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(54) **A HEIGHT ADJUSTMENT DEVICE FOR AN ARMREST**

HÖHENVERSTELLUNGSVORRICHTUNG FÜR EINE ARMLEHNE

DISPOSITIF DE RÉGLAGE DE HAUTEUR POUR UN ACCOUDOIR

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Description

[0001] The present invention relates to a height adjustment device for an armrest of a chair or other seating furniture, preferably an office chair. More specifically, the invention relates to a height adjustment device as specified in the preamble of claim 1.

[0002] There exist several previously known height adjustment devices for seating furniture, and especially office chairs. Such a height adjustment device as used by the applicant comprises a pivotable rod with teeth arranged on a side of the rod along the length of this, and where the teeth are pivoted in and out of intervention with corresponding shaped portions on a circumferential part such as to lock the armrest at different heights where each tooth constitutes a freely selectable height.

[0003] Another solution is proposed in US 7 556 316 B1.

[0004] Even though the abovementioned solutions are said to operate well, it is an object of the invention to provide a height adjustment device which is easily adapted to several different types of chairs and armrests. Further, it is an object of the invention to provide a height adjustment device which produces audible clicks during adjustment, in order to give the solution a more technical user experience and also give the user indication regarding the adjustment position, which easily secures even adjustment of both armrests. A further object of the invention is to provide a simple and robust solution, with a minimum of components, for reduced production cost.

[0005] The abovementioned and/or other objects are sought solved with the height adjustment device according to the present invention.

[0006] The height adjustment device according to the invention is characterized by the indicated features in the characteristic of claim 1.

[0007] Preferential embodiments of the invention are disclosed in the dependent claims.

[0008] A preferred, not limiting embodiment of the invention is further described in the following, with reference to the attached drawings, where

fig. 1 is a cross-sectional view of the height adjustment device according to the invention normal on the longitudinal direction of an armrest indicated with stippled lines,

fig. 2 is a perspective view of the height adjustment device shown in fig. 1, with just a small part of the armrest shown,

fig. 3 is a cross-sectional view of the height adjustment device shown in fig. 2, in a locked adjustment position,

fig. 4 is a detailed view of the portion within the circle B in fig. 3,

fig. 5 is a cross-sectional view of the height adjustment device shown in fig. 3, but in an open adjustment position,

fig. 6 is a detailed view of the portion within the circle B in figure 5,

fig. 7 is a perspective view of an assembly of an inner and an outer locking pin slidably spring loaded in relation to each other, and which forms a substantial part of the height adjustment device according to the invention, and

fig. 8 is a split view of the assembly shown in fig. 5.

[0009] In the following description, direction indications such as "upwards", "downwards" and similar are related to an office chair or other seating furniture provided with the invention and in normal use position, standing on a floor or other base.

[0010] With reference to the attached figures, and introductorily especially to fig. 1 and 2, it is according to the invention provided a height adjustment device for an armrest 1 indicated with stippled lines in fig. 1 and where a portion of the armrest 1 for pivotably fastening of a locking pin assembly 2 is indicated with 1', as the locking pin assembly 2 is pivotably supported in relation to the armrest 1 via two opposite directed pivots 3 arranged in an upper end of the locking pin assembly 2 and which grips correspondingly shaped holes in the armrest 1.

[0011] For raising and lowering of the armrest 1 the locking pin assembly 2 is slidably arranged in an internal groove 4 in an upper part of the stem 5 of the armrest, and where the stem 5 typically is attached to a not shown fitting or undercarriage of an office chair and projecting out and up on each side of a not shown chair seat, as will easily be evident for the person skilled in the art. As is evident from fig. 1, a lower part of the armrest 1 preferably encloses the upper part of the stem 5, and thus conceals and protects that part of the locking pin assembly 2 which at any given time projects up and out from the stem 5, and also forms a guiding between the armrest 1 and stem 5. Because the armrest 1 is pivotably supported in relation to the locking pin assembly 2, the adjustment device can also be easily adapted stems 5 which are arranged at an angle in relation to the shown vertical orientation of the stem 5. The locking pin assembly 2, and so the armrest 1, is locked in the desired adjustment position/height by a locking pin 6 which is brought in intervention with a chosen number of locking grooves 7 in the locking pin assembly 2. As is especially evident from fig. 4 and 6, the locking pin 6 is in its two ends slidably supported in two respective horizontal grooves 8 arranged in an upper end piece 9 of the stem 5, and with a free middle portion for intervention with a chosen one of the locking grooves 7. As is especially evident from fig. 4, the locking pin 6 in a locked position is spring loaded to intervention with a locking groove 7 of a spring 10,

here a plate spring, which is also located in the upper end part 9. In this position of the locking pin 6 the arm rest 1 will thus be locked in a particular adjustment position/height. For adjustment of the arm rest 1 it is thus required that the locking pin is brought out of intervention with the locking groove 7, as is shown in fig. 5 and 6, and this happens by pressing an adjustment lever 11 connected to the armrest 1 in, an inner part 12 of the locking pin assembly 2 is displaced upwards in relation to an outer part 13 of this, and with that presses the locking pin 6 out of the locking groove 7 from the effect of the spring 10, as will be further described below.

[0012] As is especially evident from fig. 7 and 8, the locking pin assembly 2 includes the inner part 12, the outer part 13 in which the inner part is slidably arranged, and also a spring 14, here a helical spring, which spring loads the two parts 12, 13 to a mutual position where the locking grooves 7 are open, as open portions or notches 15 on the outer part 13 are then aligned with open portions or notches 16 on the inner part 12, as is shown in fig. 7. The open portions 15 on the outer part 13 are adapted to the cross section of the locking pin 6, and the same also goes for an upper part of the open portions 16 on the inner part 12. However, a lower part of the open portions 16 is shaped like an inclined plane 17, which forces the locking pin 6 out of the locking groove 7 from the effect of the spring 10. Further, the open portions 16 are divided by closed portions 18 which completely close the locking grooves 7 when the locking pin 6 is forced out by means of the inclined plane 17 because of upwards displacement of the inner part 12 in the outer part 13 by pressing in the adjustment lever 11. Because closed portions between each respective open portion 15 on the outer part 13 are provided with respective convex curved outer edges 19, preferential, and as introductory mentioned, audible clicks are formed when adjusting the armrest 1, as the spring loaded locking pin 6 upon adjusting will slide against a curved surface with peaks and bottoms, as is especially shown in fig. 6, and where a click will sound each time the locking pin 6 reaches a bottom, and where each bottom coincides with an entrance point for the locking pin 6 to each respective locking groove 7, as is shown in fig. 6. A user will thus be able to use the number of clicks from an outer position of the armrest 1 for deciding the desired adjustment position, and to ensure equal adjustment of both the armrests 1 of the chair or seating furniture. An upper respectively a lower outer position of the armrest 1 is secured in that in a lower part of the outer part 13 of the locking pin assembly 2, a stopping hook 20 is shaped for contact with an inner surface of the end piece 9 and that in an upper end of the locking assembly 2, a horizontally projecting plane 21 is shaped for contact with an outer surface of the end piece 9.

[0013] By again especially referring to fig. 1 and 2, a pin 22 is provided in an end of the adjustment lever 11 far from the longitudinal axis of the stem 5, and thus also from an upper end of the inner part 12 of the locking pin assembly 2, pivotably supported in a correspondingly

shaped hole 25 in the armrest 1. The latter constitutes thus a fixed pivot point in the armrest 1. An opposite end of the adjustment lever 11 is provided with a rectangle shaped pocket groove 23 for pivotable support to a hook shaped upper portion 24 of the inner part 12. As the outer part 13 of the locking pin assembly 2 is pivotably attached to the portion 1' of the armrest 1 via the projecting pins 3, while the inner part 12 of the locking pin assembly 2 is pivotably attached to an end of the adjustment lever 11 via the hook shaped portion 24 will, upon pressing in the adjustment lever 11 (ref. double arrow A in fig. 1), the inner part 12 is raised in relation to the outer part 13 and thus force the locking pin 6 out of the locking groove 7 it is currently in and thus make possible raising and lowering of the locking pin assembly 2 (ref. double arrow B in fig. 1) and thereby the armrest 1 for adjusting the latter. As previously mentioned, fig. 1 shows the locking pin 6 in intervention with one of the locking grooves 7, and thus in a locked position without possibility of raising or lowering the locking pin assembly 2 and thus the armrest 1. As the spring 14 keeps the adjustment lever 11 out (i.e. not pushed in, as shown in fig. 1) and the spring 10 keeps the locking pin 6 in intervention with the locking groove 7 when the adjustment lever 11 is not activated by a user, the adjustment device according to the invention automatically return to the locked position shown in fig. 1 as soon as a user has finished adjusting.

[0014] The present invention is not limited by the above description, but can vary within the scope of the attached claims. Among others, the activation can happen in a lot of other ways than with the shown and described lever 11, as the central object of the activation is to provide the desired displacement between the inner 12 and the outer part 13 of the locking pin assembly 2.

Claims

1. A height adjustment device for an armrest (1) for a chair or other seating furniture, preferably an office chair, comprising a stem (5) for the armrest (1), which stem (5) is provided with an internal groove (4) for adjustably and lockably telescopic intake of an inner extended element connected to the armrest (1) for adjusting the height of the armrest (1), wherein the inner extended element includes a locking pin assembly (2) with two mutually displaceable parts (12, 13) in the longitudinal direction for height adjustment, as a number of locking grooves (7) for intervention with a pre-tensioned locking pin (6) are provided in the longitudinal direction of the locking pin assembly (2), which locking grooves (7) in an open position are provided by aligned open portions or notches (15, 16) respectively arranged in the longitudinal direction of the two mutually displaceable parts (12, 13), and which in a closed position are brought out of alignment and is closed by relative displacement of the two mutually displaceable parts (12, 13), and

which thus presses the pre-tensioned locking pin (6) out of the locking groove (7) due to relative shaping of the open portions or notches (15, 16), for height adjustment of the armrest (1) to a chosen one of the locking grooves (7) by operating an adjustment lever (11) operatively connected to one of the two mutually displaceable parts (12, 13) for providing of said displacement between said parts (12, 13), **characterized in that** a first, inner part (12) of said two mutually displaceable parts is slidably arranged in the second, outer part (13), which partly encloses said inner part (12), and where the inner part (12) and the outer part (13) are mutually pre-tensioned by a helical spring (14) such that the locking grooves (7) are in their open position except from by operation of the adjustment lever (11).

2. A height adjustment device according to claim 1, wherein the open portions or notches (16) are shaped with a lower inclined plane (17), in order to press the pre-tensioned locking pin (6) out of the locking groove (7) by relative displacement between the parts (12, 13) to a closed position for the locking groove (7).
3. A height adjustment device according to any one of the preceding claims, wherein a lower part of the armrest (1) encloses the upper part of the stem (5), and conceals and protects that part of the locking pin assembly (2) which at any given time is projecting up and out from the stem (5), and also forming a guiding between armrest (1) and stem (5).

Patentansprüche

1. Höhenverstellvorrichtung für eine Armlehne (1) für einen Stuhl oder ein anderes Sitzmöbel, vorzugsweise einen Bürostuhl, umfassend einen Stamm (5) für die Armlehne (1), wobei der Stamm (5) mit einer Innennut (4) zur verstellbaren und arretierbaren teleskopischen Aufnahme eines mit der Armlehne (1) verbundenen inneren verlängerten Elements zum Verstellen der Höhe der Armlehne (1) bereitgestellt ist, wobei das innere verlängerte Element eine Arretierstifanordnung (2) mit zwei gegenseitig verschiebbaren Teilen (12, 13) in Längsrichtung zur Höhenverstellung aufweist, während mehrere Arretiernuten (7) für den Eingriff mit einem vorgespannten Arretierstift (6) in der Längsrichtung der Arretierstifanordnung (2) bereitgestellt sind, wobei die Arretiernuten (7) in einer offenen Stellung durch fluchtend ausgerichtete offene Bereiche oder Kerben (15, 16) bereitgestellt sind, die jeweils in der Längsrichtung der zwei gegenseitig verschiebbaren Teile (12, 13) angeordnet sind, und die in einer geschlossenen Position außer Fluchtung gebracht werden und durch eine relative Verschiebung der zwei gegen-

seitig verschiebbaren Teile (12, 13) geschlossen wird, und die somit zur Höhenverstellung der Armlehne (1) den vorgespannten Arretierstift (6) aufgrund der relativen Formgebung der offenen Bereiche oder Kerben (15, 16) aus der Arretiernut (7) zu einer ausgewählten Arretiernut (7) drückt, und zwar durch Betätigung eines Verstellhebels (11), der mit einem der beiden gegenseitig verschiebbaren Teile (12, 13) in Wirkverbindung steht, um die Verschiebung der Teile (11, 13) in Bezug aufeinander bereitzustellen, **dadurch gekennzeichnet, dass** ein erstes, inneres Teil (12) der beiden gegenseitig verschiebbaren Teile gleitbar im zweiten, äußeren Teil (13) angeordnet ist, welches das innere Teil (12) teilweise umschließt, und wobei das innere Teil (12) und das äußere Teil (13) durch eine Schraubenfeder (14) gegenseitig vorgespannt sind, sodass die Arretiernuten (7) außer in Fällen der Betätigung des Verstellhebels (11) in ihrer offenen Stellung sind.

2. Höhenverstellvorrichtung nach Anspruch 1, wobei die offenen Bereiche oder Kerben (16) mit einer unteren geneigten Ebene (17) geformt sind, um den vorgespannten Arretierstift (6) durch relative Verschiebung der Teile (12, 13) zu einer geschlossenen Stellung der Arretiernut (7) aus der Arretiernut (7) heraus zu drücken.
3. Höhenverstellvorrichtung nach einem der vorangegangenen Ansprüche, wobei ein unterer Teil der Armlehne (1) den oberen Teil des Stamms (5) umschließt und jenen Teil der Arretierstifanordnung (2), der jeweils zu einem beliebigen Zeitpunkt aus dem Stamm (5) heraus nach oben vorsteht, verdeckt und schützt, und zudem eine Führung zwischen der Armlehne (1) und dem Stamm (5) bereitstellt.

Revendications

1. Dispositif de réglage en hauteur pour un accoudoir (1) pour une chaise ou d'autres meubles d'assise, de préférence une chaise de bureau, comprenant une tige (5) pour l'accoudoir (1), ladite tige (5) étant pourvue d'une rainure intérieure (4) pour la réception télescopique de manière réglable et verrouillable d'un élément intérieur étendu et relié à l'accoudoir (1) pour régler la hauteur de l'accoudoir (1), dans lequel l'élément intérieur étendu comprend un ensemble à broche de verrouillage (2) avec deux parties mutuellement déplaçables (12, 13) dans la direction longitudinale pour le réglage en hauteur, tandis qu'un nombre de rainures de verrouillage (7) conçues pour l'intervention avec une goupille de verrouillage précontrainte (6) sont pourvues dans la direction longitudinale de l'ensemble à broche de verrouillage (2), lesdites rainures de verrouillage (7) dans une position ouverte sont fournies par des par-

ties alignées ouvertes ou des encoches (15, 16) respectivement disposées dans la direction longitudinale des deux parties mutuellement déplaçables (12, 13), et qui, dans une position fermée, sont amenés hors de l'alignement et sont fermées par déplacement relatif des deux parties mutuellement déplaçables (12, 13), et qui pressent ainsi la broche à verrouillage précontrainte (6) hors de la rainure de verrouillage (7) en raison de la mise en forme relative des parties ouvertes ou des encoches (15, 16), pour le réglage en hauteur de l'accoudoir (1) à l'une choisie des rainures de verrouillage (7) en actionnant un levier de réglage (11) relié fonctionnellement à l'une des parties mutuellement déplaçables (12, 13) pour fournir ce déplacement entre lesdites parties (12, 13), **caractérisé en ce qu'**une première partie intérieure (12) desdites deux parties mutuellement déplaçables est disposée de façon coulissante dans la deuxième partie extérieure (13) qui entoure partiellement ladite partie intérieure (12), et la partie intérieure (12) et la partie extérieure (13) étant mutuellement prétendues par un ressort hélicoïdal (14) si bien que les rainures de verrouillage (7) sont en leur position ouvertes à l'exception du moment lors du fonctionnement du levier de réglage (11).

2. Dispositif de réglage en hauteur selon la revendication 1, dans lequel les parties ouvertes ou des encoches (16) sont formées avec un plan incliné inférieur (17), afin de presser la broche de verrouillage précontrainte (6) hors de la rainure de verrouillage (7) par déplacement relatif entre les parties (12, 13) à une position fermée pour la rainure de verrouillage (7).
3. Dispositif de réglage en hauteur selon l'une quelconque des revendications précédentes, dans lequel une partie inférieure de l'accoudoir (1) entoure la partie supérieure de la tige (5), et cache et protège cette partie de l'ensemble à broche de verrouillage (2) qui, à un moment donné, est en saillie vers le haut et hors de la tige (5), et également la formation d'un guidage entre l'accoudoir (1) et la tige (5).

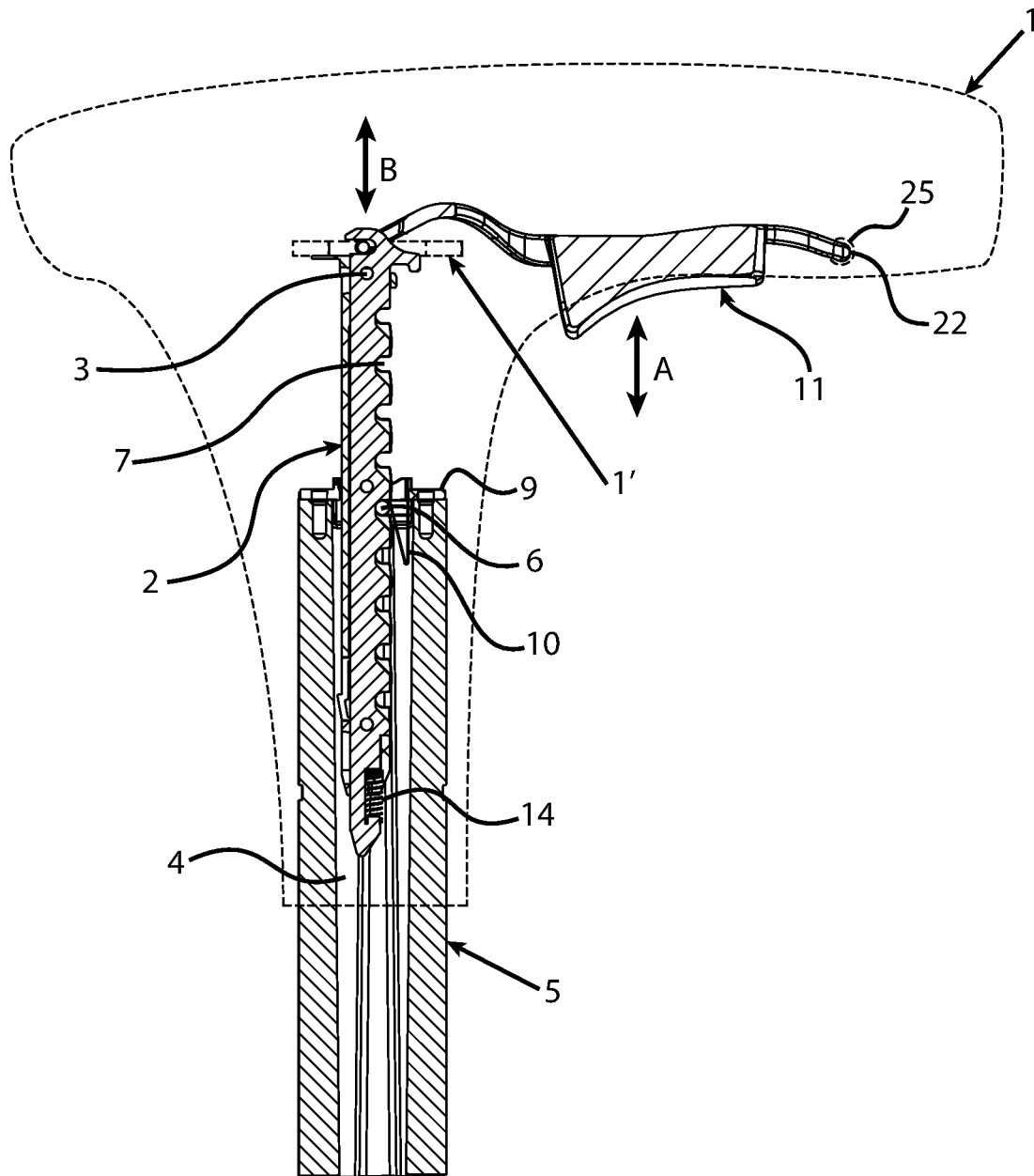


FIG. 1

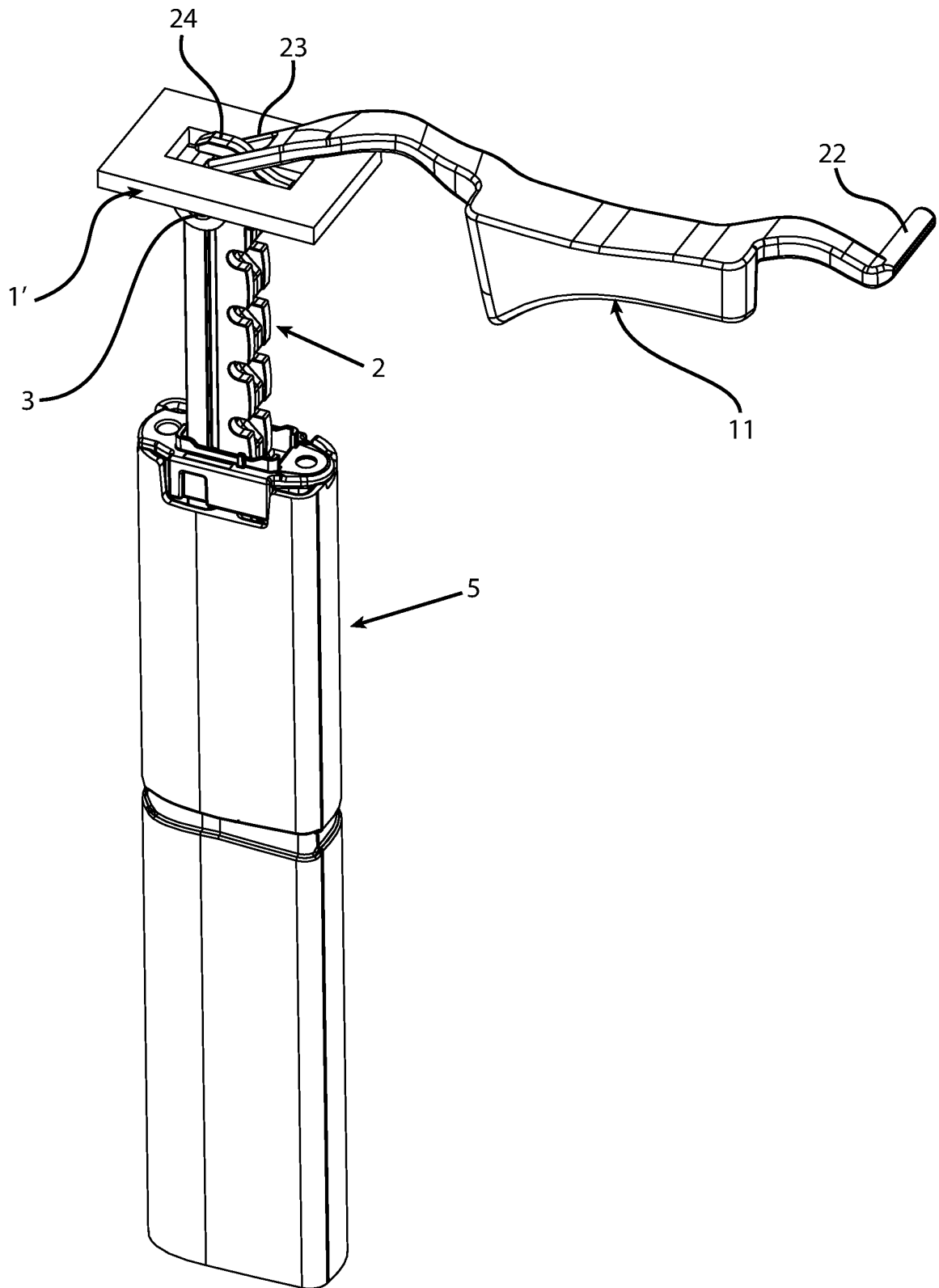


FIG. 2

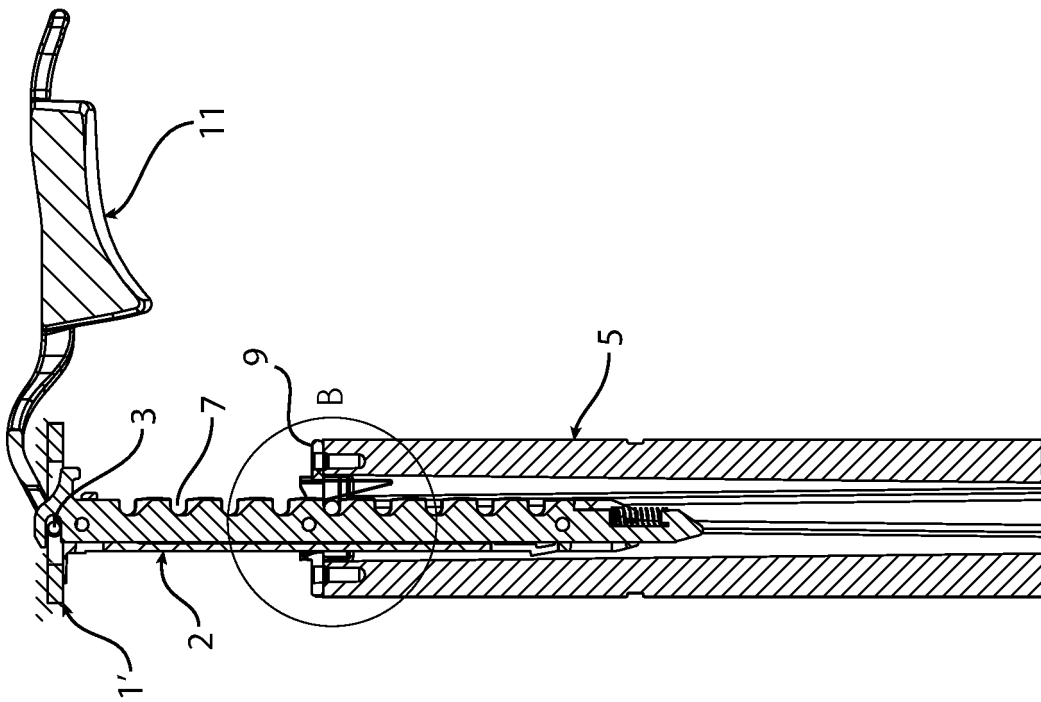


FIG. 3

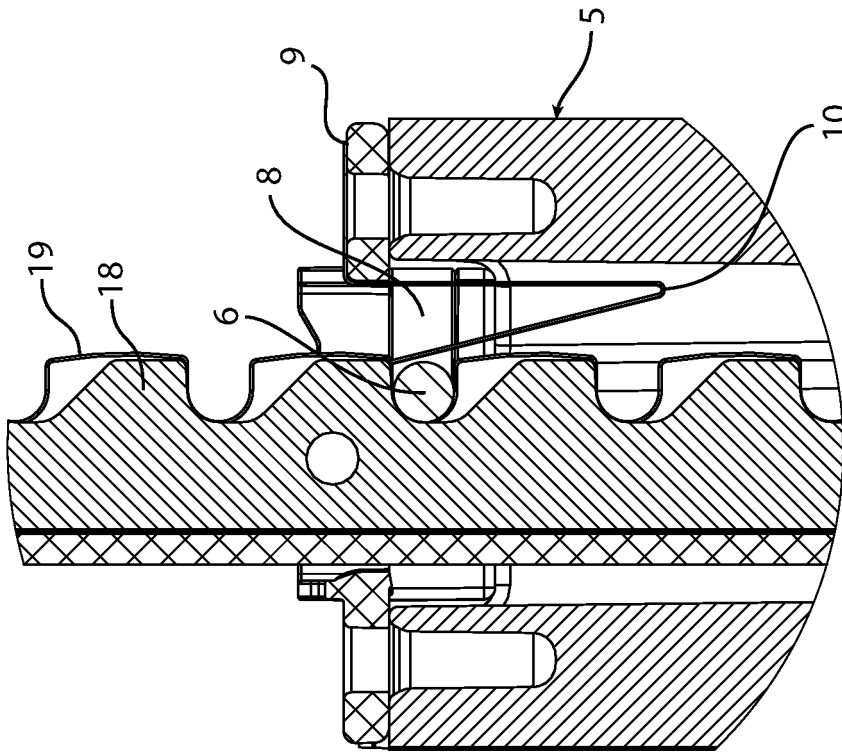


FIG. 4

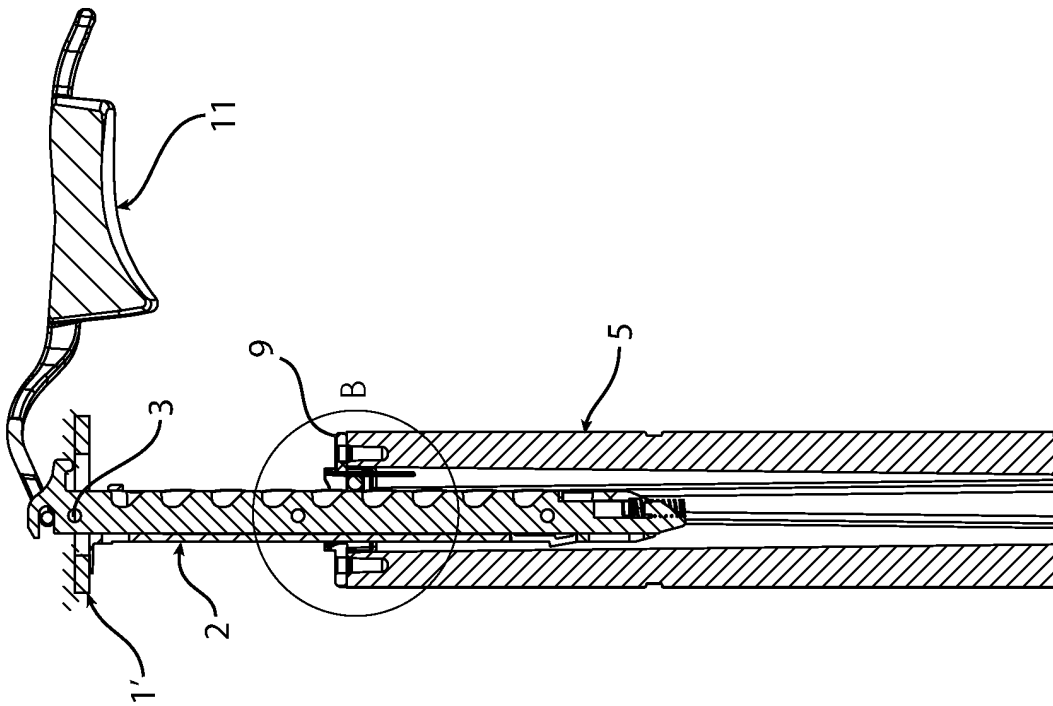


FIG. 5

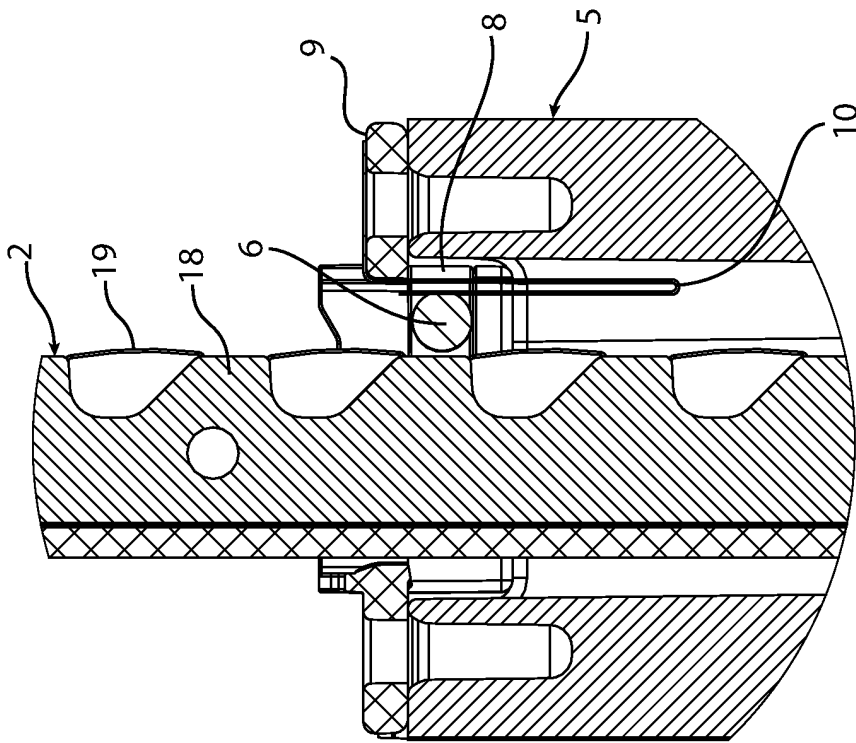


FIG. 6

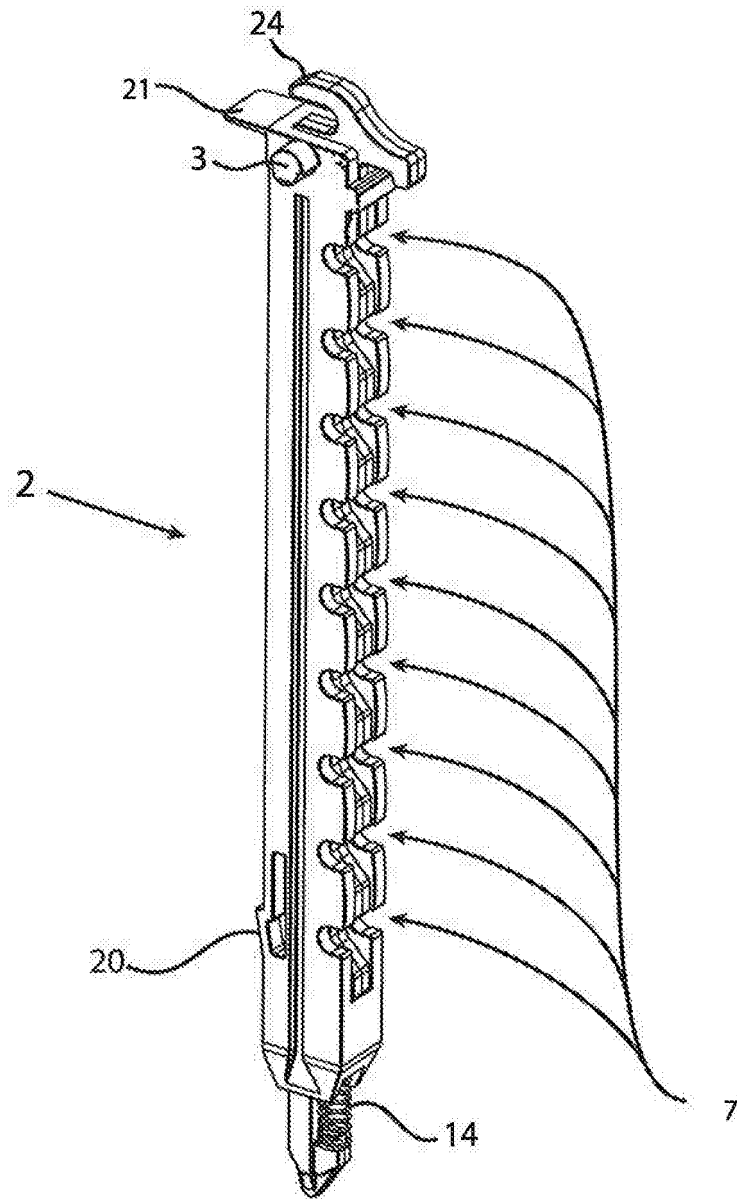


FIG. 7

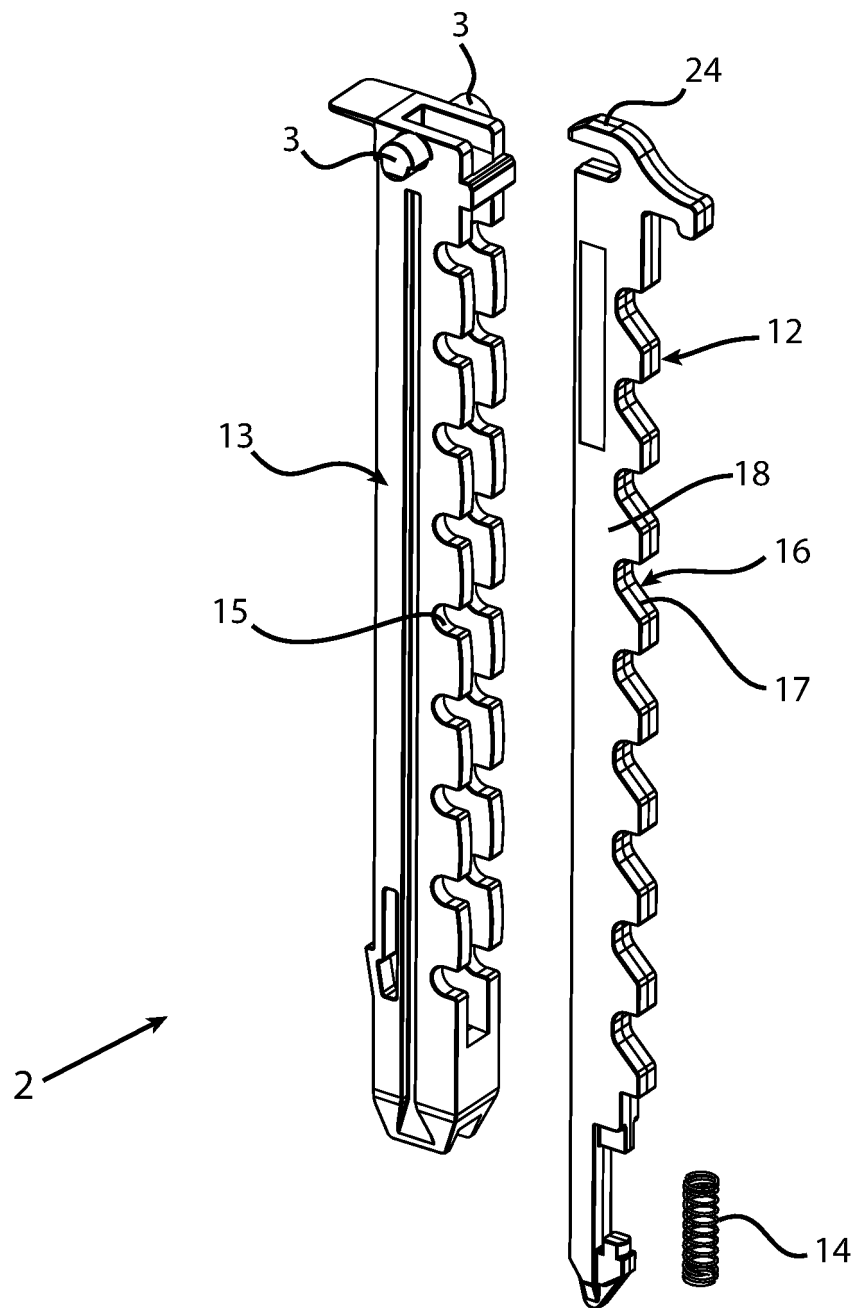


FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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