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(54) Pull up curtain and suspension system for use in such a curtain.

(57) A curtain comprising a beam (1), a pulley-block unit (2) fixed to the beam (1), cords (3, 4) extending downward from the pulley-block unit (2), a web (5) fixedly suspended from the beam (1) in front of the pulley-block unit (2) and provided with a hole (6). An end (7, 8) of the cords (3, 4) extends from the pulley-block unit (2) through the hole (6) in the web (5). A cover (11) is positioned in front of the hole (6) in the web (5), rigidly attached relative to the pulley-block unit (2) and provided with at least one passage (12, 13) guiding the cords (3, 4).

Any loads exerted onto the boundaries of the passage are directly passed to a rigid structure behind the web, so each cord is reliably guided through the hole in the web material without exerting any forces on the web material itself.

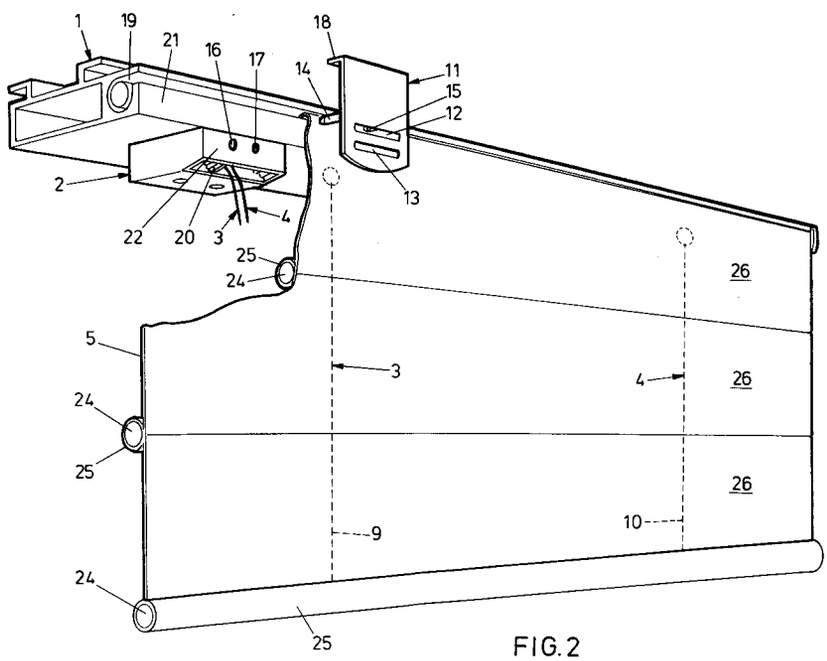

FIG.2

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The invention relates to a pull up curtain according to the introductory part of claim 1.

Pull up curtains of this type are known from practice with webs of different materials, such a woven tissue, non-woven sheets or layered compositions thereof. The web is fixedly suspended and can generally be pulled up by pulling an end of the cords to be operated extending from the pulley-block unit through the hole in the web. The lower end of the web is then pulled up by the opposite end of the cords attached to the web adjacent that lower end. For letting down the web, the cords are operated reversely, i.e. veered out. In pulled up condition, the web material is fan folded, plied into vertically staggered U-shaped plies between subsequent horizontal profiles or randomly tucked up between guide cords or otherwise contracted adjacent the beam. It is also conceivable to roll up the web from the bottom.

To optimize the appearance of the curtain as seen from the inside of the window in front of which it is suspended, the web material is generally suspended from the inner side of the beam and particularly from the top or adjacent the top of the inner lateral side of the beam, so also the beam is hidden behind the web material when seen from the inside. From the outside, the beam is generally not visible anyway, because seen from outside is generally hidden behind the window-frame. In view of aesthetical considerations also the pulley-block unit, which generally incorporates stopping means is also positioned at the outside of the web.

The pulley-block unit being located at the outside of the web, the cords to be operated for pulling up the web are suspended at the outside of the web, i.e. behind the web when seen from the inside. This would make pulling up and letting down the web cumbersome, because one usually carries out these operations from the inside of the web. To avoid this problem, the web of the known curtain is provided with an eyelet adjacent the pulley-block unit, though which eyelet the cords are guided. However, also this solutions entails a number of problems.

Firstly, manufacturing of the curtain is complicated by the need to provide an eyelet in the web in a proper position relative to the diver means behind the web.

Secondly, regardless of the position of the eyelet, there is only a limited scope of directions in which the cords can be pulled without engaging the eyelet, causing friction, wear of the cords and the eyelet and deformation of the web material adjacent the eyelet. This is particularly disadvantageous if the pulley-block unit incorporates stopping means which retain the cords against release lowering the web if the cords are tensioned in one direction and release the cords when these are tensioned in another direction.

Thirdly, the eyelets tend to become dislodged from the web easily, after which the web material adjacent the hole quickly becomes unsightly.

It is an object of the invention to provide a curtain in which the cord or the cords for pulling up and letting down the web material are lead from behind the web material to the front of the web material, but which is easier to manufacture in a good quality and in which the risk of damage to the web material is substantially reduced.

According to the present invention, this object is achieved by providing a curtain of the initially identified type with the characterizing features of claim 1.

Since the cover in front of the hole in the web is rigidly positioned relative to the pulley-block unit and provided with at least one passage guiding the cord means, any loads exerted onto the boundaries of the passage are directly passed to a rigid structure behind the web, so each cord is reliably guided through the hole in the web material without exerting any forces on the web material itself. The cover with the passage can relatively easily be positioned relative to the pulley-block unit, since the cover is fixed directly to the rigid structure behind the web. Furthermore, the cover can be dimensioned to cover a relatively large area, so the hole of the web material can be relatively large without appearing visibly. Moreover, the mounted cover can be used as a jig for determining the position and the shape of the hole in the web material.

The invention can also be embodied in a suspension structure according to claim 13, which is specifically adapted for use in a curtain according to the invention.

Particular embodiments of the invention are set out in the dependent claims.

Below, embodiments of the invention are described in more detail with reference to the accompanying drawings, in which:

Fig. 1 is a schematic perspective view of a pull up curtain according to the invention,

Fig. 2 is a schematic perspective, exploded and cut-away view of the pull up curtain shown in Fig. 1, and

Fig. 3 is a side view in cross-section of the pull up curtain shown in Figs. 1 and 2,

Fig. 4 is a side view in cross-section of another pull up curtain according to the invention,

Fig. 5 is a composite side view in cross-section partially along the line V-V and partially along the line Va-Va in Fig. 6 of a suspension system for yet another pull up curtain according to the invention, and

Fig. 6 is a frontal view of the suspension system according to Fig. 5.

In the drawings, corresponding parts of different embodiments are designated by mutually identical reference numerals.

The invention is first described with reference to the pull up curtain shown in Figs. 1-3. The main components of the pull up curtain shown in Figs. 1-3 are a beam 1, a pulley-block unit 2 fixed to the beam 1 and a web 5 fixedly suspended from the beam 1 along the front of the pulley-block unit 2 which is to face indoors. The web 5 is provided with a hole 6 adjacent the pulley-block unit 2. The material of the web 5 is flexible and may for example be sheet material, woven or other textile material or a layered composition of such materials. Cords 3, 4 extend through the pulley-block unit 2 from a horizontal direction essentially parallel to the beam 1 and extend downward from the pulley-block unit 2. The downward extending ends 7, 8 of the cords 3, 4, which can be operated to pull up and let down the web 5, extend from the pulley-block unit 2 through the hole 6 in the web 5. Opposite ends 9, 10 of the cords 3, 4 are attached to the web 5 adjacent a lower end of the web 5 so that the lower end of the web 5 is pulled up and let down if the ends 7, 8 of the cords 3, 4 extending downward from the pulley-block unit 2 are pulled respectively veered out.

The web 5 is provided with horizontal rods 24 enclosed in loops 25 of the web material. When the web 5 is pulled up, panels 26 of the web material between subsequent rods 24 are each plied into vertically staggered, essentially U-shaped plies or loops between subsequent rods 24. Naturally, the web can also be pulled up partially.

The pulley-block unit 2 is provided with a toothed cam 20 for cleating the cords 3, 4, and thereby the lower end of the web 5, in any desired position in a manner generally known in the art.

In front of the hole 6 in the web 5, a cover 11 is rigidly positioned relative to the pulley-block unit 2 and provided with two passages 12, 13 guiding the cords 3, 4.

The cover 11 is positioned relative to the beam 1 and the pulley-block unit 2 by fastening members 14, 15 which are seated in holes 16, 17 in the pulley-block unit 2 as well as by a flange 18 extending from the cover 11 which is seated against an upper wall of a groove 19 in the beam 1.

Since the cover 11 in front of the hole 6 in the web 5 is fixedly positioned relative to the pulley-block unit 2 and provided with passages 12, 13 guiding the cords, loads exerted by the cords 3, 4 onto the boundaries of the passages 12, 13 are directly passed to the beam 1 and pulley-block unit 2 behind the web 5, so the cords 3, 4 are reliably guided relative to the hole 6 in the web 5 without exerting any forces onto the web material. The cover 11 with the passages 12, 13 can relatively easily be positioned relative to the pulley-block unit 2, since the cover 11 is fixed directly to the rigid structure behind the web 5 which structure is constituted by the beam 1 and the pulley-block unit 2. Furthermore, the cover 11 can simply be dimensioned to cover a relatively large area (e.g. including any position within 5 mm of the hole in the web), so the hole 6 of the web material can be relatively large without being visible from the indoor side of the web 5. Thus, it is not necessary to maintain tight tolerances or to achieve a particularly good finish when piercing the web 5 to create the hole 6. Moreover, the mounted cover 11 can be used as a jig for determining the position and the shape of the hole 6 in the web material.

Each one of the cords 3, 4 cord is guided through a separate passage 12, 13, so twisting of sections of the cords 3, 4 behind the cover 11 is precluded.

The passages 12, 13 each have an elongate shape with an essentially uniform width. This allows the angle of the cords 3, 4 relative to the pulley-block unit 2 to be varied between an angle in which the toothed cam 20 engages the cords and an angle in which the cords are not engaged by the toothed cam 20 and can be veered out. The elongate shape of the passages 12, 13 can also be advantageous in combination with other stopping systems which are operated by varying the angle of the end of the cord end extending from the curtain.

Since the elongate passage 12, 13 are positioned closely to each other in a mutually parallel configuration, the cover 11 accommodating the passages can be of a compact design.

A suspension system to be used in a curtain according to the present invention may be supplied without web material to lofts and workshops as a base component for manufacturing a curtain according to the invention. The suspension system incorporated in the curtain shown in Figs. 1-3 is constituted by the beam 1 adapted for suspending the web 5 in a plane extending along a lateral face 21 of the beam and the pulley-block unit 2 connected to the beam 1. A divert pulley 23 is rotatably suspended in the pulley-block unit 2 for guiding a cord from a direction essentially transverse to the beam 1 to a direction essentially parallel to and preferably within the beam 1. The pulley-block unit 2 is further provided with a mounting face 22 facing in the same direction as the lateral plane 21 of the beam 1. The cover 11 is adapted to be mounted to the mounting face 21 and the passages 12, 13 are positioned such that, if the cover 11 is in mounted position as shown in Figs. 1 and 3, the passages 12, 13 are closely in front of and below the pulley 23.

Since the pins 14, 15 and the holes 16, 17 provide attachment of the cover 11 to the pulley-block unit 2, the lateral position of the cover 11 is automatically determined when the cover 11 is mounted.

When the cover 11 is mounted, the web 5 is sandwiched between the cover 11 and the beam 1. Thus it is ascertained that the web 5 extends directly behind the cover 11, so the hole 6 of the web 5 is not visible, also if one is looking at a small angle relative to the plane in which the web 5 extends.

The pins 14, 15 for fixing the cover 11 relative to the beam 1 and the pulley-block unit 2 each extending from the cover 11 through a perforation in the web 5. This enables to support the cover 11 closely to the hole 6 in the web 5 to provide a stable positioning of the cover 11 in the area of the passages 12, 13, also if the hole 6 is located at a substantial distance from the upper end of the web 5.

The pin-shaped fastening members 14, 15 are integrally attached to the cover 11. Thus there are no heads of the fastening members 14, 15 which are visible when the cover 11 is mounted. This contributes to the attractive appearance of the cover and avoids the need to provide an additional layer over the cover, such a sticker, to keep fastening members out of sight.

In Fig. 4, an alternative embodiment of a curtain according to the invention is shown which is provided of which the fastening members 14 are provided with snapping members 26 for reliably retaining the fastening members .14 in mounted position.

The curtain shown in Fig. 4 is further provided with a second cover 27 at the side of the web 5 to be facing outdoors and opposite the cover 11. A part of the web material is sandwiched between these covers 11, 27. The second cover is provided with a passage 28 which is positioned and dimensioned such that it is contiguous with the passages 12, 13 in the cover 11 mounted to the side of the web 5 to be facing indoors. The cover 27 provided at the side of the web 5 facing outdoors covers the hole 6 in the web 5 from the outside, so the edges of this hole, which may be crudely cut are also not visible from outdoors if the area of the web 5 including the hole 6 is not hidden behind a window-frame.

In Figs. 5 and 6, a suspension system is shown, which represents the presently most preferred embodiment of the invention. By mounting a curtain and cords in essentially the same manner as shown in Figs. 1-3, the suspension system can be completed into a curtain according to a most preferred embodiment of the invention.

In the device shown in Figs. 5 and 6, the cover is provided with a single passage 12 for the cords, which facilitates assembly into a complete curtain, since all cords can simply be threaded through the same passage 12. If a plurality of cords is passed through the passage 12 and the cords are mutually positioned in a given sequence in longitudinal direction of the passage 12, in practice cords will not easily change places in longitudinal direction of the passage 12, since the passage 12 is so narrow in transverse direction that suitably dimensioned cords threaded through the passage 12 cannot pass each other easily.

A rim 29 facing away from the cover 11 is provided in a side of the beam 1 which faces upward when the beam is in its operative position. Furthermore, a hook member 30 is provided which extends transversely from the cover 11 and engages the rim 29. The hook member 30 engaging the rim 29 securely holds the upper end of the cover 11 positioned against the beam 1 and provide additional support against rotation of the cover 11 in the plane in which it extends.

The fastening pins 14, 15, which are to extends through perforations in the web, fit tightly into the bores 16 in the pulley-block unit 2 to rigidly retain the cover 11 in position closely adjacent the passage 12 therein. The pins of the cover 11 of this embodiment of the invention are also integrally attached to the cover 11. Preferably the cover 11 including the hook member 30 and the pins 16, 17 are injection moulded as a single piece.

The pulley-block unit 2 of the suspension system shown in Figs. 5 and 6 comprises an upper pulley 23 for diverting cords ends extending within the beam 1 to a direction transversely to the beam 1. From the upper pulley 23, a channel 33 extends downward to a lower pulley 31. The lower pulley 31 cooperates with the toothed cam 20 as a support member against which the cords can be clamped by the toothed cam 20, which is rotatably suspended opposite the lower pulley 31 and guided in grooves (not shown) which extend obliquely in the direction of the channel 33 towards the upper pulley 23 and towards the circumference of the lower pulley 31. If the cords have been pulled and are maintained at an angle at which the cords do not engage the toothed cam 20, the lower pulley operates as a guide pulley guiding the cords form the operated end into the channel 33. A section of the channel 33 adjacent the upper pulley 23 is curved. To keep the cords centrally within the channel 33 and relative to the pulleys 23 and 31, a cam surface 32 extends in the channel 33 at the inside of the curved section of the channel 33.

A brackets 37 are provided for attaching the beam 1 to a horizontal, downward facing surface such as a ceiling. The brackets are somewhat

flexible and comprise a hook section 34 and a clip section 35 from which an operating lip 36 extends. To attach the beam 1 to the bracket 37, first one flange of the beam 1 is hooked behind the hook section of the bracket 37. Subsequently, the beam 1 is pivoted about the hook section 34 until the clip section engages a second flange of the beam 1. The bracket 37 is to be mounted with the clip section 35 at its outdoor side. Since the plane in which the web is to be suspended is spaced indoors relative to the hook section 34 of the bracket 37, the downward forces exerted by the weight of the web are all exerted onto the hook section 34 of bracket 37 and will cause the beam 1 to pivot about a longitudinal axis extending through the hook section 34, so that the end of the beam 1 engaging the clip section 35 is urged upwards. Thus the connection formed by the clip section 35 and the flange of the beam 1 engaged thereby does not have to withstand the downward forces caused by the weight of the web material. Consequently, on the one hand, this clip connection can be designed to be relatively light and therefore easily operable, and on the other hand the risk of dislodgement of the flange of the beam 1 engaged by the clip section 36 is reduced. It is noted however, that the connection formed by the clip section 35 and the flange of the beam 1 engaged thereby does have be adapted to resist some downward force, because the forces exerted onto the cords cause result in a couple about the hook section 34 which urges the flange of the beam 1 engaged by the clip section 35 downward.

Thus the suspension system includes a combination of a mounting bracket with a hook section at one side and a clip or snapping section at the other side horizontally spaced from the hook section and a beam from which a web is suspended or to be suspended, the beam being designed so that the plane in which the web is suspended is horizontally spaced from the bracket in a direction in which the side of the bracket where the hook section is located faces. Such an arrangement can also advantageously be used for other types of curtains such as curtains which are rolled up at the top, horizontal and vertical blinds and conventional curtains which are horizontally guided along rails.

Claims

1. A pull up curtain comprising a beam (1), a pulley-block unit (2) fixed to the beam (1), cord means (3, 4) extending downward from the pulley-block unit (2), a web (5) fixedly suspended from the beam (1) in front of the pulley-block unit (2) and provided with a hole (6) adjacent the pulley-block unit (2), an end (7, 8) of the cord means (3, 4) to be operated extending from the pulley-block unit (2) through the hole (6) in the web (5) and the opposite end (9, 10) of the cord means (3, 4) being attached to the web (5) adjacent a lower end of the web (5) for pulling up and letting down the web (5) **characterized by** a cover (11) in front of the hole (6) in the web (5), rigidly attached relative to the pulley-block unit (2) and provided with at least one passage (12, 13) guiding the cord means (3, 4).

2. A curtain according to claim 1, wherein the cover (11) is attached to the pulley-block unit (2).

3. A curtain according to claim 1 or 2, wherein the web (5) is sandwiched between the cover (11) and the pulley-block unit (2) or the beam (1).

4. A curtain according to any one of the preceding claims comprising at least one fastening member (14, 15) fixing the cover (11) relative to the beam (1) and the pulley-block unit (2), the fastening member (14, 15) extending from the cover (11) through a perforation in the web (5).

5. A curtain according to claim 4, comprising at least one snapping member (26) retaining said fastening member (14, 15).

6. A curtain according to claim 4 or 5, wherein the fastening member (14, 15) is integrally attached to the cover (11).

7. A curtain according to any one of the preceding claims, comprising a rim (29) in a side of the beam (1) which faces upward when the beam is in its operative position and a hook member (30) extending transversely from the cover (11) and engaging said rim (29).

8. A curtain according to any one of the preceding claims, wherein the cover (11) covers an area of the web (5) including at least any position within 5 mm of the hole 6) in the web (5).

9. A curtain according to any one of the preceding claims comprising a plurality of passages (12, 13) and a plurality of cords (3, 4), each individual cord (3, 4) being guided through a separate passage (12, 13).

10. A curtain according to any one of the preceding claims, wherein the passage (12, 13) has an elongate shape with an essentially uniform

width.

11. A curtain according to claim 10, comprising at least two passages (12, 13) positioned closely to each other in a mutually parallel configuration.

12. A curtain according to any one of the preceding claims, comprising a second cover (27) opposite said cover (11), a part of the web (5) material being sandwiched between said covers (11, 27).

13. A suspension system for use in a curtain according to any one of the preceding claims, comprising a beam (1) adapted for suspending a web (5) in a plane, a pulley-block unit (2) connected to said beam (1) for diverting a cord (3, 4) from a direction transverse to said beam (1) to a direction extending in longitudinal direction of said beam (1), a mounting face (22) facing said plane, a cover (11) adapted to be mounted to said mounting face (22) and provided with a passage (12, 13) positioned in such a position, that if the cover (11) is in mounted position, the passage (12, 13) is closely in front of said pulley-block unit (2).

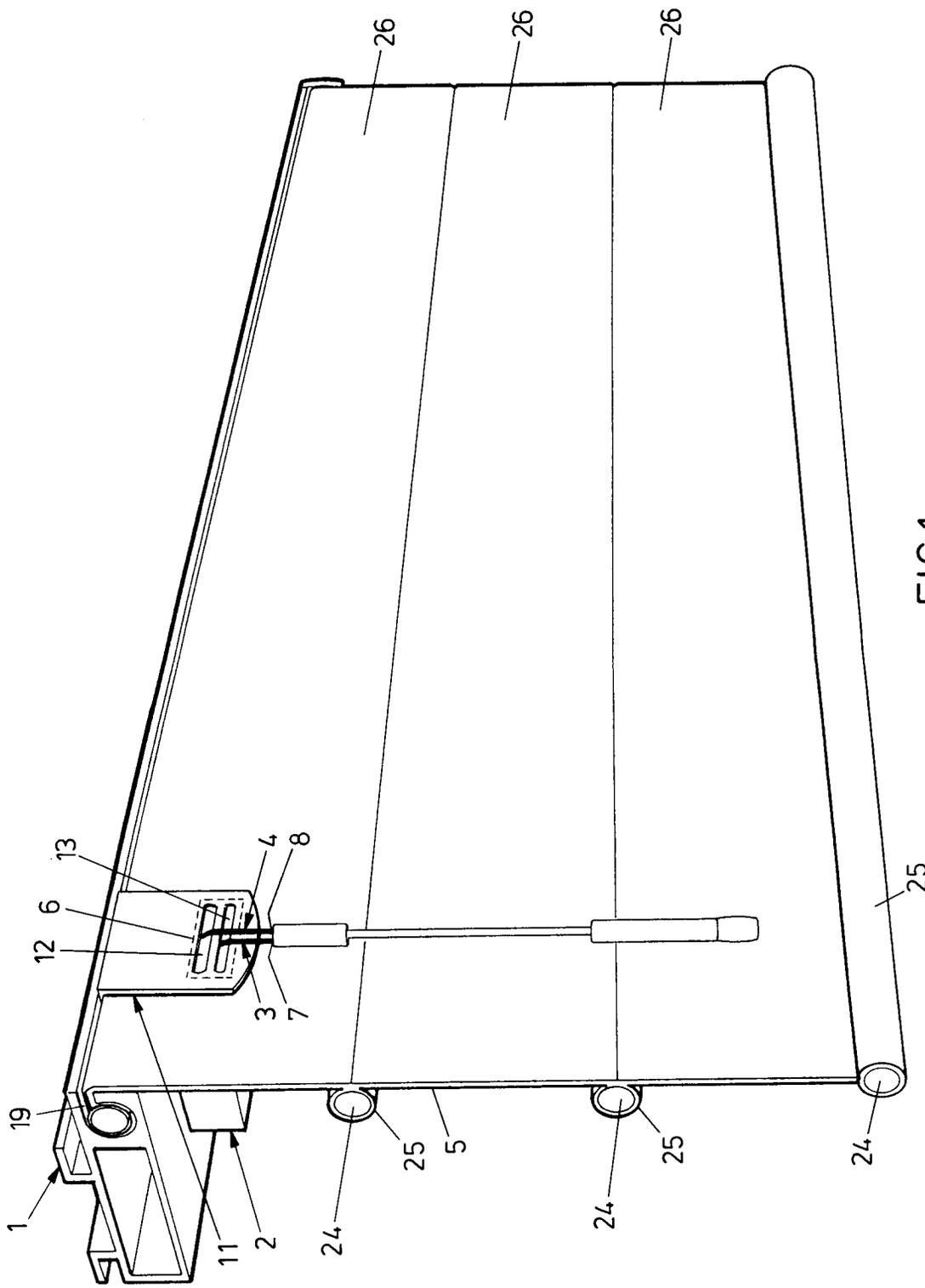

FIG.1

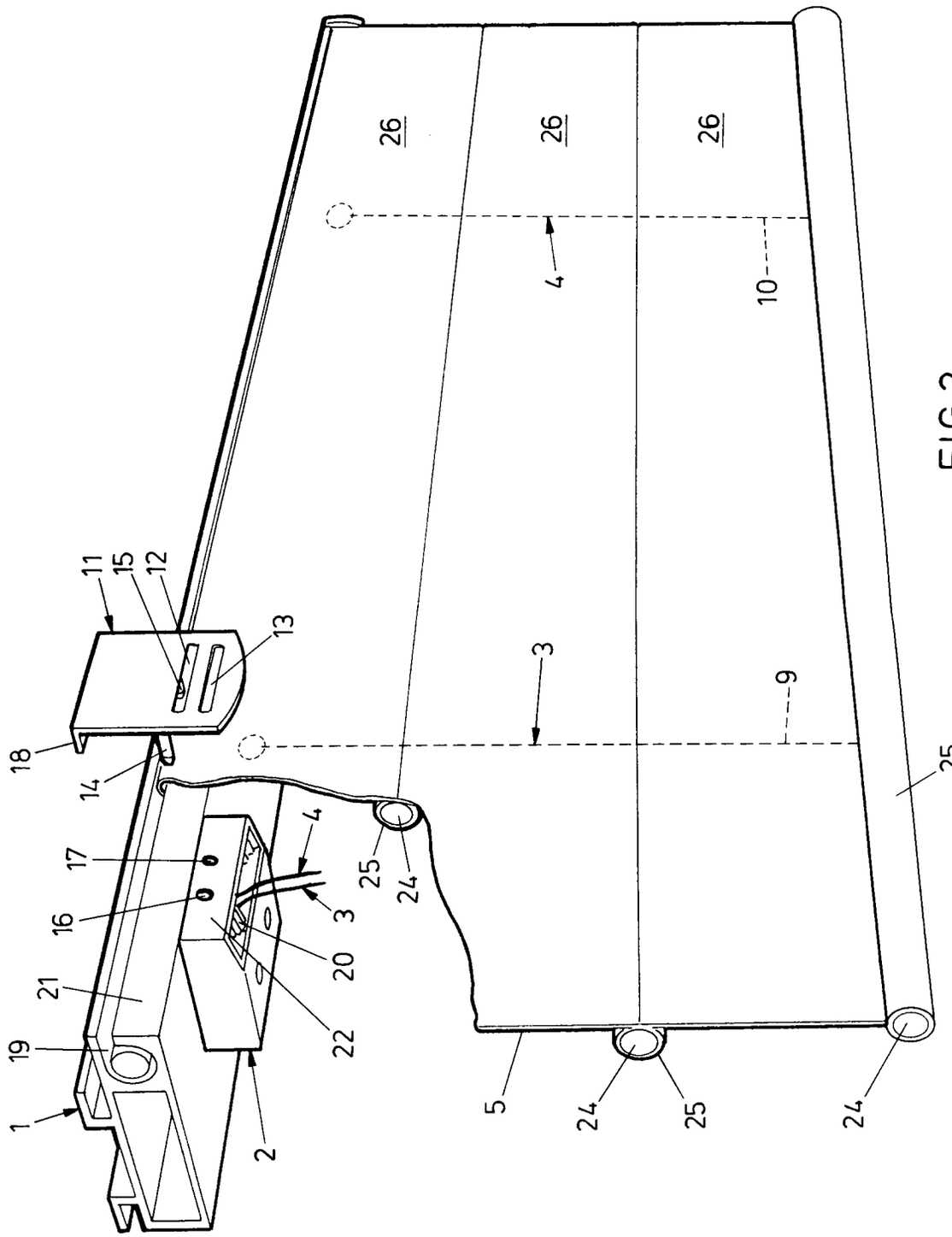
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FIG.2

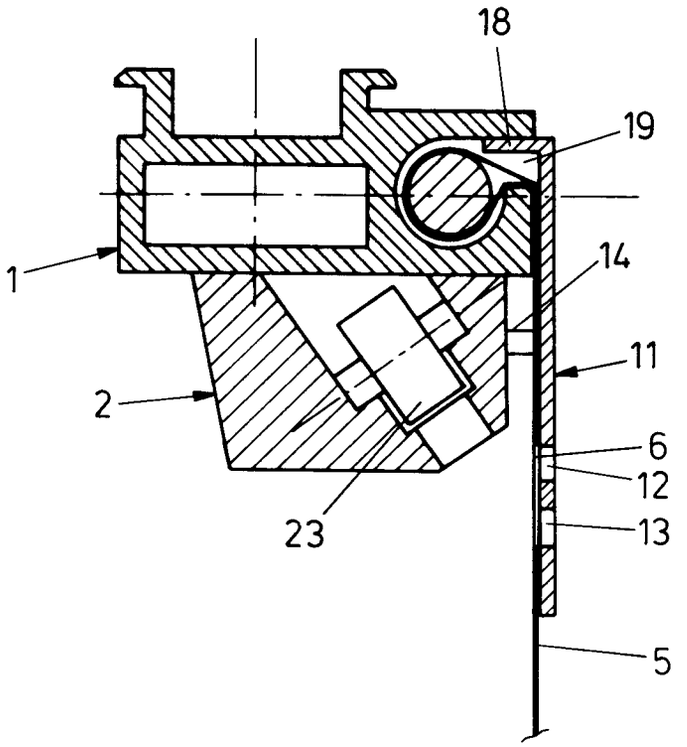

FIG. 3

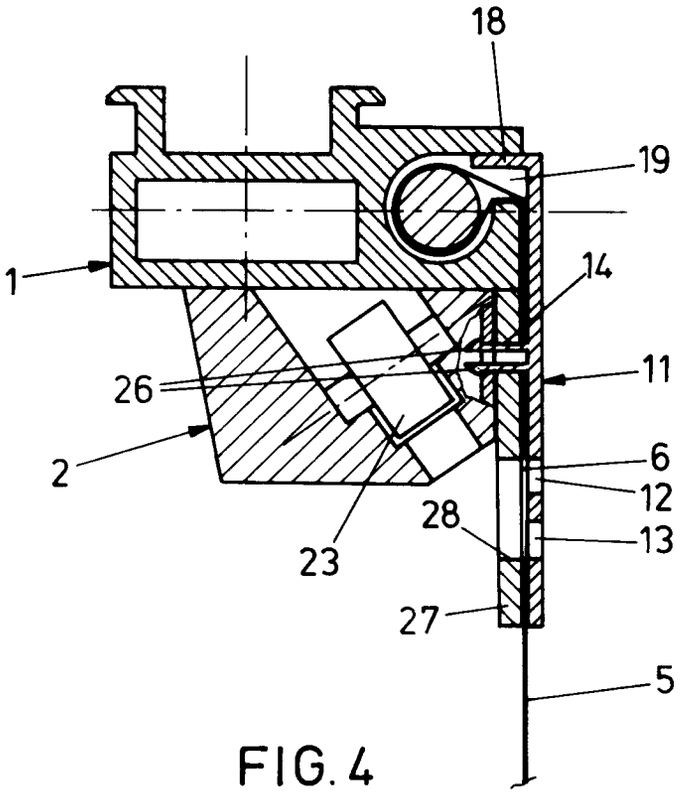

FIG. 4

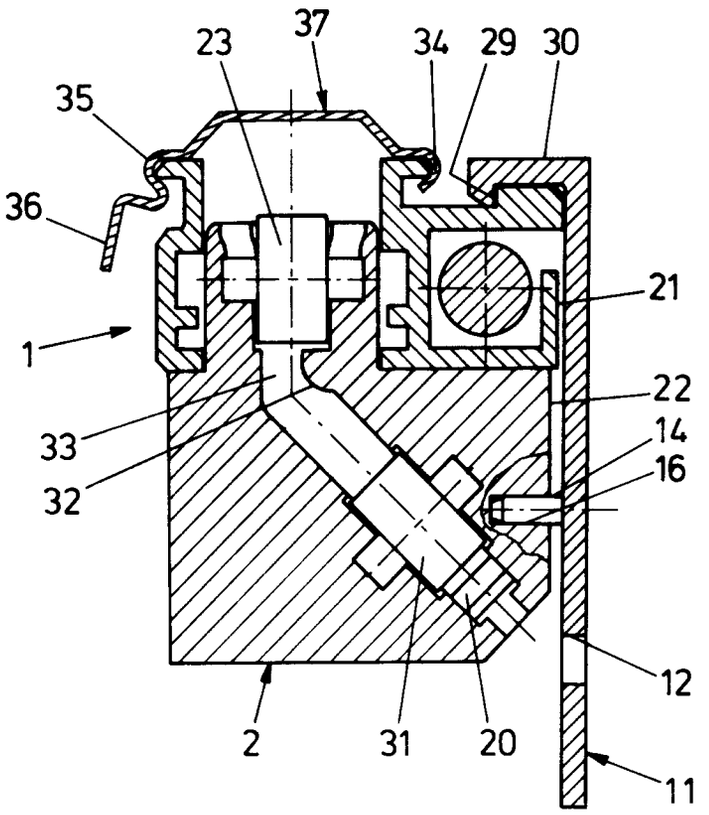
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FIG. 5

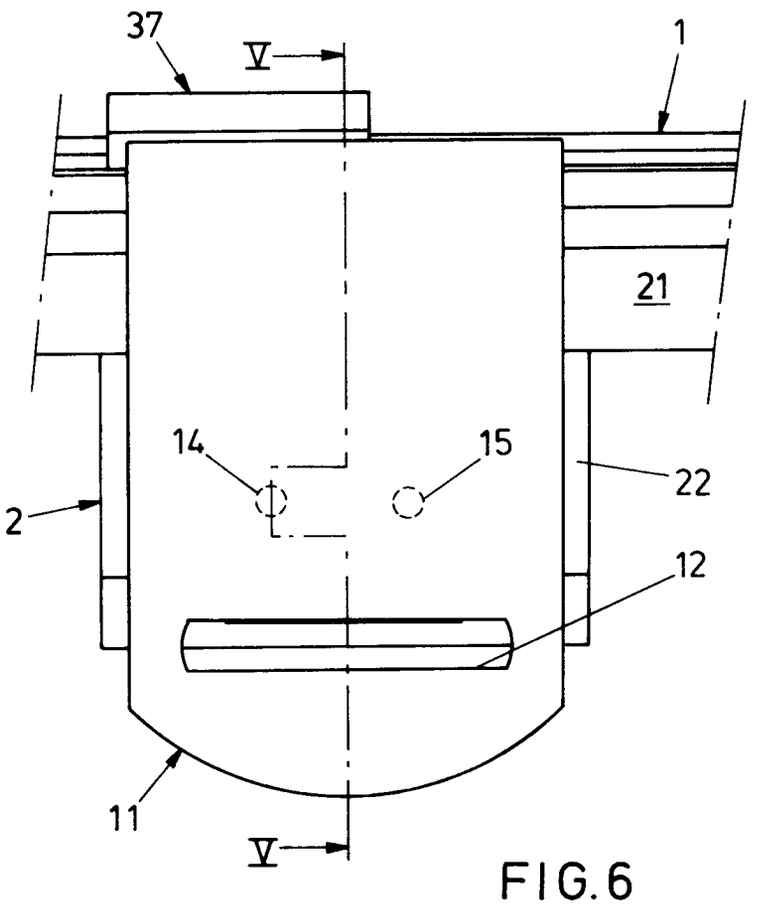
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FIG. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 20 1429

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)
A	EP-A-0 282 957 (PROSCH) * column 6, line 11 - column 7, line 9; figures 9-11 *	1	A47H5/14 E06B9/262
A	DE-U-91 14 697 (RILOGA-WERKE GMBH) * claim 1; figure 1 *	1	
A	US-A-4 651 795 (VALLE ET AL.) * abstract; figures 1,2 *	1	
A	FR-A-383 906 (DIOT) * Resumé; figures *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A47H
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 October 1994	Voutsadopoulos, K

CATEGORY OF CITED DOCUMENTS

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