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(54) Device for adjusting the elongation of backrest, armrest, or the like

(57) The present invention relates to a device (1) for adjusting the height of a backrest, arm-rest or similar rest member of a seating. The device (1) comprises a support member (3) for said rest member, which slides on a guide member (2) integral with the seating, and means for fastening the support member (3) to the guide member (2) according to a plurality of intermediate stop points (12) between a least extended position and a most extended position of the rest member. Each stop point (12) can be independendy selected while extending the rest member and is bypassed while shifting from said most extended position to said least extended position. Advantageously, the device (1) comprises, at the most extended position thereof, means for selectively preventing that the rest member may shift from the most extended position to the least extended position.

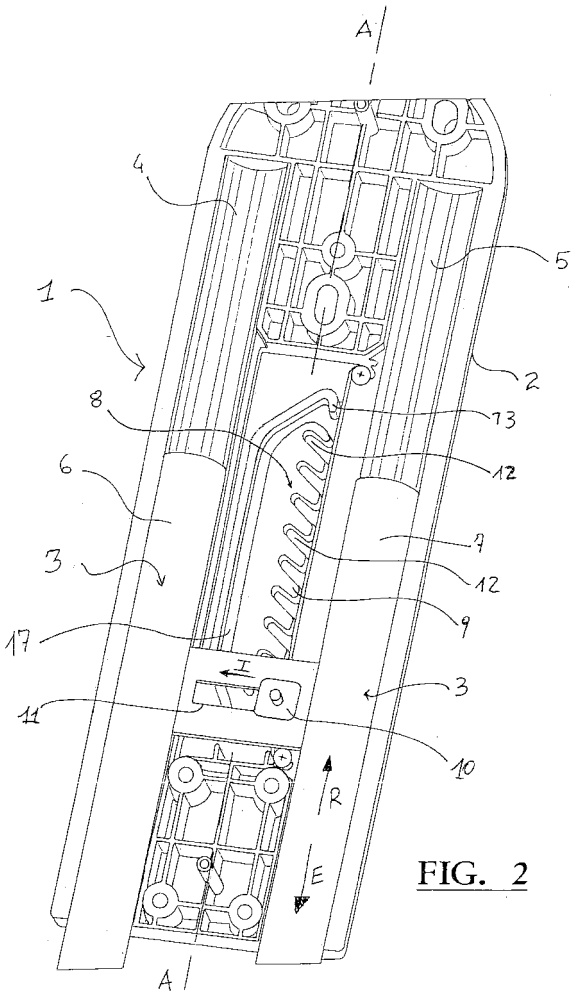

FIG. 2

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Description

[0001] The present invention relates to a device for adjusting the extension of backrests, arm-rests or similar seating elements.

[0002] Various types of seating are currently marketed, such as chairs, arm-chairs, small chairs, etc., provided with rest members for the user or supports for objects. For example, the rest members can be arm-rests or backrests, the former having the function of supporting the user's arms, the second supporting his/her trunk. Again, the rest members can also comprise headrests, or movable small tables for supporting objects.

[0003] The above-mentioned rest members are fastened to the relative seating in an extensible manner, for example they can be adjusted in height by means of a telescopic coupling. In these cases, through a suitable adjusting device, the user of the seating can adjust the extension of the rest member as required, between a most extended position and a least extended position. A plurality of intermediate stop points is provided between said positions.

[0004] The traditional extension-adjusting devices can provide two operating modes. In a first case, when the rest member is extended by a certain length, it is temporarily stopped at all the intermediate points relative to the length in question. In a second case, the rest member can be directly extended by a certain length without requiring the same to be stopped at the intermediate points relative to the length in question. From now on, reference will be made to those adjusting devices that operate according to the latter mode.

[0005] After the rest member has been fully extended, the adjusting devices provide for the same to be fully released. In practice, the rest member is brought to its least extended position, the extension thereof still being adjustable therefrom. Disadvantageously, with the adjusting devices according to the prior art, the rest member cannot be easily adjusted when it is in its most extended position. In fact, the coupling between the rest member and the seating is often unstable, and the rest member often tends to be disengaged and return to its least extended position. Furthermore, since the coupling balance is often unstable, stopping the rest member when the same is fully extended can be uncomfortable for the user, i.e. the most extended position can be difficult to set and easily bypassed.

[0006] The object of the present invention is to provide a device for adjusting the extension of a backrest, arm-rest or similar rest member of a seating that resolves the drawbacks of the traditional devices, while being easy to manufacture and cost-effective.

[0007] An object of the present invention is also to provide a device for adjusting the extension of a backrest, arm-rest or similar rest member of a seating enabling to obtain a stable configuration for the coupling between said rest member, when fully extended, and the corresponding seating.

[0008] These and other objects are achieved by the present invention that relates to a device for adjusting the extension of a backrest, arm-rest or similar rest member of a seating, comprising a support member for said rest member that slides on a guide member integral with said seating, and means for fastening said support member to said guide member at a plurality of intermediate stop points between a least extended position and a most extended position of said rest member , each stop point being independently selectable while extending said rest member and bypassed while shifting from said most extended position to said least extended position, characterized in that it provides, in said most extended position, means for selectively preventing that said rest member may shift from said most extended position to said least extended position .

[0009] According to a preferred aspect of the present invention, the preventing means comprise a further stop point for the rest member .

[0010] Advantageously, the device according to the invention provides suitable means having the function of preventing that the rest member may be accidentally disengaged from the guide member when the former is fully extended.

[0011] The engaging means preferably comprise a component provided with a linear array of teeth which is longitudinal to the extension direction of said rest member and integral with the guide member. This toothed component is engaged with a pivot, which is in turn movably fastened to the support member, and consequently, to the rest member. The pivot selectively engages the recesses comprised between the sides of two adjacent teeth, i.e. it can be brought to the position of engagement with a determined recess without necessarily having to engage the recesses provided on the toothed component upstream of the same according to the extension direction of the rest member. The thrust force of a resilient member acts on the pivot, i.e. a spring exerts a force on the pivot such that the pivot may be brought to an engaging position with a recess.

[0012] Each recess comprised between two adjacent teeth of the toothed component corresponds to a stop point for the rest member .

[0013] A first recess is provided at a first end of said toothed component, and when it is engaged by said pivot, it corresponds to the least extended position of the rest member. A last recess is provided at a second end of the toothed component, and when it is engaged by said pivot, it corresponds to the most extended position of the rest member.

[0014] The further stop point is provided at the last recess, such that the pivot associated with the rest member cannot be disengaged from the recess when it is not operated by the user. The last recess communicates with the first recess through a by-pass guide, which can be also engaged by said pivot. The by-pass guide has the function of allowing the rest member to be fully released.

[0015] The pivot engages each recess according to a

stable configuration. For example, the recesses are oriented such as to support the pivot, and accordingly the rest member, when both the force resulting from its weight and an external force act on the latter.

[0016] According to the preferred embodiment of the present invention, a first section of the by-pass guide, in the vicinity of the last recess, follows such a trajectory as to prevent any accidental engagement with said pivot. In practice, an intervention by the user is required for the pivot to be engaged with the by-pass guide, for example the support member has to be further extended, thereby obtaining the release of the rest member. For example, a first section of the by-pass guide, in the vicinity of the last recess, can either make a double curve or an arch.

[0017] Furthermore, the pivot is fastened to a guide provided on the support member, sliding along a direction substantially orthogonal to said extension direction. The pivot engages the by-pass guide to obtain the release of the rest member only when it is operated by the support member , i.e. when it is shifted by the latter in said extension direction, in order to disengage the last recess of the toothed component.

[0018] According to a similar embodiment of the present invention, the support member is integral with the seating and the toothed component is fastened to the rest member. Actually, what is important to the purpose of adjusting the rest member is that a relative motion is created between the pivot and the toothed component.

[0019] Besides allowing adjusting the extension of the relative rest member according to stable configurations, the adjusting device according to the present invention is easy to manufacture, even at minimum costs. Furthermore, the device is easy to operate. In fact, the user can fully extend the rest member without paying attention that the most extended position in which the rest member would be completely released is not exceeded. In fact, when the rest member is completely extended, it is in a stable stop point from which it can be shifted by a further operation carried out by the user.

[0020] Further aspects and the advantages of the present invention will be better understood from the description below, which is to be considered by way of a nonlimiting example with reference to the annexed figures, in which:

- Fig. 1 is a perspective view of a device according to the present invention.
- Fig. 2 is a perspective view of the device from Fig. 1 associated with an element of a seating;
- Fig. 3 is a perspective view of an element of the device from Fig. 1;

[0021] Fig. 1 and 2 show a possible embodiment of the device 1 according to the present invention. The device 1 generally comprises a guide member 2 integral with a seating (not illustrated) and a support member 3 fastened to a rest member associated with said seating. The rest member (also not shown) can be an arm-rest, a headrest, a backrest or a small table, etc. The support member 3 slides on the guide member 2 and in practice provides the coupling between the rest member and the seating in a telescopic manner.

[0022] In the embodiment illustrated, the guide member is provided with two guides 4, 5 that are longitudinal to the direction A-A of extension/release of the rest member, two portions 6, 7 of the support member 3 respectively sliding therein. The direction A-A of extension/release depends on the type of rest member associated with the inventive device. For example, if the rest member is a backrest, this direction can be substantially orthogonal to the seat of the seating and the guide member 2 can be integral with the frame of the seating. Alternatively, if the rest member is a movable small table, this direction can result inclined relative to the seat. In Fig. 2, the direction of extension is indicated with the arrow E, whereas that of release is indicated with the arrow R.

[0023] The guide member 2 is coupled to a toothed component 8. The component 8, for example a plate, is provided with a plurality of teeth 9 that are arranged according to an array aligned in the direction A-A of extension/release of the rest member. The first tooth in the array is designated with the numeral 13, whereas the last tooth in the array is designated with the numeral 14 (Fig. 3).

[0024] A pivot 10 is fastened to a guide 11 of the support member 3, sliding in a direction orthogonal to the direction A-A. Preferably, a spring (not shown) exerts a thrust on the pivot 10 in the direction I. The pivot 10 can selectively engage the recesses 12 comprised between the sides of two adjacent teeth 9. Consequently, the extension of the support member 3 can be adjusted by engaging the pivot 10 in the most suitable recess 12, for example by manually shifting either the support member or the rest member . This can be done by shifting the member 2 relative to the member 3 by a desired length. When the shifting has been accomplished, said spring brings the pivot 10 to an engaging position with the recess 12 facing the pivot 10. Particularly, the first recess provided along the direction A-A is the recess 15 and the last recess provided is the recess 16. When the pivot 10 engages the first recess 15 of the component 8, the support member 3 (and accordingly also the rest member being fastened thereto) is in its least extended position, whereas when the pivot 10 engages the last recess 16, the support member 3 (and the rest member) is in its most extended position . Each of the recesses 12 provided between the recesses 15 and 16 corresponds to an intermediate position that the support member 3 and the rest member can adopt. In practice, the member 3 can be extended by a given length, i.e. shifted in the direction of arrow E, starting from the least extended position to the desired intermediate position, without requiring the pivot 10 to be engaged in all the recesses 12 being provided along the extension section in question.

[0025] The inclination of the teeth 9 is such as to prevent that the pivot 10 may shift in the direction of arrow

R while being engaged in a recess 12. Vice versa, the inclination of the teeth 9 is such that the pivot 10 is allowed to slide along the side of a tooth 9 when the support member 3 is shifted in the direction of arrow E, such that the pivot 10, initially engaged in a recess 12, is brought to a disengagement position relative to the recess 12. Therefore, the recesses 12 correspond to stable stop points for the support member 3 and the relative rest member .

[0026] The first recess 15 and the last recess 16 are connected through a by-pass guide 17. To release the rest member, the pivot 10 has to slide within the by-pass guide 17. Practically, in order to bring the rest member back to its least extended position, the user can extend the support member 3 until the pivot 10 is engaged in the last recess 16. The same pivot 10 can then be engaged with the by-pass guide to be guided up to the first recess 15.

[0027] According to a particularly advantageous aspect of the present invention, the adjusting device 1 is provided with means for avoiding that the pivot 10 may accidentally engage the by-pass guide 17. These means have the function of stabilizing the most extended position of the rest member thereby avoiding that the pivot 10 may return to the position of engagement with the first recess 15, for example as a result of shocks or undesired movements of the rest member .

[0028] Said means can be of different types. For example, the by-pass guide 17 of the illustrated device 1 provides a portion 18, which opens to the last recess 16, that follows a curvilinear trajectory, for example the double curve that can be seen in Fig. 1. This configuration prevents the pivot 10 from being accidentally disengaged from the recess 16 and inserted in the portion 18 of the by-pass guide. In fact, in order to release the rest member, the user is required to further extend the support member 3 in the direction E, when the pivot 10 is in the last recess 16, by overcoming the force of the above-mentioned spring, such that the pivot 10 is disengaged from the recess 16 and inserted in the portion 18 of guide 17 by sliding on the curved surface 19.

[0029] Therefore, the device according to the invention allows to simply adjust the extension of backrests, arm-rests or similar rest members of a seat, while providing the stability of the relative coupling also in the most extended position of the rest member. Thereby, any accidental or involuntary release (by the user) is avoided even if the member is fully extended.

[0030] The device 1 according to the invention can be provided with the guide member 2 being integrally coupled with the rest member and with the support member 3 fastened to the seating. For the purposes of functionality of the device 1, in fact, it is sufficient that a relative motion is created between the members 2 and 3, and accordingly, between the toothed component 8 and the pivot 10. For example, the guide member 2 can be integral with the backrest of an office chair, and the support member 3 can be fixed to the frame of the same chair.

Claims

1. A device for adjusting the extension of a backrest, arm-rest or similar rest member of a seating, comprising:

   a support member for said rest member sliding on a guide member integral with said seating, and
   means for fastening said support member to said guide member according to a plurality of intermediate stop points between a least extended position and a most extended position of said rest member, each stop point being independently selectable while extending said rest member and being bypassed while shifting from said most extended position to said least extended position,

   characterized in that it provides, in said most extended position , means for selectively preventing that said rest member may shift from said most extended position to said least extended position.

2. The device according to claim 1, **characterized in that** said preventing means comprise a further stop point for said rest member.

3. The device according to the preceding claims, **characterized in that** said engaging means comprise a component provided with a linear array of teeth, longitudinal with the extension direction of said rest member and integral with said guide member, and a pivot movably fastened to said support member, suitable to selectively engage the recesses comprised between the sides of two adjacent teeth, each of said recesses corresponding to a stop point.

4. The device according to the preceding claims, **characterized in that** a first recess, being provided at a first end of said toothed element, corresponds to said least extended position of said support member and a last recess, being provided at a second end of said toothed element, corresponds to said most extended position of said support member, said further stop point being provided at said last recess which, in turn, is in communication with said first recess through a by-pass guide that can be engaged with said pivot.

5. The device according to claim 4, **characterized in that** said pivot engages each recess according to a stable configuration.

6. The device according to claims 4 and 5, **characterized in that** a first section of said by-pass guide, in the vicinity of said last recess, follows such a trajectory as to prevent any accidental engagement with

said pivot.

7. The device according to claim 6, **characterized in that** a first section of said by-pass guide, in proximity to said last recess, makes a double curve.

8. The device according to claim 6 or claim 7, **characterized in that** said pivot can be engaged within said by-pass guide only when it is pushed by said support member in the extension direction of said rest member, in order to disengage the last recess of the toothed component.

9. The device according to the preceding claims, **characterized in that** a portion of said pivot slides within a guide being provided on said support member, in a direction substantially orthogonal to said extension direction.

10. The device according to claim 9, **characterized in that** it comprises a resilient member suitable to push this pivot along said guide of the support member towards said recesses.

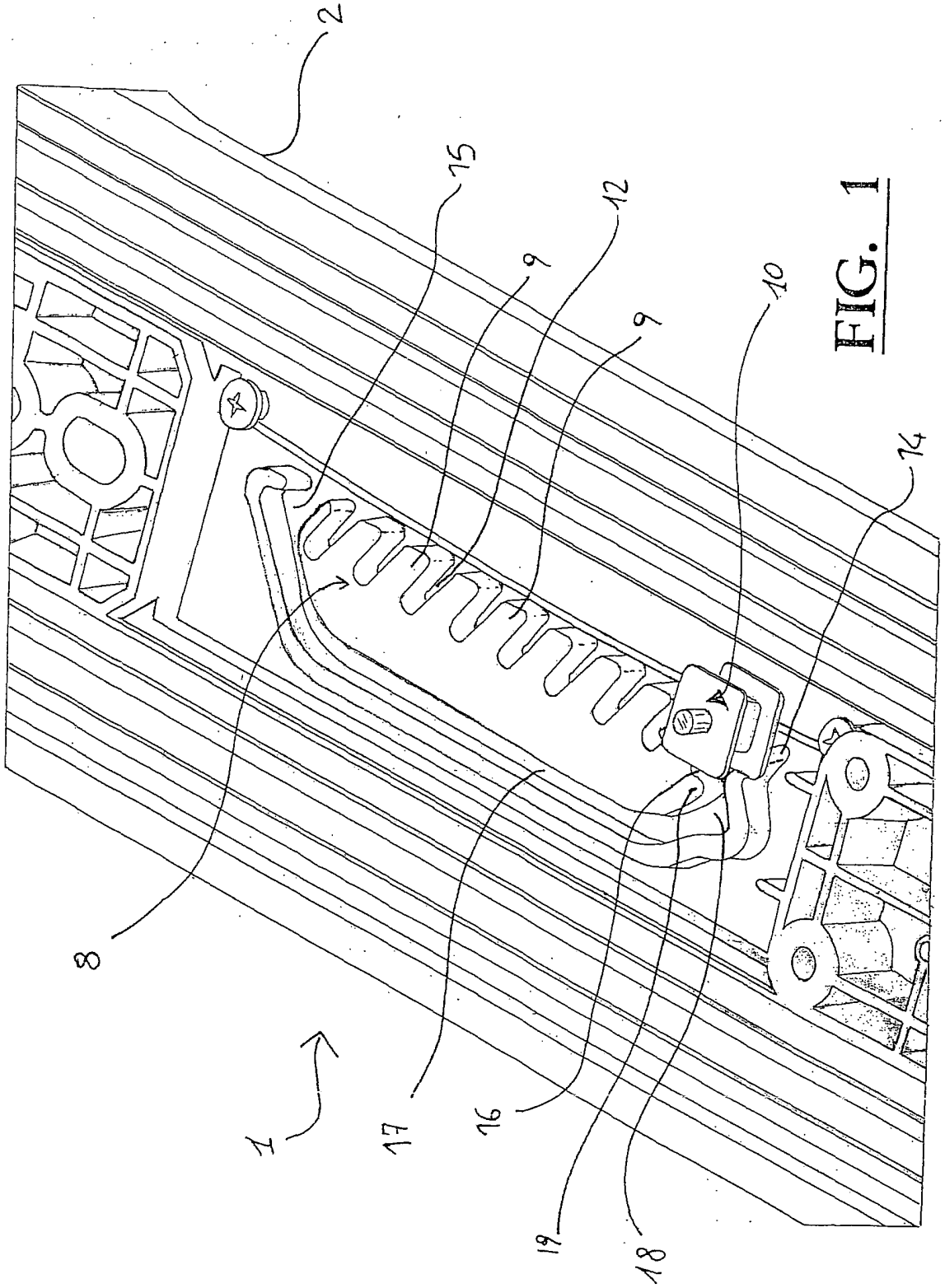

FIG. 1

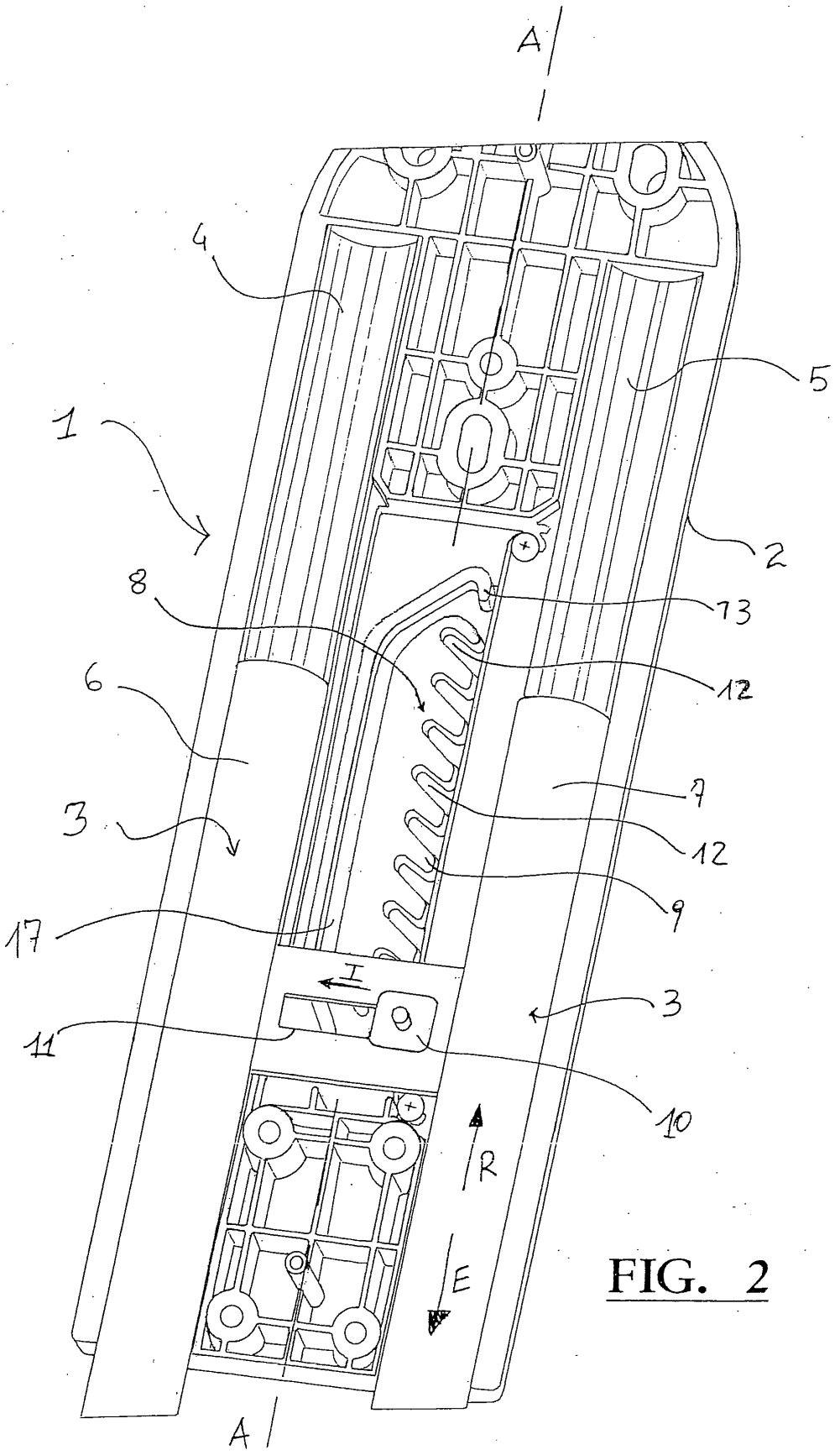

FIG. 2

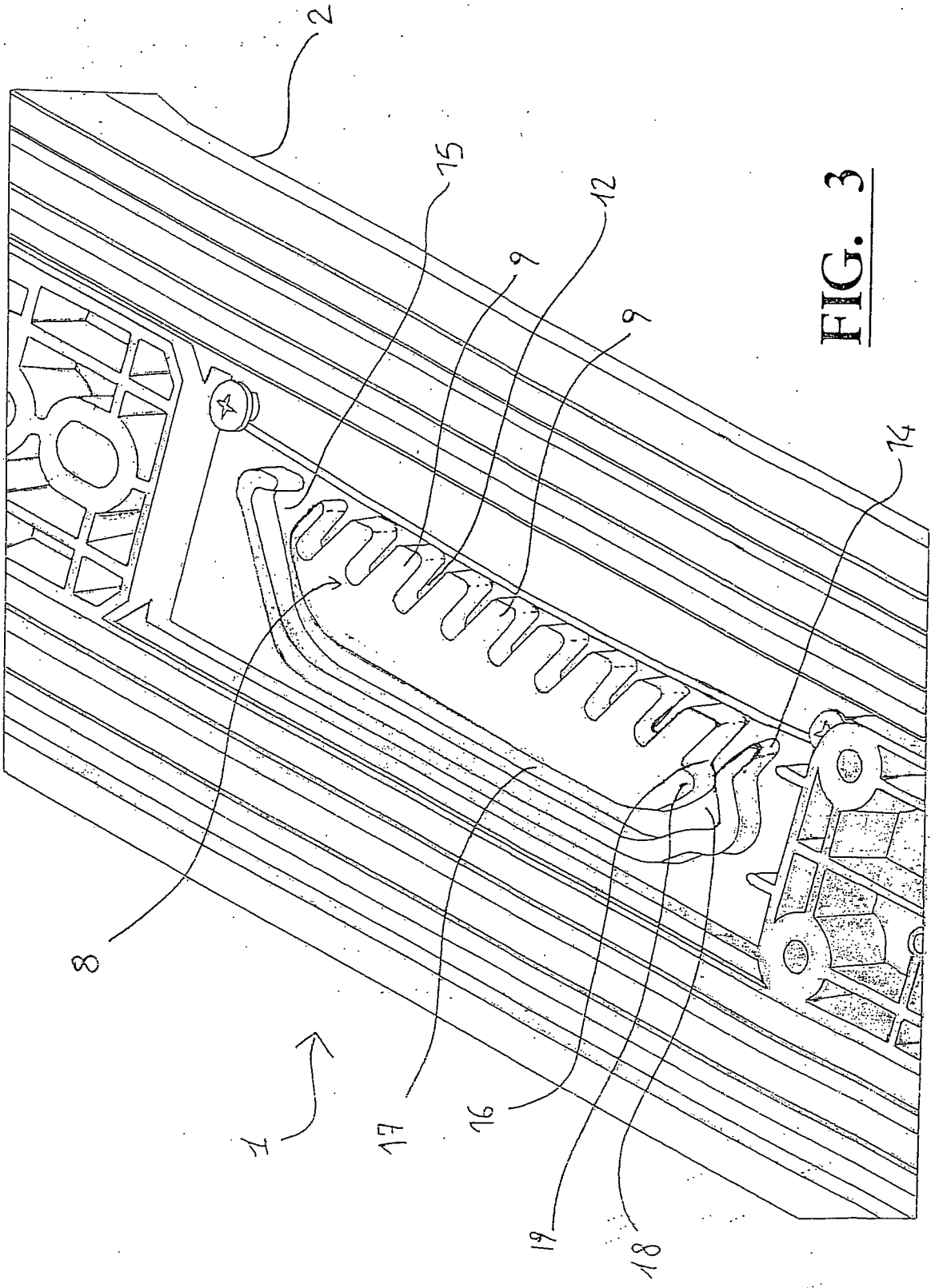

FIG. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 01 3127

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 343 840 B1 (CHUANG MEI-CHIN) 5 February 2002 (2002-02-05) * the whole document * -----	1-10	A47C1/03 A47C7/36
A	US 6 517 158 B1 (WANG CHING-CHANG) 11 February 2003 (2003-02-11) * column 3, lines 50-55; figures 1-10 * -----	10	

TECHNICAL FIELDS SEARCHED (IPC)

A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 November 2005	Vollering, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 01 3127

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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08-11-2005

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