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(54) Safety device for an electric pencil sharpener

(57) A safety device for an electric pencil sharpener (30) comprises a bracket (401), a selection turn table (402), a sliding block (403), a first switch (404), and a second switch (405), wherein after the selection turn table (408) is rotated, the sliding block (403) and the first switch (404) are driven to move, such that the second switch (405) is activated to cause a short circuit to the first switch (404), by a pillar (4031) which is formed at a side of the sliding block (403). The electric pencil sharpener (30) can be only restarted to operate by pressing down manually a press button (4051) which is electrically connected with the second switch (405), so as to reduce danger of cutting a finger when a user puts the finger into a selection hole (4021) accidentally.

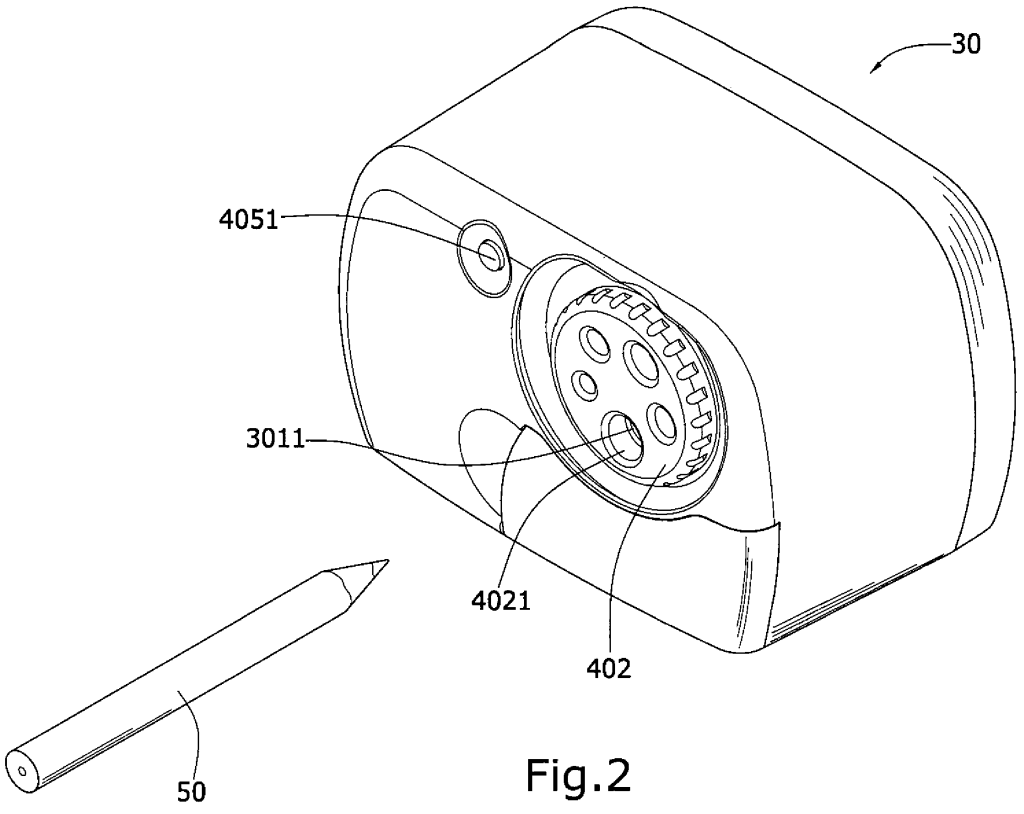

Fig.2

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Description

BACKGROUND OF THE INVENTION

a) Field of the Invention

[0001] The present invention relates to a safety device for an electric pencil sharpener, and more particularly, to a safety device of an electric pencil sharpener for switching a power supply mode.

b) Description of the Prior Art

[0002] It is known that, conventionally, a pencil is still needed for a user who does the writing, the art design, or the plotting in craft. Before using a pencil, conventionally, its outer wood layer and inner core should be sharpened properly to facilitate user to hold the pencil and to draw a line at the proper thickness. It takes time to sharpen the pencil by hands but the pencil is not easily sharpened as users wish. Therefore, an electric pencil sharpener is necessary.

[0003] Referring to FIG. 1, it shows a schematic view of structures of conventional electric pencil sharpener. As shown in the drawing, an electric pencil sharpener 10 includes primarily a housing 101, an electric motor 102, a reduction gear set 103, an arbor 104, and a switch 105. The electric motor 102, the reduction gear set 103, and the arbor 104 are assembled in an interior of the housing 101, and a front surface of the housing 101 is disposed with a rotatable selection turn table 106 and a collection box 107 for collecting debris. The selection turn table 106 is radially formed with a plurality of selection holes 1061 of different diameter, and the housing 101 is formed with a through-hole 1011 corresponding to the arbor 104. After the selection turn table 106 is rotated, one of the selection holes 1061 can be aligned with the through-hole 1011 to assemble the switch 105 between the arbor 104 and the selection turn table 106. In addition, the electric motor 102 transmits power to the arbor 104 through the reduction gear set 103. and the switch 105 is electrically connected with a power supply 108. Therefore, the power needed to operate the electric motor 102 can be provided. Diameters of pencils 20 which are sold on a market are various, the user should rotate the selection turn table 106 first to select the selection hole 1061 which is suitable to the diameter of the pencil 20. Then, the pencil 20 can be inserted into the selection hole 1061 to activate the switch 105 to drive the electric motor 102 to operate and to drive the arbor 104 to rotate. Thereby, the pencil 20 is sharpened.

[0004] Accordingly, this kind of electric pencil sharpener 10 has following shortcomings:

1. The switch 105 is fixedly located in the housing 101, when the selection turn table 106 is rotated to select one of the different selection holes 1061, the switch 105 corresponds to the selection hole 1061 which is selected. More particularly, when the selection hole 1061 of a smaller diameter is selected, the selection hole 1061 may be covered partially, and consequently the pencil 20 will not able to be inserted easily. On the other hand, if an installation position of the switch 105 is changed, it is also possible to prohibit the pencil 20 from activating the switch 105 when the selection hole 1061 of a larger diameter is used.
2. For most of this kind of electric pencil sharpener 10, the sharpening will sharpen pencils automatically after activating the switch 105; therefore, if the selection hole 1061 of a larger diameter is selected and the user or a child inserts a finger into the selection hole 1061 accidentally, the inserted finger may be cut by the arbor 104.

SUMMARY OF THE INVENTION

[0005] The primary object of the present invention is to provide a safe device for an electric pencil sharpener which facilitates sharpening a pencil and improves safety.

[0006] Accordingly, a safety device for an electric pencil sharpener of the present invention includes a bracket, a selection turn table, a sliding block, a first switch, and a second switch. The electric pencil sharpener includes primarily a housing, an electric motor, a reduction gear set, and an arbor. The electric motor, the reduction gear set, and the arbor are assembled interiorly of the housing, and a front surface of the housing is formed with a through-hole and a limiting hole. The arbor is correspondingly to the through-hole of the housing, and two surfaces of the selection turn table are formed respectively with a plurality of selection holes and a slot ring. The slot ring is spaced from each selection hole in a certain distance in order to dispose the selection turn table at an exterior side of the housing. The sliding block is disposed on the bracket at an interior side of the housing and is formed with a pillar which passes through the limiting hole to be inserted into the slot ring. Therefore, in usage, by rotating the selection turn table, one of the selection holes can be aligned with the through-hole on the housing, such that a pencil can be inserted into the through-hole for sharpening. On the other hand, when the selection turn table is rotated, the sliding block will be moved up and down along a path of the slot ring, and the first switch, which is installed on the sliding block correspondingly, will also be moved up and down together with the sliding block. The first switch is always allowed to be kept at an optimal position of the selection hole. In addition, the first switch is electrically connected with a power supply, so as to facilitate the inserting successfully the pencils in various diameters. Consequently, the first switch can activate the electric motor to operate after inserting the pencil and the power can be transmitted to the arbor via the reduction gear set. Furthermore, the second switch is located at a side of the first switch and is electrically con-

nected with the first switch. On the other hand, a side of the sliding block is formed with a flange which is used to correspond to the selection hole of a larger diameter on the selection turn table. In other words, when the selection turn table is rotated and the selection hole of a larger diameter is selected, the flange can be moved upwards to active the second switch to allow a short-circuit condition to be formed between the first switch and the power supply. Moreover, the second switch is also electrically connected with a press button on the housing. After the user presses down the button, the first switch is restored and the power supply will be driven to continue supplying the power. Accordingly, when the selection turn table is rotated and the selection hole of a larger diameter is selected, the first switch will be in inactivated status and the electric motor will not be activated to operate even when the user puts a finger into the selection hole, until the user presses down the press button manually to restart the electric pencil sharpener. Hence, a danger that the finger will be cut when the user or a child puts the finger into the selection hole accidentally can be prevented.

[0007] To enable a further understanding of the said objectives and the technological methods of the invention herein, the brief description of the drawings below is followed by the detailed description of the preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG. 1 shows a schematic view of structures of a conventional electric pencil sharpener.

FIG. 2 shows a perspective view of a preferred embodiment of the present invention.

FIG. 3 shows an exploded view of a preferred embodiment of the present invention.

FIG. 4 shows a schematic view of operations of a preferred embodiment of the present invention.

FIG. 5 shows a second schematic view of operations of a preferred embodiment of the present invention.

FIG. 6 shows a schematic view of structures of another preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] Referring to FIG. 2 and FIG. 3, it shows respectively a perspective view and an exploded view of a preferred embodiment of the present invention, wherein an electric pencil sharpener 30 comprises a housing 301, an electric motor 302, a reduction gear set 303, and an arbor 304. A front surface of the housing 301 is disposed with a press button 4051 and a selection turn table 402. When a pencil 50 is to be sharpened, the selection turn table 402 should be rotated first for selecting a selection hole 4021 which corresponds to a diameter of the pencil 50 to allow the selection hole 4021 to be aligned with a through-hole 3011 of the housing 301 Consequently, when the pencil 50 is inserted, it can pass through the selection hole 4021 into the through-hole 3011 and can be sharpened by the arbor 304 at a side in an interior surface of the through-hole 3011. The pencil 50 is completely fit in the selection hole 4021 when sharpened, so as to increase and improve the stability and the quality of sharpened pencil. A safety device for an electric pencil sharpener 40 includes a bracket 401, a selection turn table 402, a sliding block 403, a first switch 404, and a second switch 405. The center of the selection turn table 402 is formed with a connection hole 4011 that is connected with the through-hole 3011 of the housing 301 and the arbor 304 A sliding slot 4012 is formed close to the connection hole 4011 and a first holding chamber 4013 is formed at a side close to the sliding slot 4012. The selection turn table 402 is disposed at the front surface of the aforementioned housing 301. The through-hole 3011 is formed at a proper location on the front surface of the housing 301 and a limiting hole 3012 is formed at a side of the through-hole 3011. The plural selection holes 4021 are radially formed at the front surface of the selection turn table 402 and each selection hole 4021 corresponds to the position of the through-hole 3011. A slot ring 4022 is formed at a rear surface of the selection turn table 402 and is spaced from each selection hole 4021 in a certain distance. The sliding block 403 is loosely assembled in an interior of the housing 301 and is formed thereon with a pillar 4031 that is able to pass through the limiting hole 3012 of the housing 301 to be inserted in the slot ring 4022 A side of the sliding block 403 is formed with a flange 4032 corresponding to a position of the selection hole 4021 of a larger diameter when the sliding block 403 is installed. The first switch 404 is assembled on the sliding block 403 and is electrically connected to a power supply 305 to provide power required for operating the aforementioned electric motor 302 that transmits the power to the aforementioned arbor 304 through the aforementioned reduction gear set 303. The second switch 405 is assembled at a side of the first switch 404 and is opposite to the flange 4032 of the sliding block 403. The flange 4032 is electrically connected with the press button 4051. Furthermore, the second switch 405 is electrically connected between the first switch 404 and the power supply 305. The press button 4051 can be installed at a top surface of the housing 301 or on the front surface of the housing 301 at a side close to the selection turn table 402. The second switch 405 is a two-stage switch, after it is in contact with the flange 4032, a first stage operation will be executed to make the first switch 404 short-circuited. When the press button 4051 is pressed again, a second stage operation will be executed to restore the first switch 404 which creates a short circuited.

[0010] Referring to FIG. 4, it shows a schematic view of operations of a preferred embodiment of the present invention When the aforementioned selection turn table

402 is rotated and the selection hole 4021 of a larger diameter is selected, the pillar 4031 of the sliding block 403 will be moved linearly along the slot ring 4022 to move the sliding block 403 upwards. The flange 4032 at the side of the sliding block 403 that activates the second switch 405 to make the first switch 404, which is electrically connected with the second switch 405, short circuited. Thereby, it prohibits the aforementioned power supply 305 from supplying the power. However, a user can still restore the second switch 405 and the first switch 404 to an energized state by pressing down the aforementioned press button 4051 to facilitate the sharpening of the aforementioned inserted pencil 50. Referring to FIG. 5, it shows a second schematic view of operations of a preferred embodiment of the present invention. When the selection turn table 402 is rotated again to select the selection hole 4021 of a smaller diameter, the sliding block 403 will be moved downwards to make the flange 4032 separated from the second switch 405, such that the first switch 404 can be restored to the energized state naturally.

[0011] Referring to FIG. 6, it shows a schematic view of structures of another preferred embodiment of the present invention. A second holding chamber 4014 is formed at a side of the bracket 401 close to the first holding chamber 4013 to assemble a third switch 406 in an interior of the second holding chamber 4014. A press button 4061 is disposed on the housing 301 corresponding to the third switch 406 that is electrically connected with the aforementioned power supply 305 and the press button 4061. When the aforementioned second switch 405 is in contact with the flange 4032 of the sliding block 403, the first switch 404 is short circuited. The user can still enable the power supply 305 to continue supplying the power by pressing down the press button 4061.

[0012] Accordingly, the present invention has following advantages:

1. When the selection turn table is rotated to select the corresponding selection hole, the sliding block can be moved back and forth to move the first switch to the optimal position corresponding to the selection hole. Therefore, pencils of different diameters can be sharpened successfully.
2. Furthermore, by using the plural sets of switches as a safety design, the power will be cut off automatically when the user rotates the selection turn table and the selection hole of a larger diameter is selected, and electricity can be accessed by pressing down the button manually. Thereby, the danger that a finger may be cut when the user or a child puts the finger into the selection hole accidentally can be prevented.

[0013] It is of course, to be understood that the embodiments described herein is merely for illustration of the invention and that a wide variety of modifications thereto may be made by persons skilled in the art without departing from the spirit and scope of the invention as set forth in the following claims.

Claims

1. A safety device for an electric pencil sharpener comprising:

   a bracket, which is assembled in an interior of a housing, and is formed with a connection hole in its center, where a sliding slot is formed close to the connection hole and a first holding chamber is formed at a side close to the sliding slot;
   a selection turn table, which is disposed at a front surface of the housing having a front surface formed with a through-hole and a limiting hole, is provided with a plurality of selection holes in a front surface thereof where each selection hole corresponds to the through-hole, and is formed with a slot ring in a rear surface thereof;
   a sliding block, which is loosely assembled in an interior of the sliding slot, is formed with a pillar that passes through the limiting hole of the housing to be inserted into the slot ring, and is formed with a flange in a side thereof;
   a first switch, which is assembled on the sliding block and is electrically connected with a power supply to provide the power required for operating an electric motor that transmits the power to an arbor through a reduction gear set; and
   a second switch, which is assembled in an interior of the first holding chamber and is opposite to the flange of the sliding block where the flange is electrically connected with a press button, and the second switch that is electrically connected between the first switch and the power supply.

2. The safety device for an electric pencil sharpener according to claim 1, wherein the second switch is a two-stage switch.

3. The safety device for an electric pencil sharpener according to claim 1, wherein the flange corresponds to the selection hole of a larger diameter.

4. The safety device for an electric pencil sharpener according to claim 1, wherein the press button is disposed on a surface of the housing.

5. The safety device for an electric pencil sharpener according to claim 1, wherein a side of the bracket is formed with a second holding chamber for assembling a third switch which is electrically connected with the power supply and a press button.

6. The safety device for an electric pencil sharpener

according to claim 5, wherein the press button is disposed on a surface of the housing.

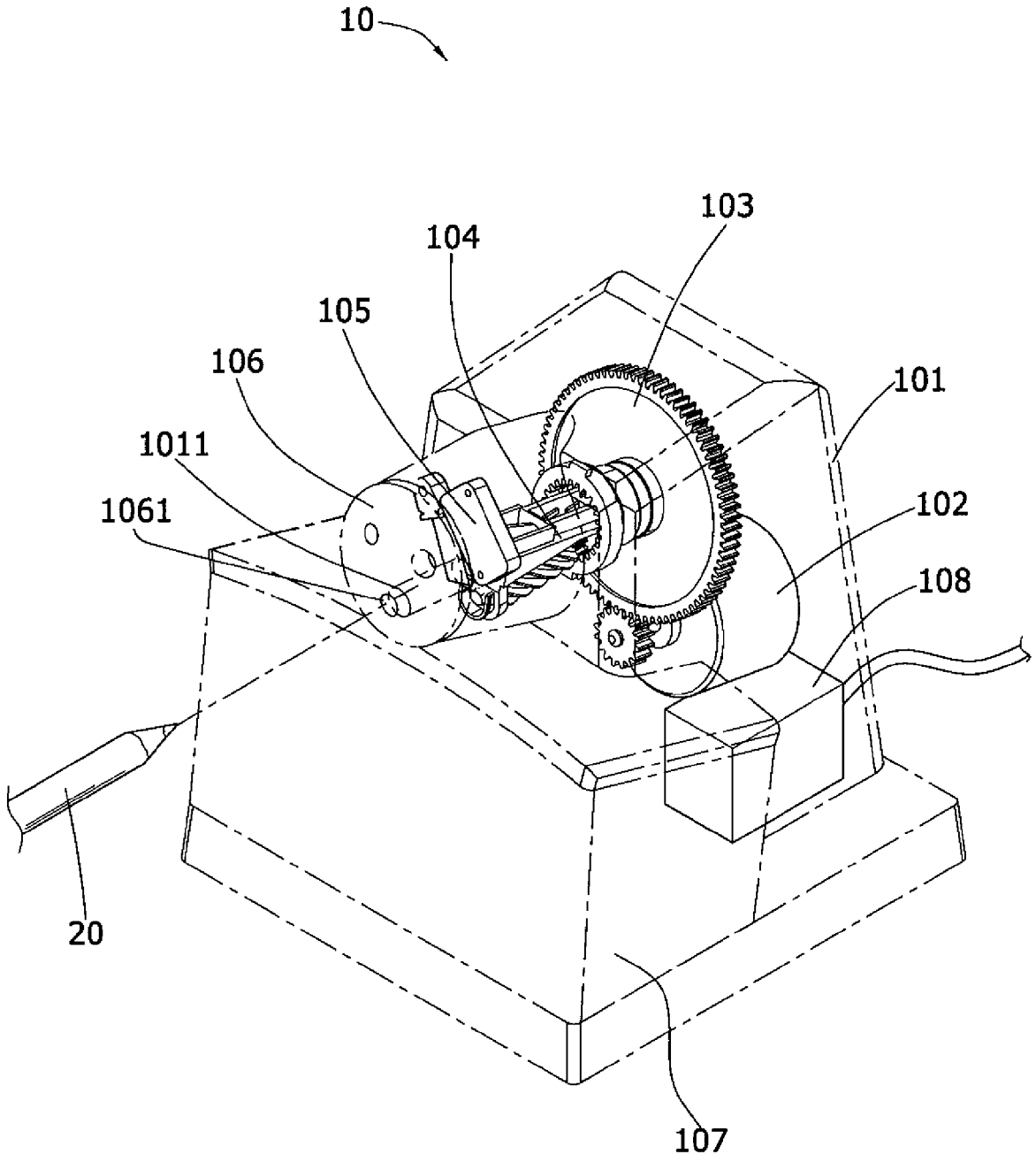

Fig.1 (Prior Art)

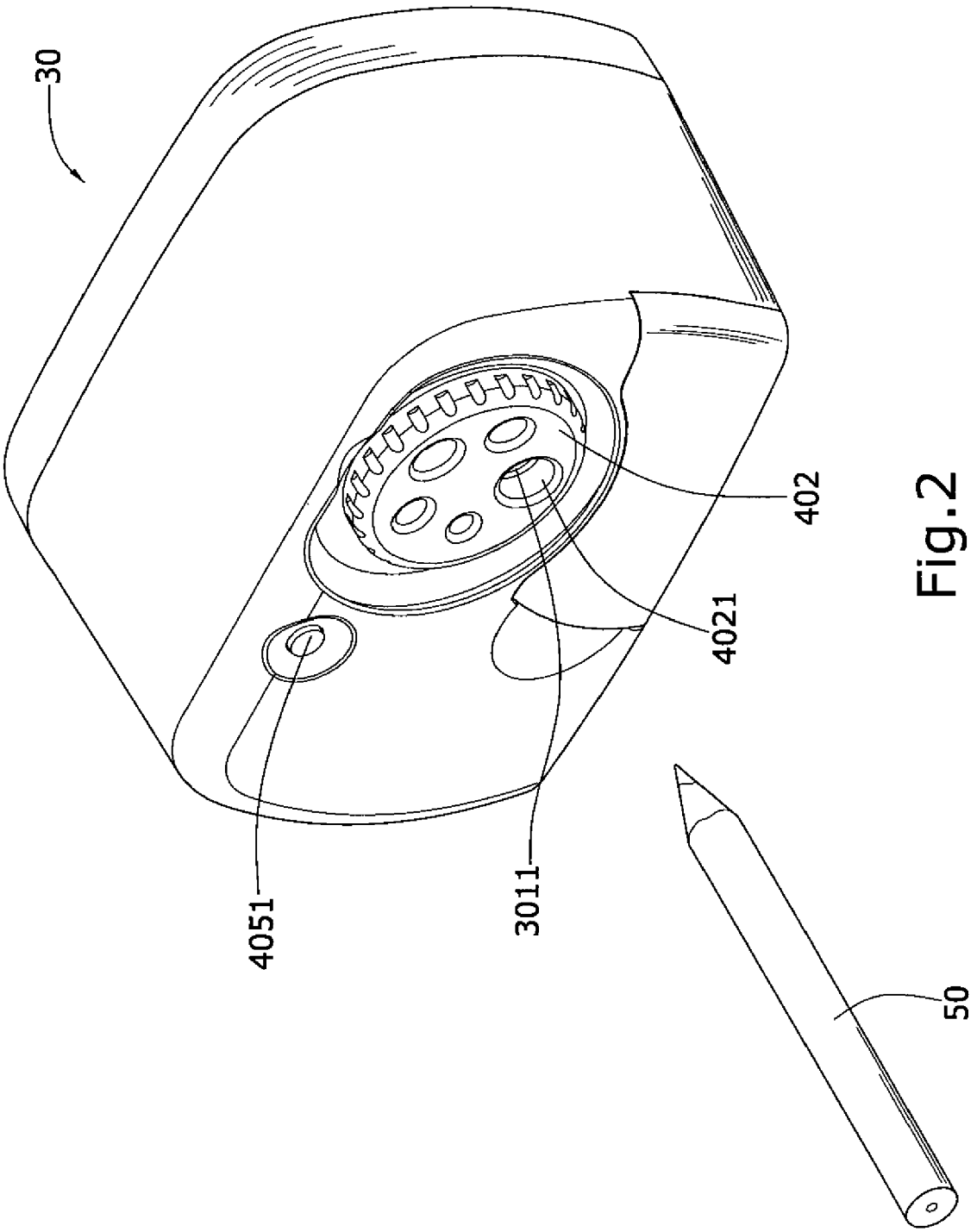

Fig.2

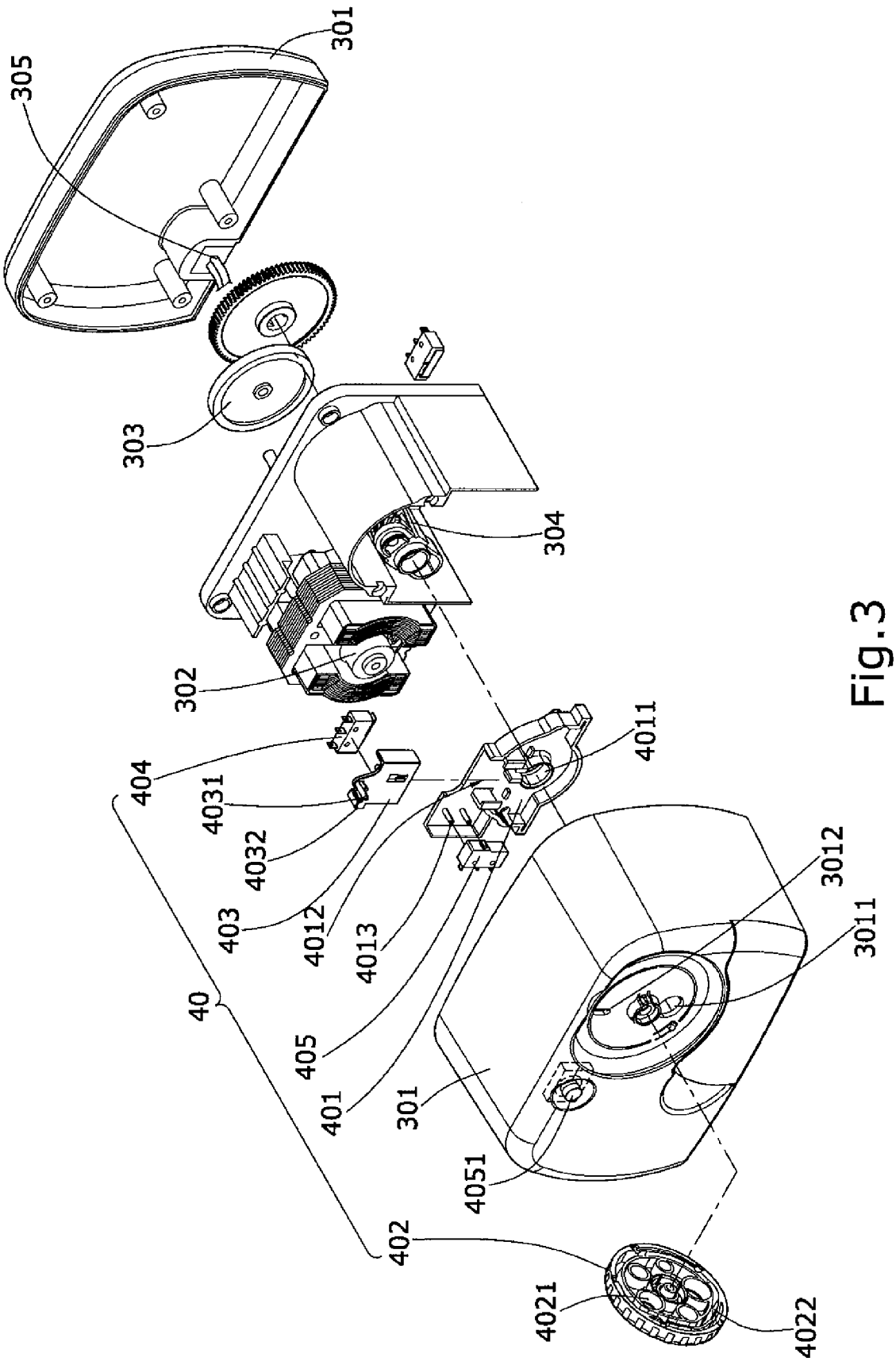
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Fig.3

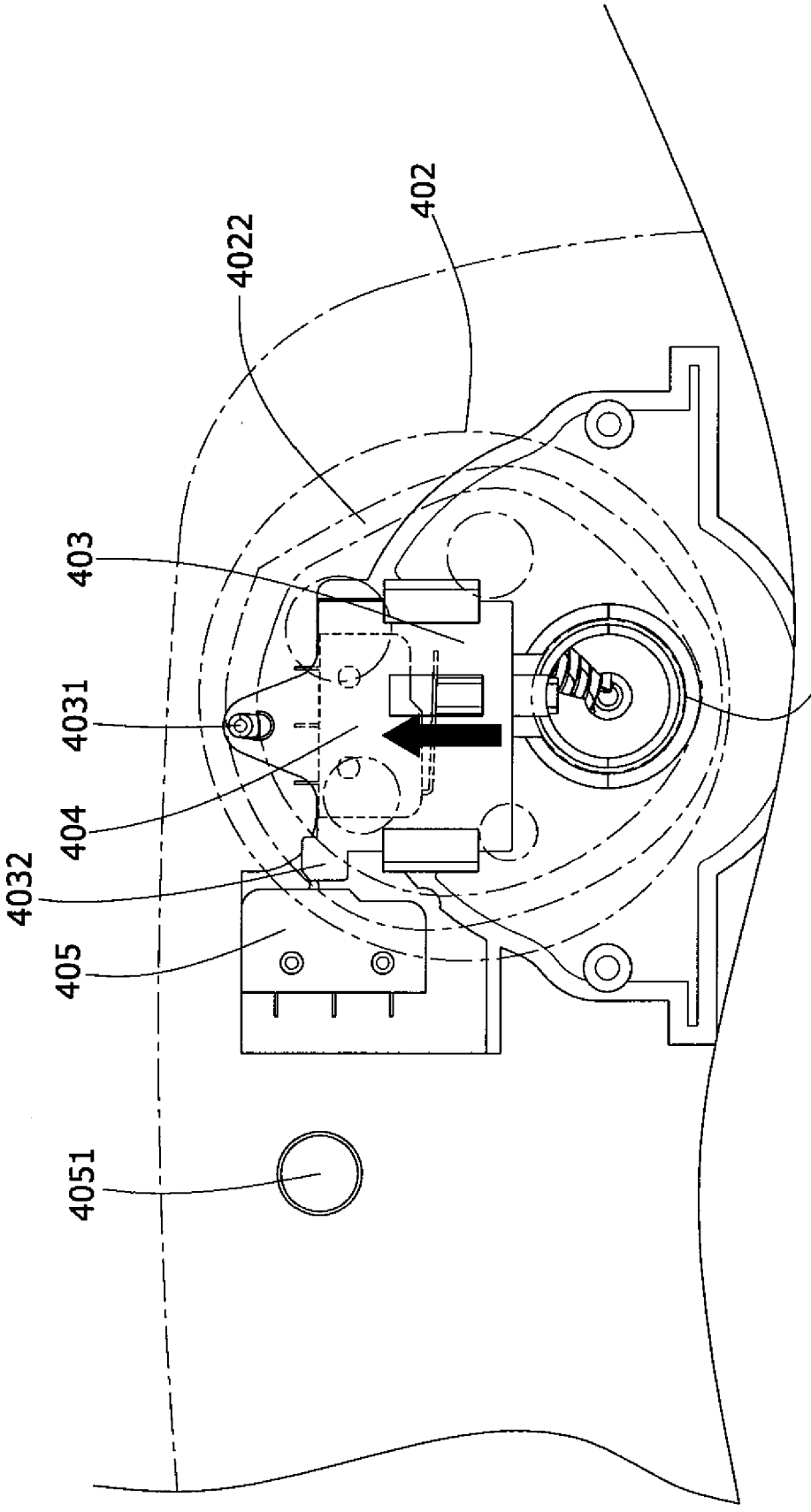

Fig.4

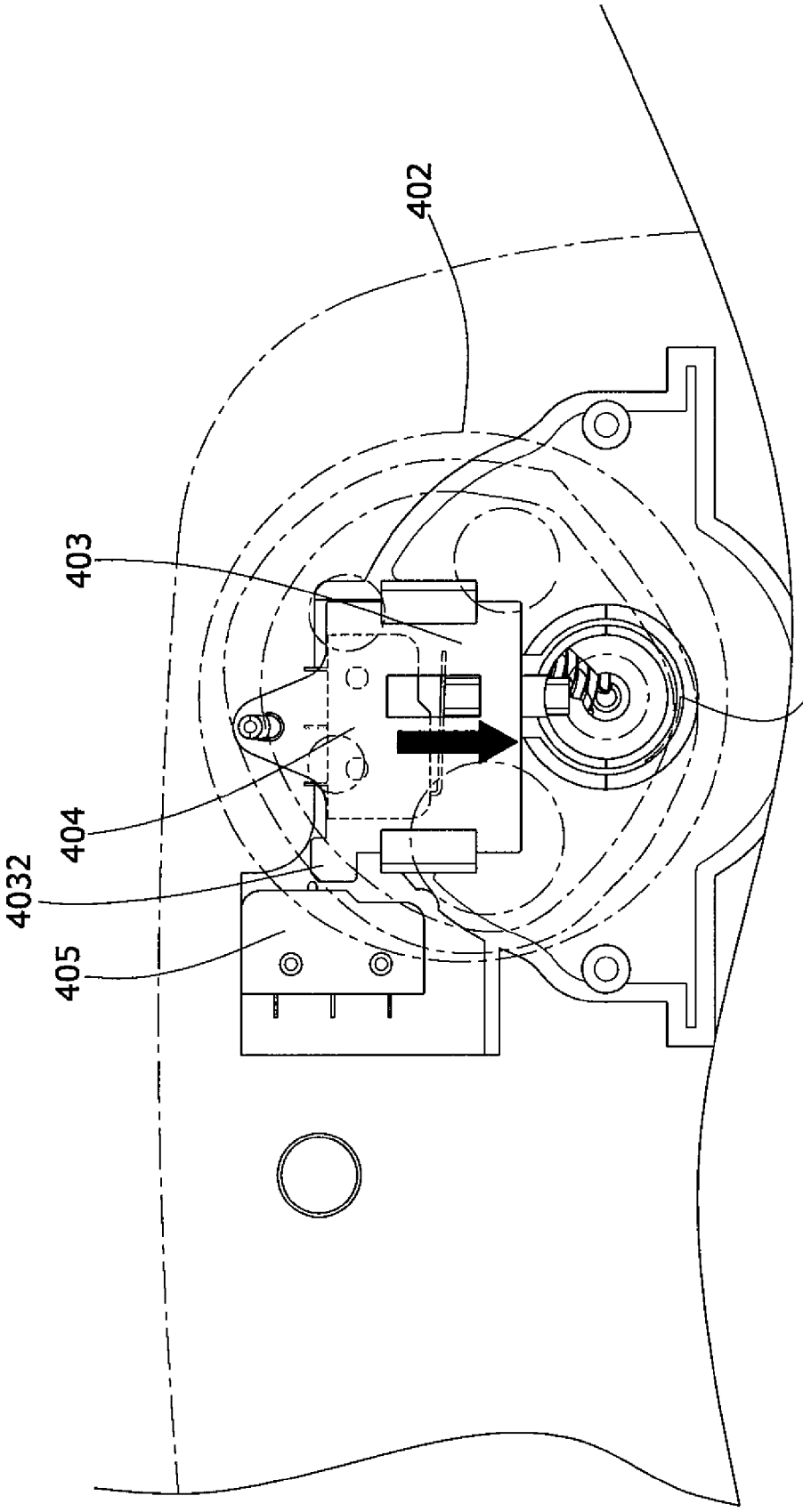

Fig.5

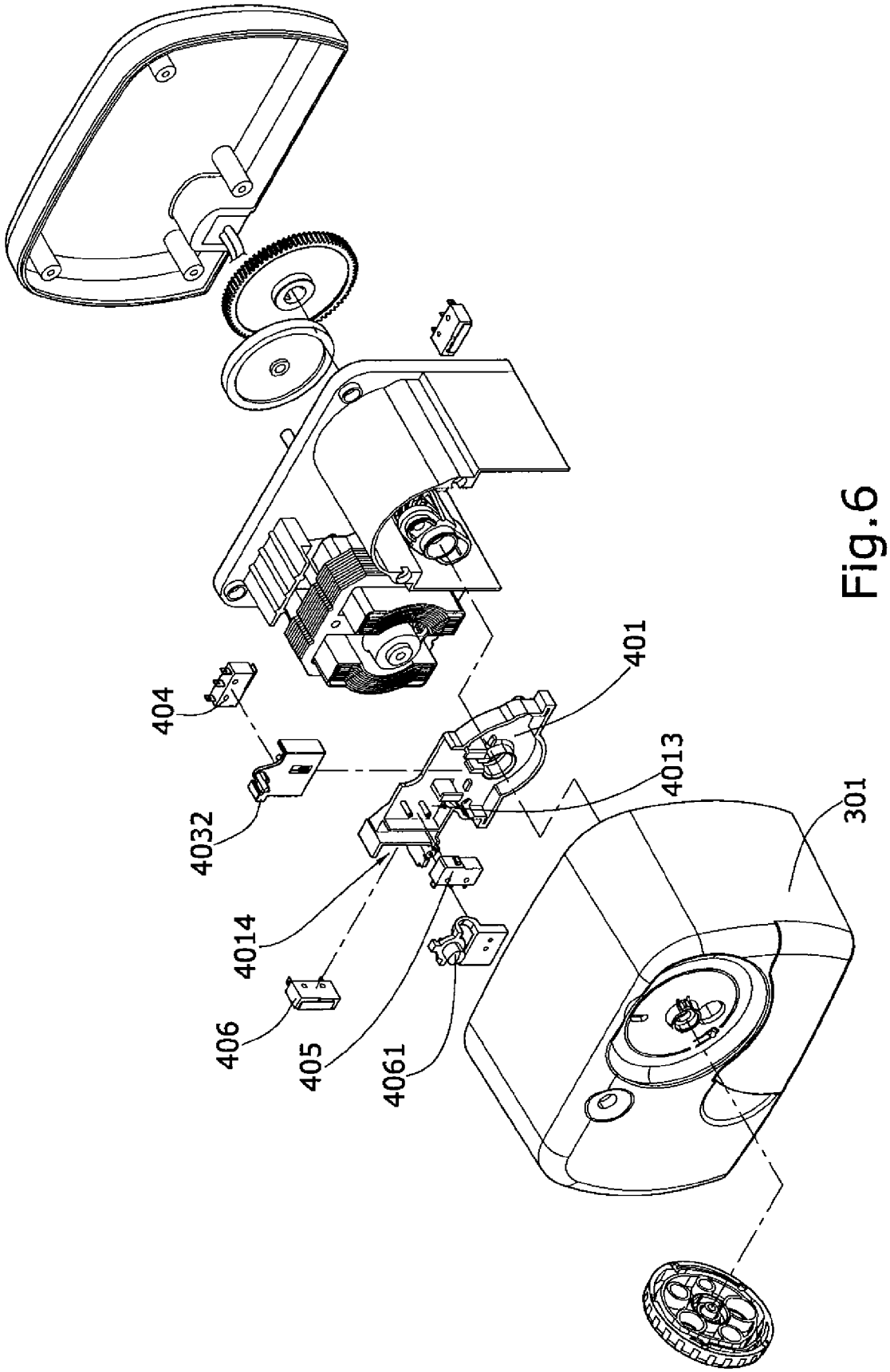

Fig.6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 15 0169

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	US 2007/039663 A1 (CHANG SHEN-HSIUNG [TW]) 22 February 2007 (2007-02-22) * page 1, paragraph 7 * * page 1, paragraph 17 - page 2, paragraph 19; figures 1-6 *	1-6	INV. B43L23/00 B43L23/02
A	US 2002/139442 A1 (FREGEOLLE GERALD P [US]) 3 October 2002 (2002-10-03) * page 1, paragraph 3 * * page 1, paragraph 7 * * page 1, paragraph 10 * * page 2, paragraph 23 * * page 3, paragraph 31 * * page 3, paragraph 34 - paragraph 37; figures 1-9 *	1-6	
A	US 2007/251105 A1 (TAKADA TOKINORI [JP]) 1 November 2007 (2007-11-01) * page 1, paragraph 12 - paragraph 13 * * page 2, paragraph 17 * * page 3, paragraph 43; figures 1-8b *	1-6	TECHNICAL FIELDS SEARCHED (IPC)
A	US 3 650 308 A (HORI TAKEO) 21 March 1972 (1972-03-21) * column 1, line 26 - line 43 * * column 2, line 59 - column 3, line 40; figures 1-6C *	1-6	B43L F16P

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 June 2008	Kelliher, Cormac

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 15 0169

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