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(54) **A tilt control device, in particular for a chair, and a method of operation**

Neigungssteuerungsvorrichtung, insbesondere für einen Stuhl, und Verfahren zum Betrieb

Dispositif de commande d'inclinaison, en particulier pour une chaise et procédé de fonctionnement

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Description

Field of the invention

[0001] The invention relates to tilt control mechanisms for chairs. More specifically, the invention concerns a tilt control device for controlling relative movements between a first member and a second member that are pivotally connected, as specified in the preamble of claim 1, and method of controlling relative movements as specified in the preamble of claim 9 and claim 10.

Background of the invention

[0002] Chairs with seats that may be tilted are well known, particularly within the field of office chairs. A tilting mechanism for an office chair typically includes two housing parts, one part attached to the seat and the other part attached to the chair pedestal. The housing parts are interconnected by an axle, allowing the seat to be pivoted, or tilted, with respect to the pedestal. A spring is arranged between the housing parts so as to dampen the pivoting movements, and is normally configured such that the neutral (equilibrium) state of the spring corresponds to a more or less horizontal seat position. A locking device provides a means for locking, or fixating, the housing parts with respect to one another at any given tilting angle. In use, the seat tilt angle is controlled by the user (shifting his or her weight on the seat), and the seat may be locked at the desired tilt angle. Known tilt locking mechanisms include frictional plates and locking pins.

[0003] When the user wants to change the tilt angle and thus release the tilt lock mechanism (e.g. retracting a locking pin from its receptacle), the preloaded spring will tend to move the seat back to the horizontal position. If the user at this instant has shifted his or her position on the chair, the sudden release of the tilt lock mechanism will cause an undesirable abrupt movement of the seat and the backrest.

[0004] The applicant has devised and embodied this invention to prevent or limit such abrupt movements.

[0005] US 6213552 B1 discloses a mechanism for adjusting the seat angle of an office chair. A so-called "lower enclosure" is connected to the chair pedestal, and a bracket is connected to the chair seat. The enclosure and bracket are pivotally connected via a pivot pin. The bracket comprises a plurality of openings, configured for receiving a locking element. This locking element is configured to slide in an opening in the enclosure. A slider element comprises a cavity in which the locking element is partly received together with a first coil spring, biasing the locking element 230. The slider element is housed in a cylindrical housing which is connected to the enclosure. A second coil spring is positioned around about the locking element and arranged to bias the locking element in the opposite direction to that of the first coil spring. A handle is pivotally connected to the outer (free) end of the cylindrical housing in which the slider element is ar-

ranged. The handle comprises a tip which is configured for direct interaction with the outer end of the slider element, either in a recess on the slider element or against a slanted face on the slider element.

[0006] The invention is set forth and characterized in the main claim, while the dependent claims describe other characteristics of the invention.

[0007] It is therefore provided a tilt control device according to claim 1.

[0008] In one embodiment, the actuating means comprise at least one resilient element. In one embodiment, the actuating means comprise a pair of springs arranged on opposite sides of an enlarged portion of the locking member in a manner such that when one spring is in compression and exerting a motive force on the locking member, the other spring is in tension or in a relaxed state, and vice versa.

[0009] In one embodiment, the first member is connected to a chair column and the second member is connected to a chair seat, and the locking member is arranged for reciprocal movement in a main body which is connected to the second member.

[0010] In one embodiment, a main body is connected to the second member and comprises a bore configured for slidably receiving the locking member.

[0011] In one embodiment, the first member comprises a plurality of receptacles arranged at regular intervals.

[0012] It is also provided a method of allowing relative tilting movement between first and second members by means of the invented tilt control device, where the first member is connected to a chair column and the second member is connected to a chair seat, and the locking member initially is in place in the at least one receptacle in the first member and thereby preventing tilting movement between the first and second members, characterized by the steps of:

- a) causing movement between the first and second members, thereby causing the at least one receptacle to pinch and hold a stem portion of the locking member;
- b) operating the operating member to activate at least one of the actuating means, whereby the tilt control device is pre-set to withdraw the stem portion from the at least one receptacle; and
- c) causing the pinching force generated in step a) to cease;

whereby the stem portion is withdrawn from the receptacle and relative tilting movement between the first and second members is allowed.

[0013] It is also provided a method of preventing relative tilting movement between first and second members by means of the invented tilt control device, where the first member is connected to a chair column and the second member is connected to a chair seat, and the locking member initially is retracted from the at least one of a plurality of receptacles in the first member and thereby

allowing tilting movement between the first and second members, characterized by the steps of:

- a) causing movement between the first and second members, thereby causing a misalignment between the at least one receptacle and the guide;
- b) operating the operating member to activate at least one of the actuating means, whereby the stem portion is urged towards the first member and abuts against the first member between adjacent receptacles, and the tilt control device thus is pre-set to lock; and
- c) causing movement between the first and second members in order to align a receptacle adjacent to the step portion with the guide;

whereby the stem portion is allowed to enter the receptacle and lock the first and second members with respect to one another.

[0014] In one embodiment of the above methods, said movements are caused by a user sitting on the chair seat and shifting his or her weight with respect to the chair column.

Brief description of the drawings

[0015] These and other characteristics of the invention will become clear from the following description of a preferential form of embodiment, given as a non-restrictive example, with reference to the attached drawings, wherein:

Figure 1 is a perspective view of a chair seat with a tilting assembly having an embodiment of the invented tilt control device;

Figure 2 is an external side view of the tilting assembly illustrated in figure 1;

Figure 3a is a plan view of section A-A in figure 2;

Figure 3b is a plan view of section B-B in figure 2;

Figure 4a is a perspective exploded view of the tilting assembly and the tilt control device;

Figure 4b is a perspective exploded view of the tilt control device;

Figure 4c is an enlarged view of the region labelled "C" in figure 4b;

Figures 5a-d are enlarged views of the region labelled "A" in figure 3a, illustrating the tilting assembly in the following states:

- figure 5a: locking bolt and knob retracted: tilting assembly is unlocked;

- figure 5b: locking bolt retracted, knob extended: tilting assembly is unlocked and pre-set to lock;
- figure 5c: locking bolt and knob extended: tilting assembly is locked;
- figure 5d: locking bolt extended, knob retracted: tilting assembly is locked and pre-set to unlock;

Figures 6a-d are enlarged views of the region labelled "B" in figure 3b, illustrating the tilting assembly in the following states:

- figure 6a: locking bolt and knob retracted: tilting assembly is unlocked;
- figure 6b: locking bolt retracted, knob extended: tilting assembly is unlocked and pre-set to lock;
- figure 6c: locking bolt and knob extended: tilting assembly is locked;
- figure 6d: locking bolt extended, knob retracted: tilting assembly is locked and pre-set to unlock;

Detailed description of a preferential embodiment

[0016] The following description will use terms such as "horizontal", "vertical", "lateral", "back and forth", "up and down", "upper", "lower", "inner", "outer", etc. These terms generally refer to the views and orientations as shown in the drawings and that are associated with a normal use of the chair. The terms are used for the reader's convenience only and shall not be limiting.

[0017] Figure 1 shows an embodiment of the tilt control device on tilting assembly 4 on an office chair having a seat 3 supported by a column 2. The column 2 is connected to a pedestal (not shown), in a manner which is commonly known in the art. The chair may also conveniently comprises a backrest (not shown).

[0018] The tilting assembly is of a type that is generally known in the art, having a lower housing part 5 which is connected to the column 2, and an upper housing part 6 which is connected to the seat 3. The housing parts 5,6 are pivotally connected by an axle (reference number 28 in figure 4a) via holes 8. Between the housing parts is arranged a spring (not shown) that serves to dampen the pivoting movements, and is configured such that the neutral (equilibrium) state of the spring corresponds to a more or less horizontal seat position. Such spring arrangements are generally known in the art and need therefore not be described further her.

[0019] Referring additionally to figures 2, 3a,b 4a-c and 5a, the illustrated embodiment of the invented tilt control device comprises a main body 12 connected to the upper housing part 6 via a footing foundation 9 and bolts 10. In the illustrated embodiment, the main body 12 has a generally cylindrical shape and a trough-going axial bore 31 configured for slidably receiving a locking bolt 16. The bolt 16 has a stem portion 17 and a head portion 20 and an intermediate shoulder portion 19. The bore is open in both ends, and the inner end 33 (figure 3a) is shaped to receive the stem portion but not the head portion. The

stem portion 17 may thus slide partly through the inner end 33 and guide opening 30 in the upper housing part 6.

[0020] An inner coil spring 27 is arranged around and coaxially with the stem portion 17. In the assembled state, in the bore of the main body 12, the inner spring 27 is arranged to abut against the shoulder portion 19 at one end, and the inner wall portion 32 at the other end.

[0021] A control knob 7 is slidably arranged on the outside of the main body 12. The knob 7 has an internal cavity and an annular groove 29 that is configured for accommodating a portion of the main body 12. In the assembled state, an outer coil spring 26 is arranged in the knob internal cavity, and abuts against the bolt head portion 20 at one end and the bottom of the knob cavity 34 at the other end.

[0022] The knob 7 comprises two grooves 14 (diametrically opposite each other) that each is configured for cooperating with a respective cam 24 and detent 23 on the main body 12. When the knob 7 is assembled onto the main body 12, the detent 23 serves as an outer limiter for the knob's reciprocal movement on the main body. Figure 5a shows the knob in this outer position: the knob collar 25 is abutting against the main body detent 23. The cam 24 is connected to the main body 12 via strip portions 21 (see figure 4c) such that the cam may flex elastically inwards. Thus, when the knob 7 is pushed to the position shown in figure 5b, the cam is momentarily depressed by the collar 25. The cam then serves to hold the knob in the position shown in figure 5b. When a user pulls back on the knob, to bring it to the position shown in figure 5a, the collar snaps back over the flexible cam.

[0023] The control knob 7 and the locking bolt 16 are thus not directly connected, but the control knob 7 controls the movements of the locking bolt 16 via intermediate resilient elements (springs 26, 27).

[0024] The lower housing part 5 comprises a number of receptacles 18, arranged at regular intervals in an arcuate configuration corresponding to the arcuate tilting movement M. Each receptacle 18 is configured for receiving a portion of the locking bolt stem portion 17. The upper housing part 6 and the lower housing part 5 may thus be interlocked at a plurality of tilt angles, by inserting the locking bolt 16 into any one of the receptacles 18 (as illustrated in e.g. figure 5c).

[0025] Figure 5a and figure 6a both illustrate the tilt control device in an "unactivated and unlocked" state: the knob 7 is pulled back to a position where the collar 25 abuts against the detent 23, and the locking bolt 16 is also retracted into the main body 12. The bolt is not engaging any of the receptacles 18, and the lower housing part 5 and the upper housing part 6 are free to move relative to one another (i.e. pivot about the axle 28, cf. figure 4a). In this state of the tilt control device, the outer spring 26 and the inner spring 27 are in a state of equilibrium.

[0026] Figure 5b and figure 6b both illustrate the tilt control device in an "activated and unlocked" state. The lower housing part 5 and the upper housing part 6 have

moved with respect to one another so that the locking bolt 16 is not aligned with any of the receptacles. The knob 7 has been pushed inwards, to a position where the collar 25 has moved across the cam 24, thereby compressing the outer spring 26 and thus urging the locking bolt 16 towards the lower housing part 5 where the free end of the stem portion 17 abuts against the lower housing part 5 between adjacent receptacles 18. The device is thus set to lock. In this state (illustrated in figures 5b and 6b), the housing parts 5, 6 may move slightly with respect to one another, but once the stem portion 17 is aligned with a receptacle 18, the stem will be urged (by the compressed outer spring 26) into that receptacle and lock the housing parts 5, 6 with respect to one another. This state is illustrated in figures 5c and 6c.

[0027] Figure 5c and figure 6c both illustrate the tilt control device in an "unactivated and locked" state: the knob 7 has been pushed inwards as described above with respect to figures 5b and 6b, and a forward portion of the stem 17 is arranged in a receptacle 18. The housing parts 5, 6 are thus locked with respect to one another. In this state of the tilt control device, the outer spring 26 has been somewhat extended (relaxed) and the inner spring 27 has been compressed, compared to the state of the springs illustrated in figures 5b, 6b.

[0028] If a user pulls back on the knob 7 when the housing parts 5, 6 are in a position as illustrated by figures 5c and 6c, the inner spring 27 will urge the bolt towards the knob and remove the stem portion 17 from the receptacle 18. The housing parts 5, 6 will again be free to pivot with respect to one another (i.e. as illustrated in figures 5a and 6a). Figure 5d and 6d both illustrate the tilt control device in an "activated and locked" state: a part of the stem 17 is still in the receptacle (as in figures 5c and 6c), but the housing parts 5, 6 have moved slightly with respect to one another (e.g. by the user shifting his or her weight on the chair seat), thereby causing the receptacle 18 to pinch and hold the stem portion 17. The knob 7 has been pulled outwards, and as the stem portion is being held (pinched) in place in the receptacle (in the locked state), the inner spring 27 is in the same state as illustrated in figures 5c and 6c. The outer spring 26 is allowed to expand, compared to the state illustrated in figures 5c and 6c. When the knob in this manner has been set to unlock the device, and the pinching force between the receptacle and the stem portion ceases, the compressed inner spring 27 will cause the locking bolt stem 17 to move out of the receptacle and thus allow the housing parts 5, 6 to pivot with respect to one another (see illustrated by figures 5a and 6a).

[0029] In use, the invented tilt control device thus ensures that the locking bolt stem 17 always enters the closest receptacle 18 when the device is set to lock (figure 5b and 6b). The invented tilt control device also ensures that the housing parts 5, 6 are not released (allowed to pivot) with respect to one another unless the user is sitting on the seat and relieving the pinching force as described above with reference to figures 5d and 6d.

[0030] It is obvious for the skilled person that modifications and/or additions can be made to the invented tilt control device, but these shall remain within the field and scope of the invention. For example, while the invention has been described with reference to coil springs 26, 27, it should be understood that any resilient element may be used. Although not illustrated, an embodiment using only one resilient element may be envisaged.

[0031] Also, while the invention has been described with reference to a seat tilting mechanism, it should be understood that the invention is equally applicable for a seatback tilting mechanism.

Claims

1. A tilt control device for controlling relative movements (M) between a first member (5) and a second member (6) that are pivotally connected; the first member (5) comprising at least one receptacle (18), and the second member (6) comprising a guide (30); the tilt control device further comprising a movable tilt locking member (16) configured for removably entering the guide (30) and the at least one receptacle (18) in order to selectively lock and unlock the first and second members with respect to one another, an operating member (7) is operably connected to the locking member (16) via actuating means (26, 27), said actuating means being configured and arranged to allow relative movement between the operating member and the locking member, and wherein the operating member (7) and the locking member (16) are not directly connected, but the operating member (7) controls the movement of the locking member (16) via the actuating means (26, 27), **characterized in that** a main body (12) is connected to the second member (6) and comprises a bore (31) configured for slidably receiving the locking member (16), and wherein the operating member (7) is slidably arranged on the outside of the main body (12).
2. The tilt control device of claim 1, wherein the operating member (7) comprises two grooves (14) configured for cooperation with a respective cam (24) and detent (23) arranged on the main body (12); each of said detent (23) being configured to serve an outer limiter for the reciprocal movement of the operating member (7).
3. The tilt control device of claim 2, wherein the operating member (7) comprises a collar (25) configured for abutment against the detent (23).
4. The tilt control device of claim 2 or claim 3, wherein the cam (24) is connected to the main body (12) via strip portions (21), whereby the cam (24) may be depressed by the collar (25).
5. The tilt control device of any one of the preceding claims, wherein the actuating means comprise at least one resilient element.
6. The tilt control device of any one of the preceding claims, wherein the actuating means comprise a pair of springs (26, 27) arranged on opposite sides of an enlarged portion (20) of the locking member (16) in a manner such that when one spring (26) is in compression and exerting a motive force on the locking member, the other spring (27) is in tension or in a relaxed state, and vice versa.
7. The tilt control device of any one of the preceding claims, wherein the first member (5) is connected to a chair column (2) and the second member (6) is connected to a chair seat (3), and the locking member (16) is arranged for reciprocal movement in a main body (12) which is connected to the second member (6).
8. The tilt control device of any one of the preceding claims, wherein the first member (5) comprises a plurality of receptacles (18) arranged at regular intervals.
9. A method of allowing relative tilting movement between first and second members (5, 6) by means of the tilt control device of any one of claims 1-8, where the first member (5) is connected to a chair column and the second member (6) is connected to a chair seat, and the locking member (16) initially is in place in the at least one receptacle (18) in the first member (5) and thereby preventing tilting movement between the first and second members (5, 6), **characterized by** the steps of:
 - a) causing movement between the first and second members (5, 6), thereby causing the at least one receptacle (18) to pinch and hold a stem portion (17) of the locking member;
 - b) pulling the operating member (7) to activate at least one of the actuating means (26, 27), whereby the tilt control device is pre-set to withdraw the stem portion (17) from the at least one receptacle (18); and
 - c) causing the pinching force generated in step a) to cease;
 whereby the stem portion is withdrawn from the receptacle and relative tilting movement between the first and second members (5, 6) is allowed.
10. A method of preventing relative tilting movement between first and second members (5, 6) by means of the tilt control device of any one of claims 1-8, where the first member (5) is connected to a chair column and the second member (6) is connected to a chair

seat, and the locking member (16) initially is retracted from the at least one of a plurality of receptacles (18) in the first member (5) and thereby allowing tilting movement between the first and second members (5, 6), **characterized by** the steps of:

- a) causing movement between the first and second members (5, 6), thereby causing a misalignment between the at least one receptacle (18) and the guide (30);
- b) pushing the operating member (7) to activate at least one of the actuating means (26, 27), whereby the stem portion (17) is urged towards the first member (5) and abuts against the first member (5) between adjacent receptacles (18), and the tilt control device thus is pre-set to lock; and
- c) causing movement between the first and second members (5, 6) in order to align a receptacle (18) adjacent to the step portion (17) with the guide;

whereby the stem portion is allowed to enter the receptacle and lock the first and second members (5, 6) with respect to one another.

11. The method of claim 9 or claim 10, wherein said movements are caused by a user sitting on the chair seat and shifting his or her weight with respect to the chair column.

Patentansprüche

1. Neigungssteuerungsvorrichtung zur Steuerung relativer Bewegungen (M) zwischen einem ersten Glied (5) und einem zweiten Glied (6), die drehbar verbunden sind; welches erste Glied (5) zumindest eine Aufnahmeeinrichtung (18) umfasst, und das zweite Glied (6) eine Führung (30) umfasst; welche Neigungssteuerungsvorrichtung ferner ein bewegliches Neigungsverriegelungsglied (16) umfasst, welches dazu ausgebildet ist, in die Führung (30) und die zumindest eine Aufnahmerichtung (18) entferntbar zu gelangen, um selektiv das erste und zweite Glied in Bezug aufeinander zu verriegeln und zu entriegeln, ein Betätigungsglied (7) über Aktivierungsmittel (26, 27) mit dem Verriegelungsglied (16) betriebsfähig verbunden ist, welche Aktivierungsmittel dafür ausgelegt und vorgesehen sind, eine relative Bewegung zwischen dem Betätigungsglied und dem Verriegelungsglied zu ermöglichen, und wobei das Betätigungsglied (7) und das Verriegelungsglied (16) nicht unmittelbar verbunden sind, das Betätigungsglied (7) jedoch über die Aktivierungsmittel (26, 27) die Bewegung des Verriegelungsglieds (16) steuert, **dadurch gekennzeichnet, dass** ein Hauptkörper (12) mit dem zweiten Glied (6) verbunden ist

und eine zur gleitenden Aufnahme des Verriegelungsglieds (16) ausgebildete Bohrung (31) umfasst, und wobei das Betätigungsglied (7) an der Außenseite des Hauptkörpers (12) verschiebbar angeordnet ist.

- 2. Neigungssteuerungsvorrichtung nach Anspruch 1, wobei das Betätigungsglied (7) zwei Rillen (14) umfasst, die für das Zusammenwirken mit einem jeweiligen Nocken (24) und einer Rastung (23) vorgesehen sind, die am Hauptkörper (12) angeordnet sind; wobei jede Rastung (23) dazu ausgelegt ist, als ein Außenbegrenzer für die gegenseitige Bewegung des Betätigungsglieds (7) zu dienen.
- 3. Neigungssteuerungsvorrichtung nach Anspruch 2, wobei das Betätigungsglied (7) einen zur Anlage an der Rastung (23) ausgebildeten Kragen (25) umfasst.
- 4. Neigungssteuerungsvorrichtung nach Anspruch 2 oder Anspruch 3, wobei der Nocken (24) über Streifenteile (21) mit dem Hauptkörper (12) verbunden ist, wobei der Nocken (24) vom Kragen (25) heruntergedrückt sein kann.
- 5. Neigungssteuerungsvorrichtung nach einem der vorhergehenden Ansprüche, wobei die Aktivierungsmittel zumindest ein elastisches Element umfassen.
- 6. Neigungssteuerungsvorrichtung nach einem der vorhergehenden Ansprüche, wobei die Aktivierungsmittel ein Paar von Federn (26, 27) umfassen, die derart auf entgegengesetzten Seiten eines vergrößerten Teils (20) des Verriegelungsglieds (16) angeordnet sind, dass die zweite Feder (27), wenn eine Feder (26) unter Kompression steht und auf das Verriegelungsglied eine bewegende Kraft ausübt, sich im Spannungszustand oder in einem entspannten Zustand und umgekehrt befindet.
- 7. Neigungssteuerungsvorrichtung nach einem der vorhergehenden Ansprüche, wobei das erste Glied (5) mit einer Stuhlsäule (2) verbunden ist, und das zweite Glied (6) mit einem Stuhlsitz (3) verbunden ist, und das Verriegelungsglied (16) für eine gegenseitige Bewegung in einem mit dem zweiten Glied (6) verbundenen Hauptkörper (12) vorgesehen ist.
- 8. Neigungssteuerungsvorrichtung nach einem der vorhergehenden Ansprüche, wobei das erste Glied (5) eine Mehrzahl von in regelmäßigen Abständen angeordneten Aufnahmeeinrichtungen (18) umfasst.
- 9. Verfahren zur Ermöglichung einer relativen Neigungsbewegung zwischen dem ersten und zweiten

Glied (5, 6) mittels der Neigungssteuerungsvorrichtung nach einem der Ansprüche 1-8, wobei das erste Glied (5) mit einer Stuhlsäule verbunden ist, und das zweite Glied (6) mit einem Stuhlsitz verbunden ist, und das Verriegelungsglied (16) sich zunächst in der mindestens einen Aufnahmerichtung (18) im ersten Glied (5) befindet und dadurch die Neigungsbewegung zwischen dem ersten und zweiten Glied (5, 6) verhindert, **gekennzeichnet durch** die folgenden Schritte:

- a) Hervorrufen einer Bewegung zwischen dem ersten und zweiten Glied (5, 6), wodurch bewirkt wird, dass die zumindest eine Aufnahmeeinrichtung (18) einen Schafftteil (17) des Verriegelungsglieds klemmt und festhält;
- b) Ziehen des Betätigungsglieds (7), um zumindest eines der Aktivierungsmittel (26, 27) zu aktivieren, wodurch die Neigungssteuerungsvorrichtung voreingestellt wird, um der zumindest einen Aufnahmeeinrichtung (18) den Schafftteil (17) zu entnehmen; und
- c) Herbeiführen, dass die in Schritt a) erzeugte Klemmkraft beendet wird; wodurch der Schafftteil der Aufnahmeeinrichtung entnommen wird, und eine relative Neigungsbewegung zwischen dem ersten und zweiten Glied (5, 6) ermöglicht wird.

10. Verfahren zur Verhinderung einer relativen Neigungsbewegung zwischen dem ersten und zweiten Glied (5, 6) mittels der Neigungssteuerungsvorrichtung nach einem der Ansprüche 1-8, wobei das erste Glied (5) mit einer Stuhlsäule verbunden ist, und das zweite Glied (6) mit einem Stuhlsitz verbunden ist, und das Verriegelungsglied (16) zunächst von der zumindest einen einer Mehrzahl von Aufnahmeeinrichtungen (18) im ersten Glied (5) zurückgezogen wird, und wodurch eine Neigungsbewegung zwischen dem ersten und zweiten Glied (5, 6) ermöglicht wird, **gekennzeichnet durch** die folgenden Schritte:

- a) Hervorrufen einer Bewegung zwischen dem ersten und zweiten Glied (5, 6), wodurch eine Verstellung zwischen der zumindest einen Aufnahmeeinrichtung (18) und der Führung (30) herbeigeführt wird;
- b) Drücken des Betätigungsglieds (7) zum Aktivieren zumindest eines der Aktivierungsmittel (26, 27), wodurch der Schafftteil (17) zum ersten Glied (5) hin gedrängt wird und am ersten Glied (5) zwischen benachbarten Aufnahmeeinrichtungen (18) zur Anlage kommt, und die Neigungssteuerungsvorrichtung so zum Verriegeln voreingestellt wird; und
- c) Hervorrufen einer Bewegung zwischen dem ersten und zweiten Glied (5, 6) zur Ausrichtung

einer dem Schafftteil (17) benachbarten Aufnahmeeinrichtung (18) mit der Führung;

wobei der Schafftteil in die Aufnahmeeinrichtung eintreten und das erste und zweite Glied (5, 6) in Bezug aufeinander verriegeln kann.

11. Verfahren nach Anspruch 9 oder Anspruch 10, wobei die Bewegungen durch einen Benutzer bzw. eine Benutzerin verursacht werden, der bzw. die sich auf dem Stuhlsitz befindet und sein oder ihr Gewicht in Bezug auf die Stuhlsäule verlagert.

15 Revendications

1. Dispositif de commande d'inclinaison pour commander les mouvements relatifs (M) entre un premier élément (5) et un deuxième élément (6) qui sont reliés à pivotement; le premier élément (5) comprenant au moins un réceptacle (18), et le deuxième élément (6) comportant un guide (30); le dispositif de commande d'inclinaison comprenant en outre un élément d'inclinaison mobile de verrouillage (16) étant configuré pour saisir le guide (30) de manière amovible et l'au moins un réceptacle (18) afin de verrouiller et déverrouiller de manière sélective les premier et deuxième éléments l'un par rapport à l'autre, un élément fonctionnement (7) est relié de manière opérationnelle à l'élément de verrouillage (16) par l'intermédiaire des moyens d'actionnement (26, 27), lesdits moyens d'actionnement étant configurés et agencés pour permettre un mouvement relatif entre l'élément de fonctionnement et l'élément de verrouillage, et dans lequel l'élément de fonctionnement (7) et l'élément de verrouillage (16) ne sont pas directement liés, mais l'élément de fonctionnement (7) commande le mouvement de l'élément de verrouillage (16) par l'intermédiaire des moyens d'actionnement (26, 27), **caractérisé en ce qu'un** corps principal (12) est relié au deuxième élément (6) et comporte un alésage (31) configuré pour recevoir de manière coulissante l'élément de verrouillage (16), et dans lequel l'élément de fonctionnement (7) est agencé de manière coulissante sur l'extérieur du corps principal (12).
2. Dispositif de commande d'inclinaison selon la revendication 1, dans lequel l'élément de fonctionnement (7) comprend deux rainures (14) configurées pour la coopération respectivement avec une came (24) et une détente (23) arrangées sur le corps principal (12); chaque dite détente (23) étant configurée pour servir de limitation extérieure du mouvement réciproque de l'élément de fonctionnement (7).
3. Dispositif de commande d'inclinaison selon la revendication 2, dans lequel l'élément de fonctionnement

(7) comprend un manchon (25) configuré pour l'appui contre la détente (23).

4. Dispositif de commande d'inclinaison selon la revendication 2 ou la revendication 3, dans lequel la came (24) est reliée au corps principal (12) via des portions de bande (21), la came (24) pouvant être pressée vers le bas par le manchon (25). 5
5. Dispositif de commande d'inclinaison selon l'une quelconque des revendications précédentes, dans lequel les éléments d'actionnement comprennent au moins un élément élastique. 10
6. Dispositif de commande d'inclinaison selon l'une quelconque des revendications précédentes, dans lequel les moyens d'actionnement comprennent une paire de ressorts (26, 27) disposés sur les côtés opposés d'une partie élargie (20) de l'élément de verrouillage (16) d'une manière telle que lorsque l'un ressort (26) est en compression pour exercer une force motrice sur l'élément de verrouillage, l'autre ressort (27) est en tension ou dans un état détendu, et vice versa. 15
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7. Dispositif de commande d'inclinaison selon l'une quelconque des revendications précédentes, dans lequel le premier élément (5) est relié à une colonne de chaise (2) et le deuxième élément (6) est relié à un siège de chaise (3) et l'élément de verrouillage (16) est agencé pour un mouvement réciproque dans un corps principal (12) qui est relié au deuxième élément (6). 25
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8. Dispositif de commande d'inclinaison selon l'une quelconque des revendications précédentes, dans lequel le premier élément (5) comprend une pluralité de réceptacles (18) disposés à intervalles réguliers. 35
9. Procédé pour permettre un mouvement relatif de basculement entre les premier et deuxième éléments (5, 6) au moyen du dispositif de commande d'inclinaison selon l'une quelconque des revendications 1 à 8, le premier élément (5) étant relié à une colonne de chaise et le deuxième élément (6) étant relié à un siège de chaise, et l'élément de verrouillage (16) étant initialement mis en place dans au moins un réceptacle (18) dans le premier élément (5) et empêchant ainsi un mouvement de basculement entre les premier et deuxième éléments (5, 6), **caractérisé par** les étapes consistant à: 40
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 - a) provoquer le déplacement entre les premier et deuxième éléments (5, 6), amenant ainsi l'au moins un réceptacle (18) à pincer et à maintenir une partie de tige (17) de l'élément de verrouillage;
 - b) tirer l'élément de fonctionnement (7) pour ac-

tiver au moins l'un des moyens d'actionnement (26, 27), le dispositif de commande d'inclinaison étant préréglé pour retirer la partie de tige (17) à partir de l'au moins un réceptacle (18); et
c) amener la force de pincement produite dans l'étape a) à cesser;

la partie de tige étant retirée du réceptacle, permettant un mouvement relatif d'inclinaison entre les premier et deuxième éléments (5, 6).

10. Procédé pour empêcher un mouvement relatif de basculement entre les premier et deuxième éléments (5, 6) au moyen du dispositif de commande d'inclinaison selon l'une quelconque des revendications 1 à 8, le premier élément (5) étant relié à une colonne de chaise et le deuxième élément (6) étant relié à un siège de chaise, et l'élément de verrouillage (16) étant initialement retiré de l'au moins un de la pluralité de réceptacles (18) dans le premier élément (5) et permettant ainsi un mouvement de basculement entre les premier et deuxième éléments (5, 6), **caractérisé par** les étapes consistant à:

- a) provoquer le déplacement entre les premier et deuxième éléments (5, 6), provoquant ainsi un défaut d'alignement entre au moins un réceptacle (18) et le guide (30);
- b) pousser l'élément de fonctionnement (7) à activer l'au moins un des moyens d'actionnement (26, 27), la partie de tige (17) étant poussée vers le premier élément (5) et venant en butée contre le premier élément (5) entre des réceptacles adjacents (18), et le dispositif de commande d'inclinaison est donc préréglée pour verrouiller; et
- c) provoquer un déplacement entre les premier et deuxième éléments (5, 6) afin d'aligner un réceptacle (18) adjacent à la partie de tige (17) avec le guide;

la partie de tige étant permis d'entrer dans le réceptacle et verrouiller les premier et deuxième éléments (5, 6) l'un par rapport à l'autre.

11. Procédé selon la revendication 9 ou la revendication 10, dans lequel lesdits mouvements sont provoqués par un utilisateur assis sur le siège de chaise et le déplacement de son poids par rapport à la colonne de chaise.

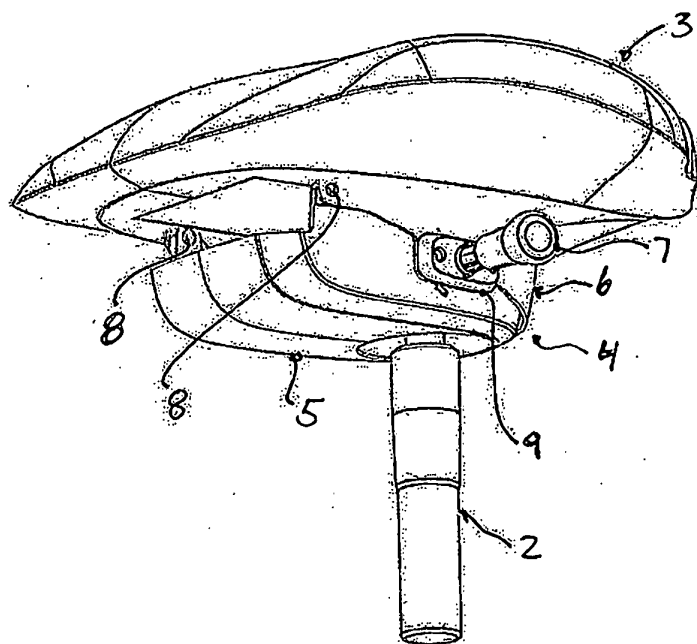


Figure 1

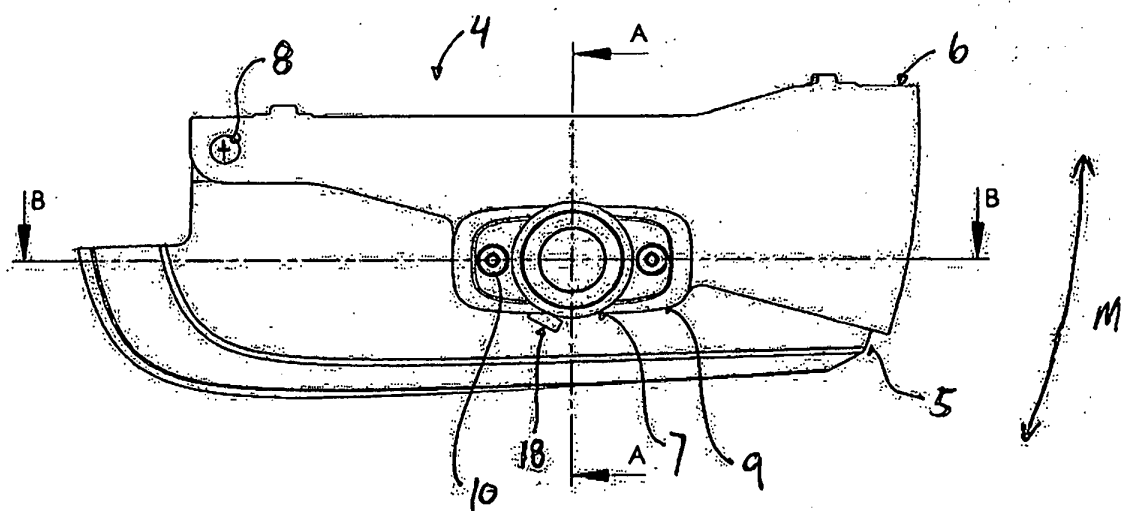


Figure 2

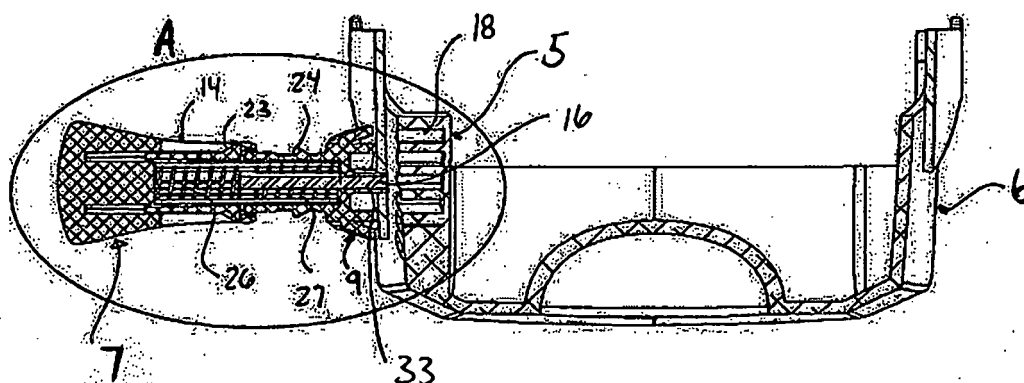


Figure 3a

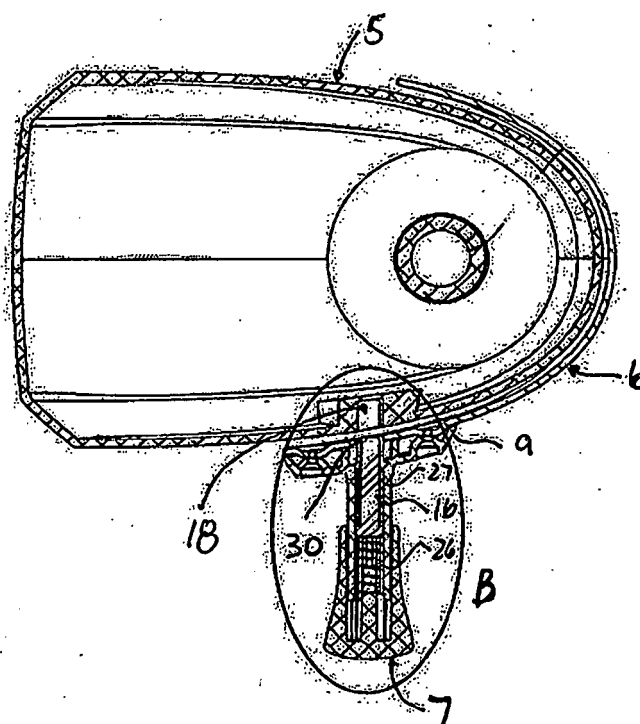


Figure 3b

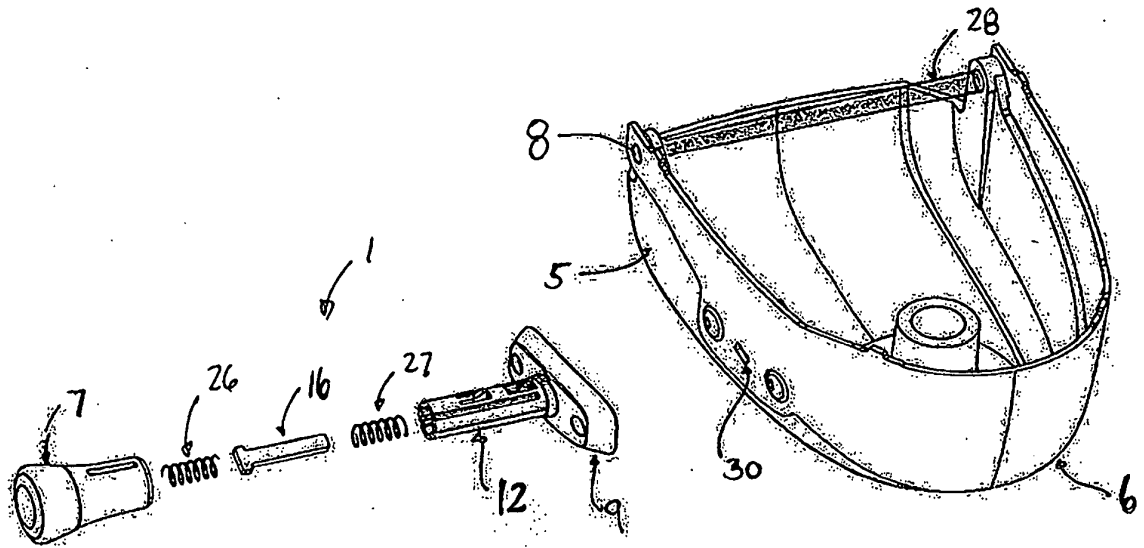


Figure 4a

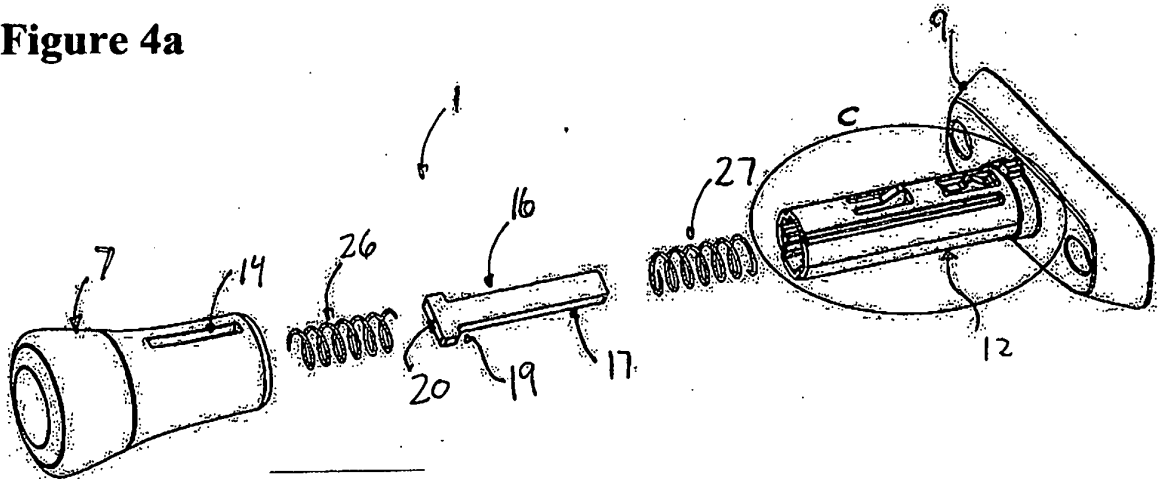


Figure 4b

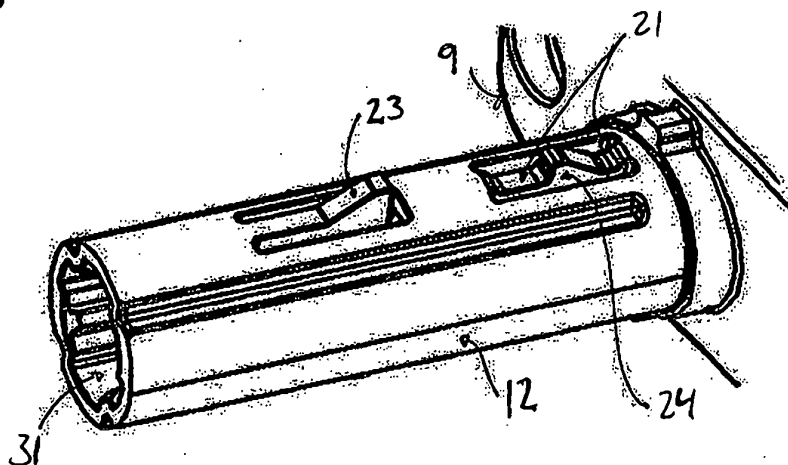


Figure 4c

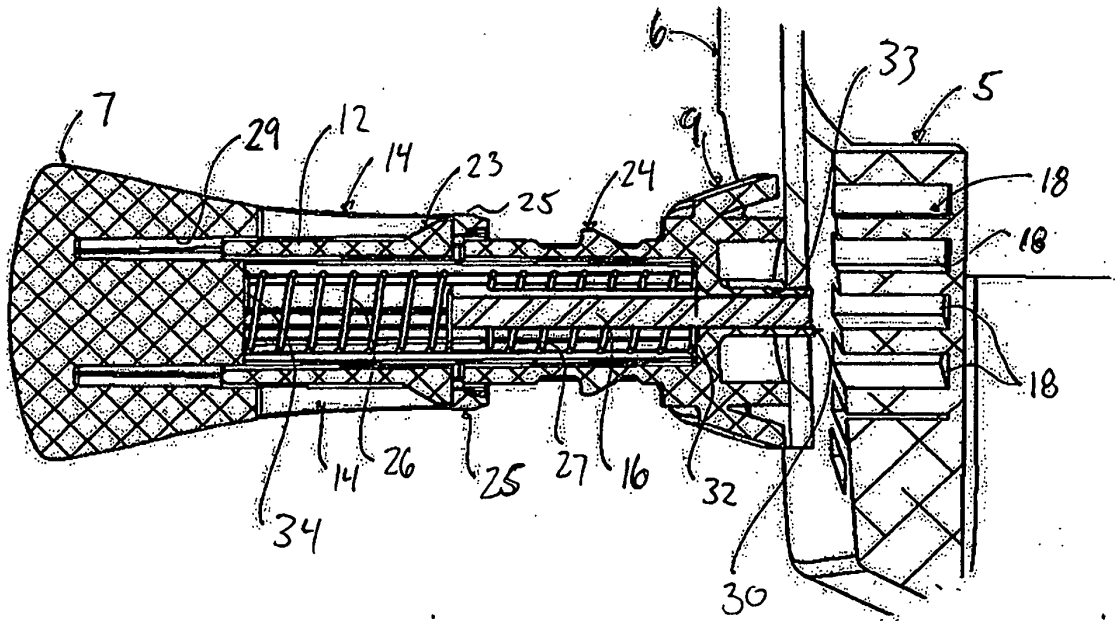


Figure 5a

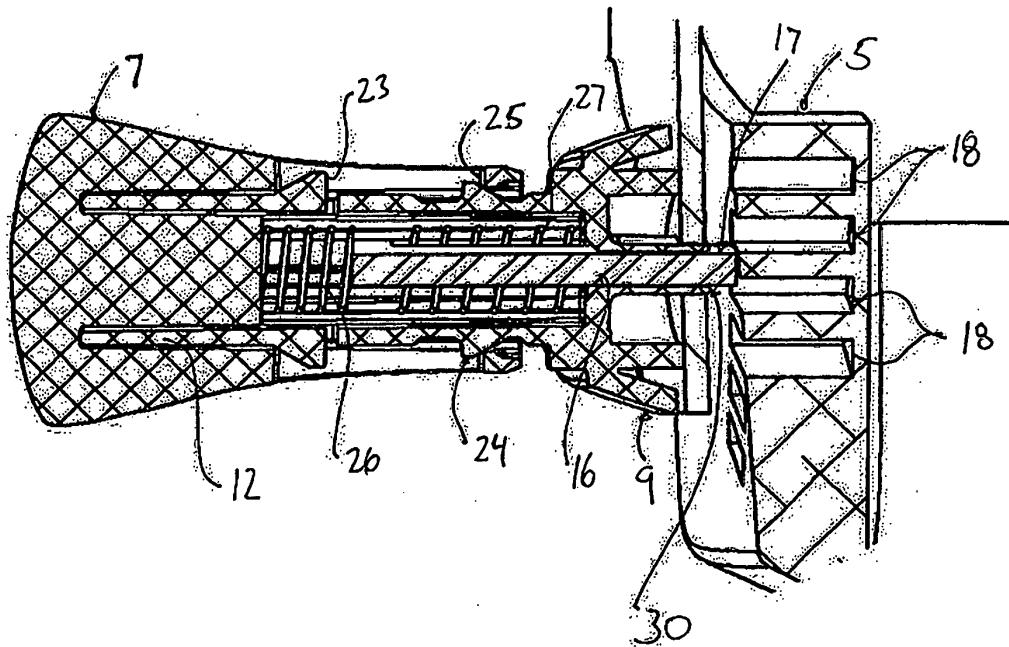


Figure 5b

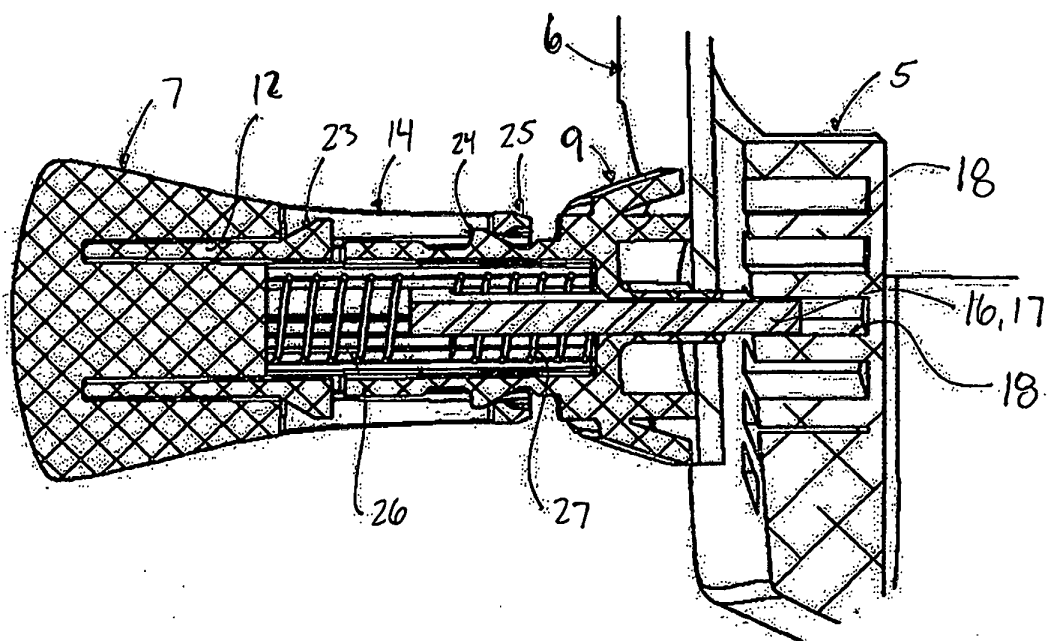


Figure 5c

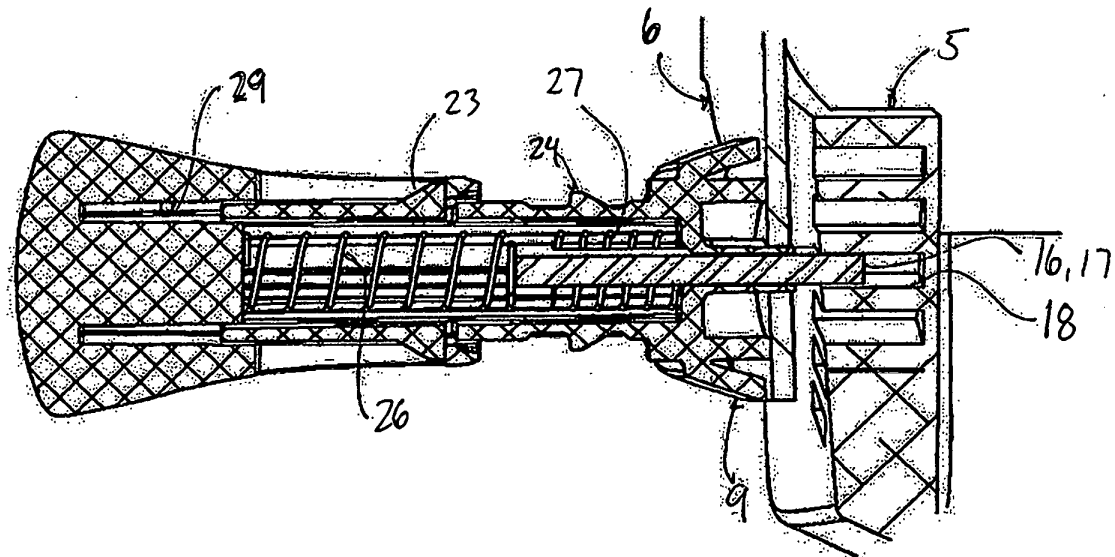


Figure 5d

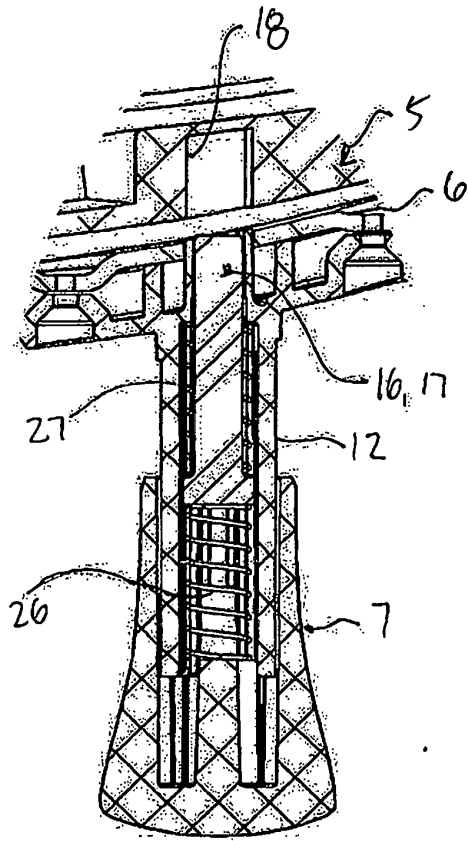


Figure 6a

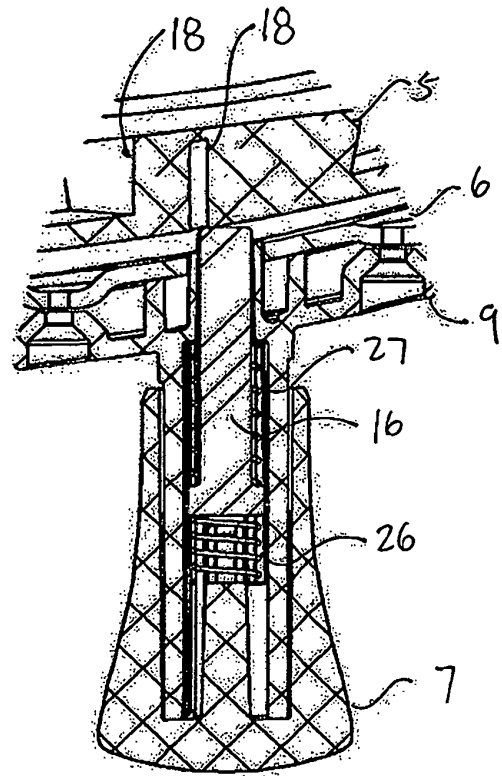


Figure 6b

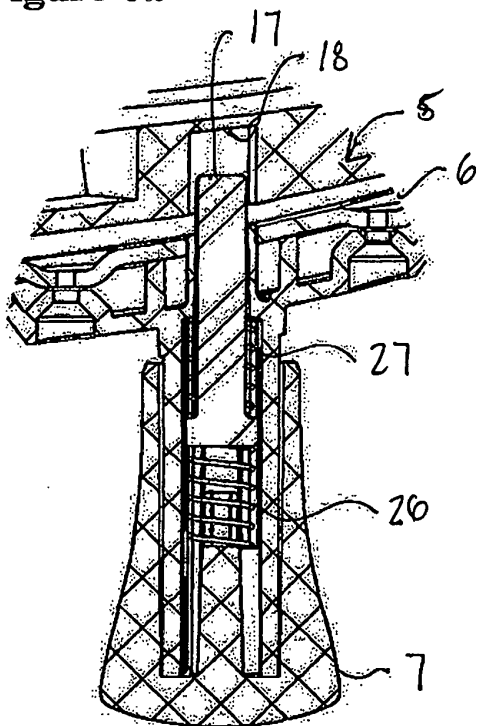


Figure 6c

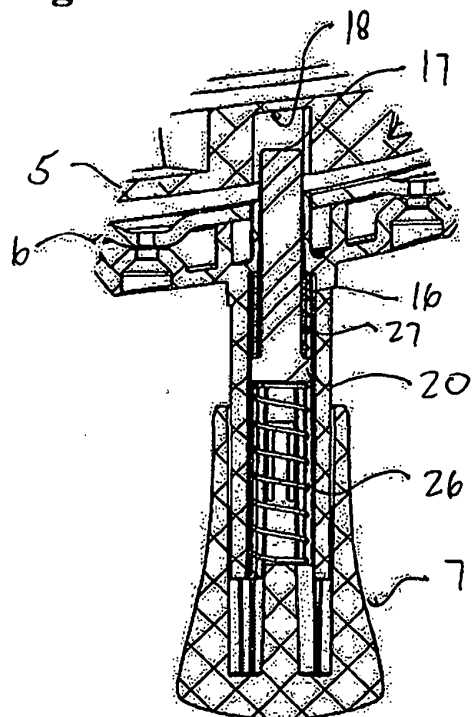


Figure 6d

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6213552 B1 [0005]