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(54) Suspension assembly for curtains and the like

(57) An assembly of a curtain rail and a number of curtain suspension elements, wherein the rail defines a slot and the suspension elements are each in a first position in the slot suspended from the rail and are displaceable in the longitudinal direction thereof, whilst each suspension element can be brought into a second position wherein it is removable from the rail via the slot, regardless of the position of the suspension element relative to the ends of the rail and/or the position relative to other suspension elements, if any.

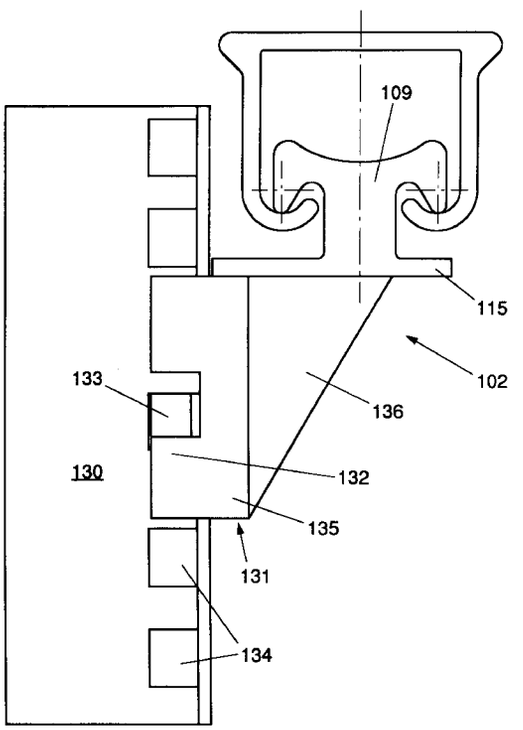

FIG. 4

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Description

The invention relates to an assembly of a curtain rail and a number of curtain suspension elements, wherein the rail defines a slot and the suspension elements are each in a first position in the slot suspended from the rail and are displaceable in the longitudinal direction thereof. Such an assembly is known from practice and is supplied by the firm of Thomas Regout B.V. at Maastricht, the Netherlands.

The known assembly comprises a rail and a series of suspension elements to be referred to as runners, from which inter alia a curtain can be suspended by means of hooks. The rail has bearing edges on both sides of the slot. The runners comprise bearing means such as projections or wheels borne in the rail on the bearing edges, with the runners extending at least partly through the slot. The runners can be slid into the rail from an open end, whereupon the curtain can be suspended. Typically, the rail is closed at both ends by means of a cap and/or the rail is fittingly mounted between two walls or the like.

This known assembly entails the drawback that the runners can be removed from the rail again only via an open end. Hence, if one of the runners no longer functions properly, for instance because of wear or breakage, or if a runner is positioned wrongly or fitted redundantly, all other runners located on one side of the relevant runner should be removed from the rail before the relevant runner can be removed and, if necessary, replaced. The same applies if a curtain is replaced by a curtain having fewer hooks. In most cases, this moreover means that before the runners can be removed, the entire rail should be detached so as to release at least one of the ends of the rail. This means that with the known assembly, replacement or removal of a runner is time-consuming and therefore costly, and that it moreover involves the risk of damage to the surroundings and to the assembly.

The object of the invention is to provide an assembly of the type described in the opening paragraph, wherein the drawbacks mentioned are avoided.

To that end, an assembly according to the invention is characterized by the features of claim 1.

An assembly according to the invention offers the advantage that each suspension element can be brought into two different positions, and the suspension element can in the second position be removed from the rail via the slot, while the suspension element is in the first position borne by the rail. Because the suspension element can be removed from the rail via the slot, a suspension element can for instance be removed in a central part of the rail without requiring that other suspension elements on both sides thereof should first be removed, if any, and/or that the suspension element should first be slid to an end of the rail which is to be released. Consequently, the removal of the suspension element can be carried out quickly and without damages.

In an advantageous embodiment, an assembly according to the invention is characterized by the features of claim 2.

Because each suspension element is placeable in the rail independently of the position thereof relative to the rail and/or other suspension elements, if any, an adjustment of the number of suspension elements or replacement thereof can be carried out in a particularly simple and safe manner.

In further elaboration, an assembly according to the invention is characterized by the features of claim 3.

In this embodiment, the suspension element is brought from the first into the second position and vice versa through rotation. In this connection, the axis of rotation is substantially at right angles to the direction of displacement, as a result of which the change of position can be realized in a simple manner. If the axis of rotation is moreover approximately at right angles to the plane of the slot, the forces exerted on the rail during rotating are readily taken up by the rail, and during normal use, i.e. when a curtain is being slid open or to, each suspension element will always stay in the first position.

In a first preferred embodiment, an assembly according to the invention is characterized by the features of claims 4 and 5.

In this embodiment, the suspension element in the first position hangs in the rail on both sides of the slot by the parts of the bearing part which extend outside the body part. Because neither in the first position, nor in the second position, the body part is wider than the slot, it is in both positions clear of the edges of the slot. This renders the suspension element slidable in the slot in both positions. As the bearing part in the second position has a smaller width than the slot, the bearing part in the second position of the suspension element can be moved through the slot, permitting the suspension element to be placed into and taken out of the rail.

Because the body part in the third position has a larger width than the slot, the rail clamps the suspension element in the third position. Consequently, in order to rotate the suspension element into and beyond that third position, a relatively great force is required, greater than the force required for displacing the suspension element. Thus, in this embodiment, the suspension element is in an optimum manner prevented from moving unintentionally from the first into the second position and vice versa.

In a further preferred embodiment, the assembly according to the invention is characterized by the features of claims 7, 8 and 9.

The curled longitudinal edges of the U-shaped rail section have the advantage of increasing the stiffness of the rail. Because the suspension elements, and in particular the wing parts, are substantially undeformable and hence always retain the same form both during placing and during normal use, a relatively great load of the suspension elements is possible. Moreover, the operative position of the suspension elements is une-

quivocally defined, in particular by the spherical bearing projections which are received within the troughed, curled longitudinal edges. This renders rotation of the suspension element from the first position in the direction of the second position even more difficult. As the bearing projections are slightly spherical, the suspension element can swing slightly within the slot, about an axis extending transversely to the direction of displacement. Consequently, when a curtain suspended therefrom is slid open and to, the power transmission to the suspension element is favorable, so that the assembly can be operated smoothly.

The rail is preferably manufactured by extrusion, in particular from aluminum, because this at least yields good running properties with a dimensionally stable rail which can be bent in a relatively simple manner. The suspension element is preferably manufactured from plastic, through injection molding. Such a suspension element is, inter alia, particularly simple and cheap in production, is dimensionally stable, provides a good freedom of design, and has excellent operating characteristics.

In an advantageous, alternative embodiment, the assembly according to the invention is characterized by the features of claim 14.

Typically, by means of a detent element comprising a hook, sew-in hooks are hung in an eye of the suspension element, while for each suspension element a strip is sewn in a pleat of the curtain to be hung. Such a sew-in hook is for instance known from Dutch laid-open application 75.07991. Consequently, when such a known sew-in hook is used for hanging curtains, apart from the suspension element at least two additional components are in each case required, viz. the strip and the detent element. This involves extra costs, both for material and in the production, fixing, and maintenance. Through the formation of a fixed connection between the strip and the suspension element, i.e. without the interposition of an eye and a suspension hook, the number of components is reduced by at least one, and possibly even two, so that the above-mentioned drawbacks of the known sew-in hooks are avoided.

In a first further embodiment, this assembly is characterized by the features of claim 15.

In this embodiment, the suspension element and the strip form one integrated component.

In a second further embodiment, this assembly is characterized by the features of claims 16 and 17.

By fixedly connecting a detent element to the suspension element and fitting the strip therein or thereto in a displaceable manner, at each point of suspension of a curtain only two components will suffice, whilst the suspension height of the curtain is adjustable at each point of suspension. Moreover, the strip preferably remains removable from the suspension element, allowing a curtain having strips that are sewn in or attached otherwise to be cleaned, or treated otherwise, separately from the suspension elements. Moreover, in this manner, a mechanical processing of the strips during the production of the curtains can be realized in a particularly simple manner.

The invention moreover relates to a suspension element for use with an assembly according to the invention.

To explain the invention, an exemplary embodiment of an assembly will be described hereinafter, with reference to the accompanying drawings. In these drawings:

Fig. 1 is a bottom view of a portion of a rail containing three suspension elements in different positions, cut through according to the line I-I in Fig. 2;
Fig. 2 shows in cross section an assembly of a rail and a suspension element according to the line II-II in Fig. 1;
Fig. 3 is a side elevation of a suspension element; and
Fig. 4 is a side elevation of an alternative embodiment of a suspension element in cross section.

Fig. 1 shows in bottom view a portion of a rail 1 containing a series of suspension elements 2. As appears in particular from the section shown in Fig. 2, the rail 1 has a substantially U-shaped section, defined by a base body 3 and two legs 4. The free longitudinal edges 5 of the legs 4 are flanged over inwards and form troughed bearing edges 7 on both sides of the slot 6. The free longitudinal edges 5 are rounded. As a matter of fact, the rail 1 may also have differently shaped bearing edges.

In principle, the rail 1 is mounted in the position shown in Fig. 2, so that the slot 6 is located at the lower end. In Fig. 2, the suspension element 2 is shown in its operative position, to be referred to as the first position. For simplicity's sake, hereinafter a vertical position of the suspension elements is started from. Accordingly, the thickness of the suspension elements is defined as lying in the longitudinal direction of the rail 1, the height as lying in the vertical direction and the width as lying horizontally, transversely to the direction of displacement V.

Each suspension element 2, shown in more detail in Fig. 3, consists of a body part 8, a bearing part 9 connected thereto at the top end, and a bearing eye 10 connected to the body part 8 at the bottom end thereof. The body part 8 has an approximately square section, having a thickness and width A slightly smaller than the width B of the slot 6. On the other hand, the diagonal dimension C is slightly greater than the width B of the slot 6.

At a first side and an opposite second side of the body part 8, the bearing part 9 comprises a wing part 11 extending outside the body part 8. Spaced from the body part 8, each wing part 11 comprises a bearing projection 12 which extends in the direction of the bearing eye 10 and has such dimensions that the two bearing projections 12 can simultaneously be received in the troughed bearing edges 7. Each bearing projection 12 has a surface 13 which is slightly spherical in at least

two directions, and connects to the body part 8 via a concave part 14. The width of the bearing part 9 is slightly less than the intermediate distance of the legs 4, while the thickness of the bearing part 9 substantially corresponds to the thickness of the body part 8. The top face 19 of the bearing part 9 is substantially concave and the height of the bearing part 9 is at least slightly less than the distance between the free longi-tudinal edge 5 and the base body 3.

The bearing eye 10 consists of a base plate 15 which abuts against the body part 8 and has at least a width approximately corresponding to the width of the bearing part 9. The base plate 15 preferably extends outside the body part 8 on all sides. Included between each bearing projection 12 and the base plate 15 is a space 20 into which the bearing edge 7 can be slid with clearance. Viewed in side elevation (Fig. 3), the base body 15 has a surface 21 having a flat center part 22 and two downwardly bevelled longitudinal edges 23. Accordingly, the intermediate distance between the projections 12 and the base body 15 is minimal at the center and maximal ajacent the outer sides. As a matter of fact, this surface can of course also be bent or have more facet faces, or be flat.

At the side facing away from the body part 8, two parallel extending sidewalls 16 are provided, connected at the bottom side by a cross bar 17. The base plate 15, the sidewalls 16 and the cross bar 17 together include a continuous opening 18 extending in a direction transverse to the direction of displacement V. The intermediate distance between the sidewalls 16 is in the order of magnitude of the thickness A of the body part 8, the height of the sidewalls is preferably greater. The opening 18 is of such dimensions that a curtain hook can be readily attached thereto in the usual manner. The sidewalls 16 of the bearing eye 10 are provided at one side of the center of the body part 8 and the base plate 15 and taper off slightly to the bottom. In addition, the sidewalls 16 include an angle with the vertical plane in such a manner that the cross bar 17 is located approximately right below one of the projections 12.

An assembly according to the invention can be used as follows.

In the usual manner, a rail 1 is fastened to for instance a ceiling by means of suspension brackets, and the ends can for instance abut against sidewalls or casings. The rail can be straight as well as bent. A suspension element 2 is gripped by the bearing eye 10 and inserted with the bearing part 9 into the slot 6. The suspension element is held in the second position II, as shown in Fig. 1, the right-most position. The suspension element is moved upwards far enough for the bearing projections 12 to be located above the free longitudinal edges 5, with the base plate 15 approximately abutting against the rail 1. Next, the suspension element is rotated about a vertical axis, towards a central position, as shown in Fig. 1, middle position. In this central position, the suspension element is slightly clamped in the slot 6, the body part 8 being slightly compressed or at least elastically deformed. The suspension element 2 is further rotated into the first position I, rotated approximately 90° relative to the second position II. In the first position I, shown in Fig. 1 as the leftmost position, the bearing projections 12 are received in the bearing edges 7 and the suspension element drops slightly. As the bearing projections 12 are received in the bearing edges 7, unintended rotation of the suspension elements 2 is prevented. Should a suspension element 2 rotate all the same, then the diagonal dimension C prevents rotation beyond the central position, so that the suspension element 2 cannot accidentally come off the rail 1. In the first position I, a curtain can be suspended from the bearing eye 10 in the usual manner.

After an appropriate number of suspension elements 2 have been fitted in the curtain rail 1 and the curtain has been suspended therefrom, the curtain can be slid open and to by sliding the suspension elements. By pulling the curtain, the suspension element 2 tilts about the bearing projections maximally until one longitudinal edge 23 of the base plate 15 abuts against the rail. Because the suspension element can tilt, an ideal force transmission is obtained, as a result of which the suspension elements keep sliding smoothly and, moreover, less wear occurs.

Fig. 4 shows a cross section of a suspension assembly according to the invention, wherein the suspension element 102 is integrated with a generally known sew-in strip 130. For that purpose, the suspension element 102, which as far as the bearing part 109 is concerned substantially corresponds to the embodiment shown and described hereinabove, comprises a detent element 131 fixedly connected thereto, instead of the bearing eye 10. The detent element 131 comprises two wall parts 132 which extend parallel to each other and at right angles to the base plate 115 and which are connected to the base plate 115 via a connecting wall 135 and a corner plate 136. From each wall part 132, at least one resilient finger 133 extends in the direction of the opposite wall part 132 and inclined in the direction of the bearing part 109. Between the wall parts 132, the sew-in strip 130 is fittingly slidably included. The sew-in strip 130 is provided with a series of recesses 134 located one above the other, into which the fingers 133 can slip. Accordingly, the sew-in strip 130 is slidable in upward direction only (i.e. in the direction of the base plate 115) and is in opposite direction borne by the fingers 133 between the wall parts 132.

The embodiment according to Fig. 4 can be used as follows.

The sew-in strip 130, which may or may not be included in the detent element 131, is sewn in a pleat of a curtain. Then, the bearing part 109 is fitted into a rail 1 in the manner described hereinabove. After that, the height of the curtain above for instance a floor surface is set through displacement of the sew-in strip 130 relative to the detent element 131.

The sew-in strip 130 and the detent element 131 can be designed in any desired and suitabe, mating

form. Moreover, the sew-in strip can be replaced by a different connecting element. Further, the sew-in strip or a like connecting element can be fixedly connected to the bearing part 109. The advantage of this embodiment is that the curtain is connected to the suspension element 102 in an unequivocal manner and that no separate intermediate parts are required, as is conventional with the known sew-in hooks.

If a wrong number of suspension elements is present in the rail, for instance because a different curtain is to be hung, a suspension element 2 can be removed by reversing the above-described positioning steps, or a suspension element can be added in the above-described manner. Because the suspension elements are removable and placeable via the slot, the other suspension elements need not be removed from the rail, so that the adjustment of the number of suspension elements takes only little time. As a matter of fact, the suspension elements can of course also be removed or inserted in the conventional manner via a free and open end of the rail. For such a manner of placing, a series of suspension elements 2 may be interconnected, at the side located adjacent the cross bar 17, by a connecting strip which can be broken off. This allows the series to be fitted at once, whereupon the strip is withdrawn and the suspension elements can be moved freely and independently of one another.

As the suspension element is in the first position I supportingly suspended in the rail and can in the second position II be placed and removed without involving a change of the shape of the suspension element, it is possible to use an element which is particularly simple in production and use. After all, neither the suspension element nor the rail needs to comprise moving parts. This moreover yields the advantage that the suspension element is robust and no fatigue of moving parts occurs, for instance in the case of changing loads.

Through injection molding, the suspension element can be manufactured in one piece from plastic in a cheap manner. Such a suspension element has optimum sliding properties, the more so because the bearing projections provide a small contact surface. The rail is preferably manufactured through extrusion from aluminum, but may also be manufactured from steel or plastic, for instance from strip steel, and may moreover be manufactured in a different manner, for instance through welding or folding. As the cross bar 17 of the bearing eye 10 is offset relative to the center of the suspension element, a so-called projecting bearing eye 10 is obtained. This has the advantage that the curtain can be suspended substantially in front of the front side of the rail, so that a better finish is obtained.

The invention is by no means limited to the embodiments as described and shown in the drawings. Many modifications thereof are possible. For instance, instead of the wing parts and bearing projections, wheels may be provided having a diameter not larger than the width of the slot. It is true that this in principle increases the cost price of the suspension elements, but when the occasion arises, the running properties of the suspension elements are improved, in particular with relatively heavy curtains. Further, the bearing projections and/or the base plate may be formed differently and the body part may have a different section, for instance round. Accordingly, the clamping action in the central position is lost, but damage upon repeated insertion and removal is prevented in an efficient manner. Further, the rail may have a section other than U-shaped. Moroever, the bearing eye may be formed and/or positioned differently. For instance, the bearing eye may extend approximately horizontally in such a manner that the cross bar extends next to the rail, or the cross bar may extend practically in the slot or within the rail. Moreover, instead of the bearing eye, a suspension hook may be fitted in the body part, from which a curtain with a pleat can be suspended directly. These and similar modifications are understood to fall within the purview of the invention.

Claims

1. An assembly of a curtain rail and a number of curtain suspension elements, wherein the rail defines a slot and the suspension elements are each in a first position in the slot suspended from the rail and are displaceable in the longitudinal direction thereof, **characterized in that** each suspension element can be brought into a second position wherein it is removable from the rail via the slot, regardless of the position of the suspension element relative to the ends of the rail and/or the position relative to other suspension elements, if any.

2. An assembly according to claim 1, characterized in that each suspension element is in the second position placeable into the rail via the slot, regardless of the position of the suspension element relative to the ends of the rail and/or the position relative to other suspension elements, if any.

3. An assembly according to claim 1 or 2, characterized in that each suspension element can at least be brought from the second position into the first position through rotation of the suspension element about an axis extending approximately perpendicularly to the direction of displacement of the suspension element and preferably approximately perpendicularly to the plane of the slot.

4. An assembly according to any one of the preceding claims, characterized in that each suspension element in the first position extends through the slot by a body part, whilst at least at the top side of the body part a bearing part is included which is in a first direction wider than the slot and which is in a second direction, at right angles to the first direction, narrower than the slot, the first and the second direction extending approximately parallel to the plane of the slot, whilst the dimensions of the body

part in the first and the second direction are smaller than the width of the slot.

5. An assembly according to claim 4, characterized in that in a third direction included between the first and the second direction and lying in the plane defined thereby, the body part has a dimension larger than the width of the slot, the arrangement being such that during rotation of the suspension element in the slot from the second to the first position and vice versa, the body part and/or the slot are slightly elastically deformed.

6. An assembly according to any one of the preceding claims, characterized in that each suspension element is slidably displaceable within the rail.

7. An assembly according to any one of claims 4-6, characterized in that the rail has a substantially U-shaped cross section, the free longitudinal edges of the rail being curled inwards to form bearing edges which define the slot, whilst when the suspension element is in the first position, the bearing part abuts against the inner and/or top side of the troughed bearing edges.

8. An assembly according to any one of claims 4-7, characterized in that the bearing part comprises at least two wing parts extending on two sides of the body part, said wing parts being stiffly and, during normal use, undeformably connected to the body part, the arrangement being such that during the positioning of the suspension element in the rail and in the first and second positions, the wing parts have in each case approximately the same shape and position relative to the body part.

9. An assembly according to claim 8, characterized in that spaced from the body part, the side of each wing part which, during use, faces the plane of the slot, comprises a slightly spherical bearing projection which in the first position at least partly abuts against the rail, the arrangement being such that the suspension element in the first position within the rail can swing slightly about the bearing projections.

10. An assembly according to any one of the preceding claims, characterized in that the rail is formed by extrusion, in particular from aluminum.

11. An assembly according to any one of the preceding claims, characterized in that each suspension element is manufactured through injection molding, preferably in one piece from plastic.

12. An assembly according to claim 11, characterized in that a series of suspension elements, after being manufactured, are connected by a strip which extends adjacent a bottom side of the suspension elements and which can be torn loose, the arrangement being such that on the one hand, the series of suspension elements can at once be placed into the rail from one side thereof, whereupon the strip can be removed, and on the other hand, the suspension elements are individually removable and placeable.

13. An assembly according to any one of claims 4-12, characterized in that adjacent the end facing away from the bearing part, the suspension element comprises a suspension eye which is offset relative to a center longitudinal plane of the suspension element, in such a manner that it is located next to the center of the rail at least by a bearing part thereof.

14. An assembly according to any one of claims 1-12, characterized in that the assembly comprises a number of strips to be attached to or in a curtain, the or each suspension element being connected to a strip so as to create a direct coupling between the strip and the suspension element.

15. An assembly according to claim 14, characterized in that the strip is fixedly connected to the suspension element.

16. An assembly according to claim 14, characterized in that the or each suspension element comprises a detent element which is fixedly connected thereto and wherein or whereto a strip can be adjustably attached.

17. An assembly according to claim 16, characterized in that the strip is slidable in or on the detent element from one side, whilst in the opposite direction the strip is borne by the detent element.

18. A suspension element for use in an assembly according to any one of the preceding claims.

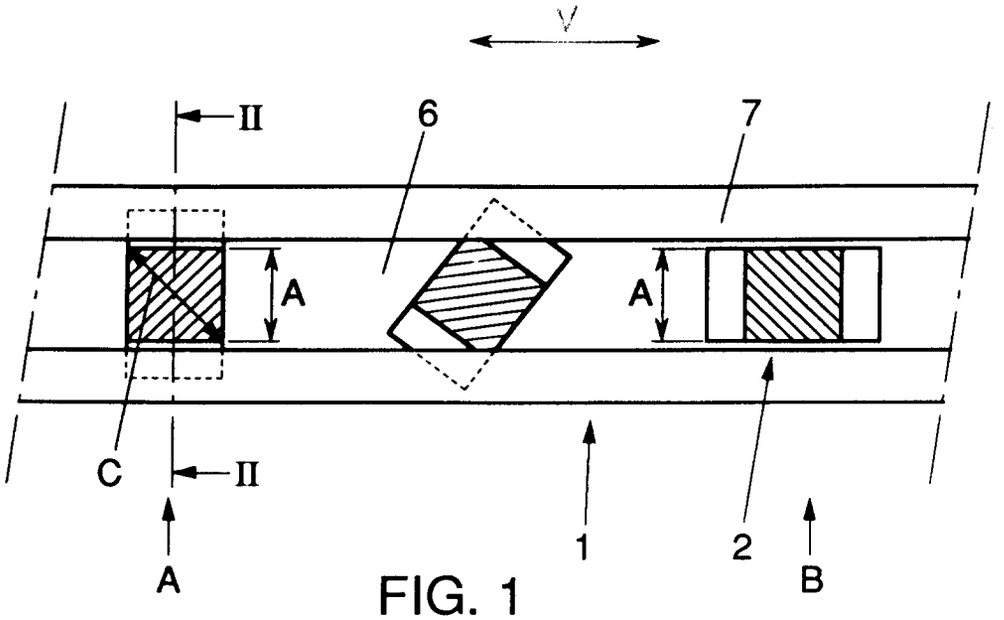

FIG. 1

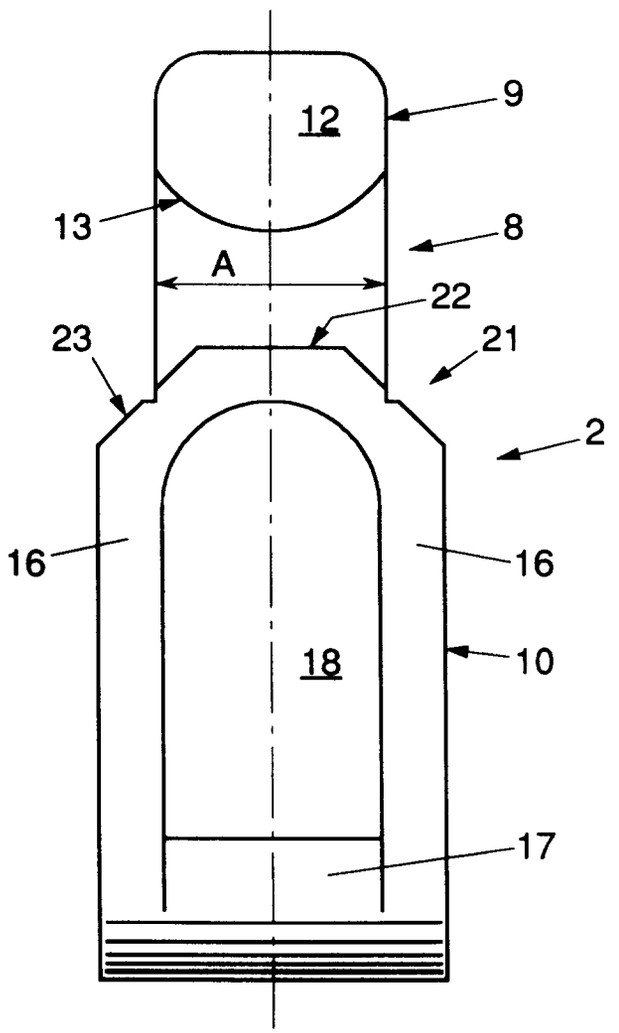

FIG. 3

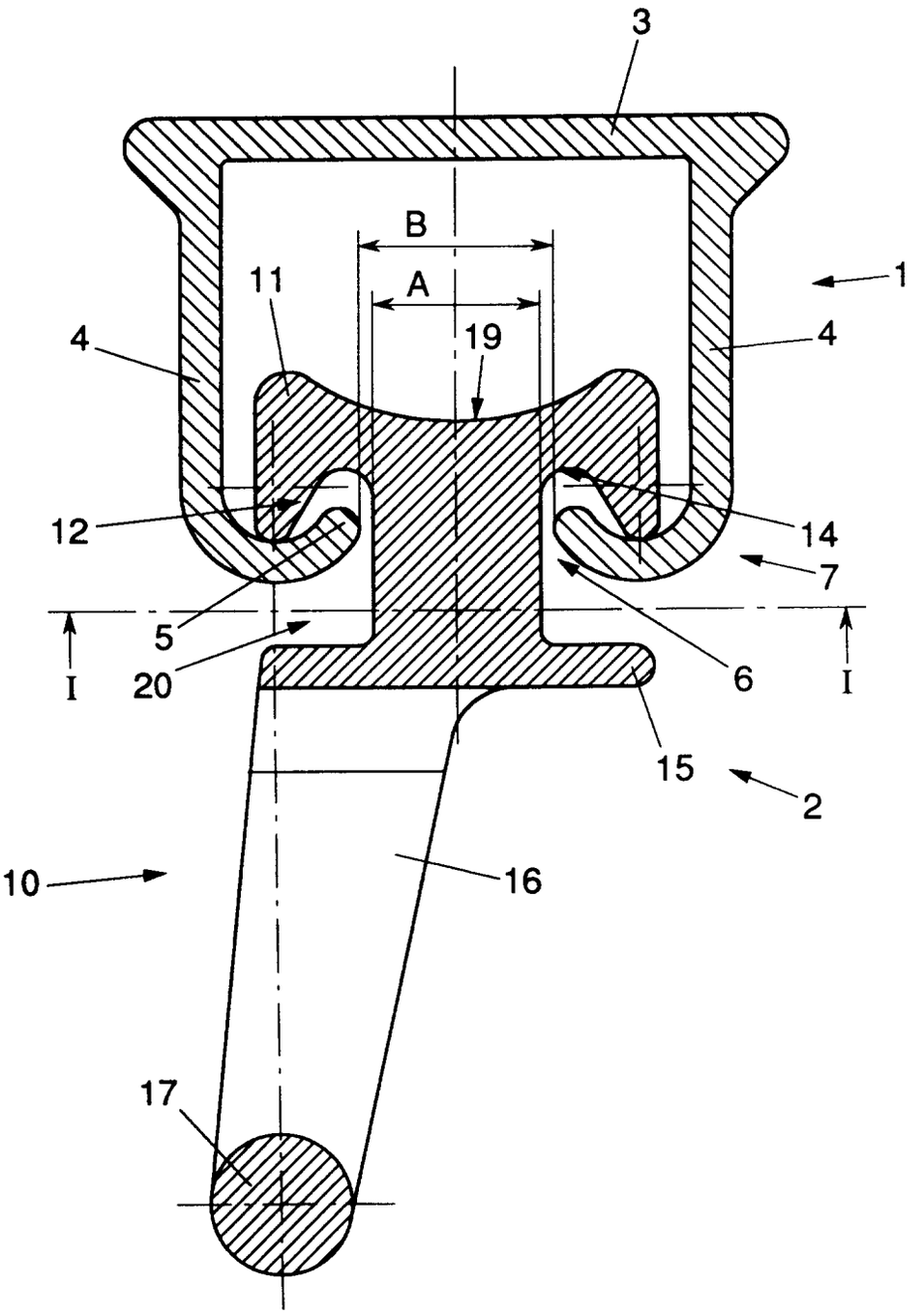

FIG. 2

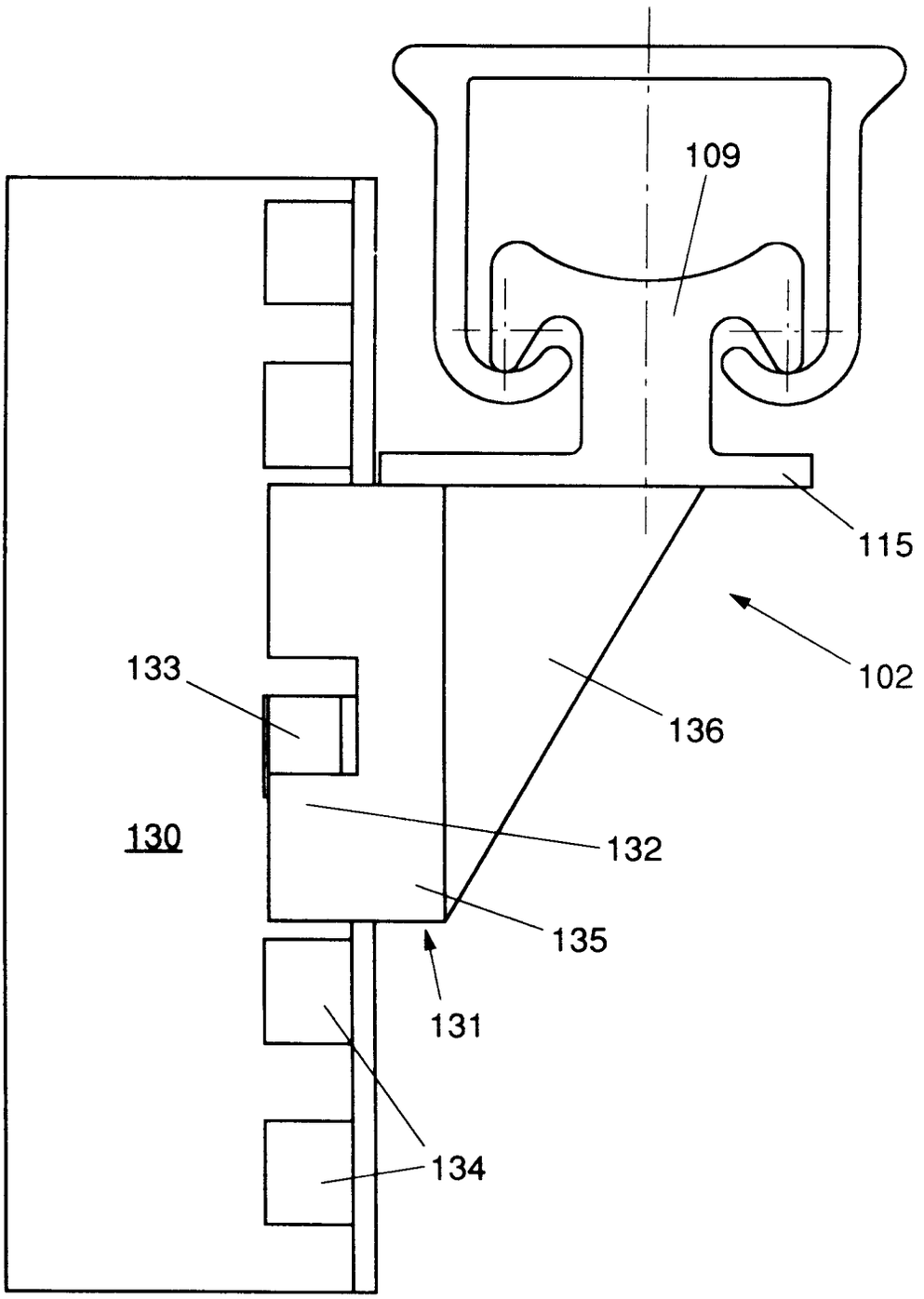

FIG. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 20 0149

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.6)
X	CH-A-681 953 (STAUFFACHER) 30 June 1993	1-4,6,8, 18	A47H15/04
Y	* column 3, line 43 - column 4, line 6; figures 7-9 *	7,9-14	
Y	NL-A-9 200 489 (BOSGOED GROOTHANDEL) 18 October 1993 * page 4, line 21 - page 5, line 7; figure 2 *	7,9-11	
Y	EP-A-0 619 971 (FOREST GROUP NEDERLAND) 19 October 1994	12-14	
A	* the whole document *	15-17	
X	CH-A-681 852 (ERWIN FLURY) 15 June 1993 * the whole document *	1-6,11, 18	
A	US-A-5 170 531 (RYAN) 15 December 1992		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A47H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 April 1996	Vrugt, S

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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