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(71) Applicant: **Koninklijke Ahrend N.V.**
1015 AE Amsterdam (NL)

(72) Inventors:
- **Van Bakel, Petrus Antonius Lauwrentius**
  5492 VC Sint-Oedenrode (NL)
- **Van der Steen, Leonardus Hubertus Geertruda**
  5482 LV Schijndel (NL)

(74) Representative: **Lips, Hendrik Jan George, Ir.**
HAAGSCH OCTROOIBUREAU
Breitnerlaan 146
2596 HG Den Haag (NL)

(54) Adjusting member for adjusting a work- or desktop at predetermined heights

(57) The invention relates to an adjusting member for adjusting a work- or desktop at predetermined heights, said adjusting member engaging a first and second telescopic tube portion of a table leg or desk leg, said adjusting member comprising a first and second part engaging respective tube portions and being locked in relation to one another in a first position and can be moved in relation to one another in a second position, in which the first part substantially comprises a shaft having one or more rows of cams arranged in longitudinal direction of the shaft and the second part has an opening for accommodating said shaft and provides passage for the shaft with the cams in at least one position.

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Description

[0001] The present invention relates to an adjusting member for adjusting a work- or desktop at predetermined heights, said adjusting member engaging a first and second telescopic tube portion of a leg of a table or desk, said adjusting member comprising a first and second part engaging respective tube portions and said first and second parts being locked in axial direction in relation to one another in a first position and can be moved in relation to one another in a second position.

[0002] Adjusting members for adjusting e.g. a worktop or desktop at a predetermined height exist in various designs, in which, however, this always concerns structures which are very complicated or structures having clearly visible parts. Complicated structures are e.g. systems having a rotating spindle by which one table or desk leg or a number of legs simultaneously are continously adjustable. The more simple structures are systems in which the legs are separately adjustable at a number of predetermined heights for the accompanying top. There, the telescoping leg portions can be locked in relation to one another by means either projecting through the legs or having operating means clearly visible from the outside. The operating means are mostly situated halfway on the legs.

[0003] The object of the invention is to provide an adjusting member of a simpler type, having such a structure, that it is beyond the normal field of vision, can be operated easily and furthermore can be manufactured in a simple way at reduced costs.

[0004] Accordingly, the invention provides for, that the first part substantially comprises a shaft having one or more rows of cams arranged in longitudinal direction of the shaft and that the second part has a through-opening for accommodating said shaft with radial cams and is provided with cam recesses for being able to accommodate one or more cams of said first part, with one or more cams being accommodated in the respective cam recesses in said second part in the first position and with first and first and second parts being locked in relation to one another and with the cams of said first part being outside the cam recesses and the second part providing a passage for the shaft having one or more rows of cams in the second position.

[0005] According to a first embodiment, it is provided for, that the second part is fixedly mounted in the lower tube portion of the leg and the first part rotatably engages the upper tube portion of said leg. The operation, rotating the first part, occurs with the help of an operating arm mounted at or near the extremity of the first part, the shaft having at least one row of cams.

[0006] This has the advantage, that the operating arm will be situated underneath the table- or worktop, hidden from view. There, the operating arm is preferably mounted in such a way, that it will contact the bottom side of the table- or worktop. In this way, the operating arm can always be found easily without having to look under the top.

[0007] After bringing the first part into the upper tube portion, the shaft having at least one row of cams can be moved through the passage in said second part of said adjusting member being fixedly mounted in the lower tube portion of the leg. To that end, the bottom of the shaft having at least one row of cams is provided with a bevelled edge and a resilient lip having a stop. On insertion, the resilient lip is compressed and the shaft can move through the passage, in the opposite direction the lip remains in the original position and the stop hits the fixedly mounted second part of the adjusting member.

[0008] According to a second embodiment, it is provided for, that the first part, the shaft having at least one row of cams, is fixedly mounted in the lower tube portion of the leg and the second part is rotatably mounted in the upper tube portion of the leg. Here, the second part substantially comprises a receiving member fixedly mounted in the upper tube portion and a sleeve rotatably received in the receiving member, the cam recesses for the cams on the first part being provided at the inside of the sleeve.

[0009] In this embodiment, the upper tube portion of the leg slides into the lower tube portion of the leg since the receiving member is preferably mounted at the free extremity of the upper tube portion. Further, by providing the cam recesses in the sleeve near the receiving member, the point of engagement of first and second portions will be at a distance from the upper edge of the lower tube portion of the leg and the highest possible degree of stability of the assembly will be obtained.

[0010] The receiving member is preferably made of two halves, engaging one another e.g. by a snap connection. This offers a simple possibility to enclose the sleeve rotatably between said two halves of said receiving member. Here, it is further provided for, that the sleeve rotatably received in said receiving member has at least one circumferentially extending guiding rim and said receiving member has a corresponding guiding track or guiding tracks for receiving the guiding rim or guiding rims.

[0011] The operating arm in the second embodiment is mounted at or near the extremity of the rotatable shaft and extends from the top within the leg near to or directly below the top to beyond said leg.

[0012] According to a further elaboration, means are provided for forcing said rotatably shaft having at least one row of cams or the rotatable sleeve having cam recesses into the first position, in which the first and second parts are locked in relation to one another.
This prevents the shaft having at least one row of cams or the rotatable shaft having cam recesses will move in the second position unintentionally, in which a passage for the cams is provided and the work- or tabletop will suddenly move to an oblique position or will slide down completely.

[0013] A simple embodiment is provided in that these means substantially comprise spring means engaging

the operating arm. The height adjustment will then only be possible by moving the operating arm against the action of the spring, which will almost certainly exclude uncontrolled movements.

[0014] Another embodiment provides for that a taper is arranged within the cam recesses, such that first and second parts are forced into the first position in which said first and second parts are locked in relation to one another in axial direction. Therefore, in order to rotate the operating arm it is necessary that first the part of the table or the desk above the tube portion of the leg concerned is moved upwards at least across the height of the taper.

Such an oblique taper is an extremly effective protection in the locked position.

[0015] The invention is further explained by way of the example given in the drawing, in which:

figs. 1A, B illustrate a cross-section of a leg comprising two parts with an adjusting member according to the first embodiment received therein;

fig. 2 illustrates in plan view and partly in cross-section the leg according to fig. 1;

figs. 3A,B illustrate a view and cross-section of a shaft having two rows of cams according to the first embodiment;

fig. 4 illustrates a cross-section of a leg comprising two tube portions with an adjusting member according to the second embodiment received therein;

figs. 5A-I illustrate a longitudinal section of the adjusting member according to the second embodiment, a detail thereof, as well as som cross-sections.

[0016] Fig. 1A indicates schematically a leg 1 of e.g. a worktable or desk having a top beam 22 and a top 23 comprising two telescopic tube portions 2, 3. The leg 1 mounts the adjusting member 4 comprising a part 5 fixedly placed in the lower tube portion 3 and a shaft 6 engaging the upper tube portion 2 and being provided with two opposite rows of cams 7, 8. Although configurations having e.g. one row of cams or more than one row of cams are possible, an embodiment having two rows is preferred since it can be manufactured in a relatively simple way and it is furthermore very stable.

[0017] The fixed part 5 bears on the lower tube portion 3 with edge 9 and is provided with a central passage 10 of a substantially round shape, see also Fig. 1B, in which the shaft 6 is received loosely. Following said passage 10, opposite slots 11 have been mounted which provide passage to the cams of said rows of cams 7, 8. By rotating the shaft 6 to a position in which the rows of cams 7, 8 are aligned with the slots 11 with the help of operating arm 12, the shaft 6 can be moved in height in relation to the fixed portion 5 and with it the tube portions 2, 3 of the leg 1.

[0018] Fig. 1B illustrates the shaft 6 with the rows of cams 7, 8 in two different positions. In the first position, with said cams 7, 8 in on line in the drawing from left to right, the cams 7, 8 are located in cam recesses 24 and first and second parts 6, 5 are locked in relation to one another in axial direction. By rotating the shaft 6 across an angle of approximately 45° in the drawing, the cams 7, 8 will be aligned with the slots 11 and first and second portions can be moved in axial direction in relation to one another.

[0019] In the example illustrated, the shaft 6 consists of two parts 13, 14 to be coupled being coupled to a snap connection. Said snap connection is designed in such a way that the shaft parts 13, 14 can not rotate in relation to one another, e.g. by having them engage one another with a radially extending profile. The shaft 6 will only be executed in two parts if mounting the shaft into an upper tube portion of a leg would be too complicated or impossible on account of the shape and/or dimensions. However, it is preferred to produce the shaft 6 as an integral part.

[0020] At the top, an axial portion 16 of a smaller diameter is provided in the shaft 6, a collar part 17 being slid across said axial portion 16. Collar part 17 is provided with a slot 18 extending along a large part of the circumference, with which it can be slid into a recess provided for it in the leg 1. Collar part 17 is preferably made of a resilient material so that it can enclose the shaft far enough and can always remain located around the shaft in this way. See also Fig. 2. The recess for the collar part 17, instead of in leg 1, can also be provided in a top beam mounted on leg 1. However, the structure is preferably always such, that operating arm 12 ends closely below or against the bottom side of a work- or desktop.

[0021] Fig. 3A shows that a resilient lip 19 is arranged at the bottom side of the shaft 6 at the extremity. Lip 19 is provided with a stop 20. By manufacturing the shaft 6 or the shaft part 14 from a resilient plastic, such a lip 19 can be realized simply by cutting it from a hollow shaft part 14. Said lip 19 with stop 20, having a bevel at the bottom, serves for being able to project said shaft part 14 through fixed part 5 and to prevent that it can be removed from the fixed part in opposite direction without further measures.

[0022] Fig. 3B illustrates a cross-section along line A-A in Fig. 3A. It is cearly visible that the shaft 6 is substantially massive and that it is further only provided with recesses 25 at both sides. This leads to savings in material and in weight.

[0023] Fig. 4 illustrates schematically a leg 1 of a worktable having a top beam 22 and a top 23, in which the leg comprises an upper and a lower tube portion 2, 3. In this embodiment, the upper tube portion 2 slides into the lower tube portion 3. The shaft 26 having rows of cams 7, 8 is fixedly mounted in the lower tube portion 3 on an attachment fitting 27. A receiving member 28 having a rotatable sleeve 29 fixedly mounted therein, is

mounted in the bottom of upper tube portion 2, see Fig. 5.

[0024] Fig. 5A illustrates a section in longitudinal direction of fixed shaft 26 having rows of cams 7, 8, the receiving member 28 and the rotatable sleeve 29. Said rotatable sleeve 29 extends across the full length of the upper tube portion 2 and has its operating arm 12 projecting beyond said upper tube portion 2 and then ends closely below the worktop. Fig. 5 illustrates a cross-section of the sleeve 29 along the line S-S. At this level, the rotatable sleeve is a hollow sleeve without any further provisions.

[0025] Fig. 5C illustrates a cross-section along the line R-R with said receiving member 28, the rotatable sleeve 29 and the fixed shaft 26 having cams 6,7. Receiving member 28 comprises two halves 30, 31 engaging one another with snap connections 32. The connecting means 33, 34 which together can constitute said snap connections 32 are mounted in openings 35 recessed to that end in said receiving member 28. This cross-section was taken between subsequent cams 7, 8 so that the cams are not visible here. What can be seen is that slots 36 have been made in the rotatable sleeve 29, which are intended for inserting the cams 7, 8. Said cams 7, 8 of the fixedly mounted shaft 26 are in one line in the drawing from left to right and the rotatable sleeve will have to be rotated clockwise across an angle of approximately 45° for having the slots 36 correspond to the cams 7, 8 so as to able to adjust the rotatable sleeve 29 with receiving member 28 in relation to the fixed shaft 26.

[0026] The cross-section according to fig. 5D was taken according to the line P-P at the level of the cams 7, 8 and illustrates again said receiving member 28 comprising two halves, rotatable sleeve 29 and fixed shaft 26 with cams 7, 8. Following the slots 36 extending in longitudinal direction, cam recesses 37 have been mounted, in which the cams 7, 8 can be locked. In the position indicated, the cams 7, 8 are in the cam recesses 37 and rotatable sleeve 29 with receiving member 28 are locked in axial direction in relation to fixed shaft 26.

[0027] The slots 36 and the cam recesses 37 have been made in the portion of the rotatable sleeve 29 which is in the receiving member 28, see also Fig. 5G. Said slots 36 connect to the hollow profile of said rotatable sleeve 29 located above it, so that the fixed shaft 26 can slide further into it if the worktop would be set to the smallest adjustable height.

[0028] Figs. 5A and 5F further show that the rotatable sleeve 29 is provided with a circumferentially extending guiding rim 38 accomodated in a guide track 39 mounted in said receiving member 28. In the drawing, a further guide rim 41 and a guide track 40 intended for it has been mounted over it between the successive openings 35 with connecting means 33, 34 for the snap connection 32 between both halves of the receiving member 28. Finally, fig. 5G indicates how the forces are transferred from the upper tube portion 2 of the leg 1 to the fixed shaft 26.

[0029] Figs. 5E and 5F illustrate successive cross-sections through the massive shaft 26.

[0030] Figs. 5H and 5I illustrate the attachment of the operating arm 12 on the rotatable sleeve 29. Said operating arm 12 comprises a fitting piece 43 which must be able to be placed on to the extremity of the rotatable sleeve 29 within the outer circumference 42 of the upper tube portion 2 across the elongated head piece 44. After that, said fitting piece 43 can be rotated to the correct position in relation to a passage 45 and the actual arm portion can be projected to the outside through it. Subsequently, a retaining piece 46 is slid across the head piece 44 in which said retaining piece 46 has a pin 47 protruding into an opening 48 intended for it in said fitting piece 43. In this structure, said rotatable sleeve 29 is rotated across an angle by pushing arm 12 inwards. Except for the conversion from translation to rotation, the structure is also meant for guiding the arm 12 outwards at both sides of a leg with the same parts.

Claims

1. Adjusting member for adjusting a work- or desktop at predetermined heights, said adjusting member engaging a first and second telescopic tube portion of a leg of a table or desk, said adjusting member comprising a first and second part engaging respective tube portions and said first and second parts being locked in axial direction in relation to one another in a first position and can be moved in relation to one another in a second position, **characterized in that** the first part substantially comprises a shaft having one or more rows of cams arranged in longitudinal direction of the shaft and that the second part has a through-opening for accommodating said shaft with radial cams and is provided with cam recesses for being able to accommodate one or more cams of said first part, with one or more cams being accommodated in the respective cam recesses in said second part in the first position and with the cams of said first part being outside the cam recesses and the second part providing a passage for the shaft having one or more rows of cams in the second position.

2. Adjusting member according to claim 1, **characterized in that** the second part is fixedly mounted in the lower tube portion of the leg and the first part is rotatably mounted in the upper tube portion of said leg.

3. Adjusting member according to claim 2, **characterized in that** an operating arm has been provided, which is mounted at or near the extremity of the first part, the shaft having at least one row of cams.

4. Adjusting member according to claim 3, **characterized in that** the shaft comprises a first shaft part which is provided with at least one row of cams and a second shaft part to which said operating arm has been affixed, in which coupling means have been provided, by which said shaft parts can be coupled axially.

5. Adjusting member according to claim 4, **characterized in that** the first and second shaft parts can be coupled by a snap connection.

6. Adjusting member according to claim 1, **characterized in that** the shaft having at least one row of cams and a resilient lip having a stop are mounted at the lower extremity of the first part.

7. Adjusting member according to claim 1, **characterized in that** the first part has a web-shaped recess along the circumference near its upper extremity, said recess having a smaller diameter than the first part with which it is intended to engage a complementary part in the upper tube portion of the leg.

8. Adjusting member according to claim 7, **characterized in that** a flange part of a resilient material is arranged at the web-shaped recess, said flange part being intended to engage a complementary part in the upper tube portion of the leg.

9. Adjusting member according to claim 1, **characterized in tha**t said first part is fixedly mounted in the lower tube portion of the leg and the second part is rotatably secured in the upper tube portion of the leg.

10. Adjusting member according to claim 9, **characterized in that** the second part substantially comprises a receiving member fixedly mounted in the upper tube portion and a sleeve rotatably received within the receiving member, said cam recesses for said cams being arranged in the first part in the inside of the sleeve.

11. Adjusting member according to claim 10, **characterized in that** the receiving member comprises two halves engaging one another by a snap connection.

12. Adjusting member according to claim 11, **characterized in that** the sleeve rotatably received in said receiving member has at least one circumferentially extending guiding rim and said receiving member has a corresponding guiding track or guiding tracks for receiving the guiding rim or guiding rims.

13. Adjusting member according to claims 10-12, **characterized in that** the sleeve is made of two identical halves extending in longitudinal direction engaging one another by a snap connection.

14. Adjusting member according to claims 10-13, **characterized in that** an operating arm has been provided which has been mounted at or near the extremity of the rotatable sleeve.

15. Adjusting member according to claim 14, **characterized in that** said operating arm is releasably mounted on the extremity of the rotatable sleeve and can be mounted on it in two opposite positions.

16. Adjusting member according to one or more of the preceding claims, **characterized in that** means are provided for forcing said rotatably shaft having at least one row of cams or the rotatable sleeve having cam recesses into the first position, in which the first and second parts are locked in relation to one another.

17. Adjusting member according to claim 16, **characterized in that** said means are spring means engaging said operating arm.

18. Adjusting member according to claim 16 or 17, **characterized in that** a taper is arranged within the cam recesses, such that first and second parts are forced into the first position in which said first and second parts are locked in relation to one another in axial direction.

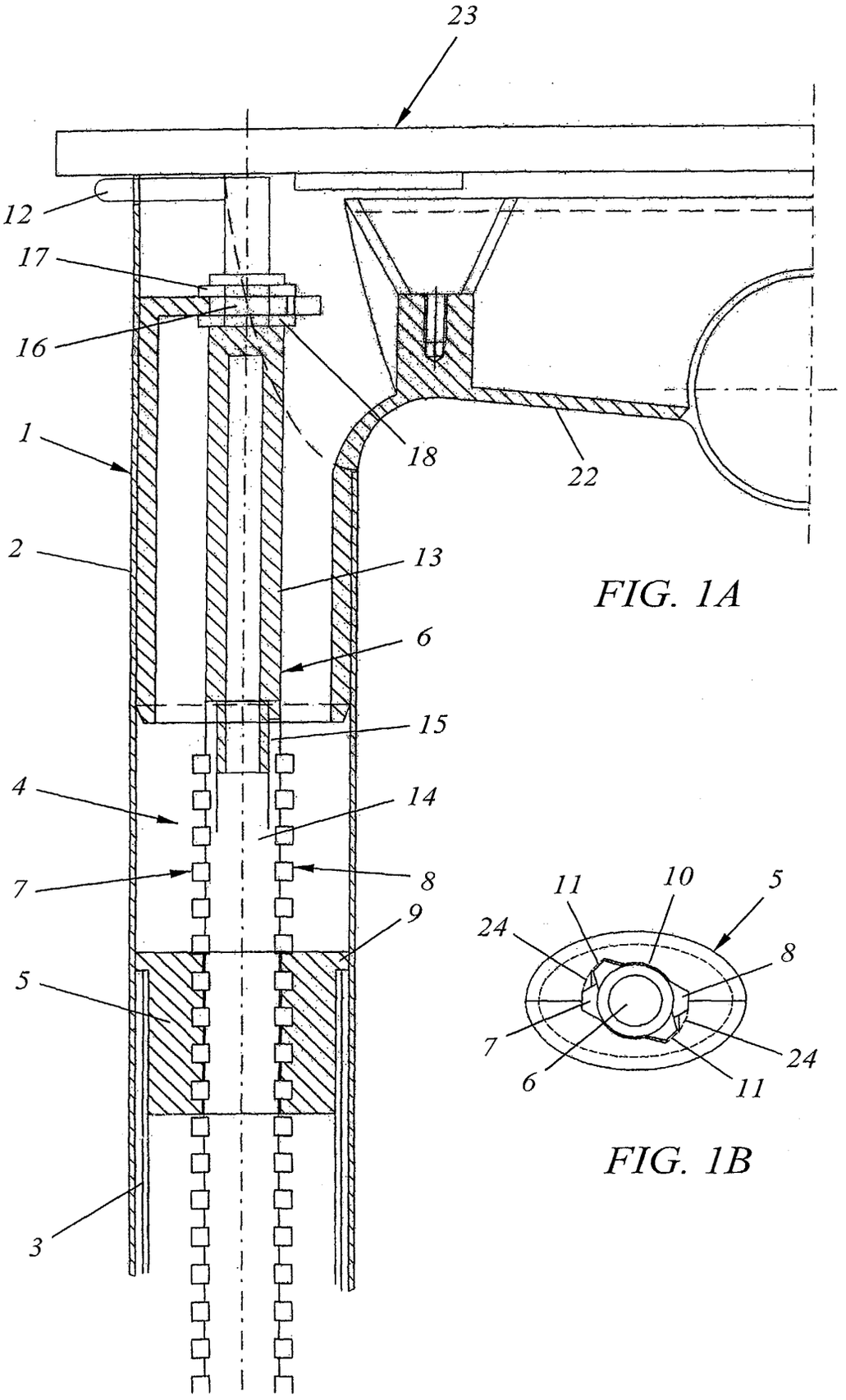


FIG. 1A

FIG. 1B

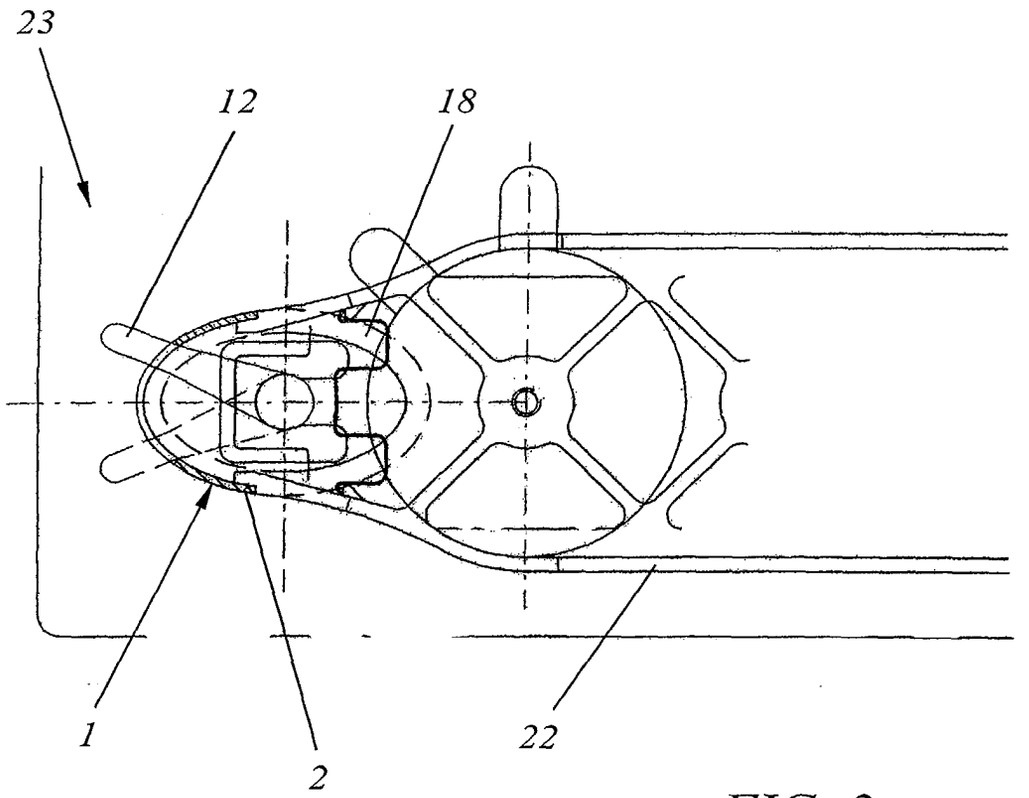


FIG. 2

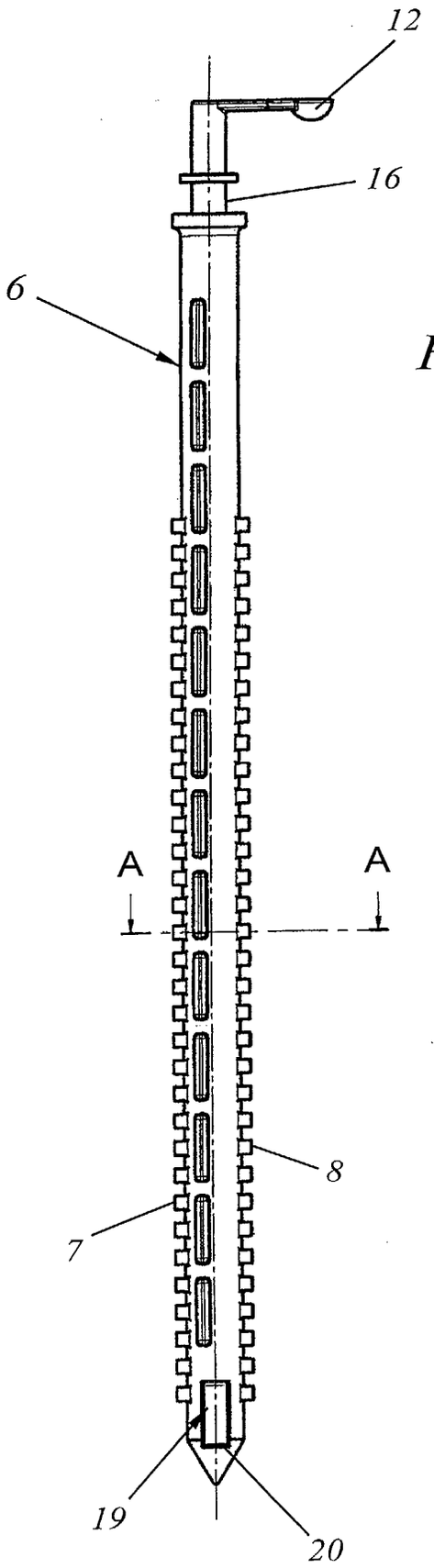


FIG. 3A

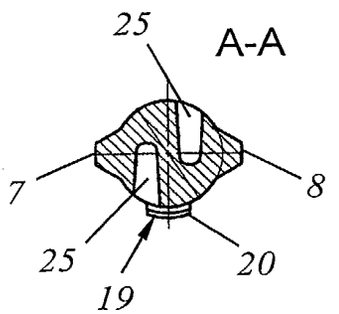


FIG. 3B

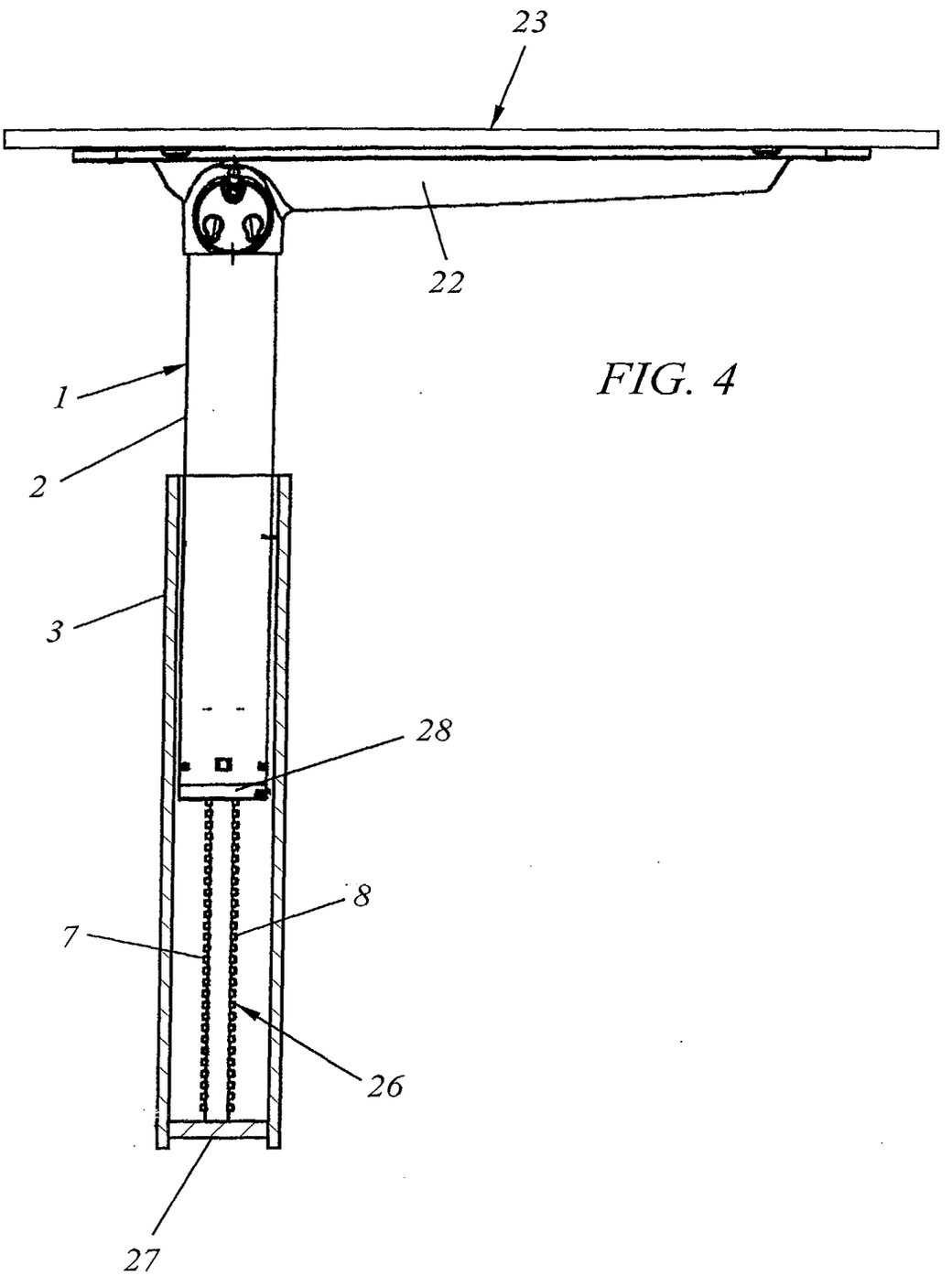


FIG. 4

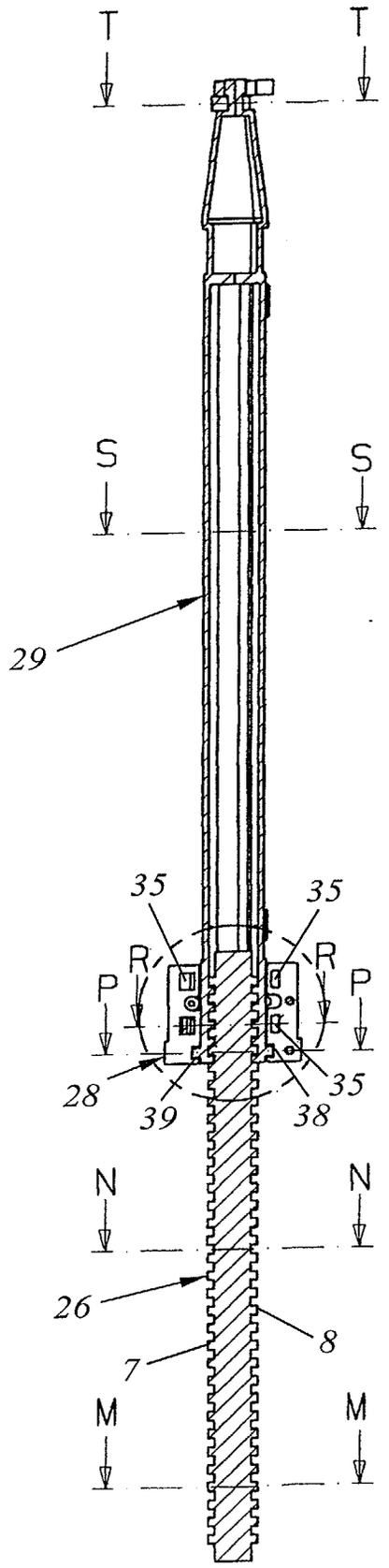


FIG. 5A

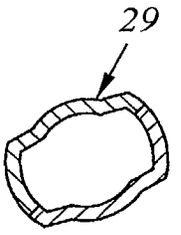


FIG. 5B

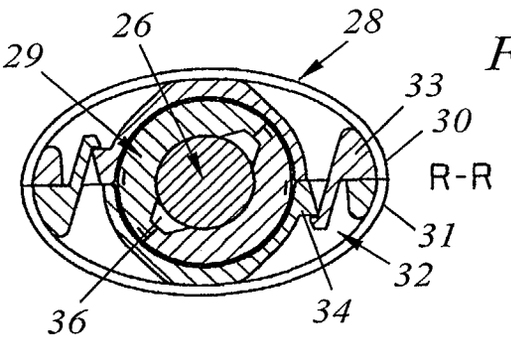


FIG. 5C

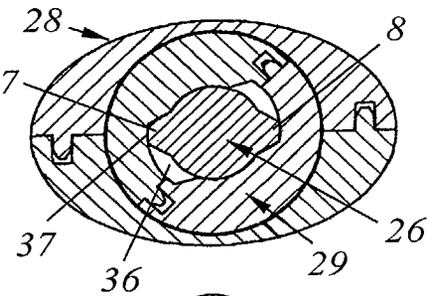


FIG. 5D



FIG. 5E



FIG. 5F

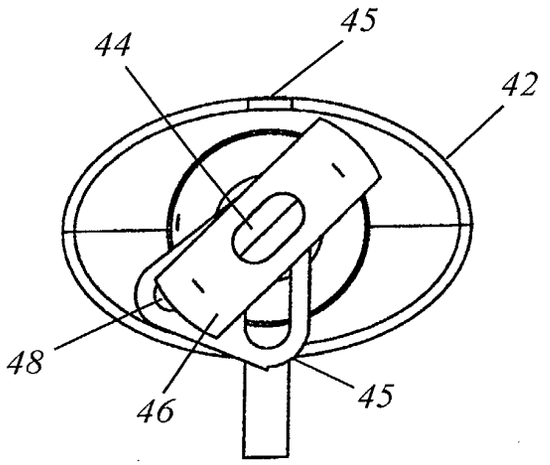


FIG. 5H

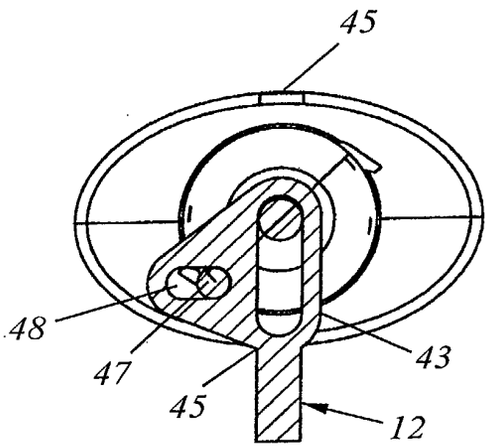


FIG. 5I

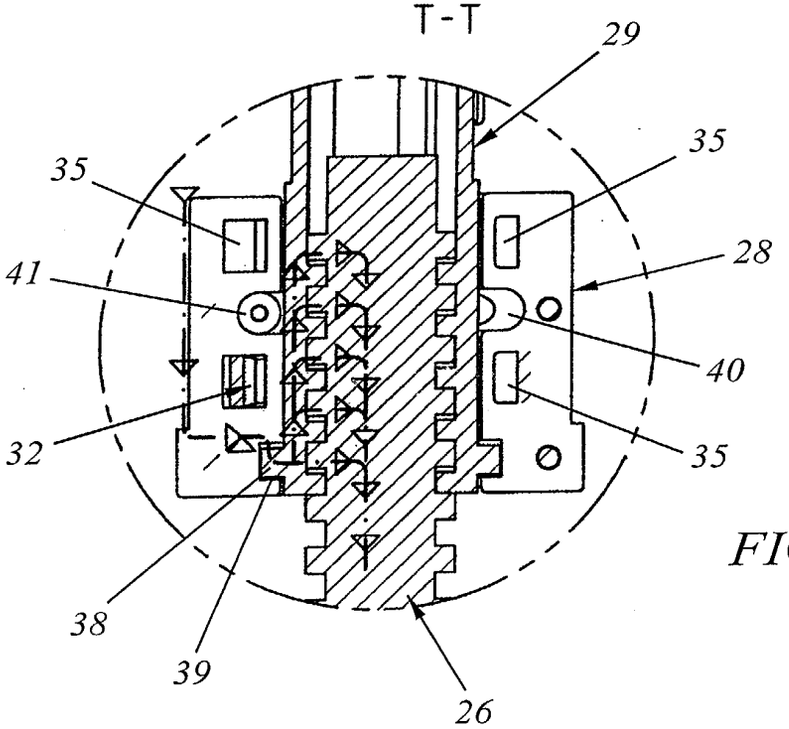


FIG. 5G

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 07 7688

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 2 614 012 A (YUAN) 14 October 1952 (1952-10-14) * the whole document *	1-3,16	A47B9/00
A	DE 296 03 920 U (SCHMIDT) 15 May 1996 (1996-05-15) * claim 1; figures 1-4 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 December 2003	Noesen, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 03 07 7688

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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19-12-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2614012 A	14-10-1952	NONE	
DE 29603920 U	15-05-1996	DE 29603920 U1	15-05-1996

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82