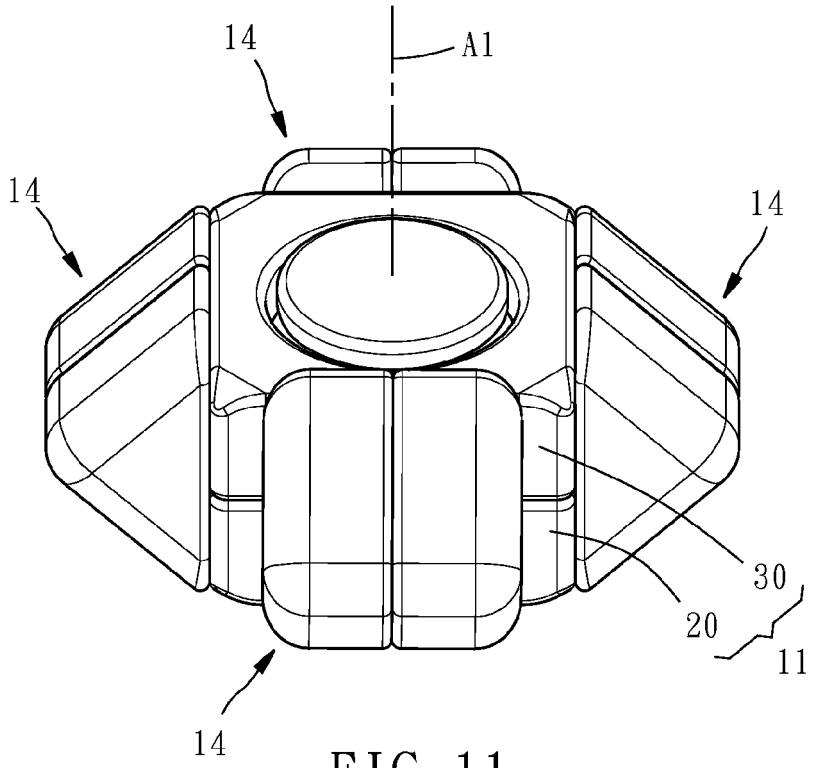


FIG. 11

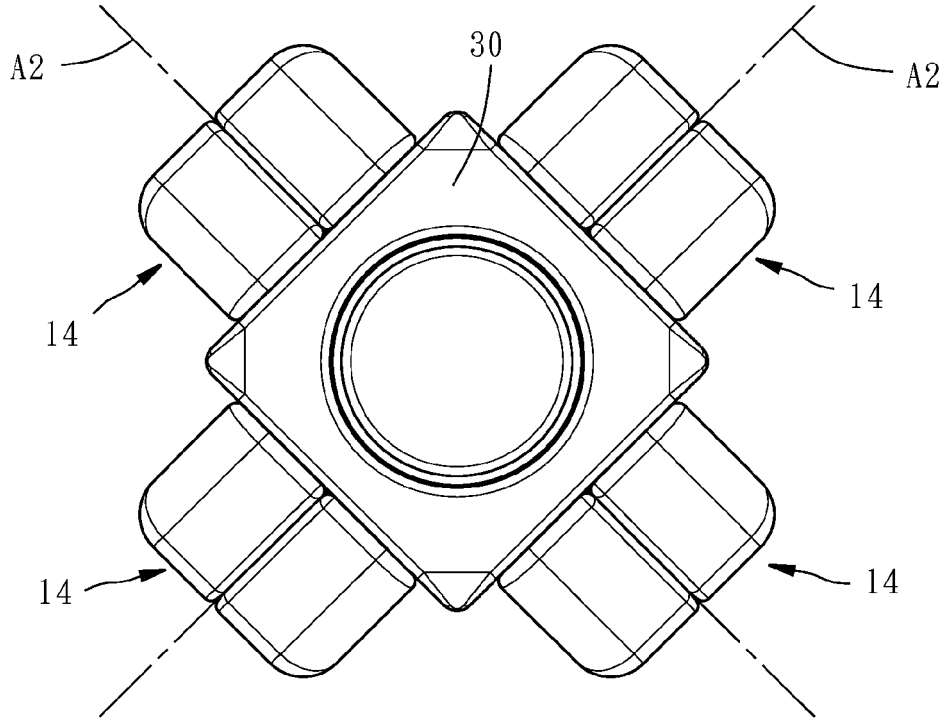


FIG. 12

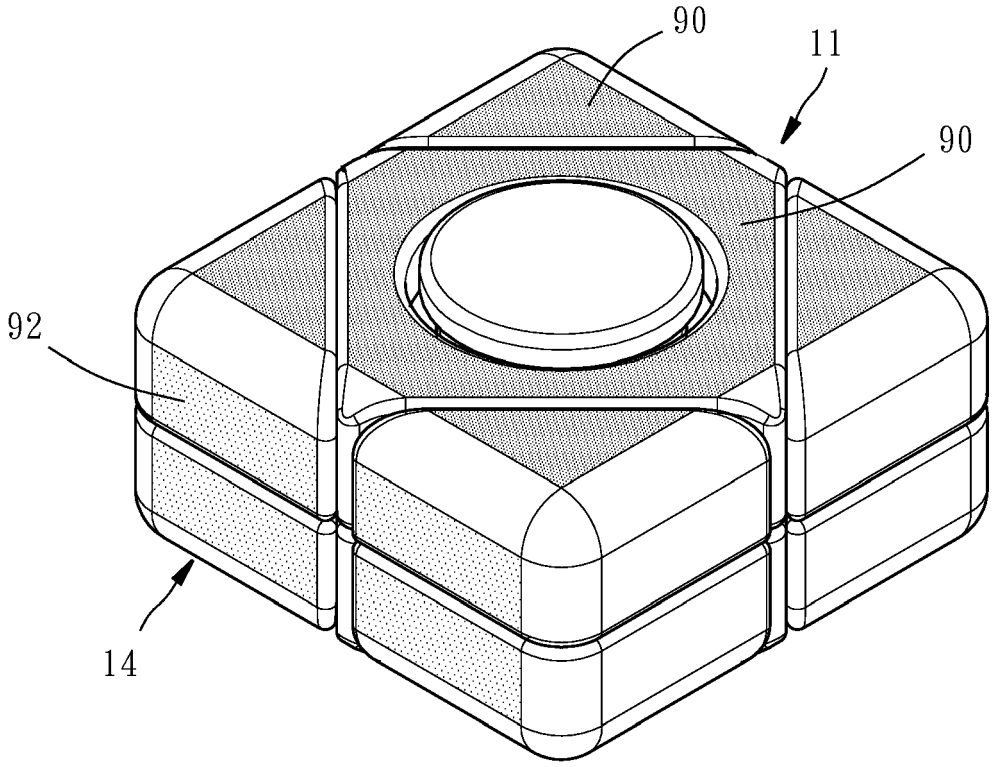


FIG. 13

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# EUROPEAN SEARCH REPORT

Application Number
EP 19 18 4561

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| A,D | CN 207 076 098 U (ZHENG NUANJUN) 9 March 2018 (2018-03-09) * the whole document * | 1-10 | INV. A63H1/00 |
| A | US 10 016 693 B1 (DOWDY DESTINY LYNN [US] ET AL) 10 July 2018 (2018-07-10) * column 4, line 16 - column 9, line 51; figures * | 1-10 | |
| A | CN 207 076 099 U (ZHENG NUANJUN) 9 March 2018 (2018-03-09) * the whole document * | 1-10 | |
| A | CN 207 076 097 U (ZHENG NUANJUN) 9 March 2018 (2018-03-09) * the whole document * | 1-10 | |

TECHNICAL FIELDS SEARCHED (IPC)

A63H

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 25 October 2019 | Lucas, Peter |

CATEGORY OF CITED DOCUMENTS

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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

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25-10-2019

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| CN 207076098 U | 09-03-2018 | NONE | |
| US 10016693 B1 | 10-07-2018 | NONE | |
| CN 207076099 U | 09-03-2018 | NONE | |
| CN 207076097 U | 09-03-2018 | NONE | |

EPO FORM P0459

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### Patent documents cited in the description


- CN 207076098 U **[0003]**