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(54) AMORTIZED SWIVEL COLUMN FOR OFFICE CHAIR

HÖHENVERSTELLBARE DREHSÄULE FÜR BÜROSTUHL

COLONNE DE PIVOTEMENT A AMORTISSEMENT POUR CHAISE DE BUREAU

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(73) Proprietor: **LIFTER S.A.**
47031 Dogana (SM)

(72) Inventor: **BERGAMASCO, Alessio**
I-33037 Pasian di Prato (IT)

(74) Representative: **D'Agostini, Giovanni, Dr.**
D'AGOSTINI ORGANIZZAZIONE
Via G. Giusti 17
33100 Udine (IT)

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Description

This invention has for object an amortized swivel column for office chair according to the preamble of claim 1.

The chair using said column form is also object of the present invention as a dependent claim.

More particularly the invention regards an amortized swivel column for office chair with two cylindrical bodies.

These types of column are well described in EP-0357592 and EP-0462997 (IT-83355A/89), in which:

- said upper and lower chambers contain oil that by means of said valve is poured over or under to vary the length (height of the seat);
- said bottom chamber includes compressed air and acts from the amortizer of the seated.

There exist other solutions of amortized swivel columns without oil, in which the amortizement is obtained by means of a helical spring and the variation of the height is obtained by means of a screw coupling between tube and column base.

The second solution is of a mechanical type with all its limitations (lubrication necessity, necessity to rotate the seat to vary the height, danger in dirtying clothing with the oil underneath the column, etc.).

The first solution is of dynamic-fluid type, extremely practical to use, therefore it is the one which is mainly used on the market. Notwithstanding this, it has some drawbacks:

- weight and cost because of the presence of oil;
- risk of leaking oil;
- high operating cost for the necessity of making two separate sealing compartments, respectively:
- an upper one containing the oil in two upper and lower chambers to vary the height and,
- a lower one for the containing of the compressed air in order to have the amortizement of the seated.

The risk in dirtying clothing however remains in both solutions.

Other solutions are complex, expensive and not reliable as for the scope of this invention.

GB-A-163915 discloses an amortized swivel column for office chair of the type with two cylindrical bodies:

- a base column which lower base is connected or connectable to the base of the chair;
- a piston tube that penetrates telescopically having a piston form piston, amortized from the compressed air compression in a bottom chamber of a lower compartment, within said column base, that exits more or less from the column base with the upper extremity connected or connectable under the seat of the chair;
- a command rod axially slideable within said tube to start a piston with inferior valve that allows or prevents, depending on its position, the pouring of a fluid into an upper compartment, between two respectively upper and lower chambers, in order to allow the lengthening or the shortening of the entire column in a condition of indifferent equilibrium;
- in order that:
  - when one wishes to vary the height, one moves the said command rod axially in order that said valve puts into communication said lower chamber with said upper chamber in said upper compartment allowing air to be drawn for compensation;
  - when one sits down, with the height variation command blocked by means of moving the said command rod in a position in which said pouring is not possible, said piston tube descends between the said base column pressing the base chamber with an elastic return if there is no compression.

This solution is simple and easy to use, but, because of its structure, does not allow a maximum flexible performance in use.

Aim of the present invention is to obviate to the above-mentioned drawbacks.

This and other aims are reached as claimed by means of an amortized swivel column for office chair as mentioned, which is characterized in that:

- said lower chamber of said upper compartment is connected directly to said bottom chamber of said lower compartment, by a fluid communication passage, so that the fluid in the base chamber and lower chamber is compressed upon seating,

- said upper and lower chambers of said upper compartment and said bottom chamber of said lower compartment comprise the same fluid, compressed air;

Advantageously the air will be dried to avoid degrading, rusting and condensation.

In this way we obtain a much simpler column, lighter because only air is present, more simplified lacking an intermediate separating tube between two compartments, more reliable, without danger in dirtying clothing and therefore always clean.

The sensible cost reduction (about 15%) finally provides a product qualitatively much more competitive on the market.

These and other advantages will appear from the successive preferential solutions description of realization with the help the drawings included which particulars of execution are not to be considered limitative but only supplied as an example.

Figure 1 is an axial section view of the column

according to the present invention.

Figure 2 is a partial view of the column concerning the lower compartment of the base column in a modified version in respect to the first.

With reference to the figure it is disclosed that 1 indicates the piston tube with cylindrical metallic shell 10, while 2 indicates the base column with cylindrical metallic shell 20.

Within the piston tube 1 slides the command rod 11 in plastic material, which lower extremity having a piston form with intermediate annular chamber valve 114 sealingly watertight from opposite gaskets 113, between a guide bush in plastic material 12 rigidly fixed in a position between the metallic shell 10 of the tube 1 by means of a lower filling in plastic material 14 holed axially 141 towards the lower compartment "I", in such a way that one has a communication between a lower "i" chamber under the piston with valve 115 and the bottom air chamber "I", that which will always supply an upward push of the command rod 11, air being compressed and introduced downwardly on behalf the charging valve 25. in the bottom chamber "I".

Obviously even the manifold valve support 12 has external sealing gaskets 121 to prevent the exit of compressed air; and has a couple of holes 122 and 123 spaced but comprised within the amplitude of the annular chamber of the piston tube 114.

From the outside of said couple of holes and between these is anularly fitted on the liner of the metallic cylindrical tube 10, a gasket ring 13 that with the respective annular gasket 131 acts from the tube piston 10.

The upper extremity of the column 2 is closed by a ring 22 and before this a sealing flange 21.

Between the sealing flange 21 and said piston gasket of the tube of 3 there is an upper annular chamber (SS) of the upper compartment "SS+S".

Finally the tube extends downwards within the column and is guided by a lining 23 with holes 231 (finning) that acts from fixed partition to the external lining of the column 20, between the upper compartment "SS+S" and the lower compartment (I) but allows the passage of the air being drawn between these "SS-I" during its lowering or lifting.

The annular partition 23 can also extend downwardly until the bottom of the column 20 to form a stronger stop to the tube piston 13 and to better balance volumes between the bottom chamber and the lower chamber or better between the upper compartment "SS+S" and the lower compartment "I".

In this way one has a softer movement.

One will note that everywhere there is only air "a" that between the other the command rod 11 always pushes, thanks to "i" towards the top.

For varying the height of the chair, it will therefore suffice to push the command rod 11 downwards, in this way one will have the valve (115) of Fig.1 which lowers and the air will be able to coflow from the lower chamber "S" to the upper chamber "SS", allowing the penetration of the tube enter the column 20 thanks also to the air passage between the bottom chamber "I" and the lower chamber "S".

Once the stem 1O is let free, this, pushed from the pressure of the compressed air in the valve "i" raises and the valve 115 blocks the two passages 122-123 as illustrated in the figure.

At this moment the column is blocked and cannot be varied in length.

When one sits, the column will however elastically shorten because the action of the column piston 113 intervenes that acts together with the bottom column 14-141 respectively the first against the stop 23 (lower chamber) and the second against the bottom of the column (bottom chamber) both communicant and therefore in continuous pressure equilibrium.

Obviously the plastic material filling 14 could also lack to increase the volume of the bottom chamber "I".

Alternatively the partition bush 23, as shown in fig. 2, can extend downwardly. In such a way taking the filling 14 and extending the stop bush 23 one obtains a further differentiation of the volume of the bottom chamber "I" whereupon one can therewith vary the elasticity, advantageous to avoid degrading or rustings of column materials or formation of condensation inside the column, the air inside the column is dried.

Claims

1. Amortized swivel column for office chair of the type with two cylindrical bodies:

   - a base column (2) which lower base is connected or connectable to the base of the chair;
   - a piston tube (1) that penetrates telescopically having a piston form, amortized from the compressed air compression in a bottom chamber of a lower compartment **(I)**, within said column base (1), that exits more or less from the column base (2) with the upper extremity connected or connectable under the seat of the chair;
   - one command rod (11) axially slideable within said tube to start a piston (114) of a lower valve (115) that allows or prevents, depending on its position, pouring of a fluid into an upper compartment (SS, S) between two respectively upper (SS) and lower (S) chambers, in order to allow the lengthening or shortening of the entire column in a condition of indifferent equilibrium,
     • in order that:

     - when one wishes to vary the height, one moves the said command rod (11) axially in order that said valve (114-115) puts into communication (122-123) said lower chamber "S" with said upper chamber "SS"

in said upper compartment allowing air to be drawn for compensation;

- when one sits down, with the height variation command blocked by means of moving the said command rod in a position in which said pouring is not possible, said piston tube (10, 13, 131) descends between the said base column pressing the base chamber (1) with an elastic return if there is no compression.

characterized in that:

- said lower chamber (S) of said upper compartment is connected to said bottom chamber of said lower compartment (I) by a fluid communication passage (231), so that the fluid in the base chamber (I) and lower chamber (S) is compressed upon seating,
- said upper (SS) and lower (S) chambers of said upper compartment and said bottom chamber of said lower compartment (I) comprise the same fluid, compressed air (a).

2. Column according to claim 1, characterized in that it disposes of an axial communication (141) between said lower compartment (I) and a valve chamber (i) under said tube piston (114) and the respective compressed air always pushes said command rod (11) upwards.

3. Column according to claim 1, characterized in that within the piston tube 1 slides the command rod (11) in plastic material, which lower extremity is of a valve piston form (115) with an intermediate annular chamber (114) watertight from opposite gaskets 113, within a guide bush in plastic material (12) fixed solidly in a position between a metallic shell (10) of said tube (1) by means of a lower filling in plastic material (14) holed axially (141) towards the lower compartment (I).

4. Column according to preceding claims, characterized in that the air in the bottom chamber (I) is introduced and compressed and adjusted by means of a charging valve (25), placed on the bottom of the column.

5. Column according to claim 3, characterized in that said guide bush (12) has external sealing gaskets (121) to prevent the exit of compressed air and has a couple of holes 122, 123 spaced but comprised within the amplitude of the annular chamber of the valve piston (114).

6. Column according to claim 5, characterized in that, from the outside of said couple of holes (122, 123) and between these, is fitted, in a ring fashion on the lining of the cylindrical metallic tube (10), a gasket ring (13) that with a respective annular gasket (131) acts as piston of the same tube (10) against an annular lower stop partition (23).

7. Column according to preceding claims, characterized in that the upper extremity of the column (2) is closed by a closing ring (22) and before this, there is a sealing flange (21).

8. Column according to claim 6, characterized in that between said sealing flange (21) and said gasket with tube piston (13) there is the upper annular chamber (SS) of the upper compartment (SS, S), while the tube (1) extends downwardly within the column (2) and is guided from the lining, as annular stop partition (23) with holes (231) §fixed to the external lining of the column (20), between the upper compartment (SS, S) and the lower compartment (I) but allows the passage of the air being drawn between them during its lowering or lifting.

9. Column according to claim 6, characterized in that said annular stop partition (23) extends downwardly until at the bottom of the column (20).

10. Column according to preceding claims, characterized in that the air inside it is dried.

11. Chair for office equipped with a column according to preceding claims.

Patentansprüche

1. Stoßgedämpfte Gelenksäule für Bürostuhl mit zwei zylindrischen Körpern:

- einer Basissäule (2), deren untere Basis mit der Basis des Stuhls verbunden oder verbindbar ist;
- einem Kolbenrohr (1), das teleskopartig eindringt, mit einer Kolbenform, stoßgedämpft durch die Verdichtung der Druckluft in einer Bodenkammer eines unteren Fachs (I), innerhalb besagter Säulenbasis (1), die mehr oder weniger aus der Säulenbasis (2) heraustritt, wobei das obere Ende unter dem Sitz des Stuhls verbunden oder verbindbar ist;
- einem Steuerhebel (11), der axial innerhalb besagtem Rohr gleitet, um einen Kolben (114) eines unteren Ventils (115) anzutreiben, das je nach seiner Position das Fließen einer Flüssigkeit in ein oberes Fach (SS, S) zwischen zwei Kammern, einer oberen (SS) und einer unteren (S), zuläßt oder verhindert, zum Verlängern oder Verkürzen der ganzen Säule unter indifferentem Gleichgewicht,
  • damit:

    - wenn man die Höhe verändern möchte,

man besagten Steuerhebel (11) axial bewegt, damit besagtes Ventil (114-115) die besagte untere Kammer "S" mit der besagten oberen Kammer "SS" in besagtem oberen Fach in Verbindung (122-123) setzt und so Luftzug zum Ausgleich zuläßt;

- wenn man sich setzt, bei mittels Bewegen des Steuerhebels in eine Position, in welcher besagtes Fließen nicht möglich ist, blockierter Höhenverstellung, besagtes Kolbenrohr (10, 13, 131) zwischen der besagten Basissäule absinkt und so gegen die Basiskammer (1) drückt, mit einem elastischen Rücklauf, falls es keine Verdichtung gibt.

gekennzeichnet dadurch, daß:

- besagte untere Kammer (S) des oberen Faches mit besagter Bodenkammer des unteren Faches (I) durch einen Flüssigkeitsverbindungsübergang (231) verbunden ist, so daß die Flüssigkeit in der Basiskammer (I) und unteren Kammer (S) beim Sich-Hinsetzen komprimiert wird,
- besagte obere (SS) und untere (S) Kammer des oberen Faches und besagte Bodenkammer des unteren Faches (I) dieselbe Flüssigkeit enthalten, Druckluft (a).

2. Säule nach Anspruch 1, gekennzeichnet dadurch, daß sie eine axiale Verbindung (141) zwischen besagtem unteren Fach (I) und eine Ventilkammer (i) unter besagtem Rohrkolben (114) aufweist und die betreffende Druckluft besagten Steuerhebel (11) immer aufwärts schiebt.

3. Säule nach Anspruch 1, gekennzeichnet dadurch, daß innerhalb des Kolbenrohrs 1 der Steuerhebel (11) aus Kunststoff gleitet, dessen unteres Ende Ventilkolbenform (115) aufweist, mit einer ringförmigen Zwischenkammer (114), die durch gegenüberliegende Dichtungen 113 wasserdicht ist, innerhalb einer Führungsbuchse aus Kunststoff (12), die in einer Position zwischen einem Metallgehäuse (10) des besagten Rohres (1) mittels einer unteren Füllung aus Kunststoff (14) fest befestigt ist, die in Richtung auf das untere Fach (I) axial durchlocht (141) ist.

4. Säule nach den vorausgehenden Patentansprüchen, gekennzeichnet dadurch, daß die Luft in die Bodenkammer (I) eingeführt und dort komprimiert und mittels des Ladeventils (25) geregelt wird, das sich auf dem Boden der Säule befindet.

5. Säule nach Anspruch 3, gekennzeichnet dadurch, daß besagte Führungsbuchse (12) äußere Dichtungen (121) aufweist, um den Austritt von Druckluft zu verhindern, und ein Paar Löcher 122, 123 aufweist, die voneinander entfernt sind, aber sich innerhalb der Breite der ringförmigen Kammer des Ventilkolbens (114) befinden.

6. Säule nach Anspruch 5, gekennzeichnet dadurch, daß, von außerhalb des besagten Löcherpaars (122, 123) und zwischen diesen ein Dichtungsring (13), in Ringform auf der Verkleidung des zylindrischen Metallrohrs (10), eingepaßt ist, der mit einer betreffenden ringförmigen Dichtung (131) als Kolben desselben Rohrs (10) gegen eine ringförmige untere Anschlagtrennwand (23) wirkt.

7. Säule nach den vorausgehenden Patentansprüchen, gekennzeichnet dadurch, daß das obere Ende der Säule (2) durch einen Schließring (22) geschlossen wird und es vor diesem einen Dichtungsflansch (21) gibt.

8. Säule nach Anspruch 6, gekennzeichnet dadurch, daß zwischen besagtem Dichtungsflansch (21) und besagter Dichtung mit Rohrkolben (13) sich die obere ringförmige Kammer (SS) des oberen Faches (SS, S) befindet, während das Rohr (1) unten innerhalb der Säule (2) verläuft und von der Verkleidung geführt wird, als ringförmige Anschlagtrennwand (23) mit Löchern (231), die an der äußeren Verkleidung der Säule (20) befestigt sind, zwischen dem oberen Fach (SS, S) und dem unteren Fach (I), aber den Übergang des Luftzugs zwischen sie während ihres Absenkens oder Hebens gestattet.

9. Säule nach Anspruch 6, gekennzeichnet dadurch, daß besagte ringförmige Anschlagtrennwand (23) unten bis auf den Boden der Säule (20) verläuft.

10. Säule nach den vorausgehenden Patentansprüchen, gekennzeichnet dadurch, daß die Luft in ihr getrocknet ist.

11. Bürostuhl, der mit einer Säule nach den vorausgehenden Patentansprüchen ausgestattet ist.

Revendications

1. Colonne à pivot amortie pour chaise pour bureau du type avec deux corps cylindriques:

   - une colonne de base (2) dont la base inférieure est connectée ou connectable avec la base de la chaise;
   - un tuyau de piston (1) qui pénètre de manière téléscopique ayant une forme de piston, amorti par la compression d'air comprimé dans une chambre de fond d'un compartiment inférieur (I), à l'intérieur de ladite base de colonne (1), qui sort plus ou moins de la base de colonne

(2) avec l'extrémité supérieure connectée ou connectable sous le siège de la chaise;

- une barre de commande (11) axialement glissable dans ledit tube pour démarrer un piston (114) d'une valve inférieure (115) laquelle permet ou empêche, selon sa position, le versement d'un fluide dans un compartiment supérieur (SS, S) entre deux chambres respectivement supérieure (SS) et inférieure (S), afin de permettre l'allongement ou le raccourcissement de la colonne entière dans une condition d'équilibre indifférent,
  • afin que:
    - quand on veut varier la hauteur, on bouge ladite barre de commande (11) axialement afin que ladite valve (114-115) mette en communication (122-123) ladite chambre inférieure "S" avec ladite chambre supérieure "SS" dans ledit compartiment supérieur permettant le tirage d'air pour la compensation;
    - quand on s'assoit, quand la commande de variation de hauteur a été bloquée en bougeant ladite barre de commande dans une position dans laquelle ledit versement n'est pas possible, ledit tuyau de piston (10, 13, 131) descend entre ladite colonne de base en pressant la chambre de base (1) avec un retour élastique s'il n'y a pas de compression.

caractérisée en ce que:

- ladite chambre inférieure (S) dudit compartiment supérieur est connectée à ladite chambre de fond dudit compartiment inférieur (I) par un passage de communication de fluide (231), afin que le fluide dans la chambre de base (I) et la chambre inférieure (S) soit comprimé en s'asseyant,
- lesdites chambres supérieure (SS) et inférieure (S) dudit compartiment supérieur et ladite chambre de fond dudit compartiment inférieur (I) comprennent le même fluide, de l'air comprimé (a).

2. Colonne selon la revendication 1, caractérisée en ce qu'elle dispose d'une communication axiale (141) entre ledit compartiment inférieur (I) et une chambre de valve (I) sous ledit tuyau de piston (114) et [que] l'air comprimé respectif pousse toujours ladite barre de commande (11) vers le haut.

3. Colonne selon la revendication 1, caractérisée en ce que la barre de commande (11) en matériel plastique glisse dans le tuyau de piston 1, l'extrémité inférieure de la barre est en forme de piston de valve (115) avec une chambre annulaire intermédiaire (114) imperméable moyennant des joints d'étanchéité opposés 113, dans une douille de guide en matériel plastique (12) fermement fixée dans une position entre une coque métallique (10) dudit tuyau (1) moyennant un remplissage inférieur en matériel plastique (14) troué axialement (141) vers le compartiment inférieur (I).

4. Colonne selon les revendications précédentes, caractérisée en ce que l'air dans la chambre de fond (I) est introduit et comprimé et ajusté moyennant une valve de chargement (25), placée sur le fond de la colonne.

5. Colonne selon la revendication 3, caractérisée en ce que ladite douille de guide (12) a des joints d'étanchéité externes (121) pour empêcher la sortie de l'air comprimé et [qu'elle] a une paire de forures 122, 123 espacées mais comprises dans la largeur de la chambre annulaire du piston de valve (114).

6. Colonne selon la revendication 5, caractérisée en ce que, du dehors de ladite paire de forures (122, 123) et entre celles-ci, un anneau d'étanchéité (13) est appliqué, de façon d'un anneau sur le bord du tuyau métallique cylindrique (10), lequel anneau avec un joint d'étanchéité annulaire respectif (131) agit en piston du même tuyau (10) contre une partition d'arrêt inférieure annulaire (23).

7. Colonne selon les revendications précédentes, caractérisée en ce que l'extrémité supérieure de la colonne (2) est fermée par un anneau de fermeture (22) et que devant celui-ci, il y a une bride d'étanchéité (21).

8. Colonne selon la revendication 6, caractérisée en ce qu'entre ladite bride d'étanchéité (21) et ledit joint d'étanchéité avec piston de tuyau (13) il y a la chambre annulaire supérieure (SS) du compartiment supérieur (SS, S), tandis que le tuyau (1) s'étend vers le bas dans la colonne (2) et est guidé par le bord, en partition d'arrêt annulaire (23) avec des forures (231) fixées au bord externe de la colonne (20), entre le compartiment supérieur (SS, S) et le compartiment inférieur (I) mais permet le passage de l'air qui est tiré entre eux pendant son abaissement ou soulèvement.

9. Colonne selon la revendication 6, caractérisée en ce que ladite partition d'arrêt annulaire (23) s'étend vers le bas jusqu'au fond de la colonne (20).

10. Colonne selon les revendications précédentes, caractérisée en ce que l' air à l'intérieur de celle-ci est séché.

11. Chaise pour bureau équipée d'une colonne selon

les revendications précédentes.

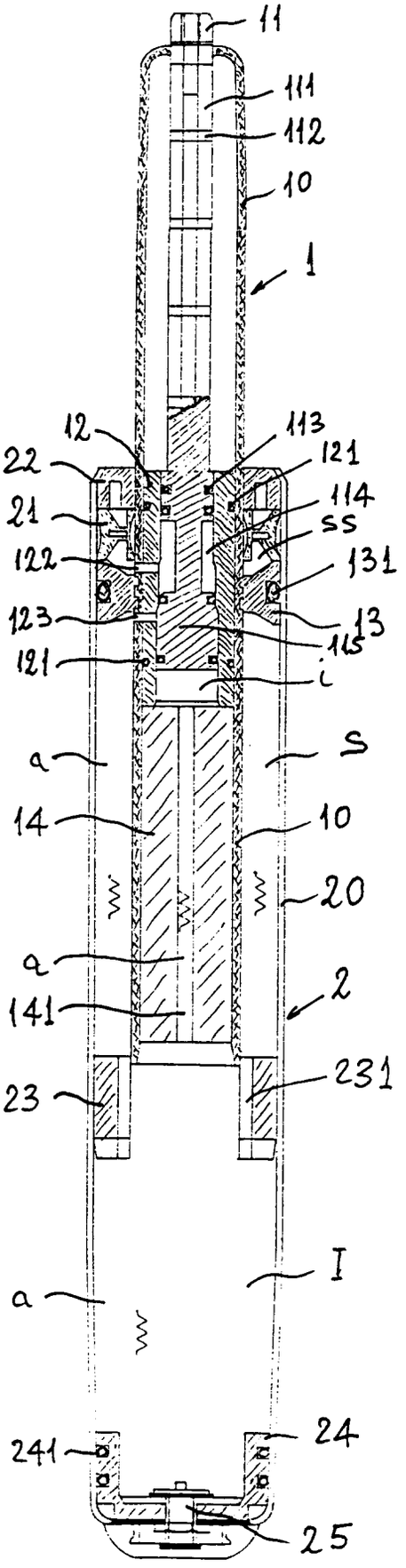

11
111
112
10
1
12
113
22
121
114
21
ss
122
131
123
13
115
121
i
a
S
14
10
20
a
2
141
231
23
I
a
24
241
25

FIG.1

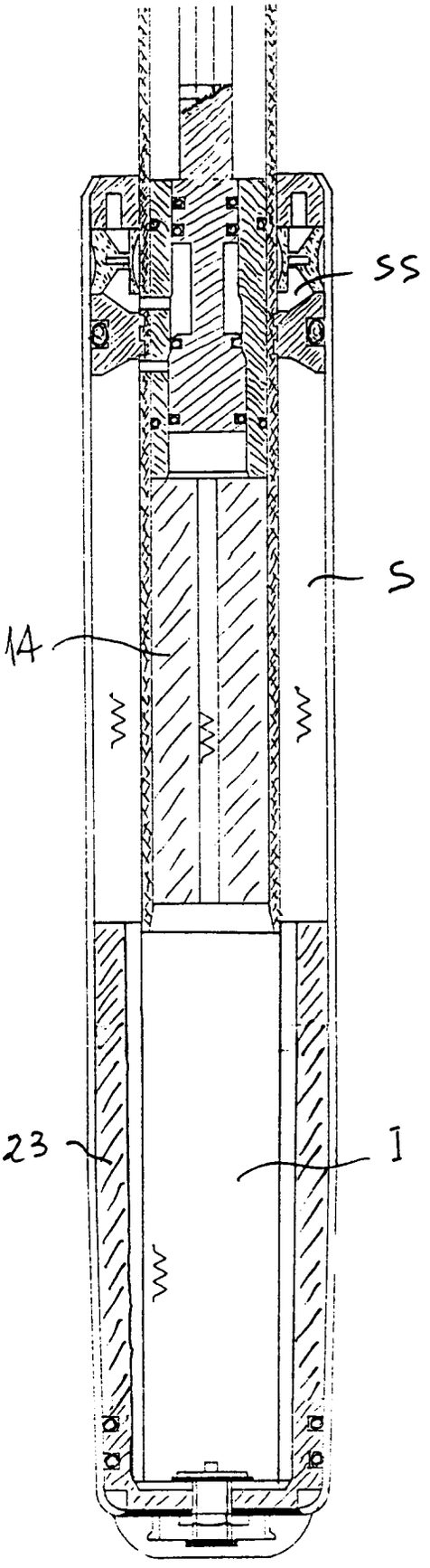


FIG.2