Title: SUPPORT ELEMENT FOR FURNITURE COMPONENTS, EQUIPPED WITH RACK-TYPE ADJUSTING DEVICE

Abstract: Support element for furniture components, equipped with devices for adjusting the relative distance of the component itself from associated support surfaces, comprising an upright (10) provided with a rack (13) on which there is movable a cursor (20) able to be inserted into a corresponding seat (30) of said furnishing component and equipped with means (23) for coupling with said rack (13), there being provided elastic means (21) for pushing said coupling means (23) towards the longitudinal axis of the cursor and means (14) for disengaging the said coupling means (23) from the rack.
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
Support element for furniture components, equipped with rack-type adjusting device

DESCRIPTION

The present invention relates to a support element for furniture components equipped with rack devices for adjusting the relative distance of the component itself from associated support surfaces.

It is known in the art that there is the need to equip certain furniture components such as tables, support surfaces, shelves, armchairs, seats, partitions, cabinets and the like with elements for resting on the ground, which are equipped with devices for adjusting the distance of said component from the corresponding surface in order to ensure the levelness and relative alignment of the furnishing component with the surrounding environment and with any other complementary furnishing components, as well as the ergonomically most correct position for the individual user.

It is also known that numerous examples of devices for adjusting the said distance have been developed and that, although performing their function, said known devices have a certain manufacturing complexity, a large number of component parts and high degree of wear and are difficult to access for adjustment.

In addition the known devices envisage the use of tools which must be made available to the user, kept in the vicinity of the location of use and accompanied by user instructions.

The technical problem which is posed, therefore, is that of providing a support element for furniture components which is equipped with devices for adjusting the distance of the furniture component from supporting surfaces such as floors and/or walls, whereby said
adjusting means must consist of a small number of component parts able to allow easy and low-cost manufacture and assembly, ease of access for adjustment and limited maintenance.

Within the scope of this problem a further requirement is that said devices should be able to perform their function without the need for auxiliary tools. These technical problems are solved according to the present invention by a support element for furniture components, equipped with devices for adjusting the relative distance of the component itself from associated support surfaces, which comprises an upright provided with a rack on which there is movable a cursor able to be inserted into a corresponding seat of said furnishing component and equipped with means for coupling with said rack, there being provided means for pushing said coupling means towards the longitudinal axis of the cursor and means for disengaging the said coupling means from the rack.

Further details may be obtained from the following description of a non-limiting example of embodiment of the invention provided with reference to the accompanying plates of drawings in which:

- Figure 1 shows an exploded perspective view of the support element with adjusting device according to the invention;
- Figure 2 shows a cross-sectional view along a vertical plane of the support element inserted in a leg of a furniture component;
- Figure 2a shows a cross-section through the upright along the plane indicated by IIa-IIa in Fig. 2;
- Figure 3 shows a cross-sectional view along a vertical plane of the support element with the adjusting device in the position disengaged from the rack;
- Figure 4 shows a cross-section along the plane indicated by IV-IV in Fig. 3;
- Figure 5 shows a cross-sectional view similar to that of Fig. 3 with the device in the middle extension position;
- Figure 6 shows a cross-section along the plane indicated by VI-VI in Fig. 5;
- Figure 7 shows a cross-sectional view similar to that of Fig. 3 with the device in the minimum extension position;
- Figure 8 shows a cross-section along the plane indicated by VIII-VIII in Fig. 7 and;
- Figures 9a to 9f show different configurations of the bottom end part of the support element depending on the type of contact surface of the ground.

As shown (Fig. 1), the support element according to the invention comprises a base 10 formed by a foot 11 and by an upright 12 which has, formed on its external surface, a rack 13, the teeth 13a of which are oriented with the bearing surface 13b directed towards the top free end of the upright 12 itself.

In a preferred embodiment, the surface 12a of the upright 12 opposite that of the rack 13 is substantially flat so as to form a reference surface for the means 20 for sliding coaxially with respect to the said upright, as will emerge more clearly below.

On each of the sides of the upright 12 there is also provided a longitudinal groove 15 delimited by an edge 15a, projecting laterally and extending over a distance in the axial direction of the said groove 15 such as to produce a top opening 15b and a bottom opening 15c arranged symmetrically with respect to said projecting edge.

As illustrated in Fig. 2a, the cross-section of the upright 12 also shows:
- two lateral surfaces 12b parallel with each other and able to form an element preventing rotation of the cursor 20 with respect to the upright during operation;  
- two chamfers 12c able to form elements for relative centring of cursor 20 and upright 12.

The part of the upright 12 arranged in the vicinity of the free end thereof and corresponding to the rack 13 also has a longitudinal, externally projecting cam 14 which forms a guide for the insertion of said sliding means on the upright 12, as well as the element for pushing outwards the rack coupling means (described further below) in order to disengage them from the rack and the upper locking element of the cursor.

The said sliding means consist of a cursor 20, the internal surface of which has a shape matching that of the upright, as well as a longitudinal recess 24 formed in the top part thereof and able to engage with said cam 14 of the upright itself.

In a preferred embodiment said cursor is formed as two half-parts 20a provided with mutual coupling elements, for example of the pin/hole type known per se and therefore not described in detail.

The external surface of the cursor also has, formed on it, ribs for the stable coupling of the cursor 20 with a seat 30 (a leg in the example of the figure) of the furniture component.

The cursor is such that, once assembled, it forms inside it a seat 22 which is inclined downwards with respect to the longitudinal axis of the cursor and is able to form the guide and housing for the rack coupling means which consist of a slide 23 in turn able to engage with the rack 13 of the upright 12.

The inclination of the seat 22 is such that, during operation, the intrinsic weight of the furniture component produces a force component able to take up
any play.

In a preferred embodiment said slide 23 is substantially in the form of a elastically deformable "U", the ends of which have teeth 23a directed inwards for engagement with said longitudinal channel 15.

Said slide 23 is kept pushed towards the longitudinal axis of the cursor 20 by a retaining spring 21 formed by an elastic plate integral with the cursor 20 itself. The device is completed by a bellows 40 which is axially mounted on the upright 12 and on the cursor 20 and fastened to them so as to cover the mechanism both in order to prevent the accumulation of dirt and provide the assembly with an aesthetically pleasing finish and also ensure greater safety, preventing the crushing of fingers and the like.

The adjusting device operates in the following manner:
- after mounting in sequence on the upright:
  - the bellows 40
  - the U-shaped slide 23
  - the two half-parts of the cursor 20 so that the U-shaped slide 23 is arranged in its seat 22 pushed inwards by the elastic plate 21 mounted integrally on the cursor;
  - the cursor is inserted inside the seat 30 (in the example a leg) to which it is constrained by conventional locking means known per se and therefore not described in detail;
  - with the base 11 of the upright being retained by the user's foot, the device is raised (Fig. 3, 4) into the fully extended position corresponding to the point of bearing contact of the cam 14 against the partial groove 24, causing:
    - pushing of the fin 14 against the internal surface of the slide 23 which is consequently pushed outwards;
    - consequent entry of the projections 23a into the
longitudinal guide 15 with the consequent disengagement of the slide from the rack 13;
- in these conditions the cursor is free to slide downwards with the slide 23 guided by the groove 15 until;
- interruption of the delimiting edge 15a in the bottom end section of the rack 13 allows the slide 23 pushed by the plate 21 to penetrate transversely inwards (Figs. 5, 6) until it engages with the first bottom tooth 13b of the rack itself;
- from this moment raising the leg of the furniture component produces the subsequent engagement of the slide 23 with each tooth 13b of the rack 13 until the last upward pulling movement of the cursor causes the renewed disengagement of the slide 23 and the entry of the projections 23a into the longitudinal guide 15 for repetition of the cycle in order to obtain a different adjustment.

It is therefore obvious how the support element according to the invention can be easily assembled, applied and used by the end user without the need for auxiliary tools.

As shown in Figures 9a to 9f, the end part of the support element may be provided with different accessories depending on the particular type of contact surface; in greater detail it is possible to insert into the hollow base 11a of the foot 11 an insert 111 which has a bottom surface as follows:
- 111a flat (Fig. 9a) for surfaces such as carpets and the like;
- 111b flat with a projecting wheel (Fig. 9b) for facilitating the movement of the furniture component;
- 111c with a coaxial female thread (Fig. 9c) for insertion of various accessory parts;
- 111d with an externally projecting spike (Fig. 9d)
for fixing in grassy terrain or the like;
- 111e with a flat, rubber, bottom surface (Fig. 9e)
for soft surfaces;
- 111f with an end-piece rotating about a pivot for
  allowing resting on inclined surfaces.
CLAIMS

1) Support element for furniture components, which is equipped with devices for adjusting the relative distance of the component itself from associated support surfaces, characterized in that it comprises an upright (12) provided with a rack (13) on which there is movable a cursor (20) able to be inserted into a corresponding seat (30) of said furnishing component and equipped with means (23) for coupling with said rack (13), there being provided means (21) for pushing said coupling means (23) towards the longitudinal axis of the cursor and means (14) for disengaging the said coupling means (23) from the rack.

2) Element according to Claim 1, characterized in that said rack (13) of the upright (12) is formed on the external surface of the upright.

3) Element according to Claim 1, characterized in that said rack (13) extends in the longitudinal direction.

4) Element according to Claim 1, characterized in that the teeth (13a) of the rack (13) are oriented with the bearing surface (13b) directed towards the free end of the upright (12).

5) Element according to Claim 1, characterized in that said means for disengaging the coupling means (23) of the cursor (20) from the rack (13) consist of a projection (14) arranged in the vicinity of the free end of the said upright.

6) Element according to Claim 5, characterized in that said projection (14) is a vertical cam projecting
transversely from the upright.

7) Element according to Claim 1, characterized in that the surface (12a) of the upright (12) opposite that of the rack (13) is flat.

8) Element according to Claim 1, characterized in that a longitudinal channel (15) delimited by a laterally projecting longitudinal edge (15a) is provided on the opposite sides of the upright (12).

9) Element according to Claim 8, characterized in that said longitudinal edge (15a) extends over a distance in the axial direction of the said groove (15) such as to form a top opening (15b) and a bottom opening (15c) symmetrically arranged with respect to said projecting edge.

10) Element according to Claim 1, characterized in that said cursor (20) has an internal surface matching that of the upright (12).

11) Element according to Claim 1, characterized in that said cursor (20) has a guiding and housing seat (22) for said means (23) for coupling with the rack (13).

12) Element according to Claim 11, characterized in that said seat (22) is inclined with respect to the longitudinal axis of the cursor.

13) Element according to Claim 1, characterized in that said means for coupling with the rack (13) consist of a slide (23) movable transversely with respect to the longitudinal axis of the cursor.
14) Element according to Claim 13, characterized in that said slide (23) is substantially in the form of a "U".

15) Element according to Claim 14, characterized in that projections (23a) able to be inserted into said longitudinal groove (15) of the upright (12) are present at the ends of said "U".

16) Element according to Claim 1, characterized in that said means for pushing the coupling element (23) are of the elastic type.

17) Element according to Claim 16, characterized in that said elastic pushing means consist of a plate spring (21).

18) Element according to Claim 1, characterized in that it is provided with a bellows (40) which can be coaxially mounted on the said upright (12) and can be fastened to the cursor (20) and to the upright itself.

19) Element according to Claim 1, characterized in that said upright (12) has two flat and parallel lateral surfaces (12b) for preventing rotation.

20) Element according to Claim 1, characterized in that said upright (12) has two rear guiding chamfers (12c) for insertion of the cursor.

21) Element according to Claim 1, characterized in that an insert (111) which is suited to the specific contact surface is inserted into the hollow end of the foot (11).
22) Element according to Claim 21, characterized in that said insert (111a) has a flat surface.

23) Element according to Claim 21, characterized in that said insert (111b) has a projecting wheel.

24) Element according to Claim 21, characterized in that said insert (111c) has a coaxial female thread.

25) Element according to Claim 21, characterized in that said insert (111d) has an externally projecting spike.

26) Element according to Claim 21, characterized in that said insert (111e) has a flat, rubber, bottom surface.

27) Element according to Claim 21, characterized in that said insert (111f) has an end-piece rotating about a pivot.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47B9/06 A47B91/02

According to International Patent Classification (IPC) or to both national classification and IPC.

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A47B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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