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(54) ELECTRIC SUPPORTING ROD

ELEKTRISCHE TRAGSTANGE

TIGE DE SUPPORT ÉLECTRIQUE

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EP 4 202 167 B1

Description

BACKGROUND OF THE DISCLOSURE

Technical Field

[0001] The present disclosure relates to an electric supporting rod, particularly to an electric supporting rod having advantages of simple in structure, easy to be assembled and capable of preventing an actuating unit from being driven to rotate.

Description of Related Art

[0002] With the rapid development of vehicle industry, an electric door has been commonly adopted because the electric door is convenient in operation. A related-art electric door utilizes electric supporting rods disposed at a left side and a right side thereof for supporting, and an electric motor disposed therein is used for performing a retracting adjustment for a length of a retractable screw rod disposed in electric supporting rod, thus an effect of opening or closing the electric door may be achieved.

[0003] An outer case of the electric supporting rod is mostly designed as two segments to make the electric motor and the retractable screw rod be correspondingly disposed in two outer cases, and the two outer cases are assembled to make the electric motor and the retractable screw rod be connected for transmitting power. However, for preventing the outer case where the retractable screw rod is disposed from being driven to rotate during the operation, a fastening unit is additionally disposed for a purpose of positioning. As such, the related-art electric supporting rod has disadvantages of complicated in structure, uneasy in assembly and requiring a high production cost.

[0004] WO 2022/200508 A1 discloses an electric supporting rod according to the preamble of claim 1, but does not disclose that a plurality of elastic latching hooks are convexly disposed on an inner wall of the first outer cylinder, neither a plurality of connection pieces.

[0005] US 6 772 653 B1 discloses a linear actuator having a tubular motor housing with an end cap, a motor and an epicyclic gearbox. The actuator has a telescopic arm, having an outer tube and an inner tube.

SUMMARY OF THE DISCLOSURE

[0006] It is an object of the present disclosure to provide an electric supporting rod having advantages of simply in structure, easy to be assembled and lowering the production cost.

[0007] This problem is solved by an electric supporting rod as claimed by claim 1. Further advantageous embodiments are the subject-matter of the dependent claims. A further aspect of the present invention relates to the use of such an electric supporting rod for opening or closing an electric door of a vehicle and supporting the electric door.

[0008] According to the present disclosure there is provide an electric supporting rod including a driving unit and an actuating unit. The driving unit has a first outer cylinder and a driver disposed in the first outer cylinder, an opening is defined on one end of the first outer cylinder, the driver has a transmission slot formed on one end facing the opening. The actuating unit has a second outer cylinder and a transmission screw rod sheathed in the second outer cylinder, an insertion part is disposed on one end of the second outer cylinder, the transmission screw rod has a passive end protruding from the insertion part, and the insertion part is extended with a plurality of connection pieces surrounding the passive end. The insertion part is inserted in the opening, the passive end is engaged with the transmission slot.

[0009] According to the present invention, a plurality of elastic latching hooks are convexly disposed on an inner wall of the first outer cylinder and located between the opening and the transmission slot, wherein each of the connection pieces is latched with each of the elastic latching hooks to longitudinally lock driving unit and the actuating unit.

[0010] Advantages achieved by the present disclosure are as follows. The driving unit may be fastened on a vehicle frame or a door frame via a connector. The actuating unit may be fastened on the door frame or the vehicle frame via a fasten hole of a rotary connector. Inner reverse hooks formed at an inner edge of the connection piece and the insertion part jointly clamp a bearing to allow a central location of transmission screw rod to be kept. With positioning columns being correspondingly inserted in positioning holes to achieve a positioning effect, the second outer cylinder may be prevented from being driven to rotate when the driver drives the transmission screw rod to rotate.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The features of the disclosure are set forth with particularity in the appended claims. The disclosure itself, however, may be best understood by reference to the following detailed description of the disclosure, which describes a number of exemplary embodiments of the disclosure, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view showing the assembly according to the present disclosure;
FIG. 2 is a perspective exploded view according to the present disclosure;
FIG. 3 is a partially enlarged view showing the insertion end according to the present disclosure;
FIG. 4 is a partially enlarged view showing the opening according to the present disclosure;
FIG. 5 to FIG. 9 are cross sectional views showing operating statuses according to the present disclosure; and

FIG. 10 to FIG. 12 are cross sectional views showing operating statuses according to another embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0012] The technical contents of this disclosure will become apparent with the detailed description of embodiments accompanied with the illustration of related drawings as follows. It is intended that the embodiments and drawings disclosed herein are to be considered illustrative rather than restrictive.

[0013] The present disclosure provides an electric supporting rod, which is used for opening or closing an electric door of a vehicle and supporting the electric door. Please refer from FIG. 1 to FIG. 4, the electric supporting rod mainly includes a driving unit 10 and an actuating unit 20.

[0014] The driving unit 10 mainly includes a first outer cylinder 11 and a driver 12. The first outer cylinder 11 is a hollow cylindrical body, an opening 111 is defined on one end of the first outer cylinder 11, and a connection part 112 is formed on another end of the first outer cylinder 11 away from the opening 111. The connection part 112 has a connector 112A used for fastening the driving unit 10 on a vehicle frame or a door frame. In some embodiments, the driver 12 is an electric motor, but here is not intended to be limiting. The driver 12 is disposed in the first outer cylinder 11, the driver 12 has a transmission slot 121 on one end facing the opening 111, and a plurality of inner teeth 121A are formed on an inner edge of the transmission slot 121. A plurality of elastic latching hooks 113 are convexly disposed on an inner wall of the first outer cylinder 11 and located between the opening 111 and the transmission slot 121 of the driver 12.

[0015] The actuating unit 20 mainly includes a second outer cylinder 21 and a transmission screw rod 22. The second outer cylinder 21 is a hollow cylindrical body, and an insertion part 211 is disposed on one end of the second outer cylinder 21 corresponding to the opening 111 of the first outer cylinder 11. The transmission screw rod 22 is received in the second outer cylinder 21, and has a passive end 221 protruding from the insertion part 211, and a plurality of outer teeth 221A engaged with each of the inner teeth 121A are formed on an outer edge of the passive end 221. The insertion part 211 is longitudinally extended with a plurality of connection pieces 212 corresponding to each of the elastic latching hooks 113, and each of the connection pieces 212 is annularly disposed at an outer periphery of the passive end 221. In some embodiments, the actuating unit 20 further includes a bearing 23. The bearing 23 is adapted to sheathe the transmission screw rod 22, and a plurality of inner reverse hooks 212A are concavely disposed on an inner edge of each of the connection pieces 212. Each of the inner reverse hooks 212A and the insertion part 211 jointly clamp and fasten the bearing 23 to allow a central location of transmission screw rod 22 to be kept.

[0016] Details are provided as follows. The actuating unit 20 further includes a moveable inner cylinder 24. The moveable inner cylinder 24 is moveably disposed in the second outer cylinder 21, and the moveable inner cylinder 24 is engaged with and connected to the transmission screw rod 22 to make the transmission screw rod 22 drive the moveable inner cylinder 24 to retractably move relative to the second outer cylinder 21. The moveable inner cylinder 24 has a fasten end 241 exposed outside the second outer cylinder 21. The fasten end 241 has a rotary connector 241A, and the rotary connector 241A has a fasten hole 241B to fasten the actuating unit 20 on the door frame or the vehicle frame.

[0017] Please refer to FIG. 1 and FIG. 2, the actuating unit 20 is connected to the driving unit 10. In some embodiments, the insertion part 211 of the second outer cylinder 21 is inserted to the opening 111 of the first outer cylinder 11, thus the passive end 221 of the transmission screw rod 22 may be engaged with the transmission slot 121 of the driver 12, and each of the connection pieces 212 is correspondingly hooked with each of the elastic latching hooks 113 to longitudinally lock the driving unit 10 and the actuating unit 20. As such, a connecting and fastening relation may be achieved between the driving unit 10 and the actuating unit 20, the transmission slot 121 of the driver 12 and the passive end 221 of the transmission screw rod 22 are connected for transmitting power, thus the driver 12 drives the transmission screw rod 22 to rotate to make the moveable inner cylinder 24 retractably move.

[0018] Details are provided as follows. Each of the elastic latching hooks 113 has a base part 113A and an elastic arm 113B. Each of the base parts 113A is disposed on the inner wall of the first outer cylinder 11, and respectively connected to each of the corresponding elastic arms 113B. Each of the elastic arms 113B is concavely formed with a hook part 113C. An outer reverse hook 212B is disposed on an outer edge of each of the connection pieces 212. Each of the hook parts 113C is correspondingly hooked with each of the outer reverse hooks 212B to longitudinally block each of the connection pieces 212. In some embodiments, every two of the elastic latching hooks 113 are defined as a set to latch one of the corresponding connection pieces 212 (in other words, the amount of the elastic latching hooks 113 is double comparing to the amount of the connection pieces 212), the two elastic latching hooks 113 defined as the set are oppositely disposed, thus the hook parts 113C of the two elastic arms 113B are jointly latched with the outer reverse hook 212B of the corresponding connection piece 212. The present disclosure is not intended to be limiting, for example there are elastic latching hooks 113 as many as the connection pieces 212 as long as a latching and restraining effect may be effectively provided.

[0019] The insertion part 211 of the second outer cylinder 21 is further extended with a plurality of positioning columns 213, and the driver 12 is concavely formed with

a plurality of positioning holes 122 surrounding the transmission slot 121. In some embodiments, each of the positioning columns 213 and each of the connection pieces 212 are arranged at intervals, but here is not intended to be limiting. Each of the positioning columns 213 is respectively inserted in each of the corresponding positioning holes 122 to achieve a positioning effect. As such, when the transmission slot 121 of the driver 12 drives the transmission screw rod 22 to rotate, the second outer cylinder 21 of the actuating unit 20 may be prevented from being driven to rotate. In some embodiments, there are four positioning columns 213, but here is not intended to be limiting. For example there may be two, three, four or more than four of positioning columns 213, as long as the positioning effect may be achieved and a rotating situation may be prevented.

[0020] Please refer from FIG. 5 to FIG. 9, which are schematic views showing the actuating unit 20 and the driving unit 10 being assembled. Firstly, please refer to FIG. 5 and FIG. 6, before the actuating unit 20 and the driving unit 10 are assembled, the passive end 221 of the transmission screw rod 22 is aligned with the transmission slot 121 of the driver 12, and each of the positioning columns 213 is correspondingly aligned with each of the positioning holes 122 as shown in FIG. 5, and then each of the connection pieces 212 is correspondingly aligned with each of the elastic latching hooks 113 as shown in FIG. 6. When the insertion part 211 is inserted in the opening 111, each of the connection pieces 212 pushes a top end and a bottom end of the two corresponding elastic arms 113B (not shown in figures), thus each of the connection pieces 212 may be inserted between the two sets of corresponding elastic latching hooks 113. Please refer from FIG. 7 to FIG. 9, when the actuating unit 20 is inserted and positioned, the insertion part 211 of the second outer cylinder 21 is latched in the opening 111 of the first outer cylinder 11, the passive end 221 of the transmission screw rod 22 is engaged with the transmission slot 121 of the driver 12, and each of the positioning columns 213 is correspondingly inserted in each of the positioning holes 122 to prevent the second outer cylinder 21 from rotating as shown in FIG. 7. The outer reverse hook 212B of each of the connection pieces 212 is latched and blocked by the hook parts 113C of the two corresponding elastic arms 113B as shown in FIG. 8 and FIG. 9, thus the actuating unit 20 and the driving unit 10 may be longitudinally locked and assembled.

[0021] Please refer from FIG. 10 to FIG. 12, which disclose a second embodiment of the present disclosure, a difference between the first embodiment and the second embodiment is that each of the positioning columns 213 is extended to a distal end of each of the connection pieces 212, and each of the connection pieces 212 and the corresponding positioning column 213 and the corresponding positioning hole 122 may be aligned on the same linear line. Please refer to FIG. 10, before the actuating unit 20 and the driving unit 10 are assembled, the passive end 221 of the transmission screw rod 22 is aligned with the transmission slot 121 of the driver 12, each of the positioning columns 213 is aligned with each of the positioning holes 122. Because the connection pin 212, the corresponding positioning column 213 and the corresponding positioning hole 122 are aligned on the same linear line, each of the connection pieces 212 is aligned with each of the corresponding elastic latching hooks 113. Please refer to FIG. 11 and FIG. 12, after the actuating unit 20 is assembled with the driving unit 10, the outer reverse hook 212B of each of the connection pieces 212 is latched and blocked by the hook parts 113C of the two corresponding elastic arms 113B, and each of the positioning columns 213 located at the front may be inserted in each of the corresponding positioning holes 122. Accordingly, the design provided by the second embodiment may effectively simplify the whole structure, reduce the assembly error and lower the production cost, and the same technical feature provided in the first embodiment may be kept.

Claims

1. An electric supporting rod, comprising:

a driving unit (10), comprising a first outer cylinder (11) and a driver (12) disposed in the first outer cylinder (11), wherein an opening (111) is defined on one end of the first outer cylinder (11), the driver (12) comprises a transmission slot (121) disposed on one end thereof facing the opening (111); and

an actuating unit (20), comprising a second outer cylinder (21) and a transmission screw rod (22) sheathed in the second outer cylinder (21), wherein the second outer cylinder (21) comprises an insertion part (211) disposed on one end thereof, the transmission screw rod (22) comprises a passive end (221) protruding from the insertion part (211), and the insertion part (211) comprises a plurality of connection pieces (212) extended therefrom and surrounding the passive end (221);

wherein the insertion part (211) is inserted in the opening (111) and the passive end (221) is engaged with the transmission slot (121),

characterized in that

a plurality of elastic latching hooks (113) are convexly disposed on an inner wall of the first outer cylinder (11) and located between the opening (111) and the transmission slot (121), wherein each of the connection pieces (212) is latched with each of the elastic latching hooks (113) to longitudinally lock the driving unit (10) and the actuating unit (20).

2. The electric supporting rod according to claim 1, wherein each of the elastic latching hooks (113) com-

prises a base part (113A) and an elastic arm (113B), and the base part(113A) is disposed in the first outer cylinder (11) and connected to the elastic arm (113B).

3. The electric supporting rod according to claim 2, wherein a hook part (113C) is concavely disposed on the elastic arm (113B), an outer reverse hook (212B) is disposed on an outer edge of each of the connection pieces (212), and the hook part (113C) is correspondingly hooked with the outer reverse hook (212B) to longitudinally block each of the connection pieces (212).

4. The electric supporting rod according to any of the preceding claims, wherein the insertion part (211) comprises a plurality of positioning columns (213) extended therefrom, the driver (12) comprises a plurality of positioning holes (122) surrounding the transmission slot (121), and each of the positioning columns (213) is correspondingly inserted in each of the positioning holes (122).

5. The electric supporting rod according to claim 4, wherein each of the positioning columns (213) and each of the connection pieces (212) are arranged spacedly.

6. The electric supporting rod according to claim 4, wherein each of the positioning columns (213) is extended to a distal end of each of the connection pieces (212).

7. The electric supporting rod according to any of the preceding claims, further comprising: a bearing (23), adapted to sheathe the transmission screw rod (22), a plurality of inner reverse hooks (212A) disposed on an inner edge of each of the connection pieces (212), and each of the inner reverse hooks (212A) and the insertion part (211) jointly clamping the bearing (23).

8. The electric supporting rod according to any of the preceding claims, wherein a plurality of inner teeth (121A) is disposed on an inner edge of the transmission slot (121), and a plurality of outer teeth (221A) is disposed on an outer edge of the passive end (221) corresponding to each of the inner teeth (121A).

9. The electric supporting rod according to any of the preceding claims, wherein the actuating unit (20) further comprises a moveable inner cylinder (24), the moveable inner cylinder (24) is moveably disposed in the second outer cylinder (21) and engaged with the transmission screw rod (22), the moveable inner cylinder (24) comprises a fasten end (241) exposed outside the second outer cylinder (21), and the fasten end (241) comprises a rotary connector (241A).

10. The electric supporting rod according to any of the preceding claim, wherein a connection part (112) is disposed on one end of the first outer cylinder (11) away from the opening (111), and the connection part (112) comprises a connector (112A).

11. Use of the electric supporting rod according to any of the preceding claims for opening or closing an electric door of a vehicle and supporting the electric door.

Patentansprüche

1. Elektrische Abstützstange, umfassend:

eine Antriebseinheit (10), die einen ersten äußeren Zylinder (11) und einen in dem ersten äußeren Zylinder (11) angeordneten Antriebskörper (12) umfasst, wobei eine Öffnung (111) an einem Ende des ersten äußeren Zylinders (11) definiert ist, der Antriebskörper (12) einen Übertragungsschlitz (121) aufweist, der an einem Ende desselben angeordnet ist und der Öffnung (111) gegenüberliegt; und
eine Betätigungseinheit (20), die einen zweiten äußeren Zylinder (21) und eine Übertragungsspindelstange (22) umfasst, die in dem zweiten äußeren Zylinder (21) eingeschlossen ist, wobei der zweite äußeren Zylinder (21) ein Einsteckteil (211) umfasst, das an einem Ende desselben angeordnet ist, wobei die Übertragungsspindelstange (22) ein passives Ende (221) aufweist, das von dem Einsteckteil (211) vorsteht, und wobei das Einsteckteil (211) eine Vielzahl von Verbindungsstücken (212) aufweist, die sich ausgehend von diesem erstrecken und das passive Ende (221) umgeben;
wobei das Einsteckteil (211) in die Öffnung (111) eingesetzt ist und das passive Ende (221) mit dem Übertragungsschlitz (121) in Eingriff steht,
dadurch gekennzeichnet, dass
mehrere elastische Verriegelungshaken (113) konvex an einer Innenwand des ersten äußeren Zylinders (11) angeordnet sind und sich zwischen der Öffnung (111) und dem Übertragungsschlitz (121) befinden, wobei jedes der Verbindungsstücke (212) mit jedem der elastischen Verriegelungshaken (113) verrastet ist, um die Antriebseinheit (10) und die Betätigungseinheit (20) in Längsrichtung zu verrasten.

2. Elektrische Abstützstange nach Anspruch 1, wobei jeder der elastischen Verriegelungshaken (113) ein Basisteil (113A) und einen elastischen Arm (113B) umfasst, und das Basisteil (113 A) im ersten äußeren Zylinder (11) angeordnet und mit dem elastischen Arm (113B) verbunden ist.

3. Elektrische Abstützstange nach Anspruch 2, wobei ein Hakenteil (113C) konkav auf dem elastischen Arm (113B) angeordnet ist, ein äußerer inverser Haken (212B) auf einem äußeren Rand jedes der Verbindungsstücke (212) angeordnet ist, und der Hakenteil (113C) entsprechend mit dem äußeren inversen Haken (212B) verhakt ist, um jedes der Verbindungsstücke (212) in Längsrichtung zu sperren.

4. Elektrische Abstützstange nach einem der vorhergehenden Ansprüche, wobei das Einsteckteil (211) eine Vielzahl von Positionierungsstangen (213) umfasst, die sich ausgehend von diesem erstrecken, der Antriebskörper (12) eine Vielzahl von Positionierungslöchern (122) umfasst, die den Übertragungsschlitz (121) umgeben, und jede der Positionierungsstangen (213) entsprechend in jedes der Positionierungslöcher (122) eingesetzt ist.

5. Elektrische Abstützstange nach Anspruch 4, wobei jede der Positionierungsstangen (213) und jedes der Verbindungsstücke (212) zueinander beabstandet angeordnet sind.

6. Elektrische Abstützstange nach Anspruch 4, wobei jede der Positionierungsstangen (213) bis zu einem distalen Ende jedes der Verbindungsstücke (212) verlängert ist.

7. Elektrische Abstützstange nach einem der vorhergehenden Ansprüche, weiterhin umfassend: ein Lager (23), das dazu angepasst ist, die Übertragungsspindelstange (22) zu ummanteln bzw. einzuschließen, wobei eine Mehrzahl von inneren inversen Haken (212A), die an einem inneren Rand jedes der Verbindungsstücke (212) angeordnet sind, und wobei jeder der inneren inversen Haken (212A) und das Einsteckteil (211) das Lager (23) gemeinsam klemmen.

8. Elektrische Abstützstange nach einem der vorhergehenden Ansprüche, wobei eine Vielzahl von inneren Zähnen (121A) an einem inneren Rand des Übertragungsschlitzes (121) angeordnet ist, und eine Vielzahl von äußeren Zähnen (221A) an einem äußeren Rand des passiven Endes (221) angeordnet ist, die jeweils einem der inneren Zähne (121A) zugeordnet sind.

9. Elektrische Abstützstange nach einem der vorhergehenden Ansprüche, wobei die Betätigungseinheit (20) ferner einen beweglichen inneren Zylinder (24) aufweist, der bewegliche innere Zylinder (24) beweglich in dem zweiten äußeren Zylinder (21) angeordnet ist und mit der Getriebespindel (22) in Eingriff steht, der bewegliche innere Zylinder (24) ein Befestigungsende (241) aufweist, das außerhalb des zweiten äußeren Zylinders (21) freiliegt, und das Befestigungsende (241) einen Drehverbinder (241A) aufweist.

10. Elektrische Abstützstange nach einem der vorhergehenden Ansprüche, wobei ein Verbindungsteil (112) an einem Ende des ersten äußeren Zylinders (11) entfernt von der Öffnung (111) angeordnet ist und das Verbindungsteil (112) einen Verbinder (112A) umfasst.

11. Verwendung der elektrischen Abstützstange nach einem der vorhergehenden Ansprüche zum Öffnen oder Schließen einer elektrischen Tür eines Fahrzeugs und zum Halten der elektrischen Tür.

Revendications

1. Une tige de support électrique, comprenant :

une unité d'entraînement (10), comprenant un premier cylindre extérieur (11) et un entraîneur (12) disposé dans le premier cylindre extérieur (11), une ouverture (111) étant définie sur une extrémité du premier cylindre extérieur (11), l'entraîneur (12) comprenant une fente de transmission (121) disposée sur une de ses extrémités en face de l'ouverture (111) ; et
une unité d'actionnement (20), comprenant un deuxième cylindre extérieur (21) et une tige filetée de transmission (22) gainée dans le deuxième cylindre extérieur (21), dans laquelle le deuxième cylindre extérieur (21) comprend une partie d'insertion (211) disposée sur une de ses extrémités, la tige filetée de transmission (22) comprend une extrémité passive (221) faisant saillie de la partie d'insertion (211), et la partie d'insertion (211) comprend une pluralité de pièces de connexion (212) étendues à partir de celle-ci et entourant l'extrémité passive (221) ;
dans lequel la pièce d'insertion (211) est insérée dans l'ouverture (111) et l'extrémité passive (221) est engagée dans la fente de transmission (121),
caractérisé par le fait que
une pluralité de crochets de verrouillage élastiques (113) sont disposés de manière convexe sur une paroi intérieure du premier cylindre extérieur (11) et situés entre l'ouverture (111) et la fente de transmission (121), dans laquelle chacune des pièces de connexion (212) est verrouillée avec chacun des crochets de verrouillage élastiques (113) pour verrouiller longitudinalement l'unité d'entraînement (10) et l'unité d'actionnement (20).

2. La tige de support électrique selon la revendication

1, dans laquelle chacun des crochets de verrouillage élastique (113) comprend une partie de base (113A) et un bras élastique (113B), et la partie de base (113A) est disposée dans le premier cylindre extérieur (11) et reliée au bras élastique (113B).

3. La tige de support électrique selon la revendication 2, dans laquelle une partie crochet (113C) est disposée de manière concave sur le bras élastique (113B), un crochet inverse extérieur (212B) est disposé sur un bord extérieur de chacune des pièces de connexion (212), et la partie crochet (113C) est accrochée de manière correspondante avec le crochet inverse extérieur (212B) pour bloquer longitudinalement chacune des pièces de connexion (212).

4. La tige de support électrique selon l'une quelconque des revendications précédentes, dans laquelle la partie d'insertion (211) comprend une pluralité de colonnes de positionnement (213) étendues à partir de celle-ci, l'entraîneur (12) comprend une pluralité de trous de positionnement (122) entourant la fente de transmission (121), et chacune des colonnes de positionnement (213) est insérée de manière correspondante dans chacun des trous de positionnement (122).

5. La tige de support électrique selon la revendication 4, dans laquelle chacune des colonnes de positionnement (213) et chacune des pièces de connexion (212) sont disposées de manière espacée.

6. La tige de support électrique selon la revendication 4, dans laquelle chacune des colonnes de positionnement (213) s'étend jusqu'à une extrémité distale de chacune des pièces de connexion (212).

7. La tige de support électrique selon l'une quelconque des revendications précédentes, comprenant en outre : un palier (23), adapté pour gainer la tige filetée de transmission (22), une pluralité de crochets inverses intérieurs (212A) disposés sur un bord intérieur de chacune des pièces de connexion (212), et chacun des crochets inverses intérieurs (212A) et la pièce d'insertion (211) serrant conjointement le palier (23).

8. La tige de support électrique selon l'une quelconque des revendications précédentes, dans laquelle une pluralité de dents intérieures (121A) est disposée sur un bord intérieur de la fente de transmission (121), et une pluralité de dents extérieures (221A) est disposée sur un bord extérieur de l'extrémité passive (221) correspondant à chacune des dents intérieures (121A).

9. La tige de support électrique selon l'une quelconque des revendications précédentes, dans laquelle l'unité d'actionnement (20) comprend en outre un cylindre intérieur mobile (24), le cylindre intérieur mobile (24) est disposé de manière mobile dans le deuxième cylindre extérieur (21) et engagé avec la tige filetée de transmission (22), le cylindre intérieur mobile (24) comprend une extrémité de fixation (241) exposée à l'extérieur du deuxième cylindre extérieur (21), et l'extrémité de fixation (241) comprend un connecteur rotatif (241A).

10. La tige de support électrique selon l'une quelconque des revendications précédentes, dans laquelle une partie de connexion (112) est disposée sur une extrémité du premier cylindre extérieur (11) à l'écart de l'ouverture (111), et la partie de connexion (112) comprend un connecteur (112A).

11. L'utilisation de la tige de support électrique selon l'une quelconque des revendications précédentes pour l'ouverture ou la fermeture d'une porte électrique d'un véhicule et le support de la porte électrique.

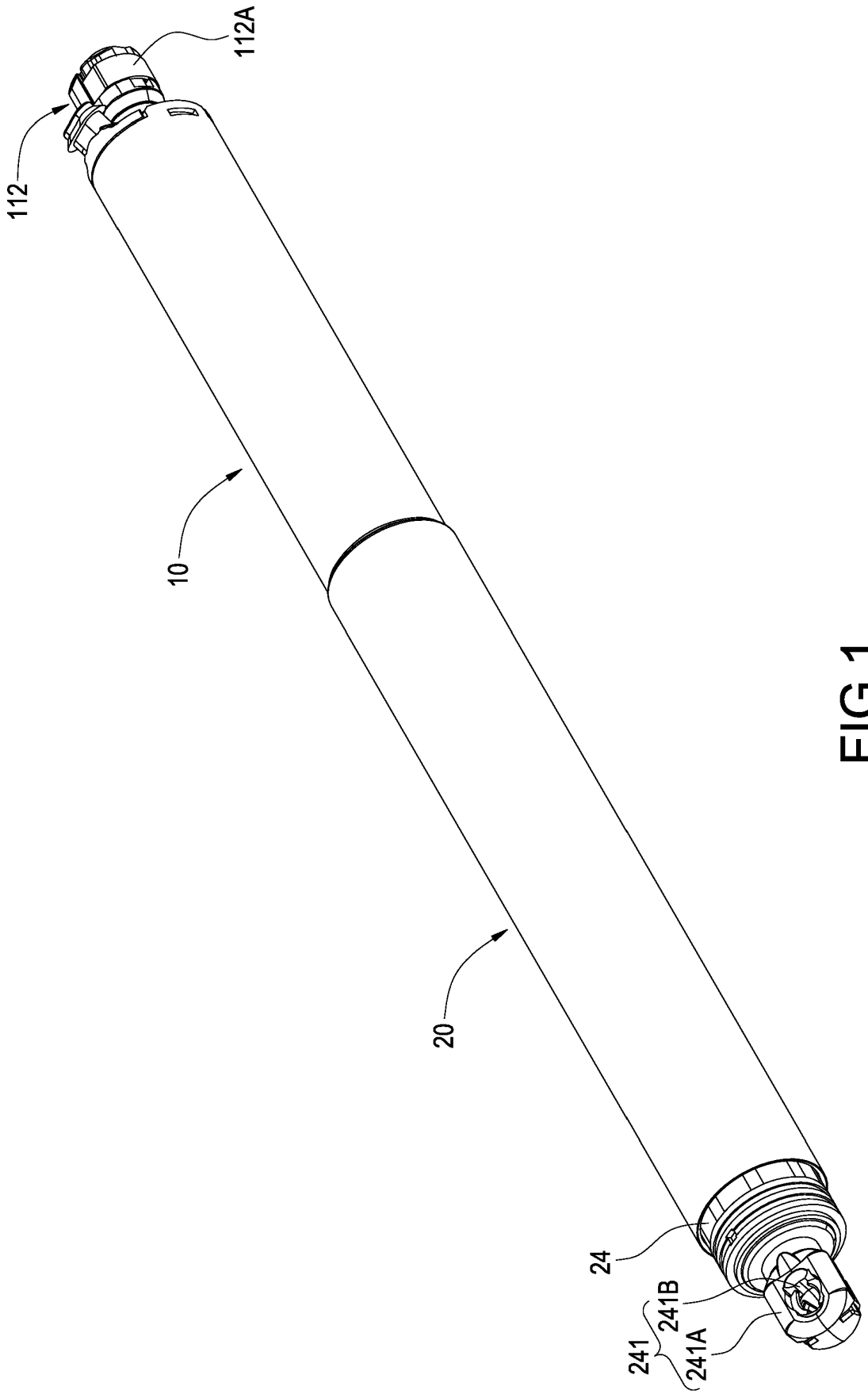


FIG.1

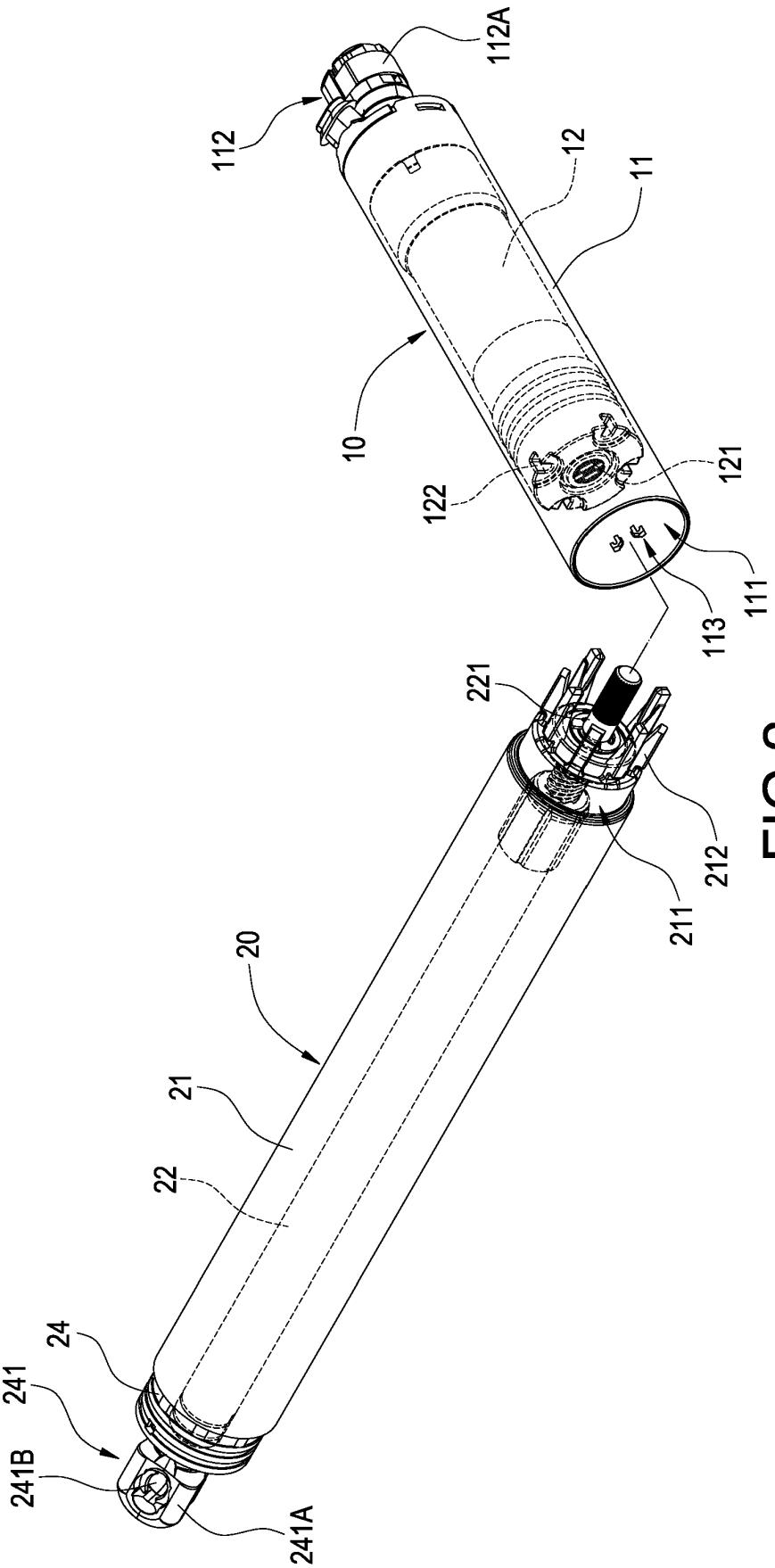

112A
112
12
11
10
121
122
111
113
221
212
211
20
21
22
24
241
241B
241A

FIG.2

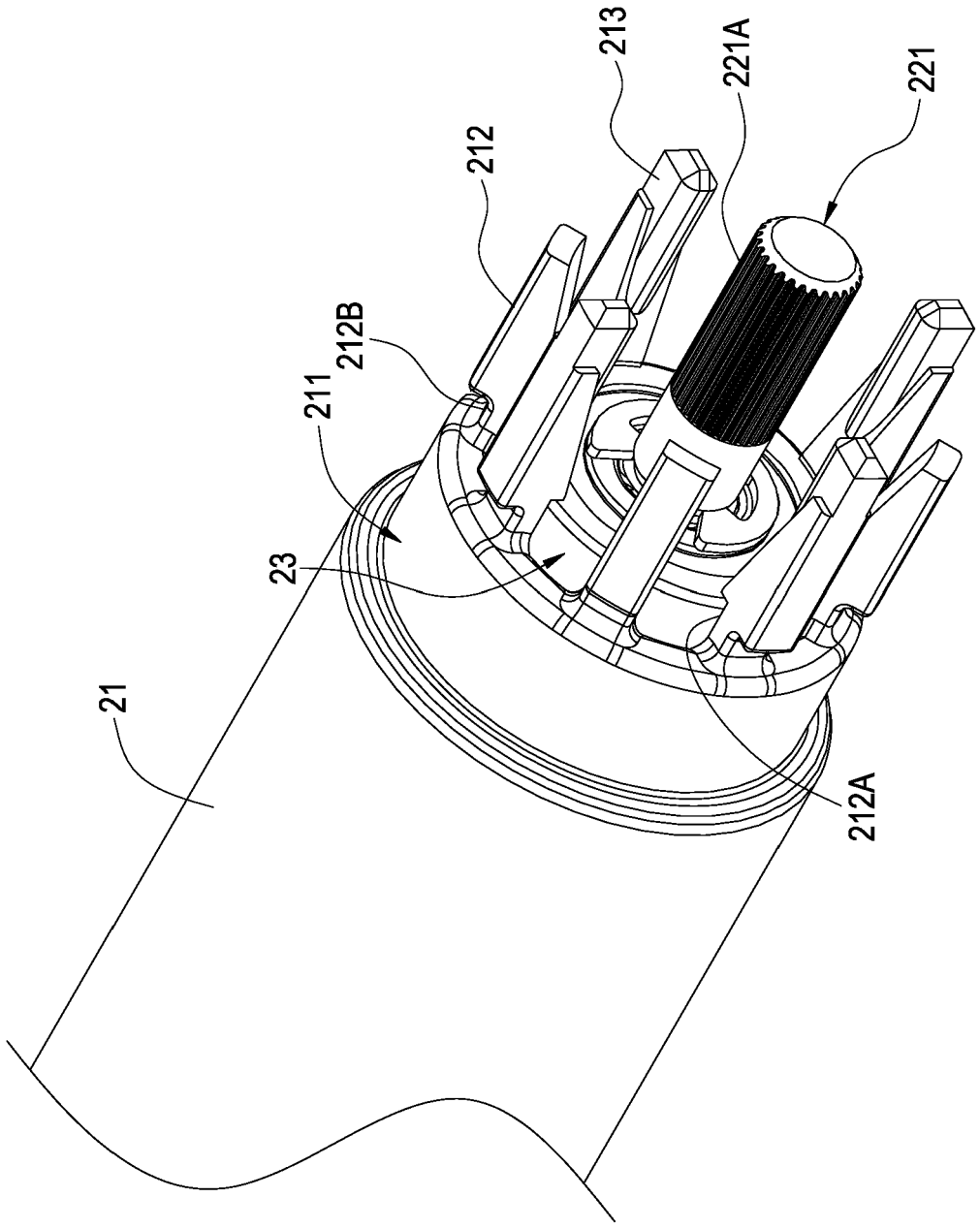


FIG.3

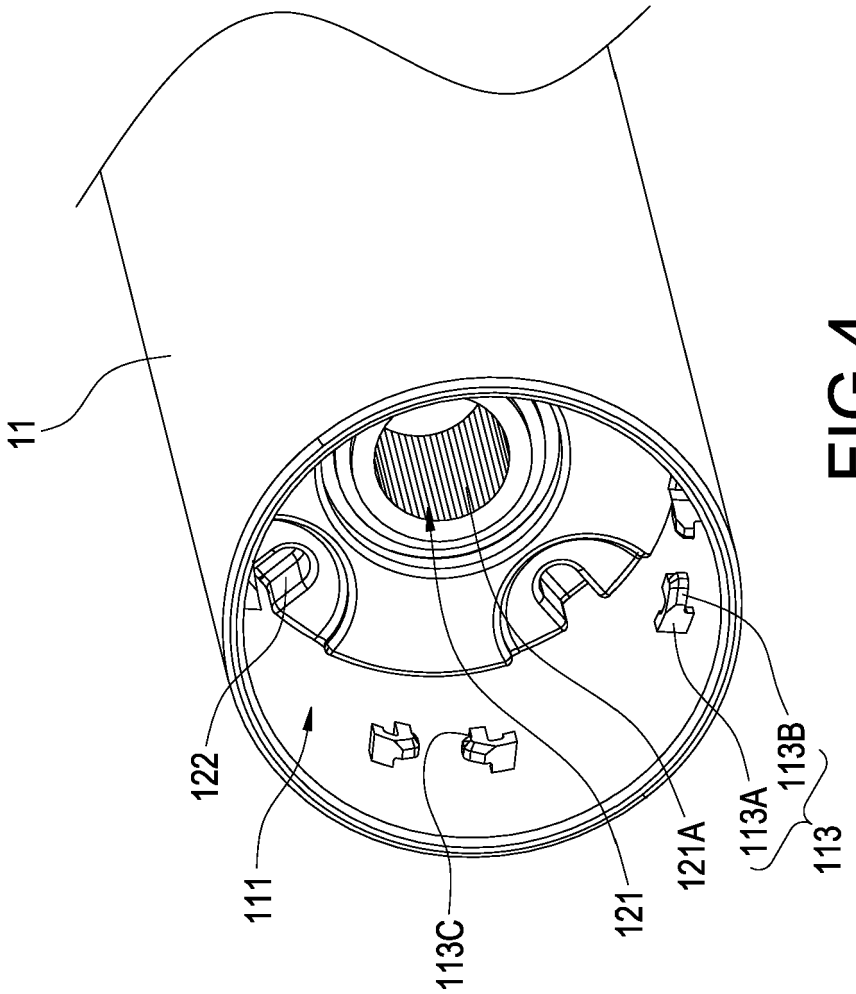


FIG.4

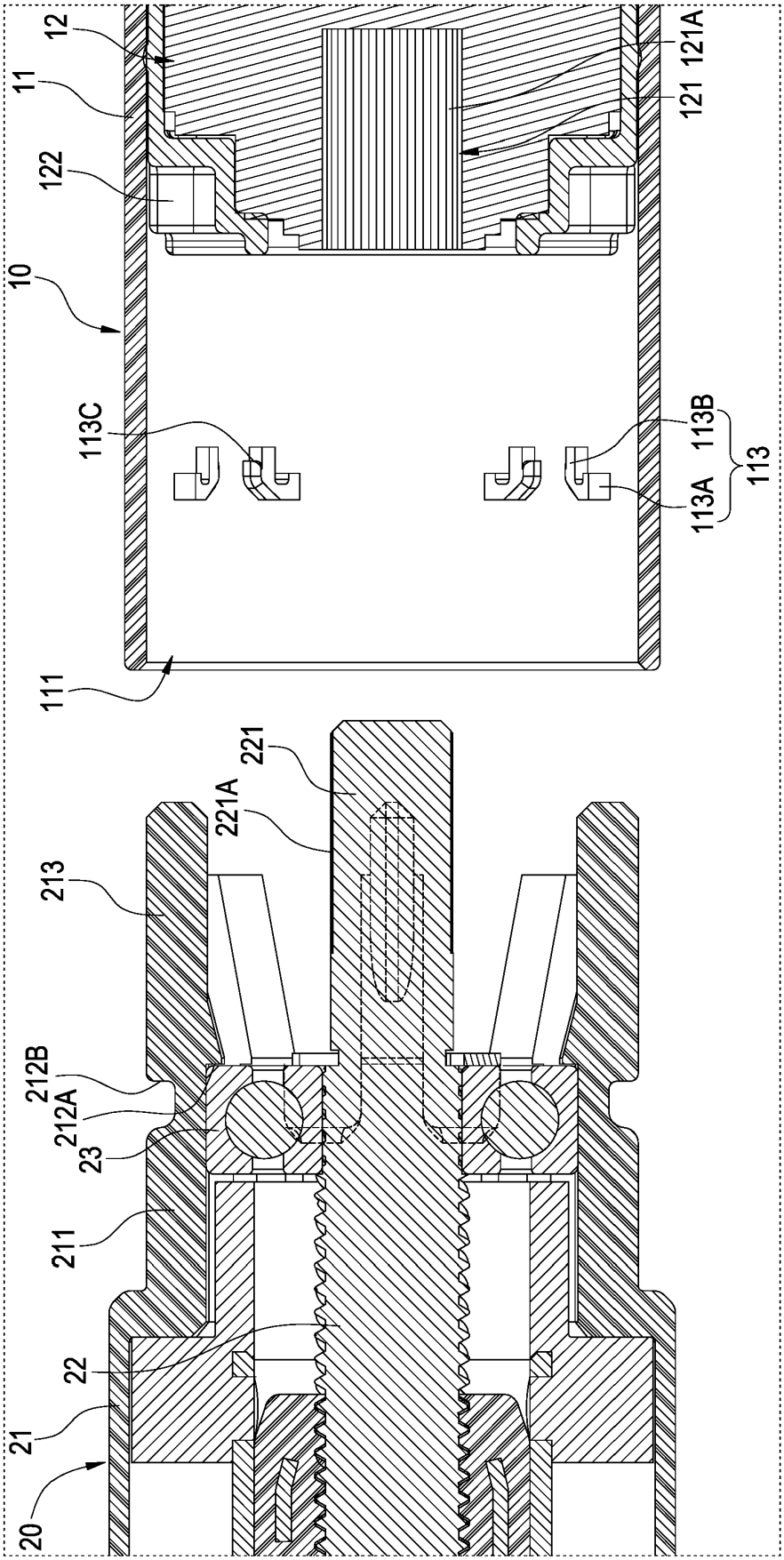

12
11
122
10
113C
111
221
221A
213
212B
212A
23
211
22
21
20
121A
121
113B
113A
113

FIG.5

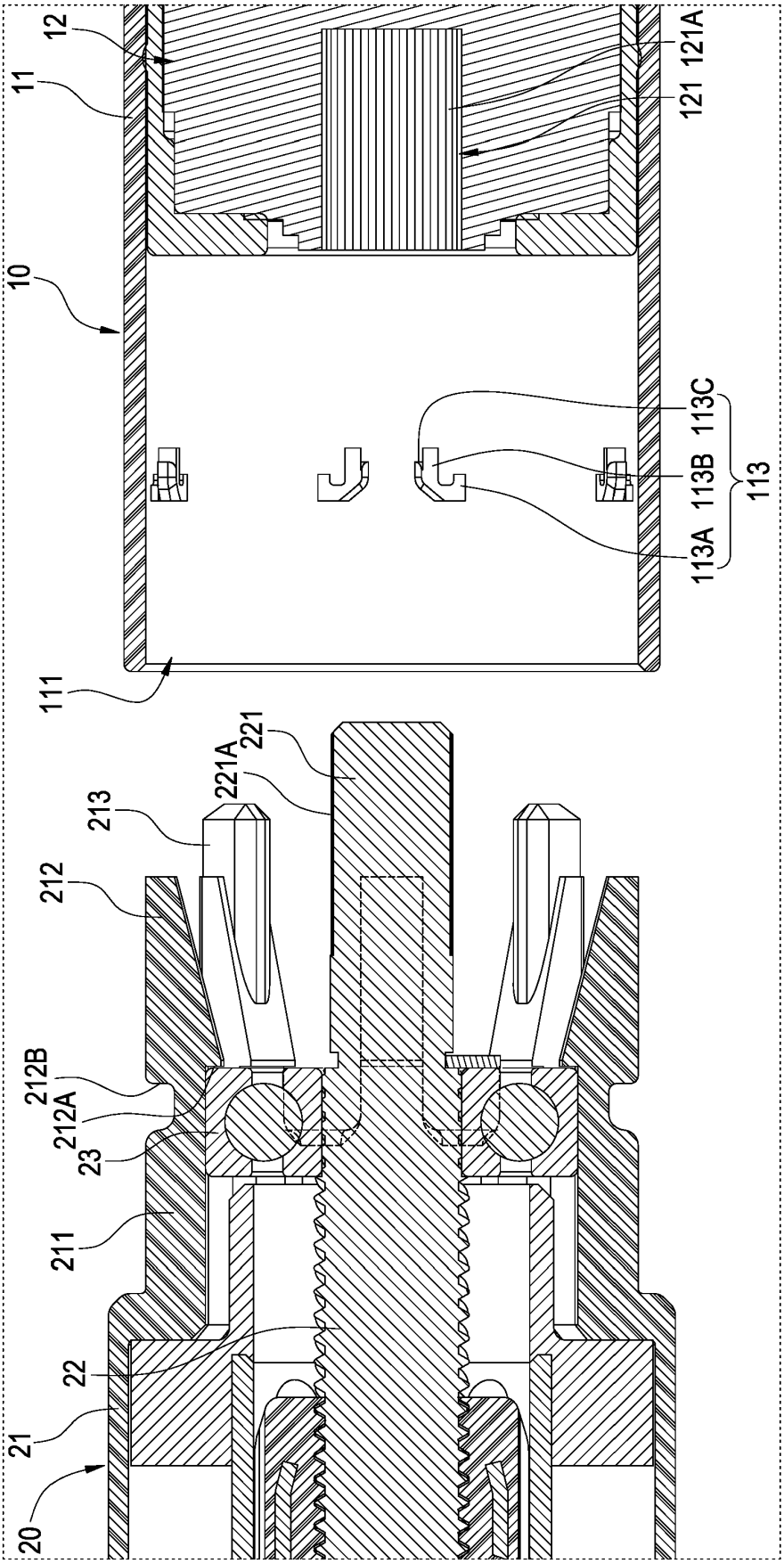

12
11
10
121A
121
113C
113B
113A
113
111
221
221A
213
212
212B
212A
23
211
22
21
20

FIG.6

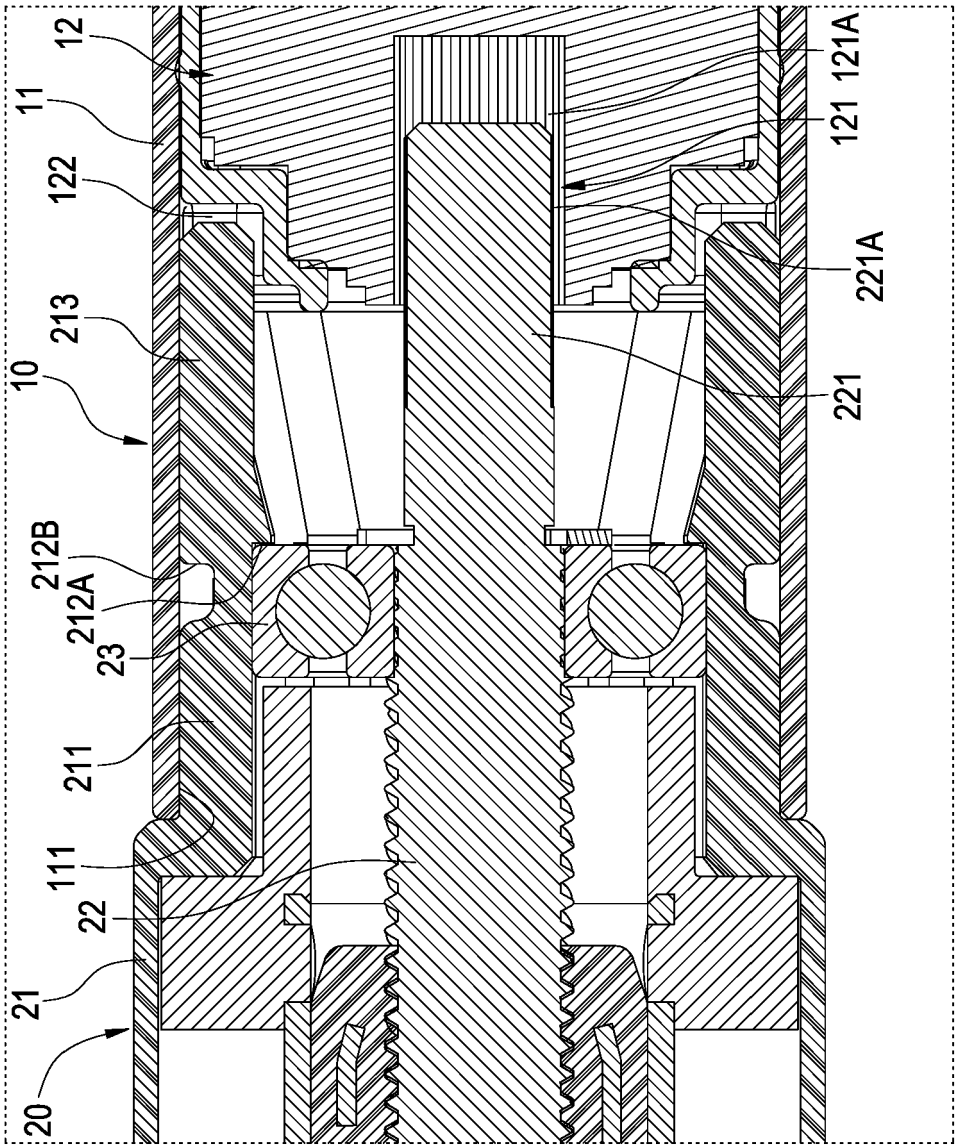


FIG.7

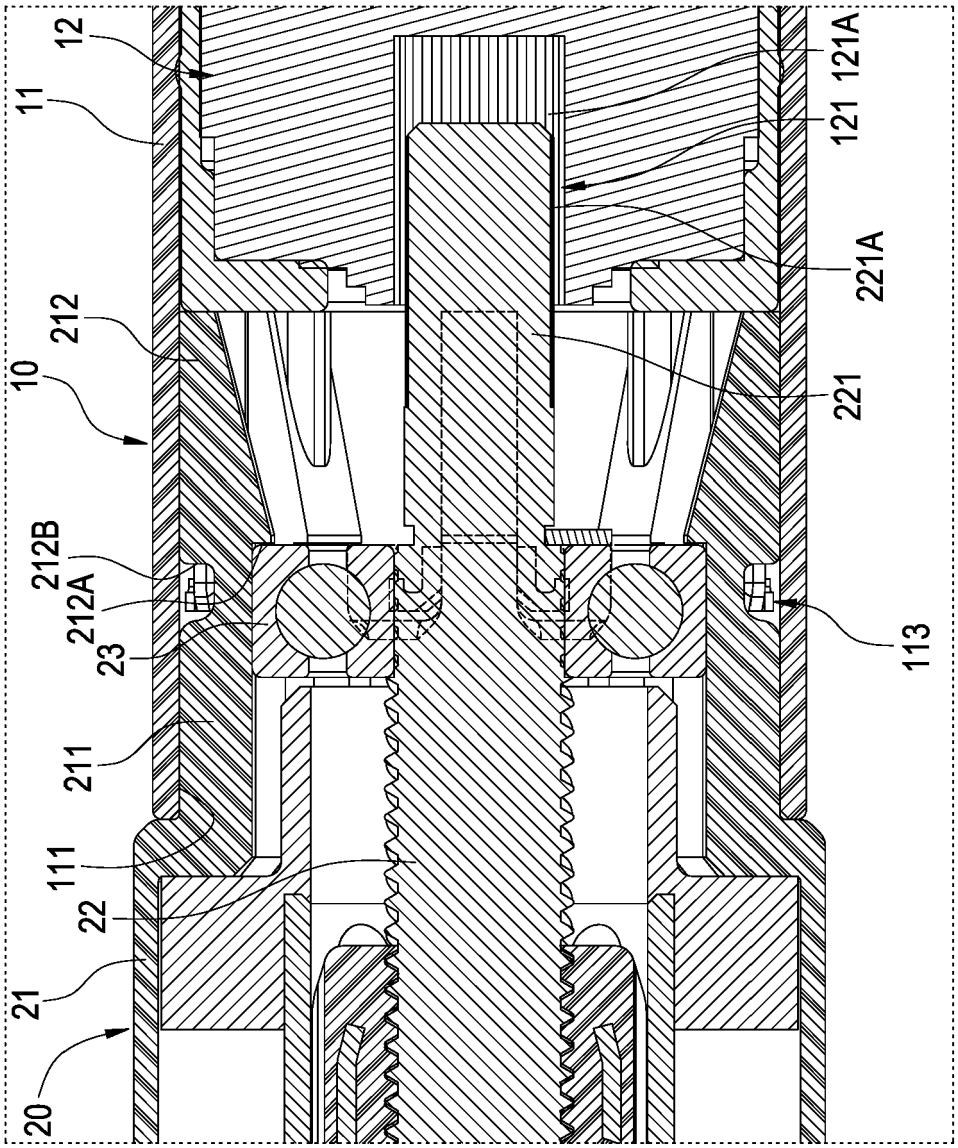


FIG.8

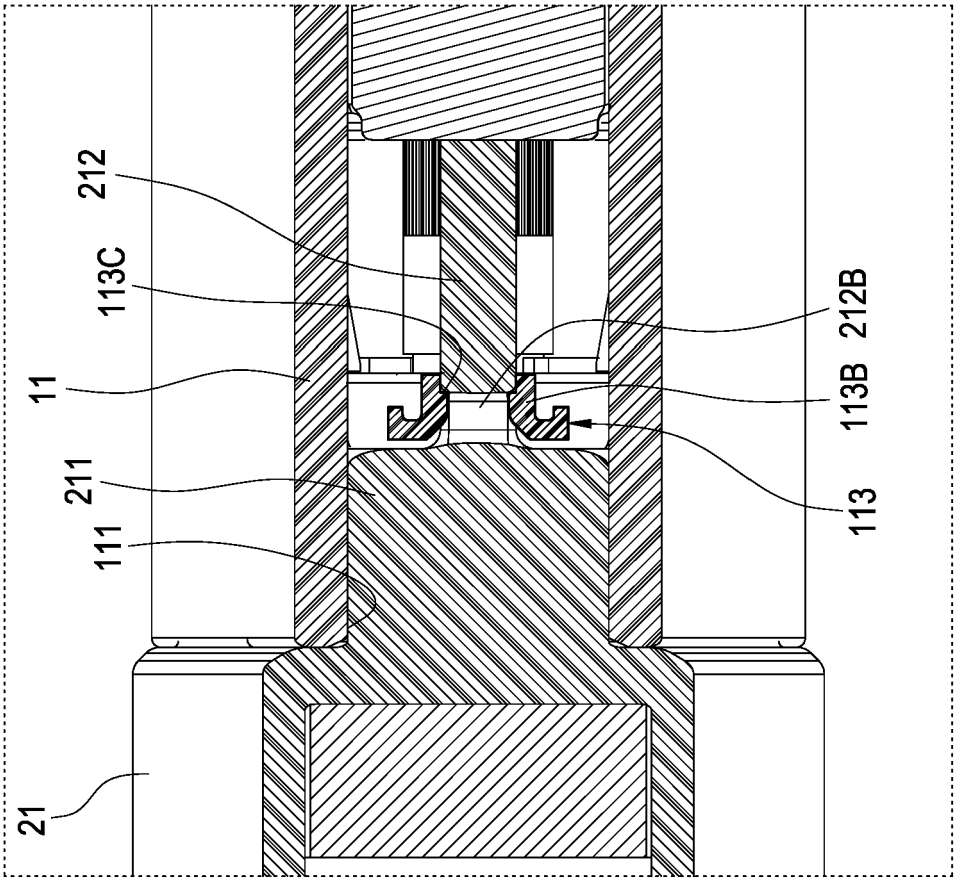
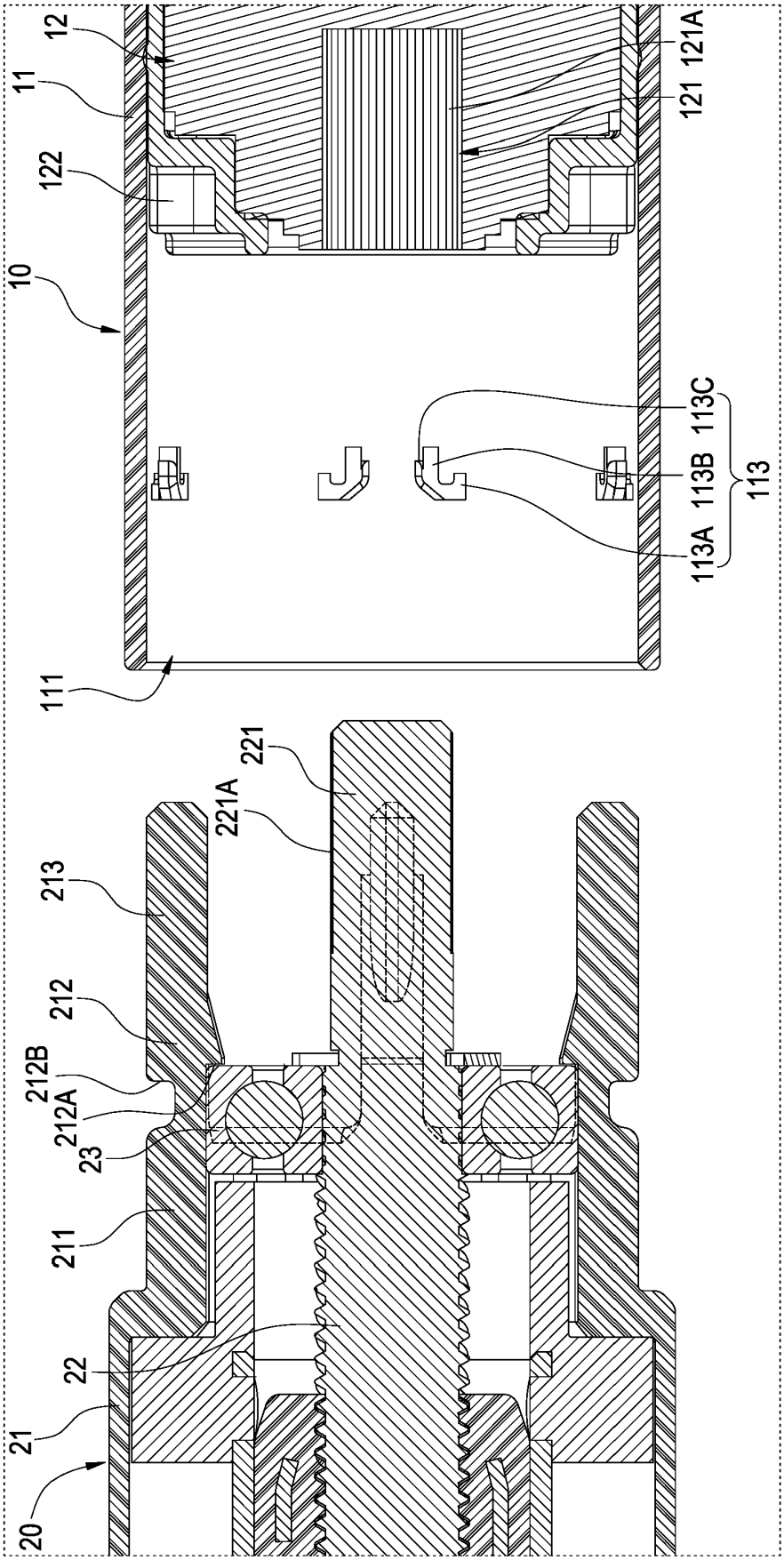


FIG.9


12
11
122
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121A
121
113C
113B
113A
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111
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221A
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212
212B
212A
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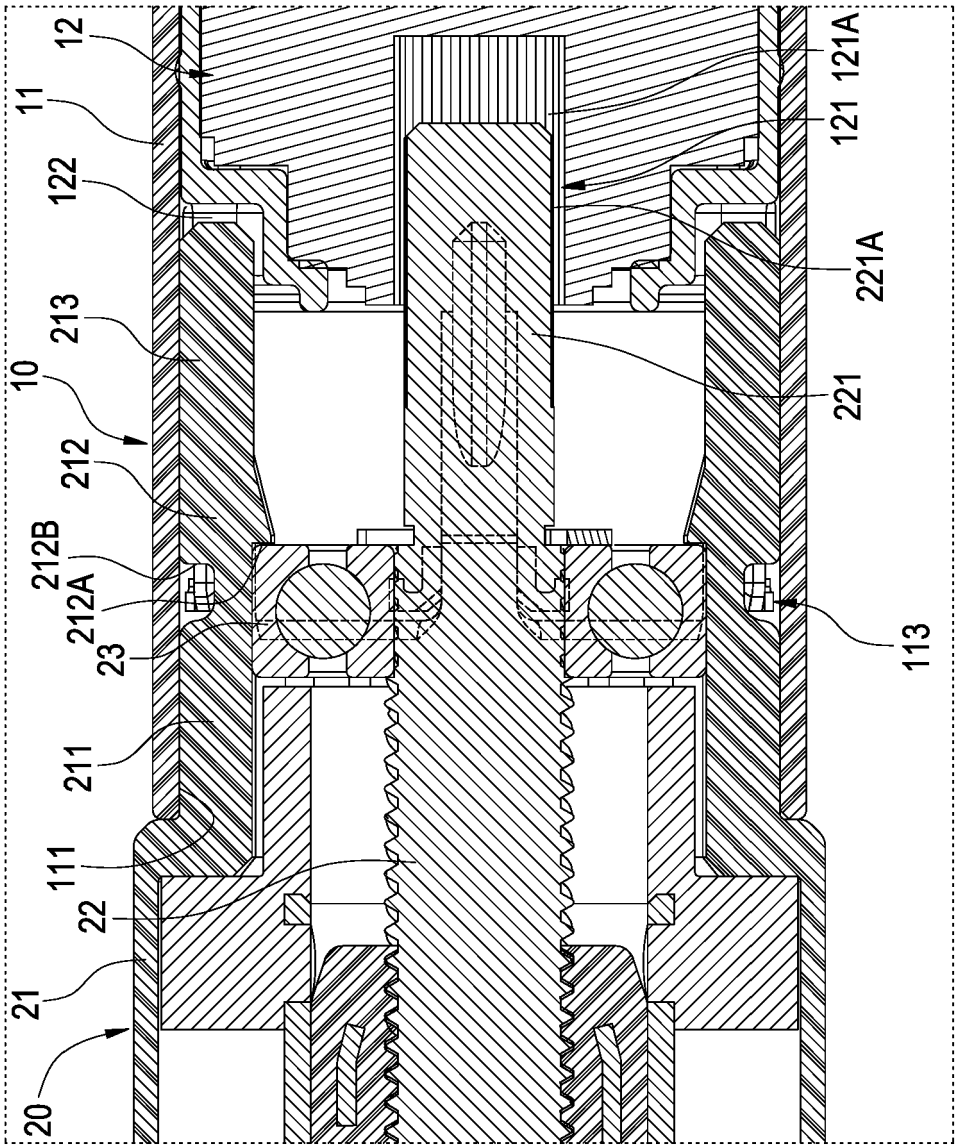
20

FIG.10


12
11
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213
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212B
212A
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211
111
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121A
121
221A
221
113

FIG.11

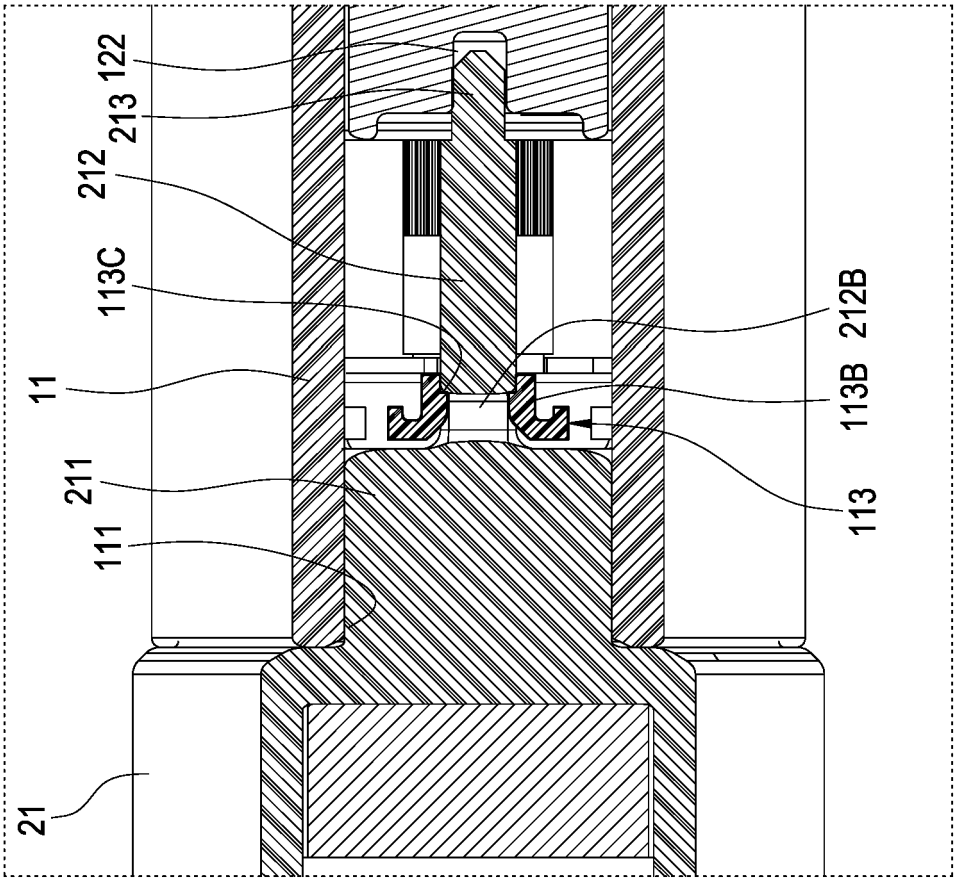

FIG.12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 6772653 B1 **[0005]**