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(71) Applicant: **You Lu Enterprise Co., Ltd.**
Taichung City (TW)

(72) Inventor: **Lin, Tsung-Te**
Taichung City (TW)

(74) Representative: **Zeitler Volpert Kandlbinder**
Patent- und Rechtsanwälte Partnerschaft mbB
Herrnstrasse 44
80539 München (DE)

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(54) **QUICK-RELEASE DEVICE FOR SCREWDRIVER BITS**

(57) A quick-release device for screwdriver bit (40) includes a shank (10) having a polygonal hole (11) longitudinally defined in one end thereof and adapted for partially receiving a bit (40). At least one slot (13) is longitudinally defined in the shank (10). An annular groove (14) is defined in an inner periphery of the polygonal hole (11) and communicates with the at least one slot (13), wherein the annular groove (14) is formed with a tapered section (15) toward the first end of the shank (10). An

expandable limit element (16) is received in the annular groove (14). A sleeve (20) is movably sleeved on the shank (10). The sleeve (20) has at least one protrusion (21) inwardly extending therefrom and engaged into the at least one slot (13) and abutting against the limit element (16) when removing the bit (40) from the polygonal hole (11). A stopper (30) is secured on one end of the shank (10) for preventing the sleeve (20) from removing from the shank (10).

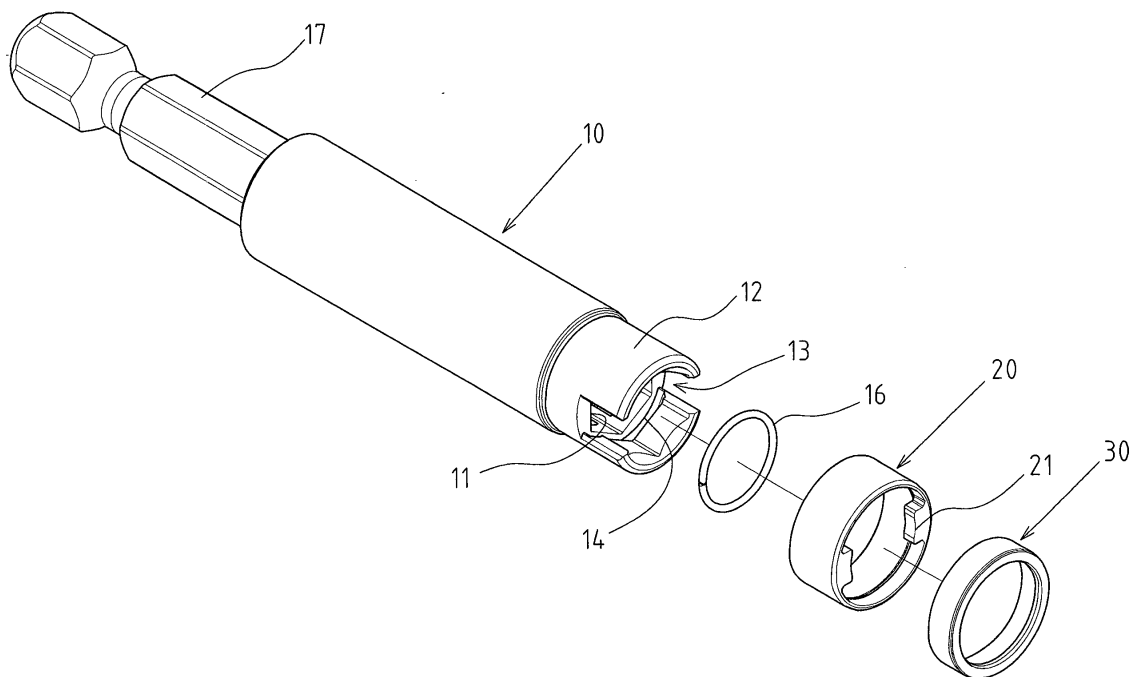


FIG.2

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a quick-release device, and more particularly to a quick-release device for screwdriver bits.

2. Description of Related Art

[0002] In our daily life, a screwdriver bit is usually longitudinally mounted into a hand tool for rotating a screw or a bolt. However, the standards of the screw/bolt are various. Consequently, the bits need to be often changed and a quick-release device for the screwdriver bit is needed for smooth operations. The conventional hand tool has a ring movably sleeved on a distal end thereof for mounting the bit and multiple steel balls are respectively radially disposed in the ring for positioning the steel balls. An outer sleeve is movably sleeved on the ring for selectively inwardly pushing the steel balls to hold the inserted bit in place. However, the inner space of the ring is limited such that to process space for/and mount steel balls is a difficult work and the processing cost of the ring is raised. Furthermore, the ring needs to have a thick wall for ensuring the structural strength of the ring after being processed. As a result, the ring must be made thicker and the metal material is wasted and a small operating space is very inconvenient for operation.

The present invention has arisen to mitigate and/or obviate the disadvantages of the conventional quick-release device for screwdriver bits.

SUMMARY OF THE INVENTION

[0003] The main objective of the present invention is to provide an improved quick-release device for screwdriver bits, which has simplified structures.

[0004] To achieve the objective, the quick-release device in accordance with the present invention comprises a shank having a first end and a second end. The shank has a polygonal hole longitudinally defined in the first end thereof and the polygonal hole is adapted for partially receiving a bit, wherein the bit has a groove annularly defined therein. At least one slot is longitudinally defined in the first end of the shank. An annular groove is defined in an inner periphery of the polygonal hole and communicates with the at least one slot, wherein the annular groove is formed with a tapered section toward the first end of the shank. An expandable limit element is received in the annular groove, wherein the limit element has an outer diameter slightly smaller than a diameter of the annular groove. A sleeve is movably sleeved on the first end of the shank. The sleeve has at least one protrusion inwardly extending therefrom, wherein the at least one protrusion is engaged into the at least one slot to prevent

the sleeve from being rotated relative to the hollow stub and the at least one protrusion abuts against the limit element when removing the bit from the polygonal hole. A stopper is secured on one end of the shank for preventing the sleeve from removing from the shank.

[0005] Further benefits and advantages of the present invention will become apparent after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006]

Fig. 1 is a perspective view of a quick-release device for screwdriver bits in accordance with the present invention;

Fig. 2 is an exploded perspective view of a quick-release device for screwdriver bits in accordance with the present invention;

Fig. 3 is a cross-sectional view of the quick-release device for screwdriver bits in Fig. 2;

Fig. 4 is a front plan view of the quick-release device for screwdriver bits in accordance with the present invention; and

Figs. 5 to 11 are operational views of the quick-release device for screwdriver bits in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0007] Referring to the drawings and initially to Figs. 1-4, a quick-release device for screwdriver bits in accordance with the present invention comprises a shank 10, a sleeve 20 movably sleeved on one end of the shank 10 and a stopper 30 is secured on one end of the shank 10 for preventing the sleeve 20 from removing from the shank 10.

[0008] The shank 10 has a first end and a second end. The shank 10 has a polygonal hole 11 longitudinally defined in the first end of the shank 10 for partially receiving a bit 40, wherein the bit 40 has a groove 41 annularly defined therein. A hollow stub 12 longitudinally extends from the first end of the shank 10 and at least one slot 13 is longitudinally defined in the hollow stub 12. In the preferred embodiment of the present invention, the hollow stub 12 has a diameter smaller than that of the shank 10 and a diametrical difference is formed between the shank 10 and the hollow stub 12, wherein the diametrical difference is equal to a thickness of the sleeve 20. The hollow stub 12 has two slots 13 defined therein and the two slots 13 diametrically correspond to each other. An annular groove 14 is defined in an inner periphery of the polygonal hole 11 and communicates with the at least one slot 13. The annular groove 14 is formed with a tapered section 15 toward the hollow stub 12. An expandable limit element 16 is received in the annular groove 14, wherein the limit element 16 has an outer diameter

slightly smaller than a diameter of the annular groove 14. In the preferred embodiment of the present invention, the limit element 16 is a C-ring, an O-ring and the like. The shank 10 further includes a polygonal shaft 17 extending from the second end thereof. The polygonal shaft 17 is adapted to be connected to a handle (not shown) for operator to easily operate the bit 40.

[0009] The sleeve 20 is movably sleeved on the hollow stub 12 and reciprocally moved relative to the hollow stub 12. The sleeve 20 has at least one protrusion 21 inwardly extending therefrom, wherein the at least one protrusion 21 is engaged into the at least one slot 13 to prevent the sleeve 20 from being rotated relative to the hollow stub 12. The at least one protrusion 21 abuts against the limit element 16 when removing the bit 40 from the polygonal hole 11.

[0010] With reference to Figs. 1, 5 and 6, the bottom of the bit 40 is directly inserted into the polygonal hole 11 when assembling the bit 40 the quick-release device in accordance with the present invention. Further with reference to Fig. 9, the limit element 16 is expended due to the shank is the bit 40 after the bottom of the bit 40 passing through the limit element 16. The limit element 16 directly engaged into a groove 41 peripherally defined in the bit 40 and the bottom of the bit 40 abuts a bottom of the polygonal hole 11 when the limit element 16 horizontally corresponds to the groove 41. Consequently, the operator can easily drive a screw by using the quick-release device in accordance with the present invention when the bit 41 is inserted into and positioned in the polygonal hole 11. Under this condition, the limit element 16 is moved with the bit 40 when the bit 40 is reversely pulled. The limit element 16 is inwardly pushed to more tightly engage into the groove 41 due to the tapered section 15 of the annular groove 14 in the shank 10 such that the bit 40 cannot be freely removing from the polygonal hole 11 in the shank 10.

[0011] With reference to Figs. 1, 7, 8 and 11, when removing the bit 40 from the polygonal hole 11 in the shank 10, the sleeve 20 is inwardly moved relative to the shank 10 to make the at least one protrusion 21 engaged to the limit element 16. Consequently, the limit element 16 does not be moved with the bit 40 toward the tapered section 15 when the bit 40 is pulled from the polygonal hole 11 in the shank 10 such that the bit 40 in the polygonal hole 11 is removed from the shank 10 when the limit element 16 is expanded due to the moving bit 40.

[0012] As described above, the quick-release device for screwdriver bits in accordance with the present invention includes the following advantages.

1. Cost down: the steel balls of the conventional quick-release device for screwdriver bits is unnecessary to the quick-release device in accordance with the present invention because the quick-release device in accordance with the present invention uses a one-piece limit element, such as a marketed C-ring or an marketed O-ring, for locating the mounted

bit, wherein the limit element is cheap because it is a marketed specified product such that the manufacturing cost of the quick-release device in accordance with the present invention is reduced.

2. The shank of the present invention does not need to process cavities for mounting steel balls that that the thickness of the shank is made thinner relative to the conventional quick-release device for screwdriver bits. In addition, the diametrical difference, between the shank and the sleeve, is equal to a thickness of the sleeve such that the total weight of the shank does not be raised.

[0013] Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

Claims

1. A quick-release device for screwdriver bits, comprising:

a shank having a first end and a second end, the shank having a polygonal hole longitudinally defined in the first end thereof and adapted for partially receiving a bit, wherein the bit has a groove annularly defined therein, at least one slot longitudinally defined in the first end of the shank, an annular groove defined in an inner periphery of polygonal hole and communicating with the at least one slot, an expandable limit element received in the annular groove, wherein the limit element has an outer diameter slightly smaller than a diameter of the annular groove; a tapered section (15) annularly on an inner periphery of the annular groove toward the first end of the shank, wherein the limit element is moved with the bit when the bit is freely reversely pulled and the limit element is inwardly pushed to more tightly engage into the groove due to the tapered section such that the bit cannot be freely removing from the polygonal hole in the shank; a sleeve movably sleeved on the first end of the shank, the sleeve having at least one protrusion inwardly extending therefrom, wherein the at least one protrusion is engaged into the at least one slot to prevent the sleeve from being rotated relative to the hollow stub, the at least one protrusion abutting against the limit element when removing the bit from the polygonal hole; and a stopper secured on one end of the shank for preventing the sleeve from removing from the shank.

2. The quick-release device for screwdriver bits as claimed in claim 1, wherein the shank includes a hollow stub longitudinally extending from the first end thereof and the at least one slot is longitudinally defined in the hollow stub, a sleeve movably sleeved on the hollow stub, the hollow stub having a diameter smaller than that of the shank and a diametrical difference being formed between the shank and the hollow stub, wherein the diametrical difference is equal to a thickness of the sleeve. 5
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3. The quick-release device for screwdriver bits as claimed in claim 1, wherein the shank further includes a polygonal shaft extending from the second end thereof and adapted to be connected to a handle for an operator to easily operate the bit that is inserted into the polygonal hole. 15
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4. The quick-release device for screwdriver bits as claimed in claim 2, wherein the shank further includes a polygonal shaft extending from the second end thereof and adapted to be connected to a handle for an operator to easily operate the bit that is inserted into the polygonal hole. 25
5. The quick-release device for screwdriver bits as claimed in claim 1, wherein the limit element is selected from the group consisting of C-ring and O-ring.
6. The quick-release device for screwdriver bits as claimed in claim 2, wherein the limit element is selected from the group consisting of C-ring and O-ring. 30
7. The quick-release device for screwdriver bits as claimed in claim 3, wherein the limit element is selected from the group consisting of C-ring and O-ring. 35
8. The quick-release device for screwdriver bits as claimed in claim 4, wherein the limit element is selected from the group consisting of C-ring and O-ring. 40

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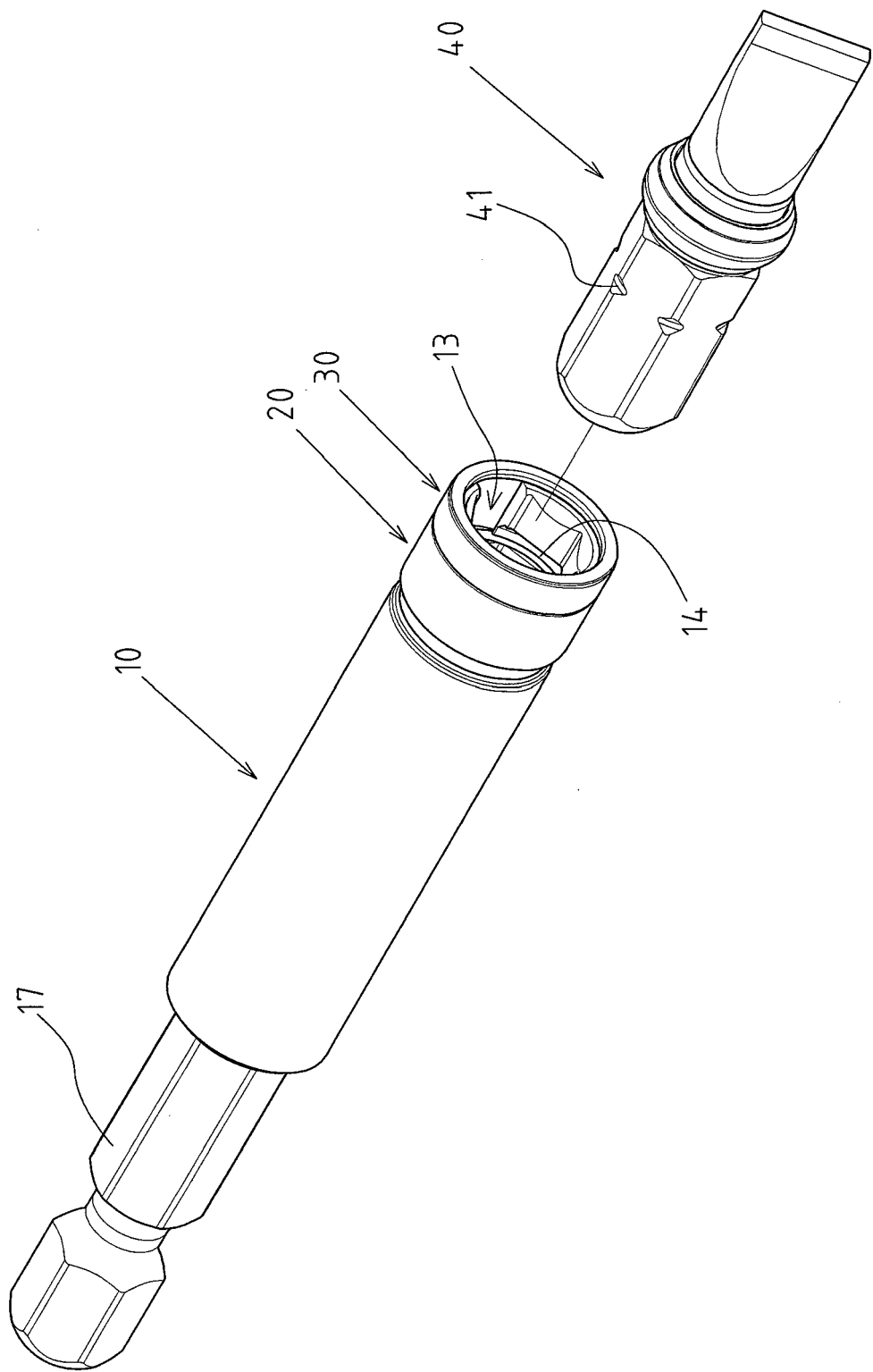


FIG.1

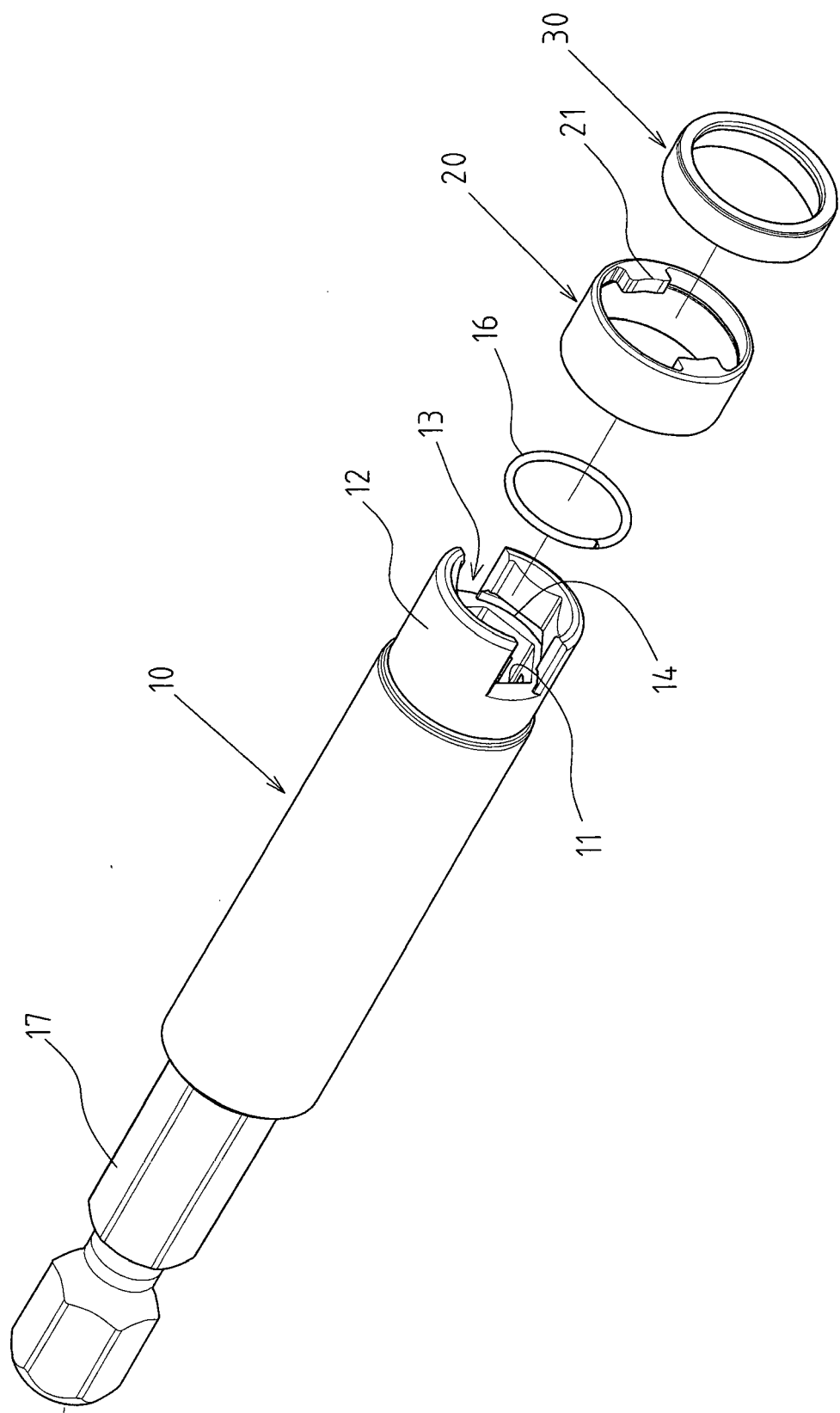


FIG.2

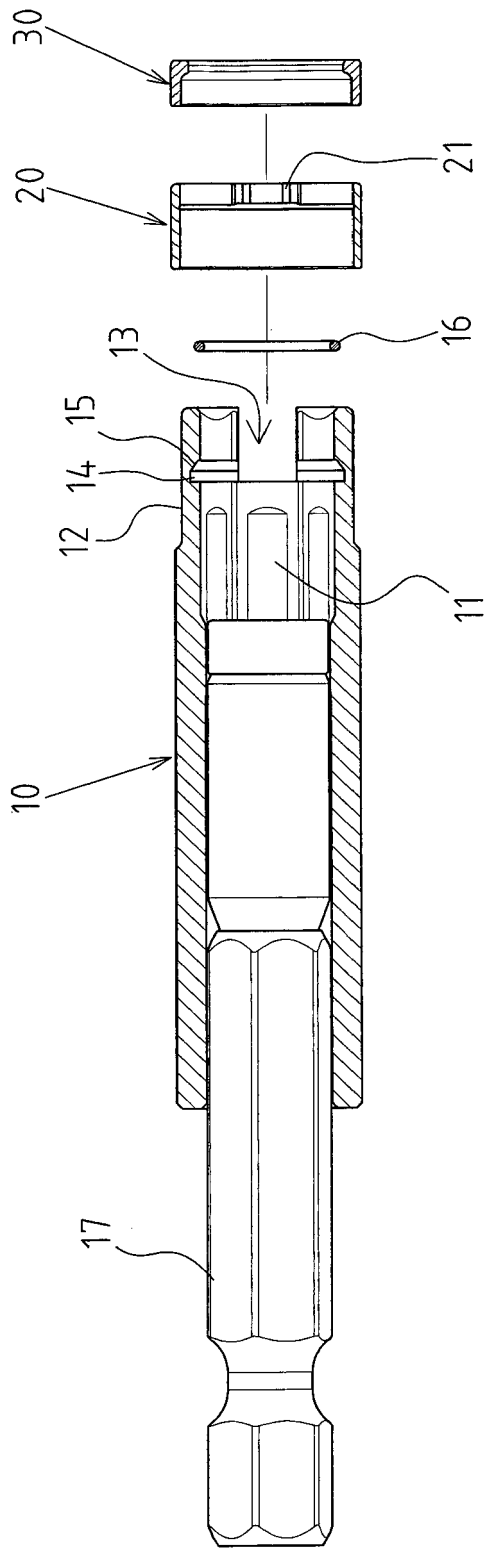


FIG.3

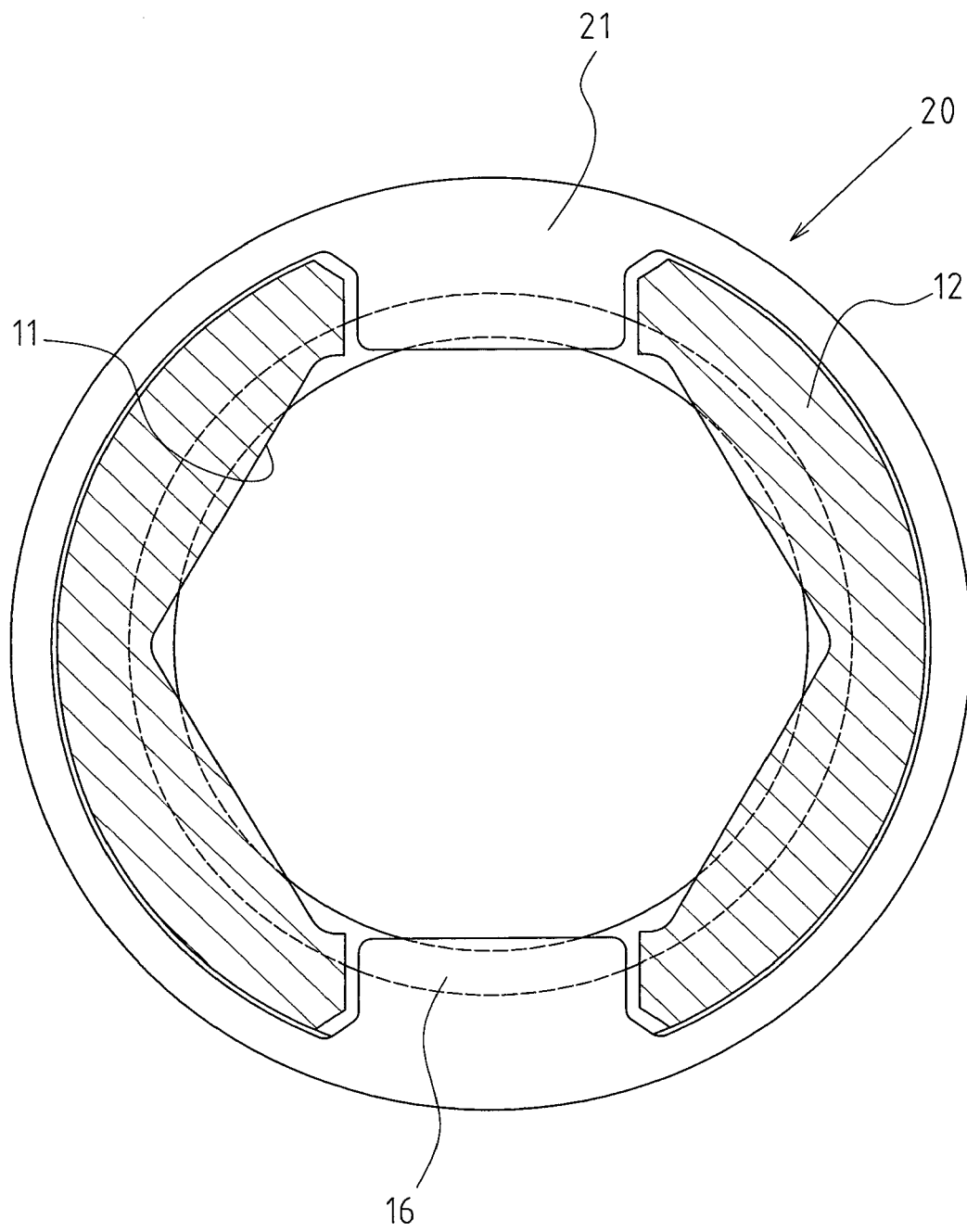


FIG. 4

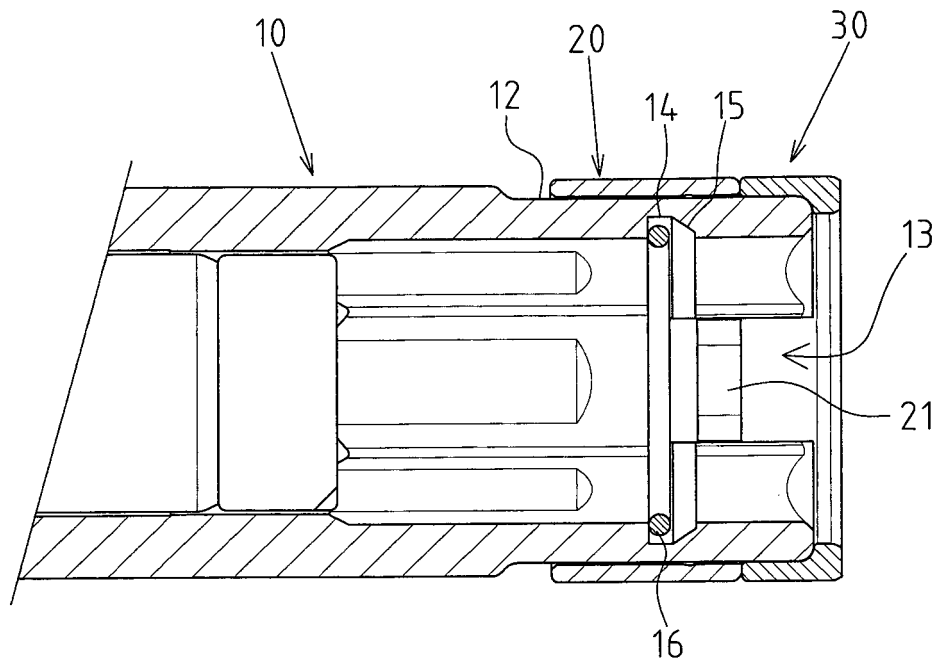


FIG. 5

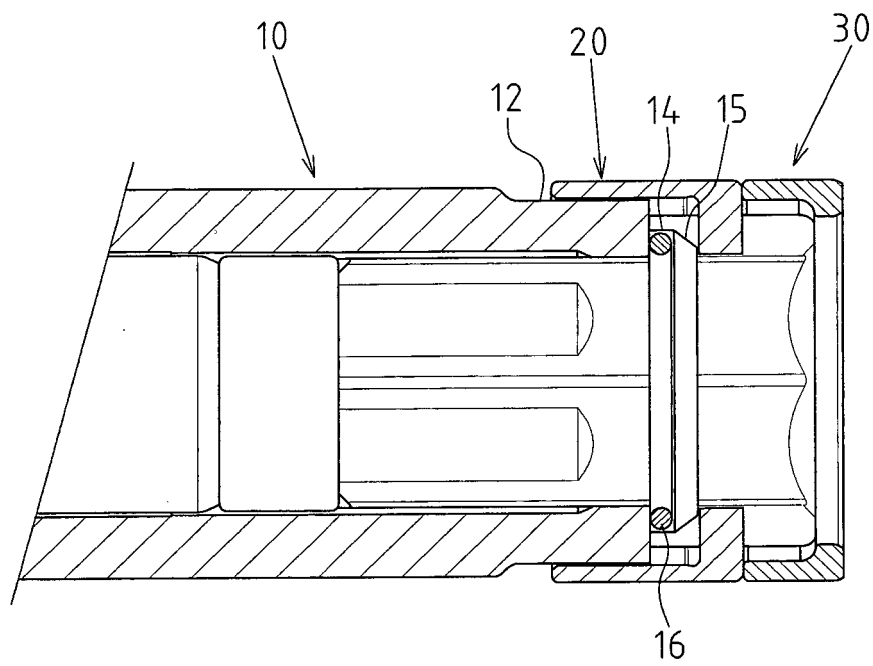


FIG. 6

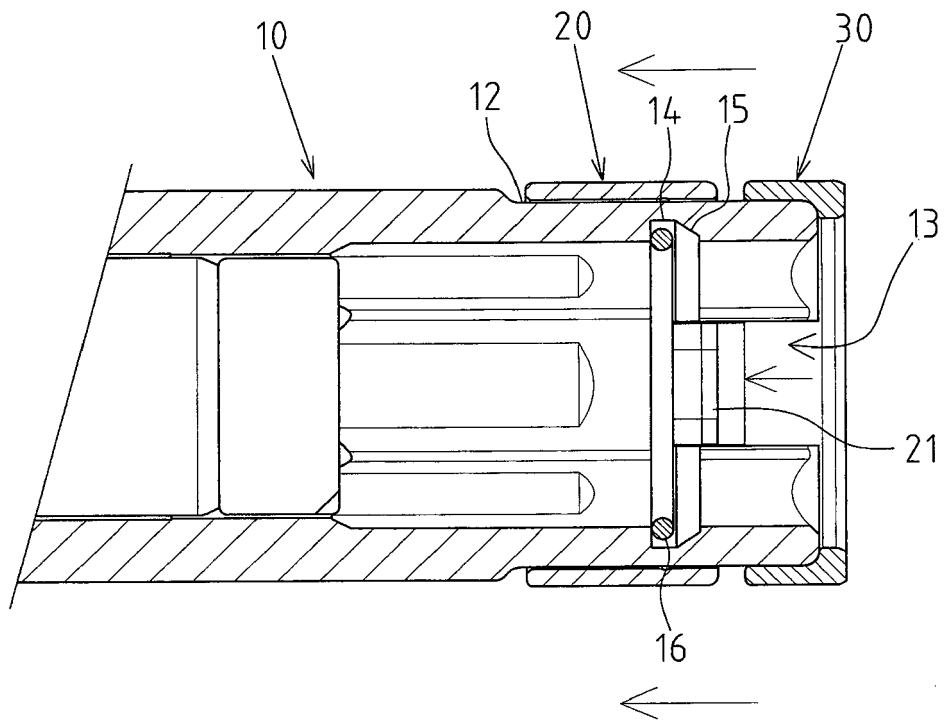


FIG. 7

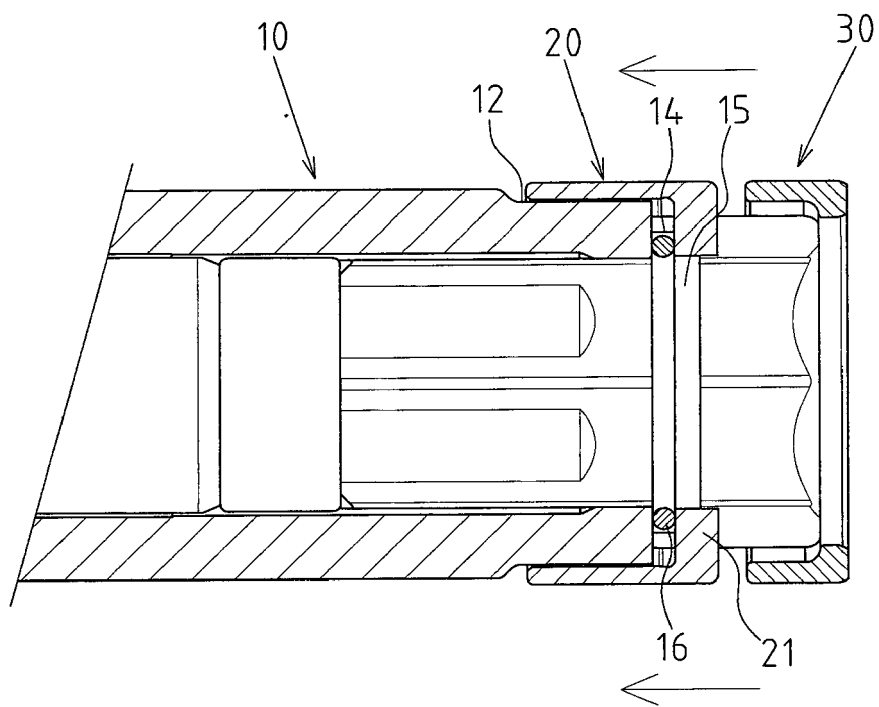


FIG. 8

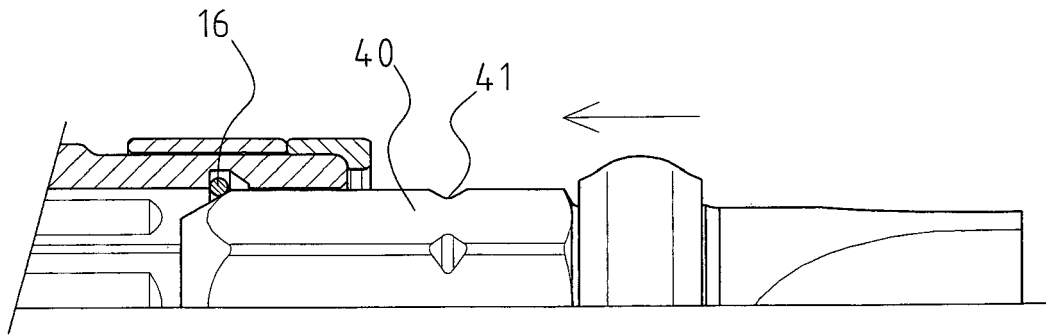


FIG. 9

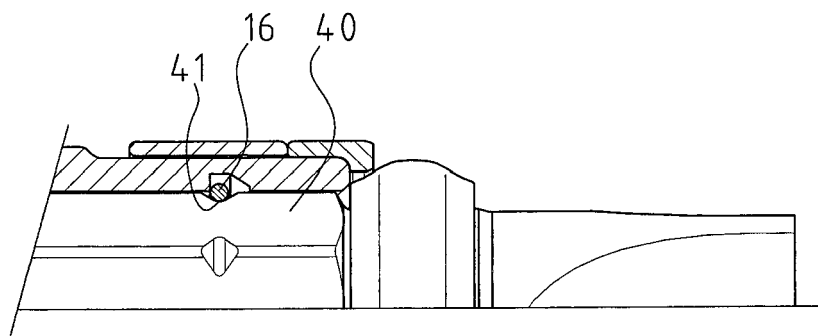


FIG. 10

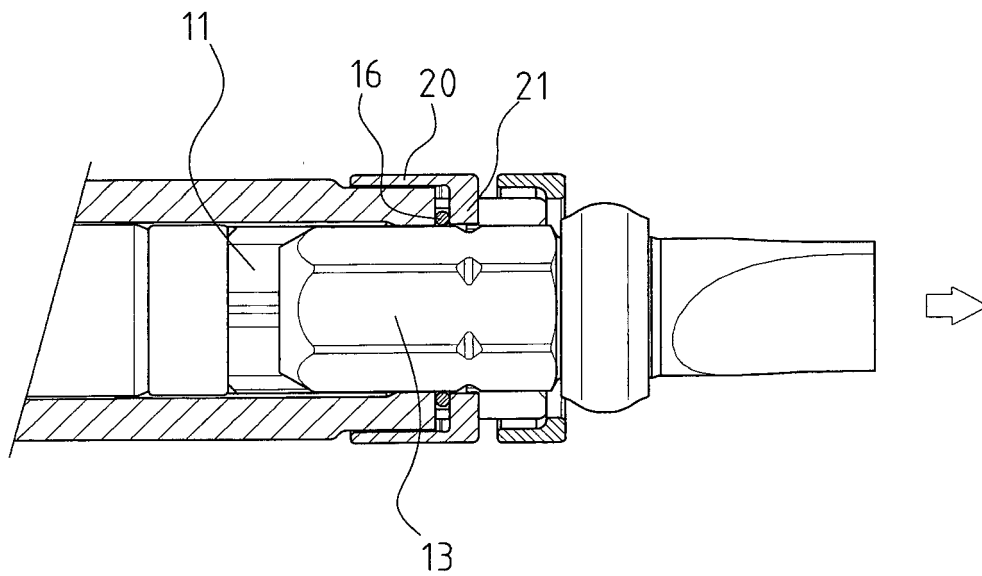


FIG. 11



EUROPEAN SEARCH REPORT

 Application Number
 EP 16 00 0896

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 November 2016	Examiner Hartnack, Kai
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