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(54) BELT SANDER

(57) A belt sander includes a shield (5), a housing (3), and a sanding belt (4). The shield (5) includes a main plate unit (51) and an extension plate unit (52). The extension plate unit (52) extends from the main plate unit (51) toward the sanding belt (4), and cooperates with the housing (3) to define an opening (520). The extension plate unit (52) is spaced apart from the sanding belt (4) in a first extending direction (X1) of a first axis (X), and cooperates with the sanding belt (4) to define a first gap (d1) therebetween in the first extending direction (X1). The extension plate unit (52) is spaced apart from the sanding belt (4) in a second extending direction (Z1) of a second axis (Z), and cooperates with the sanding belt (4) to define two second gaps (d2) therebetween in the second extending direction (Z1).

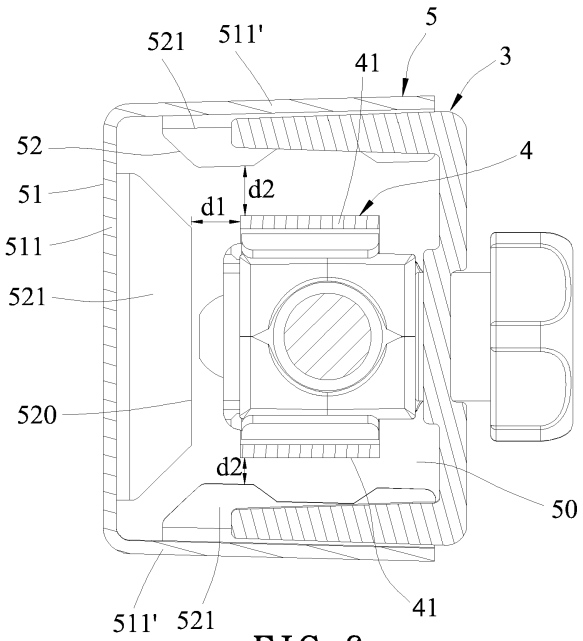

FIG. 6

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Description

[0001] The disclosure relates to a belt sander, and more particularly to a belt sander that has a shield.

[0002] Referring to FIG. 1, a conventional belt sander 1 disclosed in Taiwanese Patent No. M579576U includes a main body 11, a mounting frame 12 that is rotatably connected to the main body 11, a sanding belt 13 that is rotatably mounted to the mounting frame 12, and a cover body 14 that is rotatably connected to the mounting frame 12. The mounting frame 12 has a front opening 121 and a lateral opening 122. The sanding belt 13 extends through the lateral opening 122. The cover body 14 is operable to close the front opening 121. By virtue of the cover body 14 closing the front opening 121, dust that is generated during operation of the conventional belt sander 1 may be prevented from being spitted through a front side of the mounting frame 12, thereby protecting a user of the conventional belt sander 1.

[0003] It is noted that, in order to meet different needs, the sanding belt 13 comes in different thicknesses. The sanding belt 13 may be a thinner one such as a sanding belt having abrasive grains, or a thicker one such as a non-woven sanding belt. Thus, the lateral opening 122 of the conventional belt sander 1 is generally designed to be relatively large so as to fit the different thicknesses of the sanding belt 13. However, according to the international standard published by the International Electrotechnical Commission (IEC), a width of a gap that is in a space which spatially communicates with the lateral opening 122 and that is between the sanding belt 13 and the mounting frame 12 must be smaller than 7 millimeters. Since a width of the lateral opening 122 is not adjustable, when a relatively thin sanding belt is adopted as the sanding belt 13, with the lateral opening 122 that is designed to be relatively large, the conventional belt sander 1 may not be in compliance with the international standard.

[0004] Therefore, an object of the disclosure is to provide a belt sander that can alleviate the drawback of the prior art.

[0005] According to an aspect of the disclosure, there is provided a belt sander according to claim 1.

[0006] Other features and advantages of the disclosure will become apparent in the following detailed description of the embodiment(s) with reference to the accompanying drawings. It is noted that various features may not be drawn to scale.

FIG. 1 is a perspective view of a conventional belt sander disclosed in Taiwanese Patent No. M579576U.

FIG. 2 is a perspective view of an embodiment of a belt sander according to the disclosure.

FIG. 3 is a partly exploded perspective view of the embodiment.

FIG. 4 is a perspective view of a shield of the embodiment.

FIG. 5 is a fragmentary sectional view of the embodiment.

FIG. 6 is a sectional view taken along line VI-VI in FIG. 5.

FIG. 7 is a perspective view of a modification of the shield.

FIG. 8 is a view similar to FIG. 6, but illustrating another modification of the shield.

DETAILED DESCRIPTION

[0007] It should be noted herein that for clarity of description, spatially relative terms such as "top," "bottom," "upper," "lower," "on," "above," "over," "downwardly," "upwardly" and the like may be used throughout the disclosure while making reference to the features as illustrated in the drawings. The features may be oriented differently (e.g., rotated 90 degrees or at other orientations) and the spatially relative terms used herein may be interpreted accordingly.

[0008] Referring to FIGS. 2 to 5, an embodiment of a belt sander according to the disclosure includes a machine body 2, a housing 3, a sanding belt 4, a shield 5, and a housing fastening member 6.

[0009] The machine body 2 includes an outer housing 21, and a motor 22 that is disposed in the outer housing 21. The motor 22 includes a rotating shaft 221 that extends through the outer housing 21, and that is drivable by electric power to rotate about a first axis (X).

[0010] The housing 3 is rotatably connected to the machine body 2.

[0011] The sanding belt 4 is mounted to the housing 3, and is drivable by the rotating shaft 221 to rotate around the first axis (X). In this embodiment, the sanding belt 4 has two revolve sections 41 that are spaced apart from each other along a second axis (Z). Each of the revolve sections 41 is elongated along a third axis (Y). The third axis (Y), the second axis (Z), and the first axis (X) are substantially orthogonal to each other, and respectively extend in a third extending direction (Y1), a second extending direction (Z1), and a first extending direction (X1).

[0012] Referring further to FIG. 6, in cooperation with FIGS. 4 and 5, the shield 5 includes a main plate unit 51 and an extension plate unit 52.

[0013] The main plate unit 51 is removably connected to the housing 3, and cooperates with the housing 3 to define a protection space 50 that accommodates the rotating shaft 221 and a portion of the sanding belt 4.

[0014] In this embodiment, the plate units 51 includes a main plate 511, and two side plates 511' each of which is connected to the main plate 511. A cross section of the main plate unit 51 on an imaginary plane that has a normal vector in the third extending direction (Y1) is substantially U-shaped. The side plates 511' are spaced apart from each other along the second axis (Z), and respectively face the revolve sections 41 of the sanding belt 4. The main plate 511 is perpendicular to the first axis (X), and faces the housing 3 and the sanding belt 4.

The main plate 511 is elongated in the third extending direction (Y1). Each of the side plates 511' extends in the third extending direction (Y1). A length of the main plate 511 in the third extending direction (Y1) is greater than a length of each of the side plates 511' in the third extending direction (Y1).

[0015] The extension plate unit 52 extends from the main plate unit 51 toward the sanding belt 4. The extension plate unit 52 cooperates with the housing 3 to define an opening 520 that is in spatial communication with the protection space 50. Another portion of the sanding belt 4 extends through the opening 520. Each of the main plate 511 and the side plates 511' has an opening end 512 that is adjacent to the opening 520, and a contact end 513 that is opposite to the opening end 512 and that is in contact with the housing 3 (see FIGS. 2 and 4).

[0016] In this embodiment, the extension plate unit 52 and the main plate unit 51 are integrally formed as one piece. The extension plate unit 52 includes three extension plates 521 that are spaced apart from each other, and that cooperate with the housing 3 to define the opening 520. Each of the extension plates 521 is connected to the opening end 512 of a respective one of the main plate 511 and the side plates 511'. One of the extension plates 521 that is connected to the opening end 512 of the main plate 511 is spaced apart from the sanding belt 4 in the first extending direction (X1) of the first axis (X), and cooperates with the sanding belt 4 to define a first gap (d1) therebetween in the first extending direction (X1). Each of two of the extension plates 521 that are respectively connected to the opening ends 512 of the side plates 511' is spaced apart from a respective one of the revolve sections 41 of the sanding belt 4 in the second extending direction (Z1) of the second axis (Z), and cooperates with the respective one of the revolve sections 41 to define a second gap (d2) therebetween in the second extending direction (Z1) (i.e., the extension plate unit 52 cooperates with the sanding belt 4 to define two second gaps (d2) therebetween in the second extending direction (Z1)). A width of each of the first gap (d1) and the second gaps (d2) is smaller than 7 millimeters.

[0017] Referring to FIG. 5 again, the housing fastening member 6 extends through the main plate 511 of the main plate unit 51, and is threadedly connected to the housing 3 to interconnect the main plate unit 51 and the housing 3. By virtue of the housing fastening member 6, the shield 5 is removably connected to the housing 3 so as to facilitate replacement of the sanding belt 4 for a user of the belt sander.

[0018] By virtue of the main plate 511, the side plates 511', and the extension plates 521, when the sanding belt 4 is driven by the rotating shaft 221 to grind an object (not shown), dust that is generated during operation of the belt sander is prevented from leaving the protection space 50, thereby protecting the user. Moreover, by virtue of the extension plate unit 52 cooperating with the housing 3 to define the opening 520, a size of the opening 520 is limited by the extension plates 521. Since the width of each of the first gap (d1) and the second gaps (d2) is smaller than 7 millimeters, foreign matters are prevented from entering the belt sander through the opening 520. Therefore, the belt sander is in compliance with the international standard published by the International Electrotechnical Commission (hereinafter IEC).

[0019] It is noted that, the number of the engaging blocks 42 and the number of the engaging grooves 212 may be any positive integers according to actual requirements, the number of the extension plates 521 of the shield 5 may not be limited to three as shown in FIG. 4, and the extension plates 521 may not be limited to be respectively connected to the opening ends 512 of the main plate 511 and the side plates 511'. In a modification of the embodiment as shown in FIG. 7, the extension plate unit 52 may only include one extension plate 521, and the extension plate 521 is connected to the opening end 512 of the main plate 511. In addition, a width of a gap (not shown) that is defined by the extension plate 521 and the sanding belt 4 is also smaller than 7 millimeters. Thus, the modification of the embodiment is in compliance with the international standard published by the IEC as well.

[0020] It is noted that, as shown in FIG. 8, in another modification of the embodiment, the extension plate unit 52 and the main plate unit 51 of the shield 5 may not be integrally formed as one piece. In this modification of the embodiment, the belt sander further includes a plate fastening member 7. The extension plate unit 52 is sleeved on and removably connected to the main plate unit 51. The plate fastening member 7 extends through the extension plate unit 52, and is threadedly connected to the main plate unit 51 to interconnect the extension plate unit 52 and the main plate unit 51. Therefore, the size of the opening 520 may be adjusted by replacement of the extension plate unit 52, instead of replacement of the whole shield 5.

[0021] Since the operation of the belt sander is widely-understood by those skilled in the art, detailed descriptions thereof are omitted.

[0022] In summary, the embodiment of the belt sander offers several benefits as follows. By virtue of the main plate unit 51, dust and debris are prevented from leaving the protection space 50, thereby reducing scattering of the dust and the debris during the operation of the belt sander. Moreover, by virtue of the extension plate unit 52 cooperating with the housing 3 to define the opening 520, the size of the opening 520 is adjustable via the replacement of the shield 5 or the replacement of the extension plate unit 52. Therefore, the belt sander is suitable for sanding belts having different thicknesses while being in compliance with safety regulations.

[0023] In the description above, for the purposes of explanation, numerous specific details have been set forth in order to provide a thorough understanding of the embodiment(s). It will be apparent, however, to one skilled in the art, that one or more other embodiments

may be practiced without some of these specific details. It should also be appreciated that reference throughout this specification to "one embodiment," "an embodiment," an embodiment with an indication of an ordinal number and so forth means that a particular feature, structure, or characteristic may be included in the practice of the disclosure. It should be further appreciated that in the description, various features are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of various inventive aspects; such does not mean that every one of these features needs to be practiced with the presence of all the other features. In other words, in any described embodiment, when implementation of one or more features or specific details does not affect implementation of another one or more features or specific details, said one or more features may be singled out and practiced alone without said another one or more features or specific details. It should be further noted that one or more features or specific details from one embodiment may be practiced together with one or more features or specific details from another embodiment, where appropriate, in the practice of the disclosure.

[0024] While the disclosure has been described in connection with what is(are) considered the exemplary embodiment(s), it is understood that this disclosure is not limited to the disclosed embodiment(s) but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements.

Claims

1. A belt sander comprising:

a machine body (2);
a housing (3);
a sanding belt (4); and
a shield (5);
characterized in that:

the machine body (2) includes a rotating shaft (221) that is drivable by electric power to rotate about a first axis (X);
the housing (3) is rotatably connected to the machine body (2);
the sanding belt (4) is mounted to the housing (3) and drivable by the rotating shaft (221) to rotate around the first axis (X); and
the shield (5) is removably connected to the housing (3), and includes

a main plate unit (51) that cooperates with the housing (3) to define a protection space (50) accommodating a portion of the sanding belt (4), and

an extension plate unit (52) that extends from the main plate unit (51) toward the sanding belt (4), the extension plate unit (52) cooperating with the housing (3) to define an opening (520) that is in spatial communication with the protection space (50) and that is for another portion of the sanding belt (4) to extend therethrough, the extension plate unit (52) being spaced apart from the sanding belt (4) in a first extending direction (X1) of the first axis (X) and cooperating with the sanding belt (4) to define a first gap (d1) therebetween in the first extending direction (X1), the extension plate unit (52) being spaced apart from the sanding belt (4) in a second extending direction (Z1) of a second axis (Z) substantially orthogonal to the first axis (X) and cooperating with the sanding belt (4) to define two second gaps (d2) therebetween in the second extending direction (Z1).

2. The belt sander as claimed in claim 1, wherein the main plate unit (51) includes a main plate (511), and two side plates (511') each of which is connected to the main plate (511) and faces the sanding belt (4), the side plates (511') being spaced apart from each other along the second axis (Z), the main plate (511) facing the housing (3).

3. The belt sander as claimed in claim 2, wherein each of the main plate (511) and the side plates (511') has an opening end (512) that is adjacent to the opening (520), and a contact end (513) that is opposite to the opening end (512) and that is in contact with the housing (3).

4. The belt sander as claimed in claim 3, wherein the extension plate unit (52) includes an extension plate (521) that cooperates with the housing (3) to define the opening (520), and that is connected to the opening end (512) of at least one of the main plate (511) and the side plates (511').

5. The belt sander as claimed in claim 3, wherein the extension plate unit (52) includes three extension plates (521) that are respectively connected to the opening ends (512) of the main plate (511) and the side plates (511'), and that are spaced apart from each other.

6. The belt sander as claimed in claim 5, wherein one of the extension plates (521) that is connected to the opening end (512) of the main plate (511) cooperates with the sanding belt (4) to define the first gap (d1) therebetween in the first extending direction (X1),

and each of two of the extension plates (521) that are respectively connected to the opening ends (512) of the side plates (511') cooperates with the sanding belt (4) to define a respective one of the second gaps (d2) therebetween in the second extending direction (Z1), a width of each of the first gap (d1) and the second gaps (d2) being smaller than 7 millimeters.

7. The belt sander as claimed in any one of claims 2 to 6, wherein each of the side plates (511') extends in a third extending direction (Y1) of a third axis (Y) that is substantially orthogonal to the first axis (X) and the second axis (Z).

8. The belt sander as claimed in claim 7, wherein a length of the main plate (511) in the third extending direction (Y1) is greater than a length of each of the side plates (511') in the third extending direction (Y1).

9. The belt sander as claimed in any one of claims 7 and 8, wherein a cross section of the main plate unit (51) on an imaginary plane that has a normal vector in the third extending direction (Y1) of the third axis (Y) is substantially U-shaped.

10. The belt sander as claimed in any one of claims 1 to 6, wherein a cross section of the main plate unit (51) on an imaginary plane that has a normal vector in a third extending direction (Y1) of a third axis (Y) which is substantially orthogonal to the first axis (X) and the second axis (Z) is substantially U-shaped.

11. The belt sander as claimed in any one of claims 1 to 10, further comprising a housing fastening member (6), the main plate unit (51) of the shield (5) being removably connected to the housing (3), the housing fastening member (6) extending through the main plate unit (51) and being threadedly connected to the housing (3) to interconnect the main plate unit (51) and the housing (3).

12. The belt sander as claimed in any one of claims 1 to 11, further comprising a plate fastening member (7), the extension plate unit (52) of the shield (5) being removably connected to the main plate unit (51) of the shield (5), the plate fastening member (7) extending through the extension plate unit (52) and being threadedly connected to the main plate unit (51) to interconnect the extension plate unit (52) and the main plate unit (51).

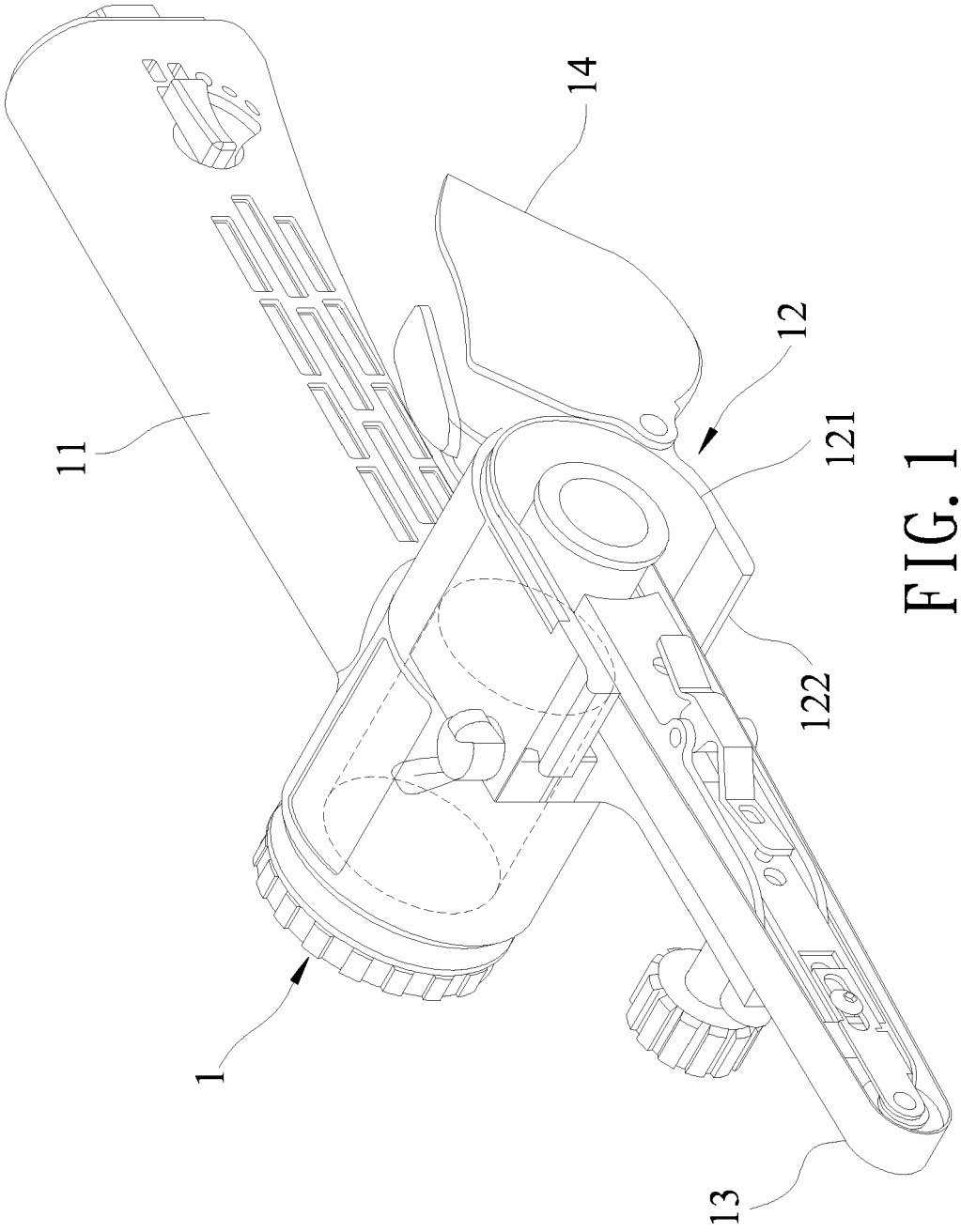

FIG. 1
PRIOR ART

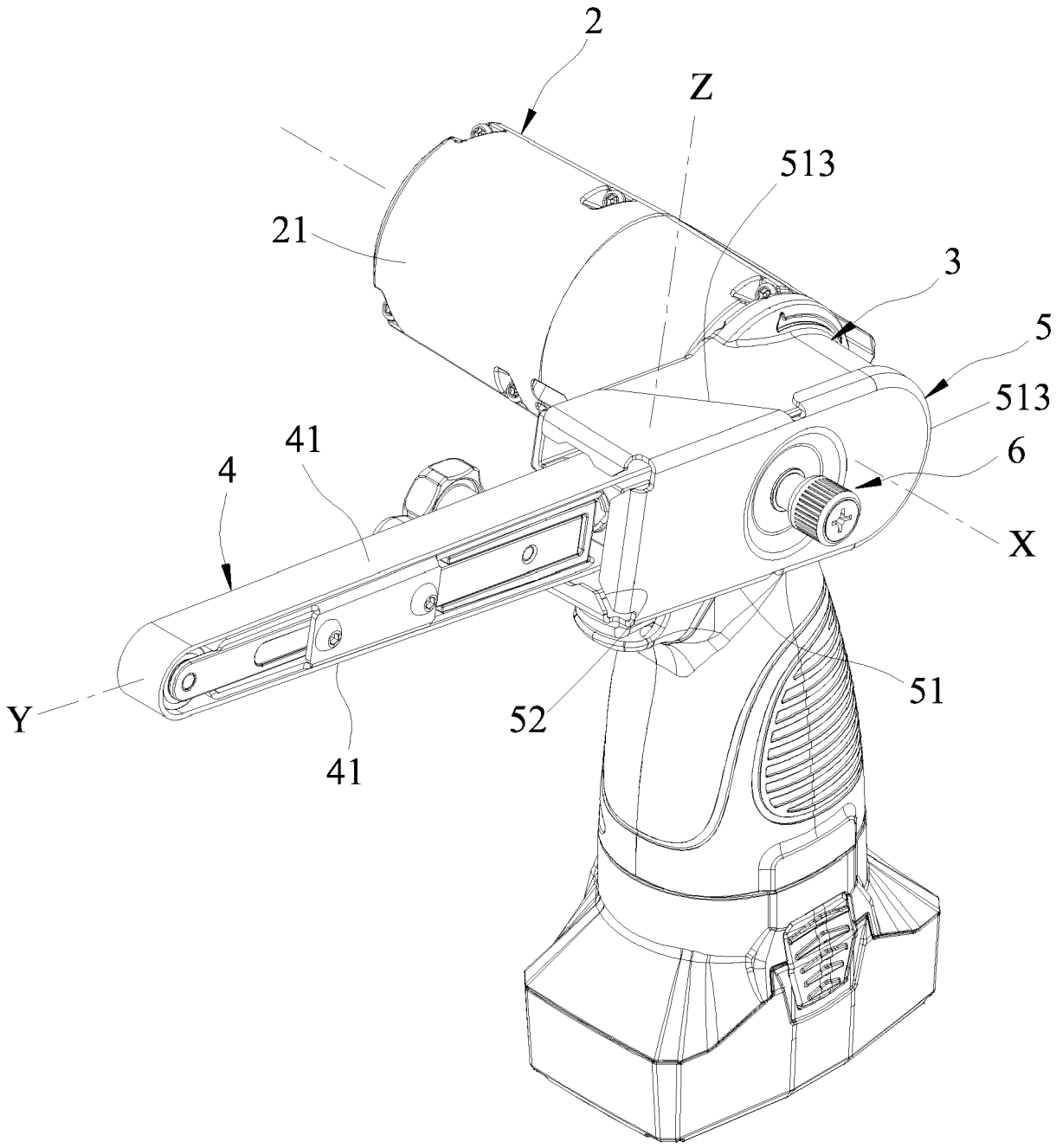

FIG. 2

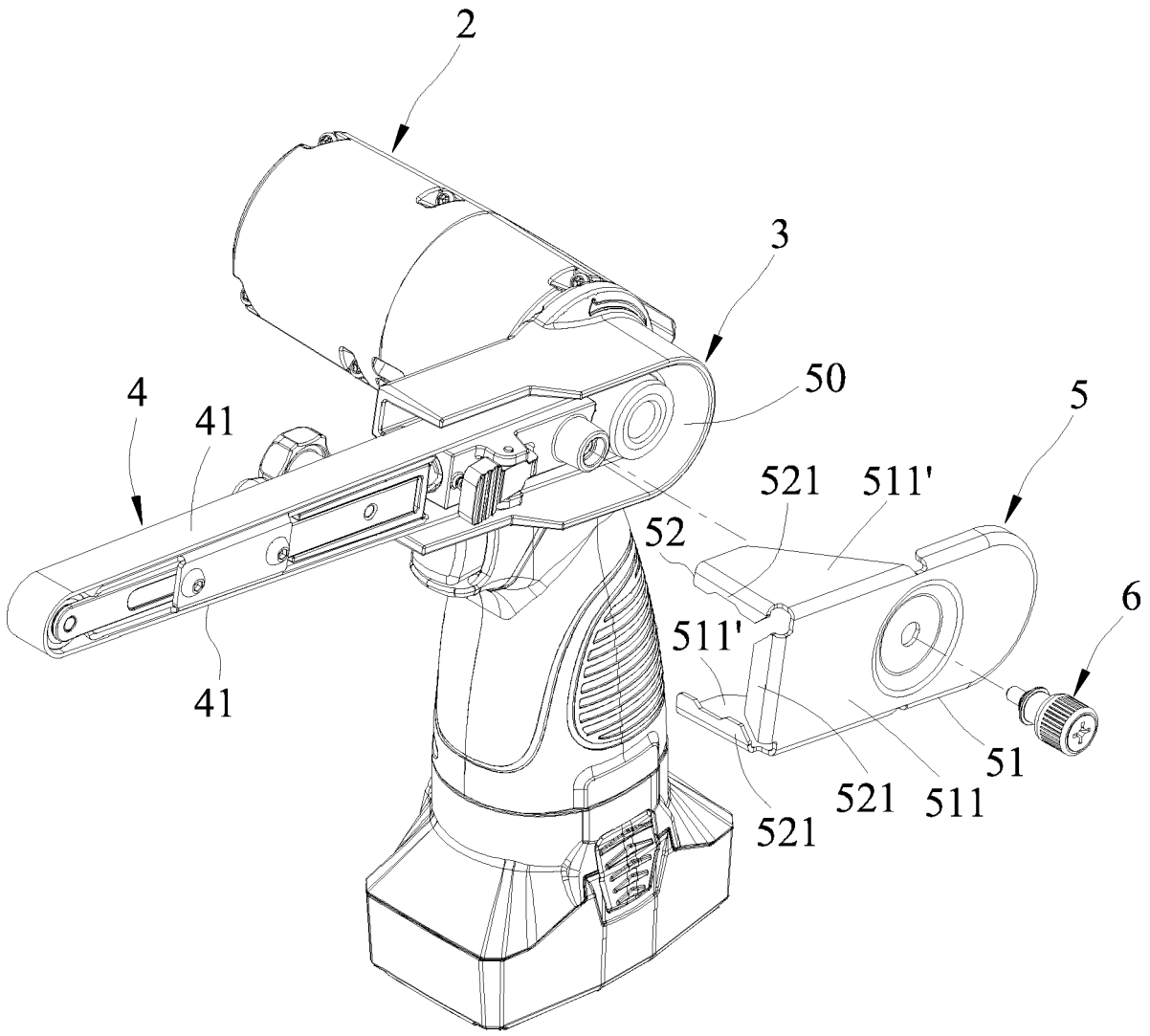

FIG. 3

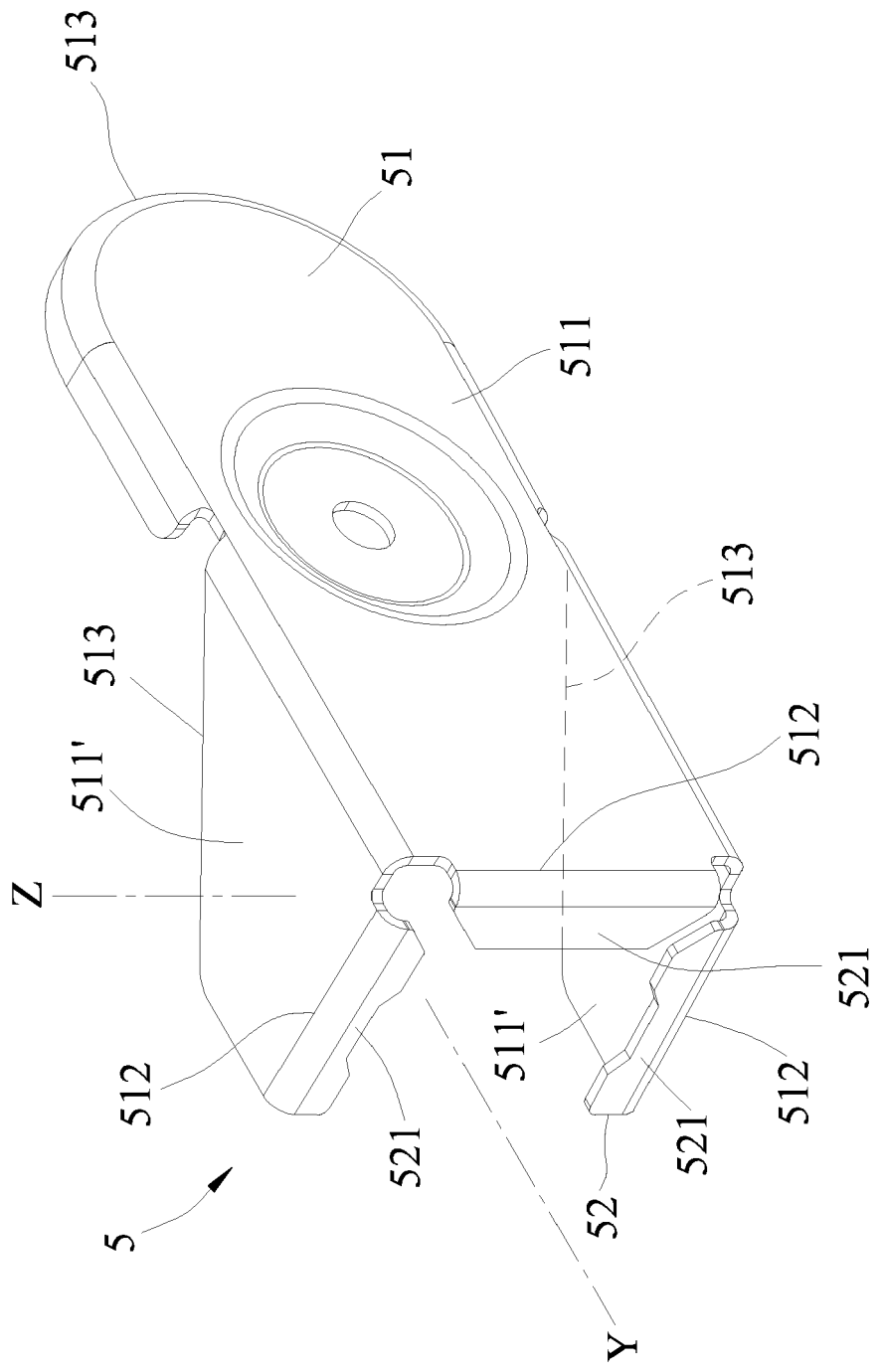

FIG. 4

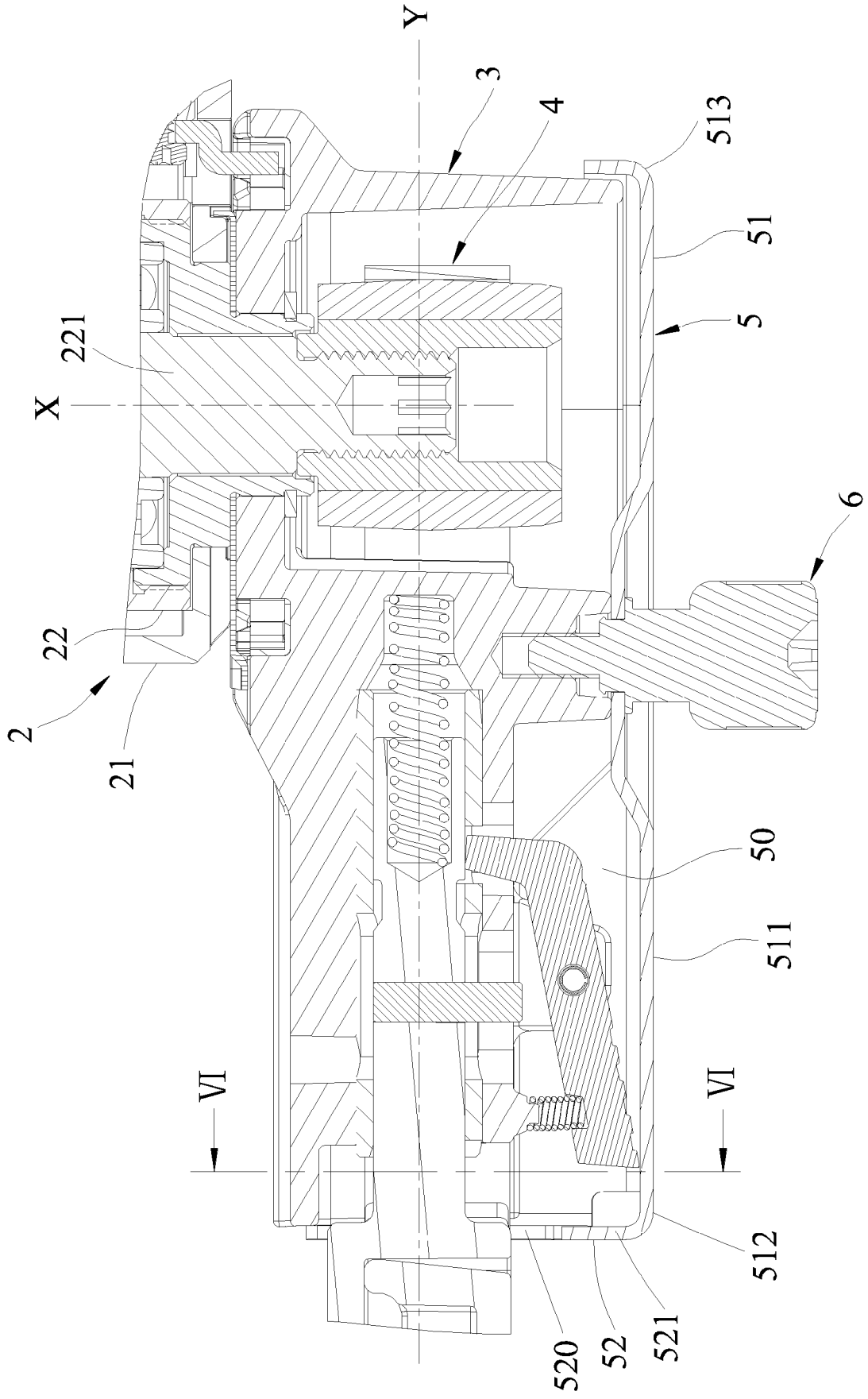

FIG. 5

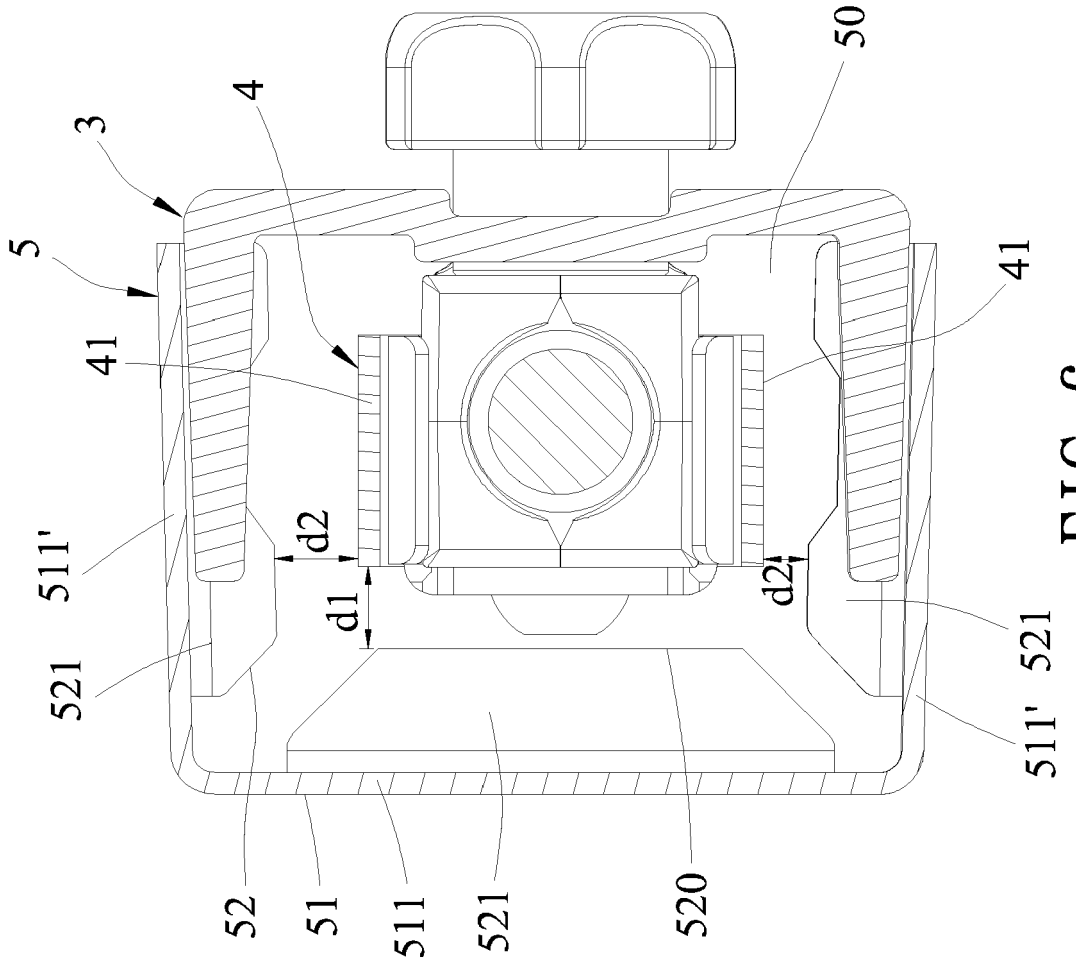

FIG. 6

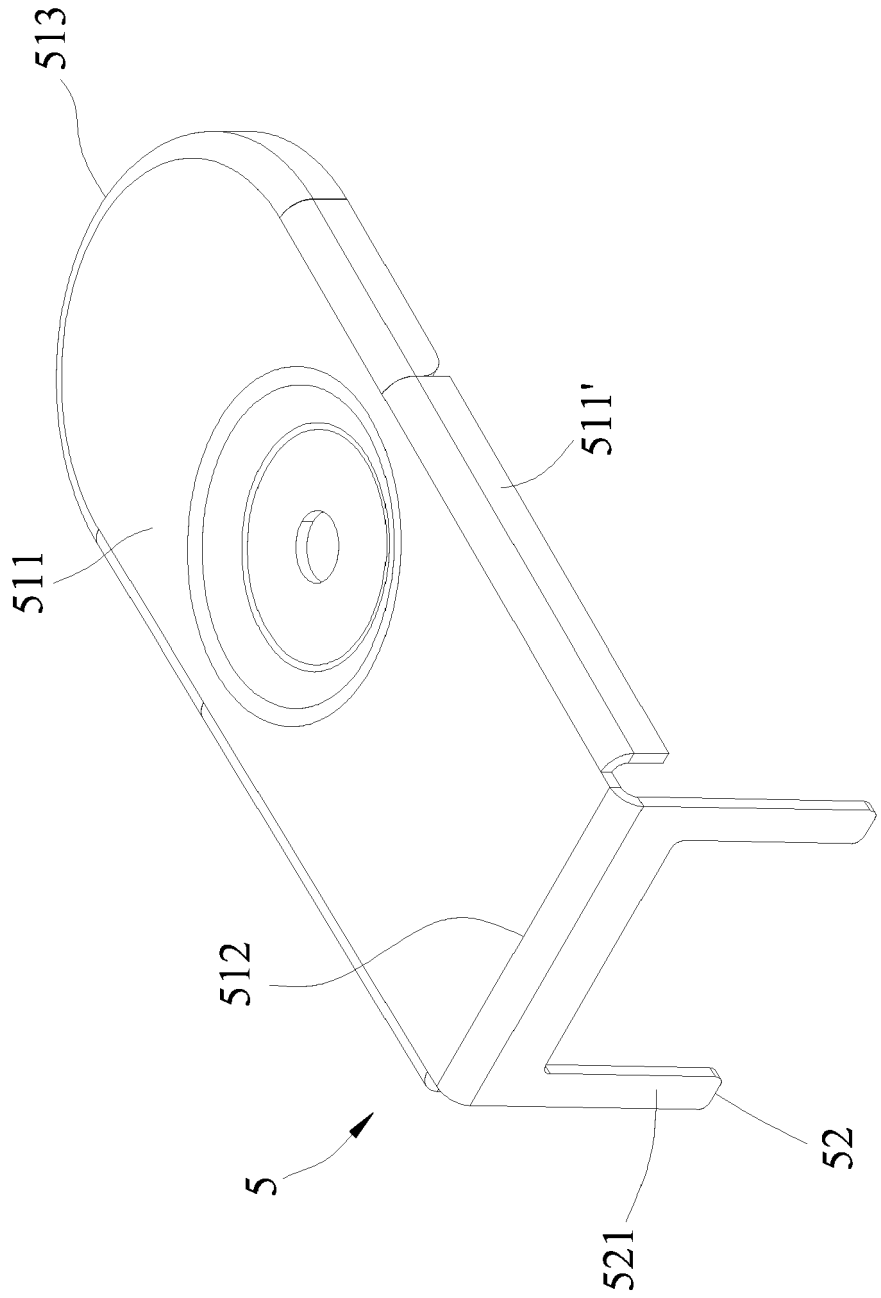

FIG. 7

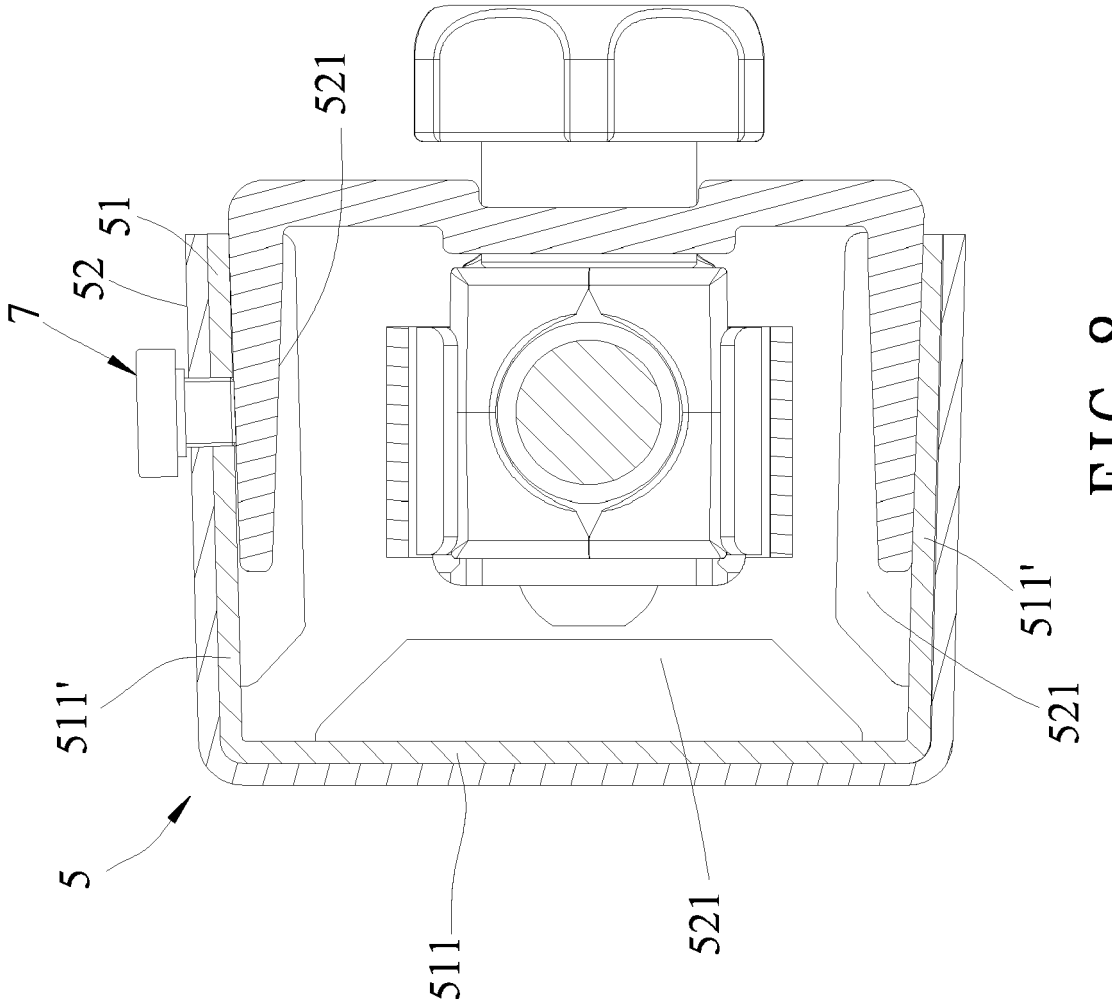

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 24 17 1666

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B24B
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 August 2024	Arhire, Irina

CATEGORY OF CITED DOCUMENTS

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REFERENCES CITED IN THE DESCRIPTION

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