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⑰ **Improved mechanism for selecting the vertical positioning of load-bearing furniture components.**

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Description

This invention consists of an improved mechanism for selecting the vertical positioning of load-bearing furniture components.

To be more precise, this invention consists of an improved mechanism for selecting the vertical positioning of load-bearing components for seats, chairs and armchairs, tables and occasional tables and such like (furniture) according to the preamble of claim 1.

Various types of load-bearing components are known for seats for reading, for people involved in work activities such as typing, for office staff, for professional people and others, as to be seen in FR—A—2482436.

These load-bearing components normally comprise a column. The lower end of the column is attached to a base which ensures that it rests firmly on the ground. The upper end of the column is attached to the seat, chair or armchair, table or occasional table or any other work surface.

The load-bearing columns are fitted with mechanisms which regulate the height of the seat or work surface from the ground. The purpose of this is to allow the user to assume a position which is suitable for his height and physical build and which is more comfortable and appropriate for the work to be done.

There are various kinds of mechanism known. For example, helicoidal load-bearing columns mean that the seat has to be rotated to reach the desired level from the floor or the ground.

The more recent types of load-bearing column are fitted with components which are made up of several coaxial components. A pressurised gas (usually nitrogen) is enclosed in the hollow space of these components. The gas is distributed in various coaxial chambers, the gas being transferred from one to the other as necessary to achieve the change in height or vertical extension of the load-bearing column.

A lever, which can be easily and comfortably reached by the person sitting on the chair, acts on the valves which control the movement of the pressurised gas between the coaxial chambers. All the known mechanisms, even the most recent and most sophisticated ones, have limitations or certain negative aspects. For example, the pressurised gas is contained in spaces which are adjacent to the outermost component of at least one of the aforementioned coaxial chambers of the load-bearing column. Because of this, the gas, which reaches several tens of atmospheres of pressure, can catch fire, particularly if it heats up because of high ambient temperatures.

Attempts have been made to counteract the above-mentioned fire risk by isolating the spaces either occupied, or which can be reached by the pressurised gas, from the outer structural component of the column. This is done by placing a copper pipe in the circuit connecting the coaxial spaces, one of which is enclosed by the outermost component, which could explode

under the effect of the pressure or eventual temporary or transitory superpressures. This was the way in which problems of possible fire or explosion were solved. However, the presence of the pipe referred to above means that the structure of the resultant load-bearing column becomes exceedingly complex. Moreover, the presence of this pipe means that the load-bearing column has to be completely dismantled if there are losses and/or solutions of continuity in the pipe and the components which make up to the circuit. The improved mechanism covered by this invention provides a rational and complete solution to all these defects indicated above and is characterized by the features of the characterizing part of claim 1. This mechanism is composed of a multiple structure forming the load-bearing column. This structure has at least two coaxial components which enclose the coaxial chambers between which the pressurised gas moves. This multiple structure has a double wall which is resistant to pressure and to eventual transitory or persistent superpressures. This multiple structure also encloses the various gas passages and has a lever which acts as necessary on the valve components which are present in and act on the pressurised gas transfer circuit whenever it is necessary to adjust the height of the seat and/or other piece of furniture. The improved mechanism covered by this invention is also fitted with a series of seals which are distributed among the various fixed and moving components in such a way as to guarantee optimal sealing.

In addition to this, at least some of the said seals are arranged in the mechanism in such a way that they can be removed and replaced if necessary.

The characteristics mentioned above and other, more specific, characteristics of the improved mechanism covered by this invention will become apparent in the course of the detailed description which follows. The references made in this description are to the attached figures, which illustrate a specific example of use. These figures are:

—Fig. 1, which is a diagram of the section of this improved mechanism showing the vertical plane containing the axis of the load-bearing column;

—Fig. 2, which is a diagram of the section of the plane indicated by II—II in Fig. 1.

With reference to the figures, the mechanism 10 which forms the load-bearing column of furniture components, is made up of an outer tubular component 12 which encloses a coherent coaxial tubular body 14, thereby forming a double structure.

A piston 32, which runs in the tubular body 14, divides the space into two chambers, 16 and 18. The pressurised gas is contained in these chambers and is transferred from one to the other as necessary by the action of valve components which are described on the following pages.

The outer tubular component 12 has an aperture 20 from which a lever 22 extends. This lever

is screwed onto a hinge 24 which is kinematically connected to a moving body 26, part of which has a reduced diameter. The axial movements of this component open and close the circuit.

When at rest, the parts of the moving body 26 which have a larger diameter hermetically seal chambers 16 and 18 by means of seals 26' and 26''. When lever 22 is raised, the part of the moving body 26 with a reduced diameter allows the gas to move between the two chambers, 16 and 18, through the passages 28 and 30.

The moving piston 32 which defines and separates the two chambers 16 and 18 can be defined as being an "entrainer". It forms a solid body with a rod 34 which contains the passage 30 running through to chamber 16.

The free end 36 of the above rod 34 has a shaped appendix attached to it. This is locked into a base, indicated as a whole as 38 and indicated in the figure as a broken line, which allows the seat or equivalent piece of furniture to rest firmly on the ground. The upper part 40 of the outer tubular component 12 is attached, in the normal way, to the seat 41, which again is indicated by a broken line. The structural characteristics of this seat are not described as they are not pertinent to the subject of this invention.

The lower part of the inner tubular component 34 corresponding to the base 38 is fitted with a step 42. The support washer 44 of a flange 46 is kept pressed against this step 42. The flange 46 contains the above-mentioned rod 34 by means of a seal 48. Another outer seal 50 guarantees the sealing between flange 46 and the shaped end 52 of the inner tubular component 14 mentioned above.

A valve component 68 is pressure sealed into the upper part of inner tubular component 14, corresponding to the seat 42. A hollow space 68' is left between the valve component 68 and the internal walls of tubular component 14 for passage of the gas.

The hermetic sealing between the upper part of the inner tubular body 14 and the valve component 68 is completed by seals 70 and 72.

The moving body 26, which can correctly be defined as the valve unit which is actuated by lever 22, is hermetically sealed inside valve component 68.

The rod 34 and the piston 32 are pierced along their entire length. A pierced pipe 62, preferably made of copper, is inserted into this aperture. The upper end of this pipe 62 is attached to a small chamber 66 by means of a pipe-holder 64. The passage pierced inside pipe 62 exits into the little chamber 66.

A hollow space 34' is left between pipe 62 and the inner wall of the aperture in rod 34 to allow passage of the gas.

Chamber 66 can be made to connect with chamber 18 by means of tubes 28, 28' and hollow space 68', by lowering moving body 26. Seals 54 and 56, which are screwed to form a kind of stuffing box, by screws 58 and 60 respectively, enclose pipe 62 in correspondence to piston 32

and valve component 68, guaranteeing sealing. The way in which the improved mechanism covered by this invention works can be briefly summed up as follows. With the weight of the person seated weighing on the seat 41, let us suppose that the height of the seat has to be adjusted to make the seat lower. By moving lever 22 in the direction shown by the arrow A, the moving body 26 is lowered, allowing the pressurised gas contained in chamber 18 to move through passages 68', 28 and 28' into the small chamber 66 and then through the aperture in pipe 62, hollow space 34 and passage 30 into the other chamber 16.

Because of the pull of gravity caused by the weight of the person, the multiple structure 12 and 14 gradually moves down with respect to rod 34 until, the position required for the comfort of the person having been reached, lever 22 is moved in the direction opposite to that shown by arrow A, thus halting the movement of the gas.

In order to obtain a proportionally progressive raising of the seat 41, the pressure of the gas in chamber 18, which is greater than that in the other coaxial chamber 16, is exploited.

When lever 22 is moved without the weight of a person sitting on the seat, the pressurised gas moves in the opposite direction, i.e. from chamber 16 to chamber 18, thereby completing the operation of positioning the seat 41 at the height desired by the user.

The improved mechanism covered by this invention has been described represented and commented on with reference to the figures, which represent a simplified, explanatory example.

It is understood that the mechanism which, when produced on an industrial scale, may undergo numerous constructional and/or functional modifications, will still be covered by the invention which is the subject of this patent.

Claims

1. A mechanism for selecting the vertical positioning of load-bearing furniture components, comprising a load-bearing column (10) between the seat or work surface and the base (38), said column consisting of two coaxial tubular bodies (12, 14), a moving piston (32) with rod (34) in the cavity of this column which divides the cavity into two coaxial chambers (16, 18), a pressurised gas distributed in these chambers, valve component (68) for regulating the movement of the gas between the coaxial chambers (16, 18) by a lever (22) and means for connecting said chambers (16, 18), characterized in that the means for connecting the chambers (16, 18) comprise a hollow space (68') between the valve component (68) and the inner wall of the tubular body (14), a chamber (66) communicating with the space (68') through the valve component (68), a pierced pipe (62) made of copper, fixed to the chamber (66) and extending into a cavity of the piston (32) and rod (34), a hollow space (34') between the pipe

(62) and the inner wall of the rod aperture (34), and a passage (30) in the rod (34) communicating the hollow space (34') with the chamber (16).

2. The mechanism of claim 1, wherein the pipe (62) is sealed to piston (32) and to valve component (68) by sealing gaskets (54, 56) blocked by screws (58, 60).

3. The mechanism according to claim 1 or 2, wherein the valve component (68) comprises a moving body (26), having a part of reduced diameter and moved with seal by a lever (22) into a chamber, and passages (28, 28') connecting the hollow space (68') to said chamber of the moving body (26).

Patentansprüche

1. Ein Mechanismus zur Auswahl der vertikalen Positionierung von tragenden Möbelteilen, bestehend aus einer tragenden Säule (10) zwischen dem Sitz oder der Arbeitsfläche und der Basis (38); die besagte Säule besteht aus zwei koaxialen röhrenförmigen Körpern (12, 14), einem beweglichen Kolben (32) mit Stab (34) in dem Hohlraum dieser Säule, der den Hohlraum in zwei koaxiale Kammern (16, 18) teilt, einem druckfesten Gas, das in diesen Kammern verteilt wird, einem Ventil (68) zur Regelung der Gasbewegung zwischen den koaxialen Kammern (16, 18) durch einen Hebel (22) und Mitteln zur Verbindung dieser Kammern (16, 18), gekennzeichnet durch die Tatsache, daß die Mittel zur Verbindung der Kammern (16, 18) mit einem Hohlraum (68') zwischen dem Ventil (68) und der Innenwand des röhrenförmigen Körpers (14), einer mit dem Raum (68') durch das Ventil (68) kommunizierenden Kammer (66), einem durchbohrten Kupferrohr (62), das an der Kammer (66) befestigt ist und bis in den Hohlraum des Kolbens (32) und Stabs (34) reicht, einem Hohlraum (34') zwischen dem Rohr (62) und der Innenwand der Staböffnung (34), und einem Durchgang (30) in dem Stab (34), der den Hohlraum (34') mit der Kammer (16) verbindet, versehen ist.

2. Der Mechanismus des Patentanspruchs 1, wobei das Rohr (62) am Kolben (32) und am Ventil (68) durch Dichtungen (54, 56) befestigt sind, die wiederum durch Schrauben (58, 60) angebracht sind.

3. Der Mechanismus gemäß Patentanspruch 1 oder 2, wobei das Ventil (68) einen beweglichen Körper (26) hat, von dem ein Teil einen kleineren Durchmesser hat, und mit der perfekten Abdichtung durch einen Hebel (22) in eine Kammer gebracht wird; es besteht außerdem aus den Durchgängen (28, 28'), die den Hohlraum (68') mit der besagten Kammer des beweglichen Körpers (26) verbinden.

Revendications

1. Un mécanisme pour le choix de la position verticale d'éléments d'ameublement portant, y compris une colonne portante (10) entre le siège ou la surface de travail et la base (38), ladite colonne est composée de deux corps tubulaires coaxiaux (12, 14), un piston mobile (32) avec une tige (34) dans la cavité de cette colonne qui divise la cavité en deux chambres coaxiales (16, 18), du gaz pressurisé distribué dans ces chambres, une soupape (68) pour le réglage du mouvement du gaz entre les chambres coaxiales (16, 18) par un levier (22) et les moyens pour la connexion des chambres (16, 18), caractérisé par le fait que les moyens pour la connexion des chambres (16, 18) comprennent un espace creux (68') entre la soupape (68) et la paroi intérieure du corps tubulaire (14), une chambre (66) communiquant avec l'espace (68') à travers la soupape (68), un tube percé (62) en cuivre, fixé à la chambre (66) et s'étendant dans une cavité du piston (32) et de la tige (34), un espace creux (34') entre le tube (62) et la paroi intérieure de l'ouverture de la tige (34), et un passage (30) dans la tige (34) qui fait communiquer l'espace creux (34') avec la chambre (16).

2. Le mécanisme de la revendication 1, où le tube (62) est fixé au piston (32) et à la soupape (68) par des garnitures de fixation (54, 56) bloquées par des vis (58, 60).

3. Le mécanisme d'après la revendication 1 ou 2, où la soupape (68) comprend un corps mobile (26), ayant une partie au diamètre réduit et bougeant avec un joint par un levier (22) dans une chambre, et des passages (28, 28') qui connectent l'espace creux (68') à ladite chambre du corps mobile (26).

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