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(54) SUPPORTING STRUCTURE FOR A SEAT

(57) Support structure (2) for a seat, comprising:
- an upper element (4) that is intended to constitute or to be bound to a seat,
- a lower support element (6) which is associated with an upright (10) for supporting said seat, said upright (10) being of a telescopic type (11, 13) and being provided with means for adjusting its height and a device (36) for the control of said adjusting means,
- at least one elastic element (20), which is interposed between the lower surface (7) of said upper element (4) and said lower support element (6), said at least one elastic element (20) constitutes the only sustaining element of said upper element with respect to said lower support element (6), so as to allow both the inclination and the translation of said upper element (4) with respect to a substantially vertical axis (9),
and characterized in that it comprises an inner collar (40) which is fitted around said upright (10) and which defines an actuating lever, with substantially annular development, cooperating with a member (34) acting on said control device (36) of said means for adjusting the height of said upright (10).

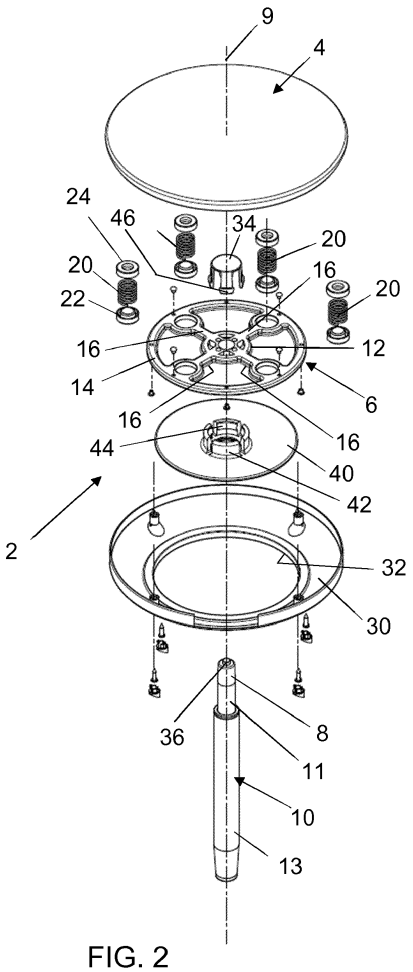

FIG. 2

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Description

[0001] The present invention relates to a support structure for the seat of a chair, a small armchair, a stool and the like.

[0002] Chairs, armchairs and stools are known in which the seat oscillates tilting in all directions with respect to the base resting on the floor.

[0003] Generally, in these known solutions the inclination of the seat is obtained through the use of a spherical joint which directly connects the lower surface of the seat with a vertical upright of which the support base is provided.

[0004] This method of articulated connection is not completely satisfactory from the constructive point of view since it requires the use of a spherical joint which needs excellent lubricating properties and a high resistance to wear, thus making the construction of the seat particularly complicated and expensive.

[0005] Moreover, this solution is not completely satisfactory even from the point of view of utilization, since, while allowing oscillations of the seat in all directions, it does not cause variations in height of the seat during the oscillations and therefore it cannot be considered ergonomic.

[0006] DE 20 2016 007410, US 2012/292968, DE 20 2015 005159 and DE 10 2014 000386 already describe a solution in which between an upper element, which constitutes or is constrained to the seat, and a lower element, which is associated and fixed to the upright, an elastic element is interposed which acts as a support for said upper element.

[0007] The object of the invention is to propose a support structure for a seat which overcomes the drawbacks of the traditional solutions.

[0008] Another object of the invention is to propose a support structure for a seat which has highly ergonomic characteristics.

[0009] Another object of the invention is to propose a support structure for a seat that is quick and easy to assemble.

[0010] Another object of the invention is to propose a support structure for a seat in which the control means for height adjustment are easily accessible and activated.

[0011] Another object of the invention is to propose a support structure for a seat which has an alternative characterization, both in constructive and functional terms, with respect to the traditional ones.

[0012] Another object of the invention is to propose a support structure for a seat that can be obtained simply, quickly and with low costs.

[0013] Another object of the invention is to propose a support structure for a seat that can be produced in series and in a rapid and efficient manner.

[0014] Another object of the invention is to propose a support structure for a seat which is of high standards, both functional and aesthetic, and at the same time has an accessible price, thus allowing its diffusion on a large scale.

[0015] These objects, both individually and in any combination thereof, as well as others which will result from the following description, are achieved, according to the invention, with a support structure for a seat as defined in claim 1.

[0016] The present invention is hereinafter further clarified in a preferred embodiment thereof, given purely by way of non-limiting example with reference to the attached tables of drawings in which:

Figure 1 shows a perspective view of a support structure for a seat according to the invention,
Figure 2 shows it according to an exploded perspective view,
Figure 3 shows it according to a plan view,
Figure 4 shows it according to the section A-A of fig. 3
Figure 5 shows it according to the section B-B of fig. 3
Figure 6 shows it according to the section C-C of fig. 3
Figure 7 shows it in the same view as fig. 4 in a different embodiment.

[0017] As shown from the figures, the structure according to the invention, indicated as a whole by reference 2, comprises an upper element 4, which can itself constitute the seat of a chair or an armchair or, as shown in the drawings, a stool, or it can be made integral with a seat of any type, not shown in the drawings.

[0018] The upper element 4 cooperates with a lower support element 6, which is suitably made integral with the upper end 8 of an upright 10 which, preferably, belongs to the base of the chair, the small armchair or the stool.

[0019] Conveniently, the upright 10 is of the double telescopic tube type with the upper tube 11 axially slidable with respect to a lower guide tube 13.

[0020] Preferably, the upper element 4 has an upper surface 5 essentially flat and preferably of essentially discoidal shape (see Fig. 3).

[0021] Advantageously, the lower support element 6 is bound to the upright 10, for example it is fitted, in such a way so as to prevent it from sliding along the vertical axis 9 which appropriately corresponds to the longitudinal axis of the upright 10 and, preferably, passes through the centre of the upper element 4.

[0022] Advantageously, the lower support element 6 cooperates with the lateral surface of said upright 10 at the upper end 8 of the upright itself.

[0023] More in detail, preferably the lower support element 6 comprises an inner annular portion 12, which is intended to be engaged by the upper end 8 of the upright 10, and, preferably, also comprises a plurality of radial portions 16, which develop from said annular portion 12. Advantageously, the outer end of said radial portions 16 is bound to an external portion 14, that is preferably ring-shaped.

[0024] Preferably, the inner annular portion 12 of the lower support element 6 is fitted and fixed around the

upper end 8 of the upright 10.

[0025] It is also understood that the inner annular portion 12 can radially develop continuously outwardly, thus defining a full circular crown.

[0026] Advantageously, in the embodiment illustrated in the figures, four radial portions 16 are provided which suitably are aligned two by two along two diametrical directions which, preferably, are orthogonal to one another. However, it is understood that only two or three, but also more than four, radial portions 16 could be provided, which are preferably arranged so as to define essentially equal angles with each other.

[0027] The structure 2 comprises at least one elastic element 20, which is interposed between the lower surface 7 of said upper element 4 and said lower support element 6, and which constitutes the only supporting element of said upper element 4 with respect to said lower support element 6 to allow both the inclination and the translation of the upper element 4 with respect to an essentially vertical axis 9.

[0028] Particularly, between the lower surface 7 of the upper element 4 and the lower support element 6 one or more elastic elements 20 are interposed, preferably constituted by helical springs which alone sustain and support the upper element 4 with respect to said lower support element 6 so as to allow both the inclination and the translation of said upper element 4 with respect to a vertical axis which, preferably, corresponds to the longitudinal axis 9 of the upright 10. In essence, therefore, there is no rigid connection direct between the upper element 4 and the upright 10 as the upper element 4 is associated, only by the elastic elements 20, to the lower support element 6, which is then the only element connected to the upright 10.

[0029] Preferably, an elastic element 20 is mounted on each radial portion 16 of the lower support element 6 and, therefore, the number of elastic elements 20 essentially corresponds to the number of the radial portions 16, which develop from the inner annular portion 12 of the lower support element 6.

[0030] In particular, in the embodiment shown in the figures, four elastic elements 20 are provided, however it is understood that these could also be provided in different numbers (i.e. two, three or even more than four).

[0031] According to an alternative embodiment, not shown in the drawings, one elastic element 20 may also be provided which is interposed between the lower surface 7 of the upper element 4 and the inner annular portion 12 of the lower support element 6. In particular, conveniently, in this case the elastic element 20 is positioned coaxially with the upright 10 so as to be crossed by the vertical longitudinal axis 9 thereof.

[0032] Advantageously, the compression/elongation direction of the elastic elements 20 is substantially parallel to the longitudinal axis 9 of the upright 10. Preferably, the compression/elongation direction of the elastic elements 20 is substantially vertical and they are all parallel to each other.

[0033] Advantageously, the elastic elements 20 are radially spaced with respect to the longitudinal axis 9 of the upright 10. Preferably, all the spring elements 20 are radially equidistant from the longitudinal axis 9 of the upright 10 so as to guarantee an angle of inclination of the upper element 4 in respect of it, which is significantly the same in all directions.

[0034] Conveniently, by varying the degree of rigidity of the elastic elements 20 and/or varying their mutual position and/or the radial distance of each elastic element 20 with respect to the vertical axis 9 of the upper upright 10, the angle of inclination of the upper element 4 with respect to that axis can be modified, for example by defining an angle or a plane of preferential inclination and greater in one direction with respect to another.

[0035] More in detail, preferably to each radial portion 16 an inferior abutment 22 for the elastic element 20 is fixed while a corresponding upper abutment 24 for the latter is associated with the lower surface 7 of the upper element 4. Advantageously, for this purpose, on the lower surface 7 of the upper element 4 suitable positioning seats are defined for the upper abutments 24.

[0036] Advantageously, the support structure 2 also comprises an outer collar 30 for lower closing, which preferably has a slightly flared and rounded shape, and which is fixed, for example with screws, to the lower surface 7 of the upper element 4 at the external edge of the latter. Preferably, the upper element 4 and the outer collar 30 together define a cover to hide from the exterior the elastic elements 20.

[0037] Advantageously, the inner edge 32 of the outer collar 30 defines a limit element for the oscillations of the upper element 4 constrained to the outer collar 30. More in detail, when a user sits on the seat, its weight causes a vertical translation of the upper element 4 until the elastic force of the elastic elements 20 balances the weight of the user. Further, when the user with its weight causes the inclination of the assembly formed by the upper element 4 and the outer collar 30 according to any vertical plane, the inclination itself finds a stop caused by the contrast of the inner edge 32 of the collar 30 against the outer portion 14 of the lower support element 6, which is fixed. Advantageously, on the inner edge 31 of the outer collar 30 and/or on the outer portion 14 of the lower support element 6 suitable limits, preferably made of deformable material, can be mounted to reduce the noise resulting from the contact between the collar 30 and lower element 6, as well as to avoid rigid collisions between these two elements.

[0038] Conveniently, under stationary conditions (i.e. in the absence of stresses of the upper element 4), the inner edge 32 of the outer collar 30 also constitutes a limit for upward translation of the upper element 4.

[0039] The support structure 2 also comprises an inner collar 40 which is appropriately positioned around the upright 10 below the lower support element 6. Preferably, the inner collar 40 is shaped so as to define a lower closure for the lower support element 6.

[0040] Conveniently, the inner collar 40 has a substantially annular development, preferably but not necessarily complete and continuous.

[0041] Advantageously, as provided in the embodiment shown in Figures 3-5, the inner collar 40 has a slightly flared and rounded shape, preferably with an external curvature which continuously extends the corresponding curvature of the outer collar 30.

[0042] Advantageously, the lower closure outer collar 30, which is associated with the upper element 4, and the inner collar 40 are shaped and cooperate with said upper element 4 to define an essentially closed chamber separated from the outside (except that for the passage of the upright 10), inside which the elastic elements 20 are housed.

[0043] Advantageously, as provided in the embodiment of fig. 7, the inner collar 40 has centrally an outer curvature 51 which continuously extends the corresponding curvature of the outer collar 30 and, preferably, at the outermost perimeter, has a shaped profile 50 (which protrudes downwards with respect to said curvature 51) to facilitate gripping from above by the user's hand.

[0044] More in detail, suitably the outer collar 30 centrally presents an appropriately sized opening for receiving the inner collar 40.

[0045] Conveniently, the inner collar 40 is fitted around the upright 10 and, to this end, has a central opening suitably sized to allow the upper part of the upright 10 to pass.

[0046] Conveniently, the support structure 2 also comprises a cooperating member 34 acting directly on the control device 36 of the adjustment means (not shown and comprising, for example, a traditional gas piston) of the height of the telescopic upright 10.

[0047] Conveniently, the inner collar 40 defines an actuating lever with a substantially annular development which, by cooperating with the member 34, acts on the control device 36 to activate the means for adjusting the height of the telescopic upright 10. This is particularly advantageous as it allows the user to easily adjust the height of the seat using either the right hand and/or the left hand, and also avoiding having to find where the positioning lever is positioned, below the seat itself.

[0048] Preferably, member 34 is shaped as a cap. Preferably, the member 34 is associated with the central portion 12 of the lower element 6 and cooperates with the command device 36, which preferably is button-shaped, of a traditional gas piston for adjusting the height of the telescopic upright 10. Preferably, the control button 36 is provided on the upper base of the upright 10 and protrudes substantially from the latter.

[0049] Advantageously, the inner collar 40 is shaped so as to cooperate with the member 34 provided in correspondence of the control button 36 of a traditional mechanism for adjusting the height of a telescopic-type upright 10. In particular, the inner collar 40 acts as an annular lever and cooperates with said member 34 so that - a lifting action of the inner collar 40 (i.e. an upward movement of said internal collar 40 following a thrust carried out by the user or by another subject) - causes movement of said member 34 so to press the control button 36. More in detail, the upward movement of the inner collar 40 causes the downward movement of the member 34 which, in this way, presses the control button 36 of the height adjustment mechanism of said telescopic upright 10.

[0050] Advantageously, the inner collar 40 is supported - preferably it is exclusively supported - by said member 34 which is provided and which acts directly on the control button 36 of the height adjustment mechanism of the telescopic upright 10.

[0051] Advantageously, the inner collar 40 is pivoted to said member 34 at the respective mutual contact zones. Preferably, the inner collar 40 is fastened to said member 34 at a mutual contact zone which develops (continuously or even discontinuously) substantially for the entire circumferential development of the central opening of said inner collar.

[0052] Conveniently, the inner collar 40 has at least a first appendage 44 which cooperates and is in contact with a corresponding second appendage 46 of said member 34 acting on the control button 36 of the means for adjusting the height of the telescopic upright 10.

[0053] Advantageously, in correspondence of its central opening, the inner collar 40 comprises a protruding tubular portion 42 which comprises internally, preferably along its entire circumferential extension substantially, a plurality of first toothed appendages 44 facing upwards and cooperating with corresponding second toothed appendages 46, which are preferably formed along the entire outer circumferential flange of the hood-shaped member 34.

[0054] Advantageously, as said, the inner collar 40 acts as a ring-shaped actuation lever for operating the gas piston for adjusting the height of the upright 10. In particular, when the user acts on the inner collar 40 pushing it upwards, the first toothed appendage 44 opposite to the area of the inner collar 40 pressed by the user cooperates with the corresponding second appendage 44 of the cap member 34 so that the upper base thereof presses the button 36 of the gas piston for its regulation in a traditional way.

[0055] From the foregoing it is clear that the seat support structure according to the invention is much more advantageous than traditional structures and in particular, thanks to the elimination of the central spherical joint, it is adapted in an efficient and ergonomic manner to the movements of the user since the upper element of the seat, besides being able to oscillate/tilt in all directions with respect to a vertical axis, can also translate along the latter.

[0056] Moreover, the support structure according to the invention differs from the ones of DE 20 2016 007410, US 2012/292968, DE 20 2015 005159 and DE 10 2014 000386 as none of these describes a support structure

that is without a spherical joint and in which the inner collar defines an annular development lever cooperating with an organ acting on the control button of a traditional mechanism for adjusting the height of a telescopic upright. In particular, this is advantageous because, in addition to allowing the upper element of the seat to be able to oscillate/tilt in all directions with respect to a vertical axis and to move along the latter, it also allows a comfortable and easy height adjustment of the entire seat.

Claims

1. Support structure (2) for a seat, comprising:

- an upper element (4) that is intended to constitute or to be bound to a seat,
- a lower support element (6) which is associated with an upright (10) for supporting said seat, said upright (10) being of a telescopic type (11, 13) and being provided with means for adjusting its height and a device (36) for the control of said adjusting means,
- at least one elastic element (20), which is interposed between the lower surface (7) of said upper element (4) and said lower support element (6), said at least one elastic element (20) constitutes the only sustaining element of said upper element with respect to said lower support element (6), so as to allow both the inclination and the translation of said upper element (4) with respect to a substantially vertical axis (9),

and **characterized in that** it comprises an inner collar (40) which is fitted around said upright (10) and which defines an actuating lever, with substantially annular development, cooperating with a member (34) acting on said control device (36) of said means for adjusting the height of said upright (10).

2. Support structure according to claim 1, **characterized in that** said inner collar (40) and said member (34) are configured and arranged so that the raising of said inner collar (40) causes a movement of said member (34) such as to press, and then activate, said control device (36).

3. Support structure according to one or more of the preceding claims, **characterized in that** said inner collar (40) is supported by said member (34) acting on the control device (36) of said means for adjusting the height of said upright (10).

4. Support structure according to one or more of the preceding claims, **characterized in that** said inner collar (40) comprises at least one first toothed appendage (44) cooperating with at least one corresponding second toothed appendage (46) formed on said member (34) acting on the control device (36) of said means for adjusting the height of said upright (10).

5. Support structure according to one or more of the preceding claims, **characterized in that** said internal collar (40) comprises, along its entire circumferential development, first toothed appendages (44) cooperating with corresponding second toothed appendages (46) obtained along the entire circumferential flange of said member (34) which preferably is shaped like a cap and which acts on the control device (36) of said height adjustment means of said upright (10) of telescopic type (11, 13).

6. Support structure according to one or more of the preceding claims, **characterized in that** said at least one elastic element (20) comprises at least two helical springs.

7. Support structure according to one or more of the preceding claims, **characterized in that** the compression/elongation direction of the elastic elements (20) is substantially parallel to the longitudinal axis (9) of the upright (10).

8. Support structure according to one or more of the preceding claims, **characterized in that** said lower support element (6) is constrained around the upper end of said upright (10) so as to prevent its vertical sliding.

9. Support structure according to one or more of the preceding claims, **characterized in that** said lower support element (6) comprises an inner portion (12) which is associated with said upright (10) and from which develops at least one radial portion (16), or a continuous circular crown, to support lowerly said at least one elastic element (20).

10. Support structure according to the previous claim, **characterized in that** said lower support element (6) comprises at least one pair of diametrically aligned radial portions (16), each of which supports lowerly a corresponding elastic element (20).

11. Support structure according to one or more of the preceding claims, **characterized in that** said at least one elastic element (20) is radially spaced with respect to the longitudinal axis (9) of said upright (10).

12. Support structure according to one or more of the preceding claims, **characterized in that** it comprises at least one elastic element (20) which is crossed by the longitudinal axis (9) of said upright (10).

13. Support structure according to one or more of the preceding claims, **characterized in that** it is config-

ured in such a way that, by varying the degree of rigidity of the elastic elements (20) and/or by varying the mutual position of the elastic elements (20) and/or by varying the distance of each elastic element (20) with respect to the longitudinal axis (9) of the upright (10), an inclination of the upper element (4) is defined with respect to said vertical axis (9) which is greater in one direction than to another one.

14. Support structure according to one or more of the preceding claims, **characterized in that** it comprises a outer collar (30) for lower closure which is associated with the upper element (4), said lower support element (6) cooperating with said outer collar (30) defining a limit stop for the inclinations, with respect to said vertical axis (9), of the assembly formed by said upper element (4) and by said outer collar (30).

15. Support structure according to one or more of the preceding claims, **characterized in that** it comprises an outer collar (30) for lower closure which is associated with the upper element (4), said outer collar (30) is shaped and cooperates with said upper element (4) to define a cover to hide from the outside the elastic elements (20).

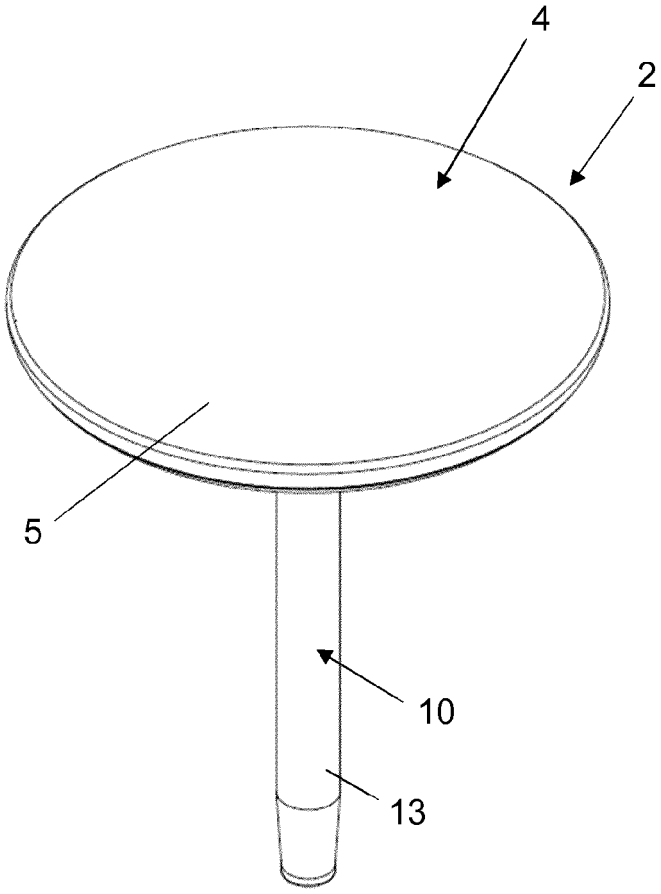
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FIG. 1

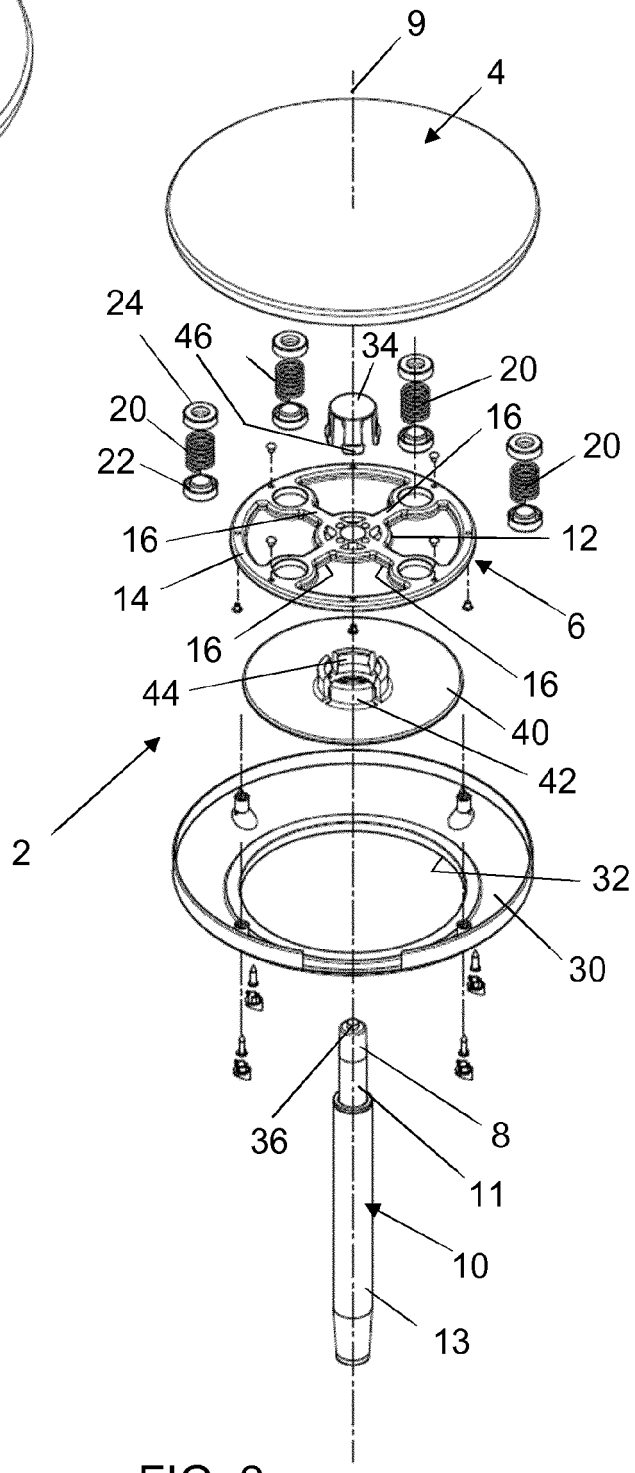
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FIG. 2

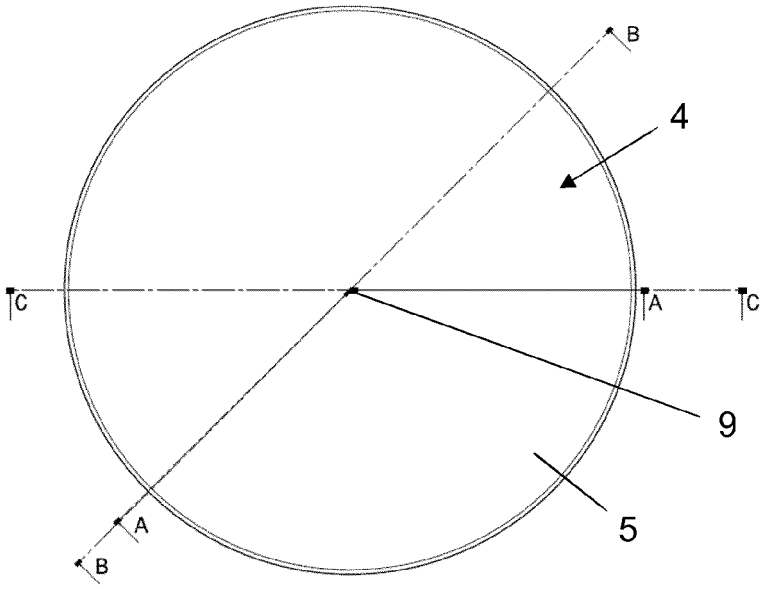
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FIG. 3

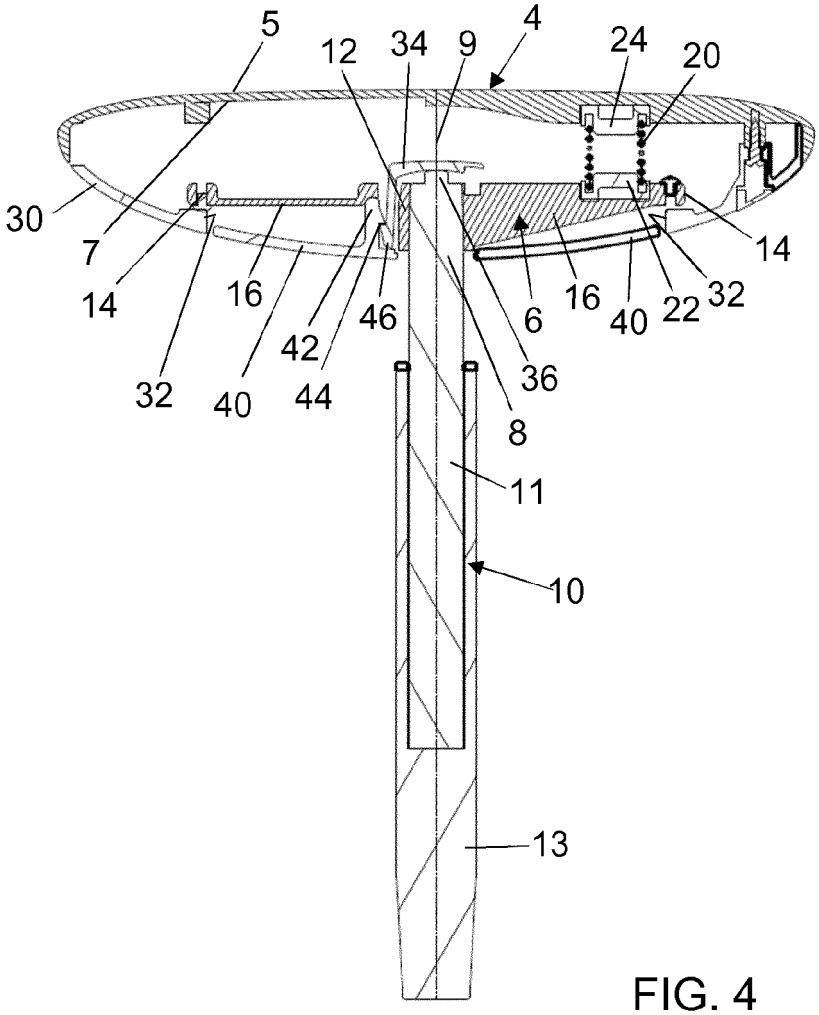
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FIG. 4

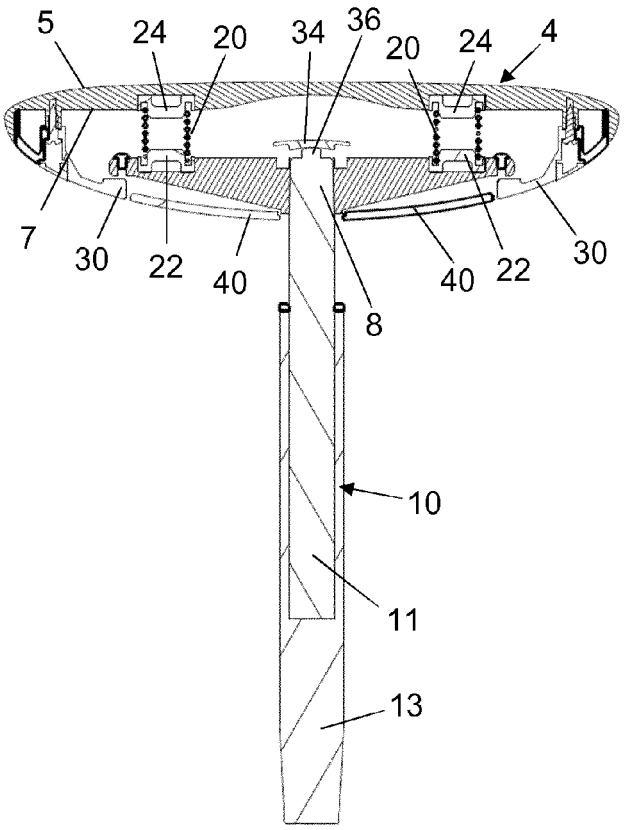
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FIG. 5

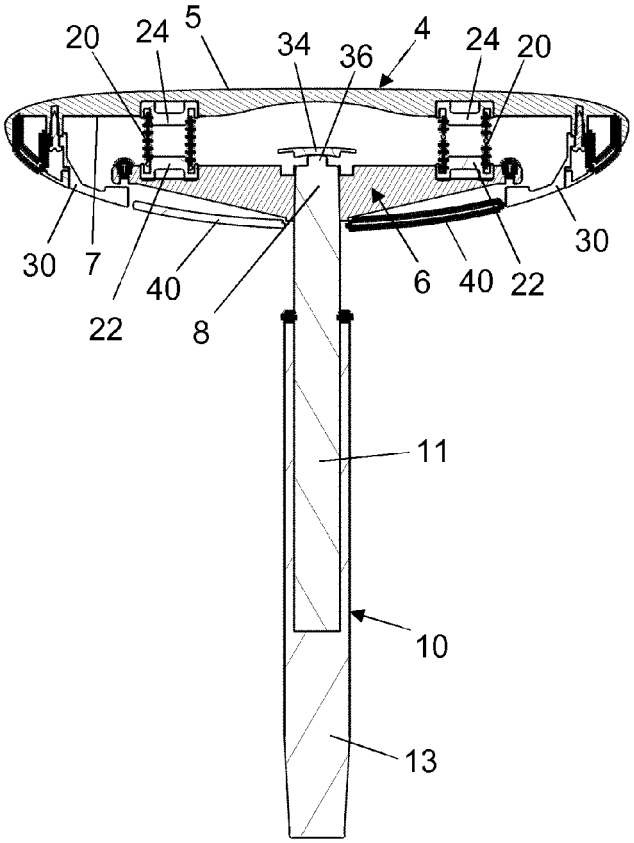
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FIG. 6

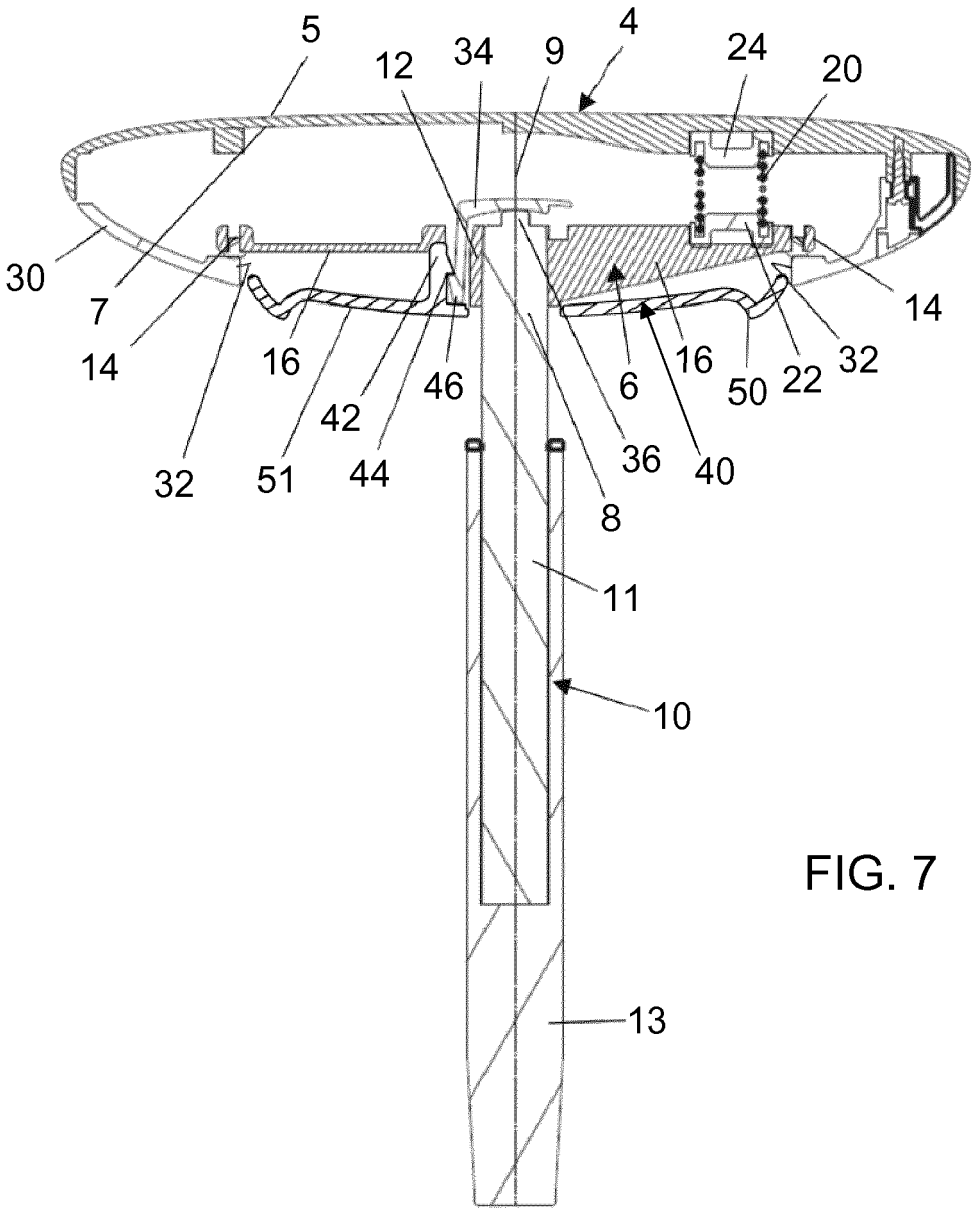
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FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 18 19 8275

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 January 2019	Lehe, Jörn

CATEGORY OF CITED DOCUMENTS

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28-01-2019

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- DE 202015005159 **[0006] [0056]**
- DE 102014000386 **[0006] [0056]**