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(54) **ADJUSTABLE WALKING CANE**

(57) An adjustable walking cane (70) includes an inner tube (10), an outer tube (20), a connecting rod (30), a pushing unit (40) and an extending unit (50). A spring compresses the connecting rod (30) against the extending unit (50) and the pushing unit (40), a resilient sleeve (54) bears against the inner threaded segment (23) on the outer tube (20), and then the length of the outer tube and inner tube can be fixed. In the extending process, the inner tube and the outer tube extend outwardly by pulling the cane from two ends thereof, and the inner tube and the outer tube are released from compression while the resilient sleeve (54) is detached from the inner threaded segment. In the retracting process, the inner tube and the outer tube are released from compression while the extending pieces on the extending unit driven by controlling unit is detached from the taper surface (41) of the pushing unit (40).

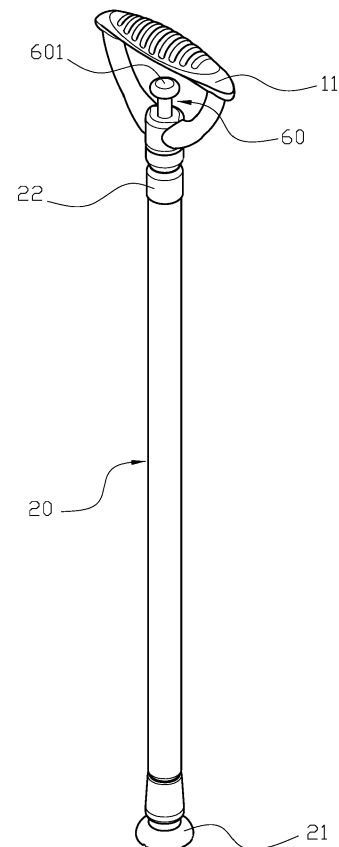


FIG. 1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a walking cane, and more particularly to an adjustable walking cane that can be simply operated and adjusted.

BACKGROUND OF THE INVENTION

[0002] The current adjustable walking cane (70) (as shown in FIGs. 10 and 11) has a first stem (71) and a second stem (72). A positioning unit (80) comprising a sleeve (81) and an annular compressible unit (82) is formed between the first stem (71) and the second stem (72). The sleeve (81) is tightly engaged with the second stem (72), and a surface thereof has an outer threaded segment (811). A lower end of the annular compressible unit (82) shaped into a cone is connected to the outer threaded segment (811) of the sleeve (81), and a resilient claw portion (821) is formed at a bottom thereof. The sleeve (81) is inserted and engaged with a taper base (90), and a supporting portion (812) is formed at an upper portion thereof for supporting the taper base (90). The resilient claw portion (821) of the annular compressible unit (82) bears against the taper base (90) to grip an interior surface of the first stem (71). The user can adjust the length of the cane (70) by twisting the second stem (72) that simultaneously drives the sleeve (81) and the taper base (90) to spin. By tightening or loosening the outer threaded segment (811) of the sleeve (81), the relative positions between the annular compressible unit (82) and the taper base (90) can be changed for achieving the effect of adjusting the length of cane (70).

[0003] However, conventional adjustable walking cane (70) is disadvantageous because: (i) by tightening the outer threaded segment (811) of the sleeve (81), the resilient claw portion (821) of the annular compressible unit (82) bears against the taper base (90) to grip the interior surface of the first stem (71). The user need to exert more strength to compress the sleeve (81) forward to the annular compressible unit (82) while the position of the outer threaded segment (811) of the sleeve (81) is more closer to the taper base (90). Also, when the user exerts more strength on the first stem (71), the outer threaded segment (811) of the sleeve (81) is compressed tightly by the annular compressible unit (82), so the probability of getting stuck between the annular compressible unit (82) and the sleeve (81) and the difficulty of disengaging the second stem (72) by twisting for the user are increased; (ii) the length of the cane (70) is adjusted by twisting the outer threaded segment (811) of the sleeve (81) and the annular compressible unit (82). the twisting action is difficult for the user to perform while a surface of the second stem (72) is smooth; and (iii) the length of the cane (70) is fixed by bearing against the resilient claw portion (821) of the annular compressible unit (82) made of the plastic material to grip the interior surface of the

first stem (71), and the frictional resistance is insufficient while the interior surface of the first stem (71) is smooth. Thus, the cane (70) is not reliable while the annular compressible unit (82) and the first stem (71) can not be engaged tightly. Therefore, there remains a need for a new and improved design for an adjustable walking cane to overcome the problems presented above.

SUMMARY OF THE INVENTION

[0004] The present invention provides an adjustable walking cane, which comprises an inner tube, an outer tube, a connecting rod, a pushing unit and an extending unit. The inner tube is connected to a first handle at one end, and a protruding portion is formed at the other end thereof. A controlling unit having a cover at one end is formed adjacent the first handle, and a through hole is formed on the first handle for penetration by the other end of the controlling unit. The outer tube comprises a non-slip plug received at one end and a restricting cover is secured on the other end. A block portion is formed at an inner edge of the restricting cover for engaging with the protruding portion of the inner tube while the outer tube is connected to the inner tube, and an inner threaded segment is formed at an inner surface of the outer tube. The connecting rod driven by pressing the controlling unit is secured with the controlling unit at one end, and a threaded segment formed at the other end is connected to the outer tube, and a blocking piece is formed at a central portion thereof. The pushing unit having a tapered surface at one end is secured at an open end of the inner tube with the protruding portion thereon, and a connecting portion is formed at the other end thereof. The connecting portion is compressed against the inner tube, and a plurality of axial slots are formed thereon for increasing the deformation of the connecting portion by compression. An annular portion protruding from a middle portion of the pushing unit is compressed against the open end of the inner tube, and a rod hole is formed at a top portion of the pushing unit for penetrating by the end of the connecting rod with the threaded segment, and a spring is formed between the pushing unit and the blocking piece. The extending unit comprises an axial pore for connecting to the threaded segment on the end of the connecting rod, and a nut is fastened on the threaded segment for securing the positions of the extending unit and the pushing unit. A plurality of extending pieces is formed around the connecting rod, and a resilient sleeve is formed at an outer edge of an upper end thereof. A first tubular piece and a second tubular piece protruded from the extending pieces are formed for limiting the position of the resilient sleeve.

[0005] Comparing with conventional adjustable walking cane, the present invention is advantageous because: (i) the resilience of the spring compresses the connecting rod against the extending unit and the pushing unit, and the resilient sleeve bears against the inner threaded segment of the outer tube, and then the length

of the outer tube and inner tube can be fixed. In extending process, the inner tube and the outer tube are extended outwardly by directly pulling the cane from two ends thereof, and the inner tube and the outer tube are released from compression while the resilient sleeve is detached from the inner threaded segment. In retracting process, by operating the controlling unit by the user, the inner tube and the outer tube are released from compression while the extending pieces on the extending unit driven by controlling unit is detached from the taper surface of the pushing unit, and the length of cane can be adjusted easily; (ii) the spring of the cane bears against the pushing unit and the blocking piece of the connecting rod, and the extending pieces on the extending unit compresses against the taper surface of the pushing unit, and the resilient sleeve compresses against the inner threaded segment while the taper surface compresses against the extending pieces. When the cane is in use, the pushing unit driven by the inner tube compresses against the extending unit, and the extending pieces on the extending unit is expanded by the pushing unit. Thus, the resilient sleeve tightly compresses against the inner threaded segment while the user exerts more strength on the first handle, and the adjustable walking cane is much reliable while the rugged thread of the inner thread segment and the resilience of the resilient sleeve increase the resistance between the resilient sleeve and the inner threaded segment; and (iii) the spring of the cane bears the connecting rod against the extending unit and the pushing unit, and the resilient sleeve is expanded against the inner threaded segment on the outer tube, and then the length of the outer tube and inner tube can be fixed. The controlling unit can be easily operated by axially detaching the taper surface of the pushing unit from the extending pieces and the resilience of the extending pieces and the resilient sleeve.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006]

FIG. 1 is a three-dimensional view of the adjustable walking cane of the present invention.
 FIG. 2 is a three-dimensional, exploded view of the adjustable walking cane of the present invention.
 FIG. 3 is a sectional view of the adjustable walking cane of the present invention.
 FIG. 4 is a partial enlarged drawing of FIG. 3 of the adjustable walking cane in the present invention.
 FIG. 5 is a schematic view of the adjustable walking cane of the present invention in extending process.
 FIG. 6 is a schematic view of the adjustable walking cane of the present invention in retracting process.
 FIG. 7 is a partial enlarged drawing of FIG. 6 of the adjustable walking cane in the present invention.
 FIG. 8 is a three-dimensional view of another embodiment of the adjustable walking cane in the present invention.

FIG. 9 is a sectional view of another embodiment of the adjustable walking cane in the present invention.
 FIG. 10 is a prior art.
 FIG. 11 is a prior art.

DETAILED DESCRIPTION OF THE INVENTION

[0007] The detailed description set forth below is intended as a description of the presently exemplary device provided in accordance with aspects of the present invention and is not intended to represent the only forms in which the present invention may be prepared or utilized. It is to be understood, rather, that the same or equivalent functions and components may be accomplished by different embodiments that are also intended to be encompassed within the spirit and scope of the invention.

[0008] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood to one of ordinary skill in the art to which this invention belongs. Although any methods, devices and materials similar or equivalent to those described can be used in the practice or testing of the invention, the exemplary methods, devices and materials are now described.

[0009] All publications mentioned are incorporated by reference for the purpose of describing and disclosing, for example, the designs and methodologies that are described in the publications that might be used in connection with the presently described invention. The publications listed or discussed above, below and throughout the text are provided solely for their disclosure prior to the filing date of the present application. Nothing herein is to be construed as an admission that the inventors are not entitled to antedate such disclosure by virtue of prior invention.

[0010] In order to further understand the goal, characteristics and effect of the present invention, a number of embodiments along with the drawings are illustrated as following:

[0011] Referring to FIGs. 1 and 2, the present invention provides an adjustable walking cane, which comprises an inner tube (10), an outer tube (20), a connecting rod (30), a pushing unit (40) and an extending unit (50). The inner tube (10) is connected to a first handle (11) at one end, and a protruding portion (12) is formed at the other end thereof. A controlling unit (60) having a cover (601) at one end is formed adjacent to the first handle (11), and a through hole (111) is formed on the first handle (11) for penetrating by the other end of the controlling unit (60). The outer tube (20) comprises a non-slip plug (21) received at one end and a restricting cover (22) is secured on the other end. A block portion (221) is formed inside the restricting cover (22) for engaging with the protruding portion (12) of the inner tube (10) while the outer tube (20) is connected to the inner tube (10), and an inner threaded segment (23) is formed at an inner surface of the outer tube (20). The connecting rod (30) driven by pressing the controlling unit (60) is connected with the

controlling unit (60) at one end, and a threaded segment (31) formed at the other end is connected to the outer tube (20), and a blocking piece (32) is formed at a central portion thereof. The pushing unit (40) having a tapered surface (41) at one end is secured at an open end of the inner tube (10) with the protruding portion (12) thereon, and a connecting portion (42) is formed at the other end of the pushing unit (40). The connecting portion (42) is compressed against the inner tube (10), and a plurality of axial slots (421) are formed thereon to increase the degree of deformation of the connecting portion (42) caused by the compression. An annular portion (43) protruding from a middle portion of the pushing unit (40) is compressed against the open end of the inner tube (10) to secure the pushing unit (40) at one end of the inner tube (10). A rod hole (44) is formed at a top portion of the pushing unit (40), so the threaded segment (31) of the connecting rod (30) can penetrate the rod hole (44), and a spring (45) is formed between the pushing unit (40) and the blocking piece (32). The extending unit (50) comprises an axial pore (51) for connecting to the threaded segment (31) of the connecting rod (30), and a nut (52) is fastened on the threaded segment (31) to restrict the extending unit (50) and the pushing unit (40). A plurality of extending pieces (53) is formed around the connecting rod (30), and a resilient sleeve (54) is formed at an outer edge a rear end of the extending piece (53). A first tubular piece (531) and a second tubular piece (532) protruded from the extending pieces (53) are formed for restricting the resilient sleeve (54). By using the extending pieces (53) compressing against the taper surface (41) of the pushing unit (40), the resilient sleeve (54) is compressed against the inner threaded segment (23) on the outer tube (20), so the length of the outer tube (20) and the inner tube (10) is fixed.

[0012] Referring to FIGs. 2 and 3, the controlling unit (60) is plugged into the through hole (111) on the first handle (11) to connect to the threaded segment (31) of the connecting rod (30), and the inner tube (10) covered by the restricting cover (22) is locked to the first handle (11). The connecting rod (30) penetrates through the inner tube (10) to connect to the rod hole (44) on the pushing unit (40), and the spring (45) disposed on the lower portion thereof. The spring (45) aligned between the blocking piece (32) and the pushing unit (40) is compressed by the connecting portion (42) of the pushing unit (40) against the opening of the inner tube (10). The resilient sleeve (54) disposed on the extending unit (50) is located between the first annular piece (531) and the second annular piece (532), and the axial hole (51) on the extending unit (50) is upwardly connected to the end of the connecting rod (30) with the threaded segment (31). The nut (52) is fastened on the threaded segment (31) for securing the spring (45), the pushing unit (40) and the extending unit (50) between the blocking piece (32) and the threaded segment (31). Then, the inner tube (10) is inserted into an open end of the outer tube (20), and the expanding unit (50) is secured among the inner

threaded segment (23) on the outer tube (20).

[0013] When in use, referring to FIGs. 1 to 4, the spring (45) compressing against the pushing unit (40) and the blocking piece (32) of the connecting rod (30) tightens the connecting rod (30) forward the first handle (11), and keeps the expanding pieces (53) of the expanding unit (50) compress against the taper surface (41) of the pushing unit (40). The expanding pieces (53) compressed by the taper surface (41) extends outwardly to compress the resilient sleeve (54) against the inner threaded segment (23) on the outer tube (20). When the present invention of the adjusted walking cane is in use, the strength pressed by user is transferred from the handle (11) of the cane to the inner tube (10). By compressing the resilient sleeve (54) against the inner threaded segment (23) of the outer tube (20) and pressing the taper surface (41) of the pushing unit (40) by the end of the inner tube (10), the extending pieces (53) on the extending unit (50) can be more expanded by the pushing unit (40). In other ward, the resilient sleeve (54) and the inner threaded segment (23) can be tightly attached each other when the first handle (11) is much pressed by the user, and the adjustable walking cane is much reliable while the rugged thread of the inner thread segment (23) and the resilience of the resilient sleeve (54) increase the resistance between the resilient sleeve (54) and the inner threaded segment (23).

[0014] Referring to FIGs. 1 to 5, by pulling the cane from two ends thereof, the inner tube (10) and the outer tube (20) are extended outwardly (the user may hold the first handle (11) or the inner tube (10) by one hand and hold the outer tube (20) or the anti-slip plug (21) by the other hand), and the cane can be extended into extending position without twisting or pressing action. In extending process, the pushing unit (40) can be driven directly by the inner tube (10) to detach from the extending unit (50) due to the resistance of the inner threaded segment (23) on the outer tube (20). Further, the inner tube (10) and the outer tube (20) can be extended easily while the extending pieces (53) releases the compression from taper surface (41) of the pushing unit (40), and the resilient sleeve (54) is no longer compressed against the inner threaded segment (23) on the outer tube (20). Moreover, the spring (45) bearing the blocking piece (32) of the connecting rod (30) compresses the extending unit (50) against the pushing unit (40) in any length of cane, then the length of the inner tube (10) and outer tube (20) can be fixed. When the cane is used for going down the stair, the cane can be adjusted to a variety of lengths to accommodate different sized people. In retracting process, referring to FIGs 6 and 7, the user can hold the first handle (11) by one hand to press the cover (601) of the controlling unit (60), and hold the outer tube (20) by the other hand to press toward the first handle (11). Specifically, the connecting rod (30) compressed by the controlling unit (60) is moved toward the end of the anti-slip plug (21), and the taper surface (41) of the pushing unit (40) is detached from the extending pieces (53) on the ex-

tending unit (50). In retracting process, the inner tube (10) and the outer tube (20) are released from compression while the resilient sleeve (54) is detached from the inner threaded segment (23). The controlling unit (60) can be easily operated by axially detaching the taper surface (41) of the pushing unit (40) from the extending pieces (53) and the resilience of the extending pieces (53) and the resilient sleeve (54). Also, the present invention of the adjustable walking cane has a function to retract the cane against the ground to help the user stand the body, when the user is in sitting position.

[0015] In one embodiment, referring to FIGs. 8 and 9, a slot (13) is formed at an upper end of the inner tube (10), and the controlling unit (60) comprises a plug (61), a sleeve body (62) and a second handle (63). The plug (61) is secured on a top portion of the connecting rod (30), and a bolt (64) is formed pivotally for securing the second handle (63) on the sleeve body (62), and the sleeve body (62) secured around the slot (13) is disposed on the inner tube (10), and one end of the second handle (63) penetrates through the slot (13) to bear against the plug (61). In retracting process, the user can pull the second handle (63) by one hand, and the bolt (64) is served as a pivot of the second handle (63) for rotation, and the plug (61) compressed by the other end of the second handle (63) drives the connecting rod (30) to adjust the length of the cane easily.

[0016] Having described the invention by the description and illustrations above, it should be understood that these are exemplary of the invention and are not to be considered as limiting. Accordingly, the invention is not to be considered as limited by the foregoing description, but includes any equivalents.

Claims

1. An adjustable walking cane comprising:

an inner tube connecting to a first handle at one end, a protruding portion formed at the other end thereof; and a control unit disposed near the first handle;

an outer tube comprising a non-slip plug received at one end and a restricting cover secured on the other end, and a block portion formed inside the restricting cover to engage with the protruding portion of the inner tube when the inner tube is received in the inner tube, and an inner threaded segment formed at an inner surface of the outer tube;

a connecting rod connecting with the controlling unit at one end, and a threaded segment formed at the other end and connected to the outer tube, and a blocking piece formed at a central portion of the connecting rod;

a pushing unit having a tapered surface at one end and secured at an open end of the protrud-

ing portion of the inner tube, and a connecting portion formed at the other end thereof; and a rod hole formed at a top portion of the pushing unit for the threaded segment of the connecting rod to penetrate, and a spring formed between the pushing unit and the blocking piece;

an extending unit comprising an axial pore for connecting to the threaded segment of the connecting rod, and a nut fastened on the threaded segment for securing the extending unit and the pushing unit, wherein a plurality of extending pieces are formed around the connecting rod, and a resilient sleeve is disposed at an outer portion of the extending pieces, wherein the extending pieces compress against the taper surface of the pushing unit, while the resilient sleeve is compressed against the inner threaded segment on the outer tube, so the length of the outer tube and the inner tube is fixed.

2. The adjustable walking cane of claim 1, wherein a first tubular piece and a second tubular piece protruded from the extending pieces are formed for restricting the resilient sleeve.
3. The adjustable walking cane of claim 1, wherein an annular portion protruding from a middle portion of the pushing unit is compressed against the open end of the inner tube.
4. The adjustable walking cane of claim 1, wherein the connecting portion is compressed against the inner tube, and a plurality of axial slots are formed thereon to increase the degree of deformation of the connecting portion.
5. The adjustable walking cane of claim 1, wherein the controlling unit comprises a cover formed at one end, and a through hole formed on the first handle is penetrated by the other end thereof, and a connecting rod is driven by pressing the controlling unit.
6. The adjustable walking cane of claim 1, wherein a slot is formed at an upper end of the inner tube, and the controlling unit comprises a plug, a sleeve body and a second handle. The plug is secured on a top portion of the connecting rod, and a bolt is formed pivotally for securing the second handle on the sleeve body, and the sleeve body secured around the slot is disposed on the inner tube, and one end of the second handle penetrates through the slot to bear against the plug, and the connecting rod is driven by pressing the second handle.

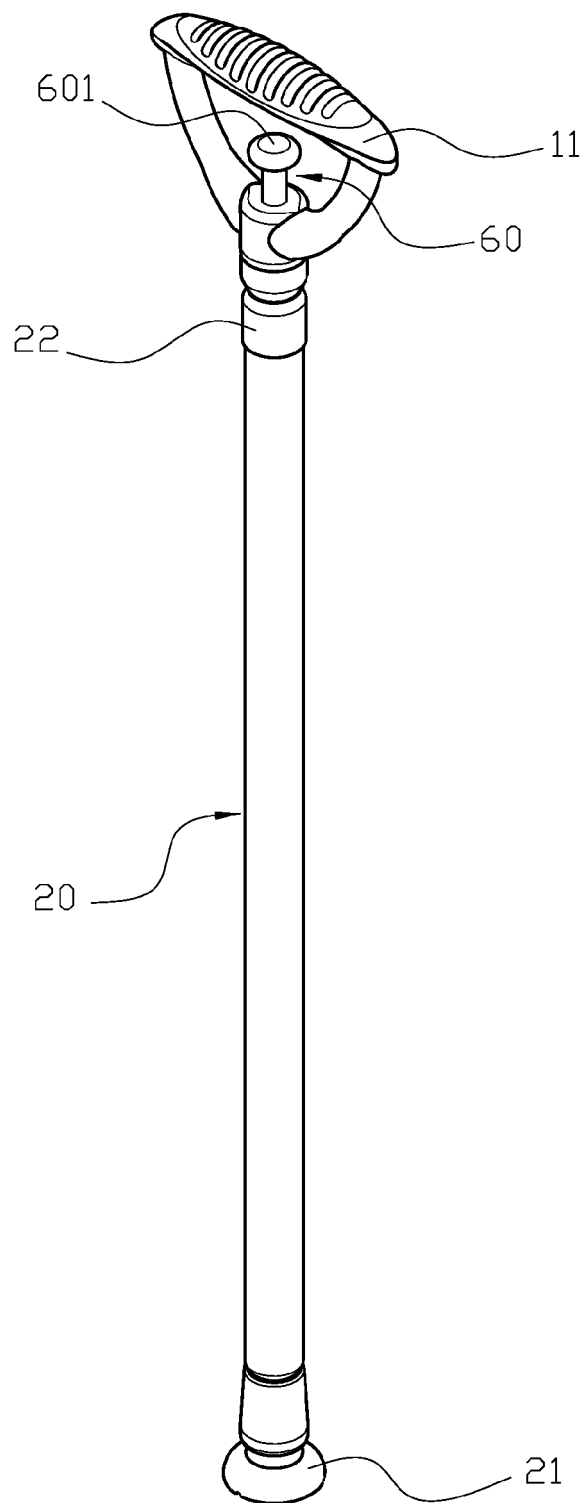


FIG. 1

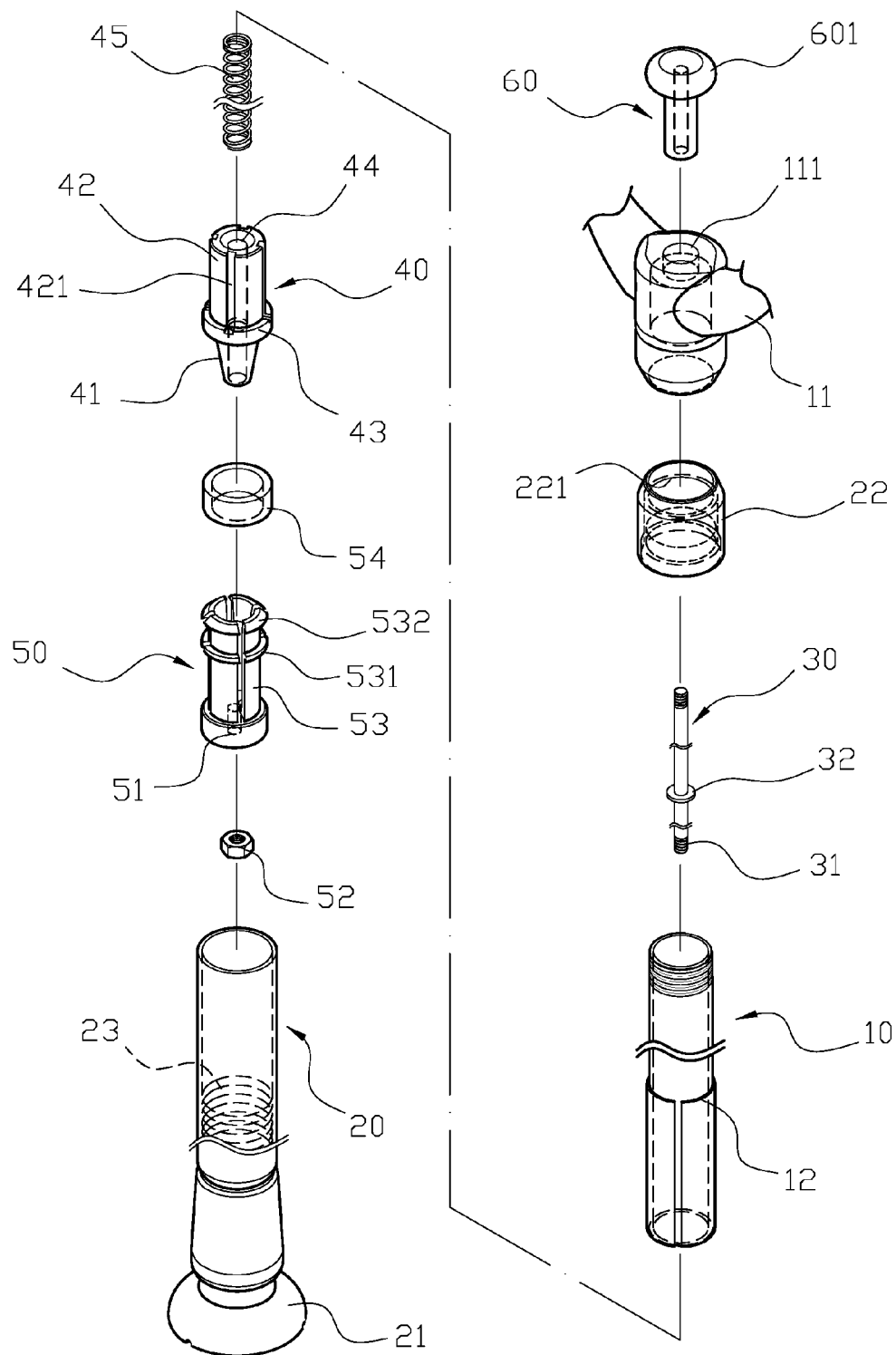


FIG. 2

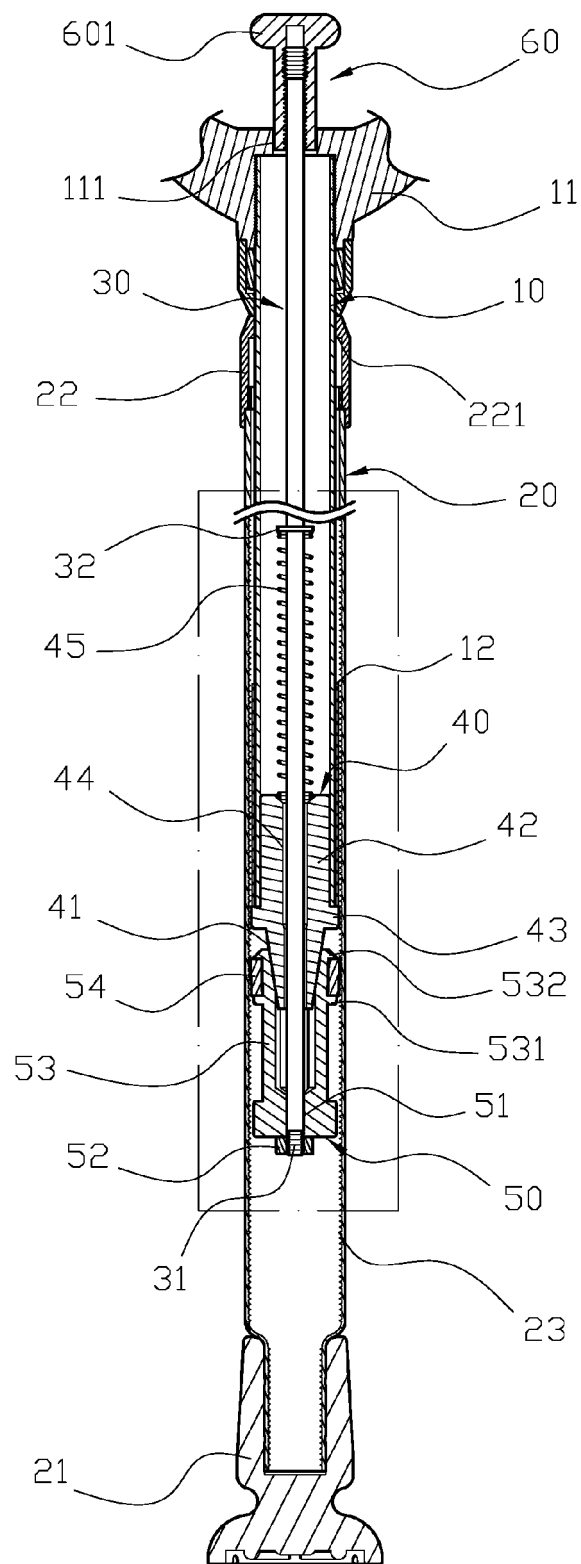


FIG. 3

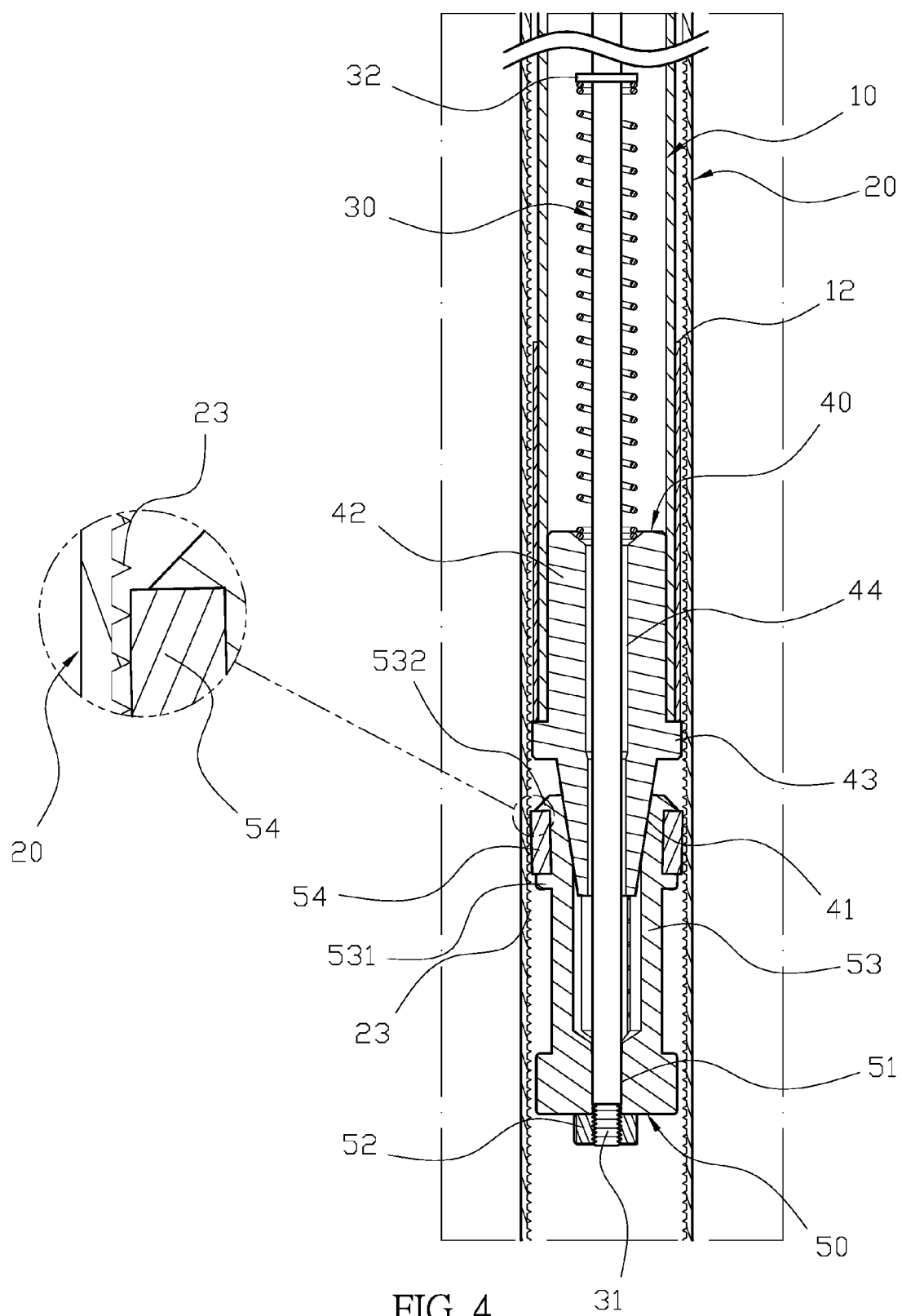


FIG. 4

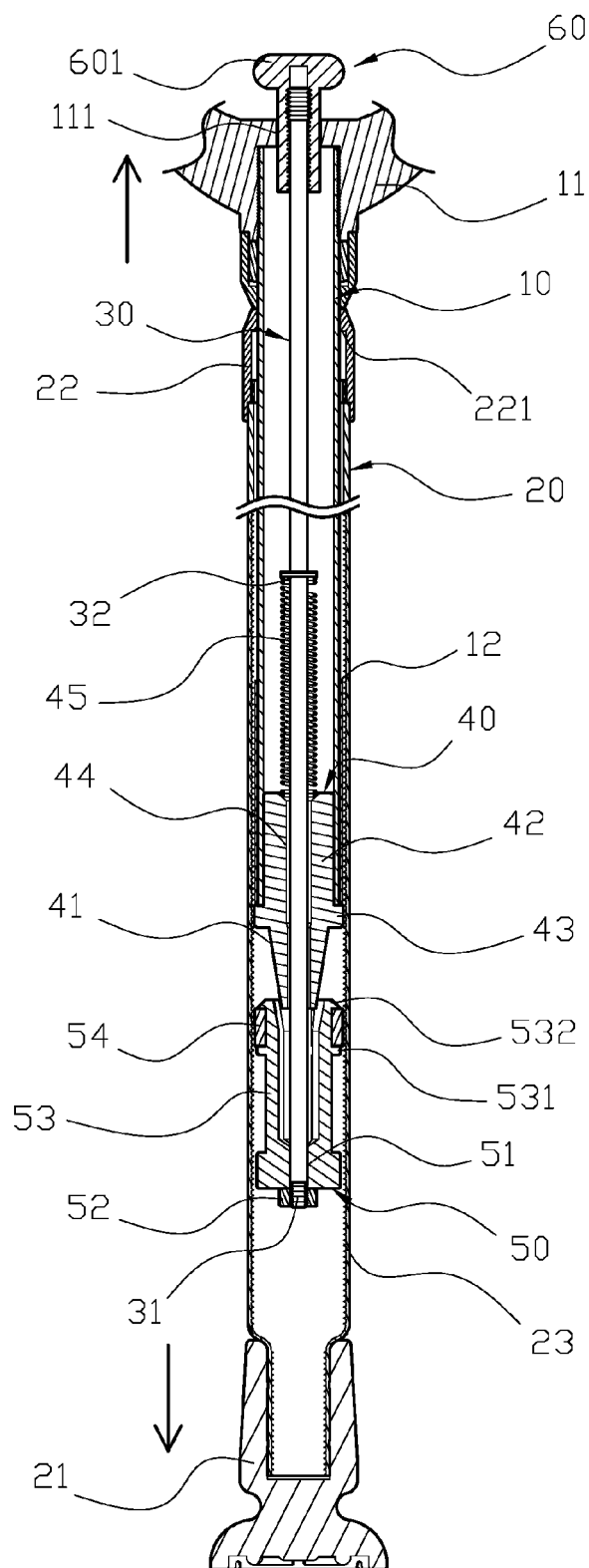


FIG. 5

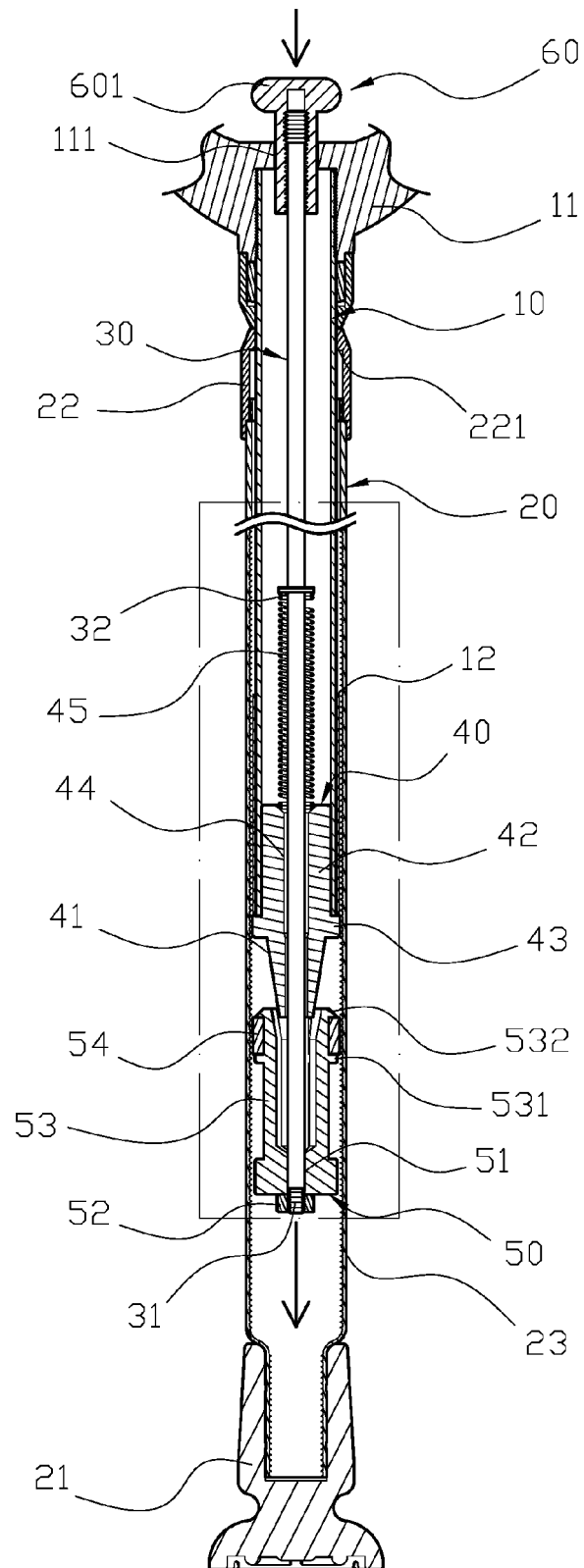


FIG. 6

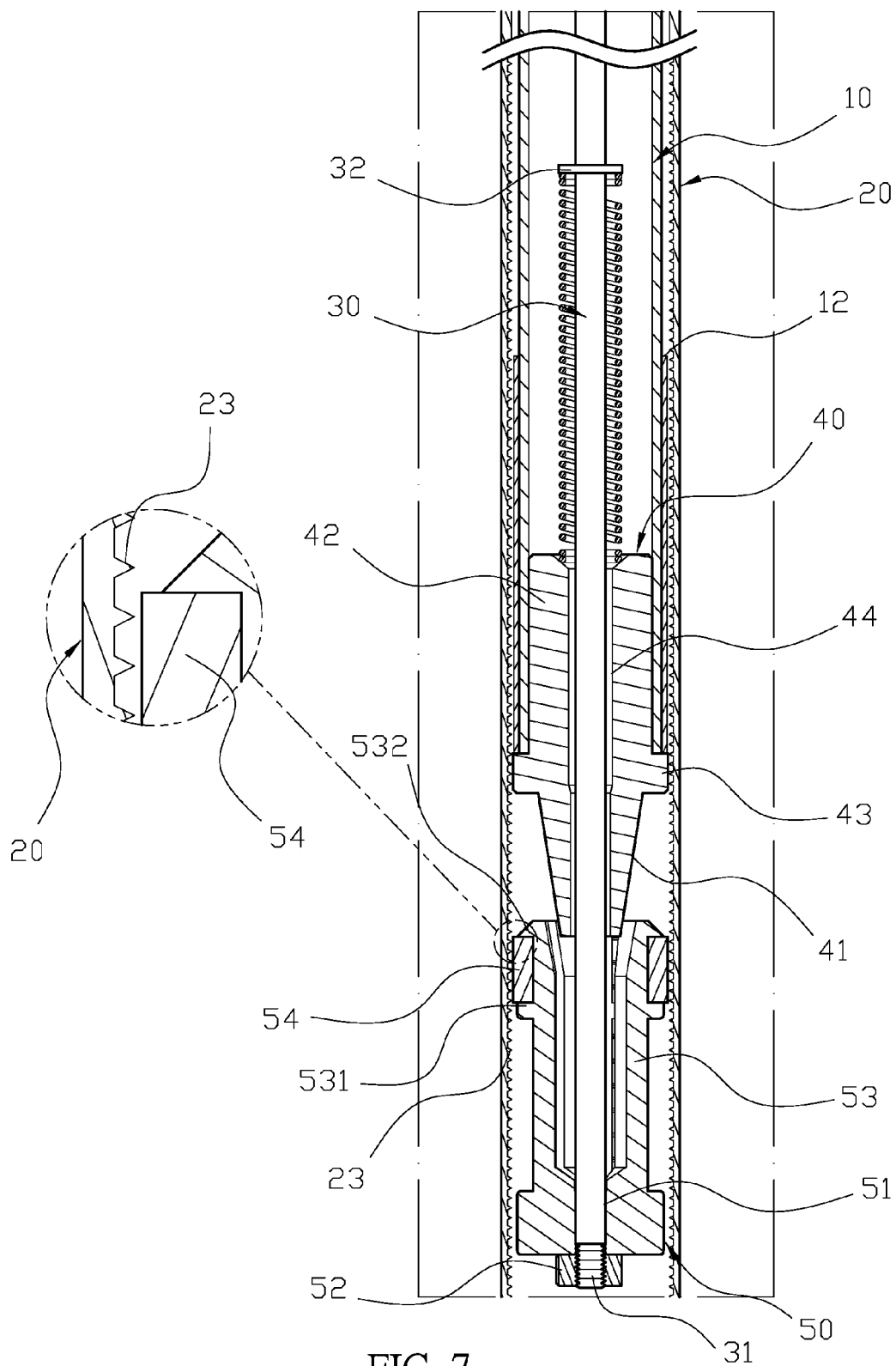


FIG. 7

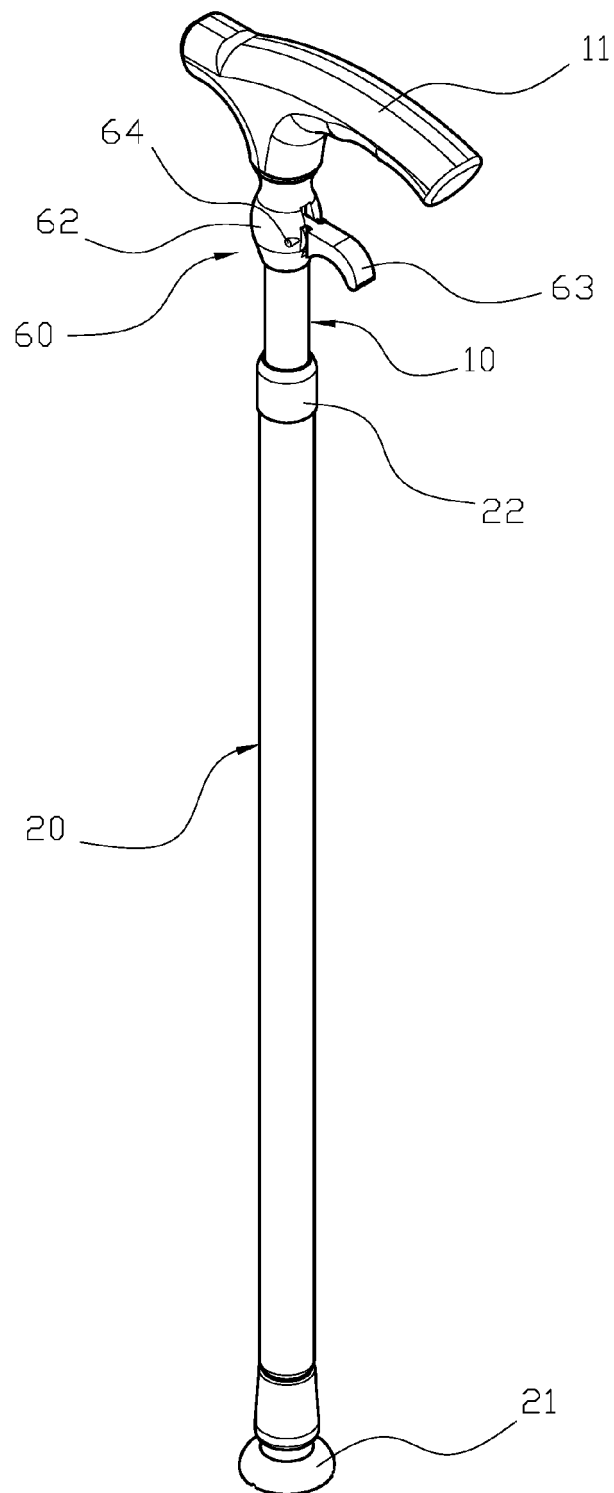


FIG. 8

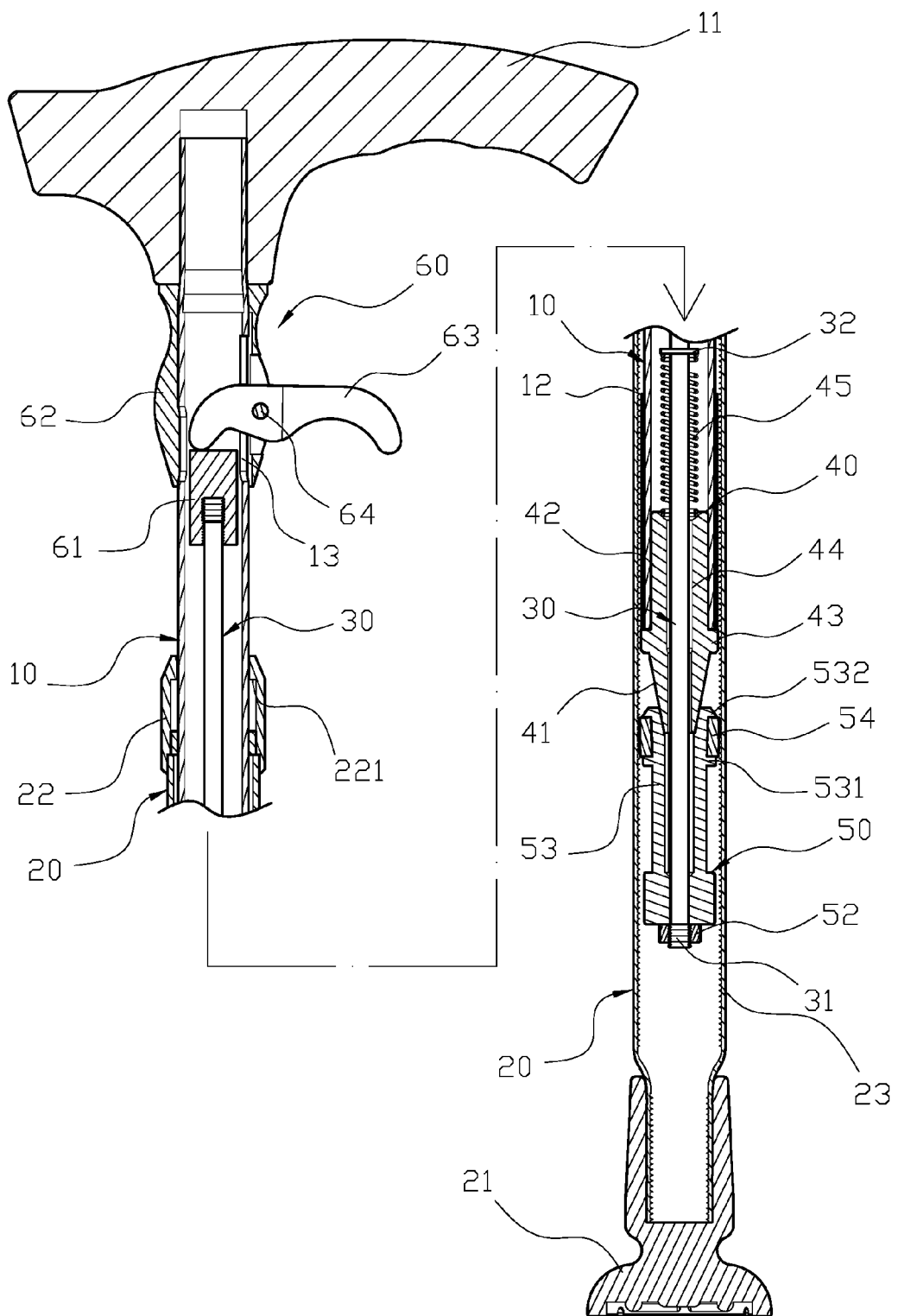


FIG. 9

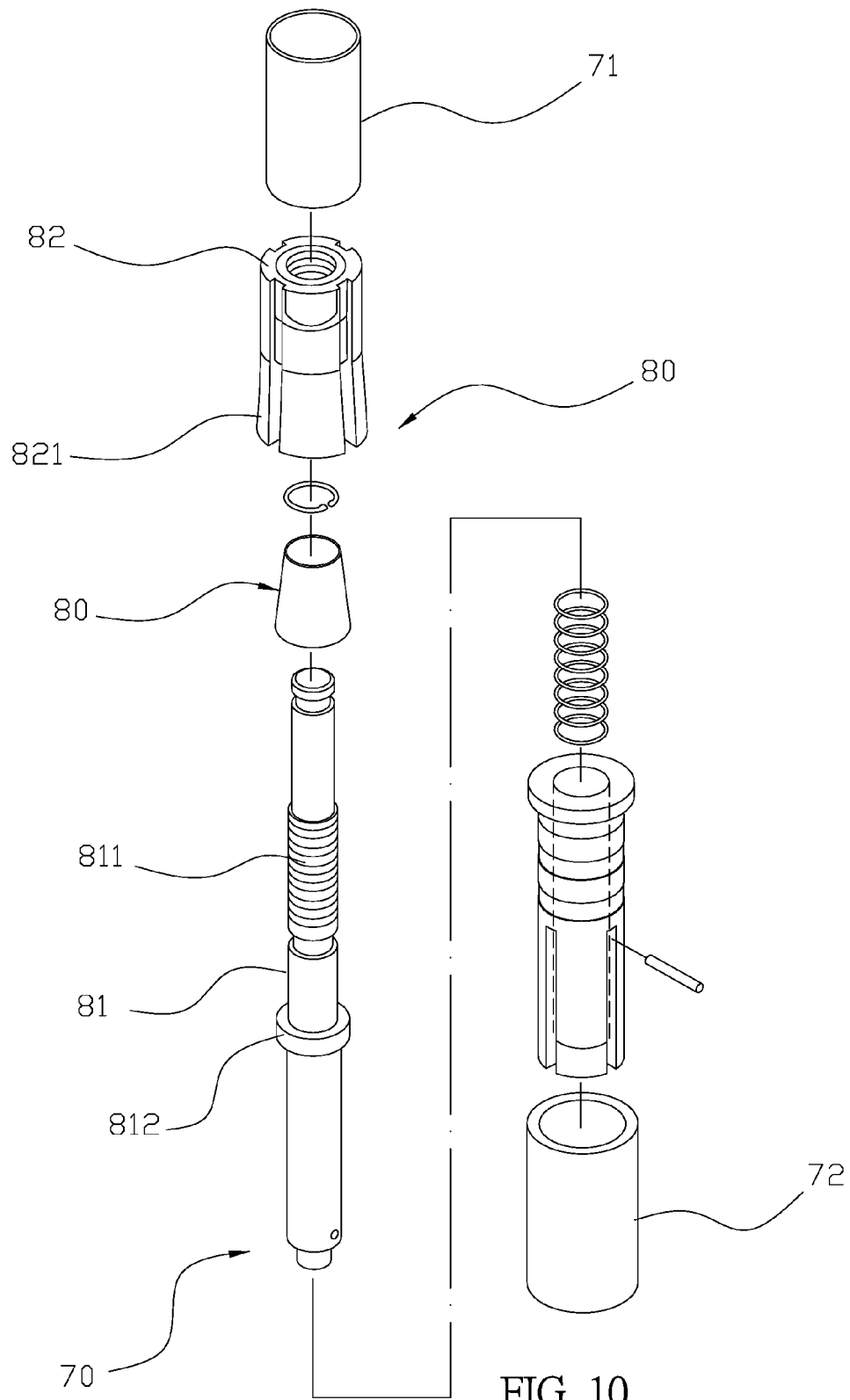
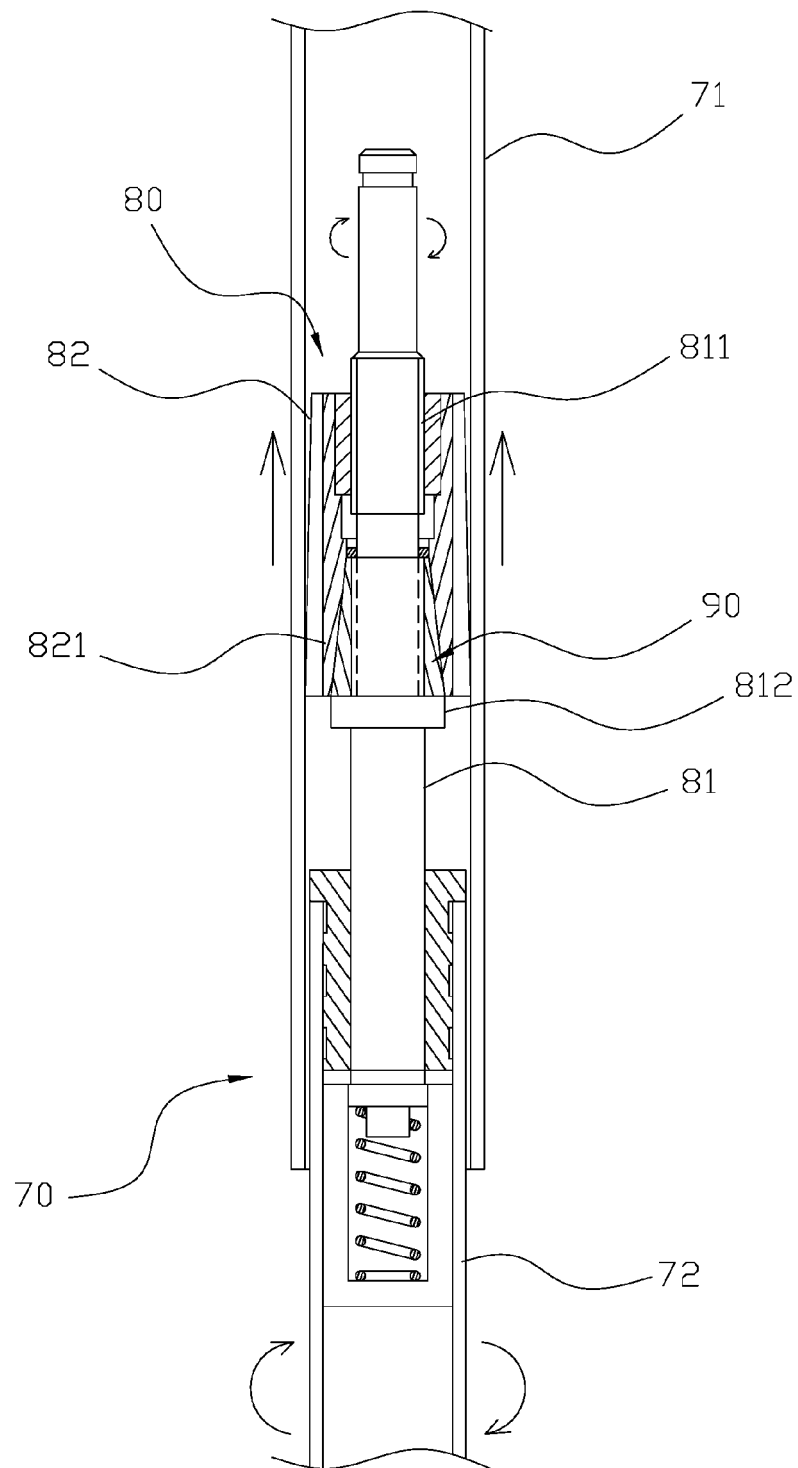


FIG. 10
PRIOR ART





EUROPEAN SEARCH REPORT

Application Number
EP 15 17 3205

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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 2014/053887 A1 (LEE LANNY RAY [US]) 27 February 2014 (2014-02-27) * paragraphs [0040] - [0044]; figures *	1-6	INV. A45B9/00
A	US 2010/316438 A1 (SOHN DAE UP [KR]) 16 December 2010 (2010-12-16) * paragraphs [0039] - [0051], [0056] - [0066]; figures *	1-6	
			TECHNICAL FIELDS SEARCHED (IPC)
			A45B A61H A63C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 16 November 2015	Examiner Dinescu, Daniela
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 17 3205

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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16-11-2015

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