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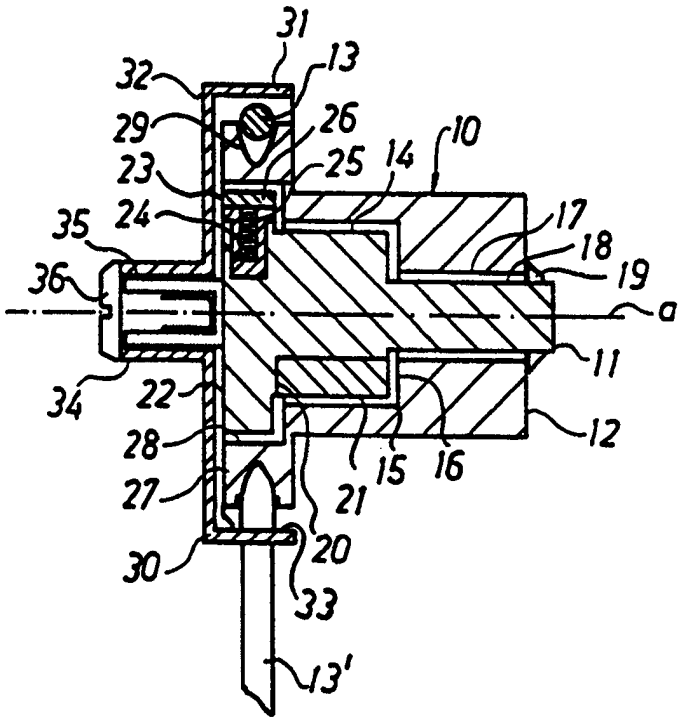
(54) Title: LATERAL PULLING DEVICE FOR ROLLER BLINDS

(57) Abstract

A lateral pulling device (10) intended for a roller blind comprises a blind web wound on a rod and a rotor member (12) for rotating said rod. The rotor member (12) is mounted on a stator member (11) in a rotatably and vertically limited displaceable manner and has a cord roll (27), over which a pulling cord (13) is running for rotating the rotor member (12). The rotor member (12) is biased against the stator member (11) with the aid of a spring means (25) which puts a brake on the rotor member by means of an intermediate brake shoe (21). The spring means (25) can be compressed by means of the pulling cord (13), the brake of the lateral pulling device (10) thus being releasable and the rotor member (12) being rotatable in an easily running manner.



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LATERAL PULLING DEVICE FOR ROLLER BLINDS

Field of the Invention

The present invention relates to a lateral pulling device intended for a roller blind according to the preamble to claim 1.

Background of the Invention

Such lateral pulling devices are previously known and used in more and more cases instead of more conventional solutions, which by using a spring that must have a certain degree of tension to function well cause problems to many users that are difficult to solve.

A drawback of the prior-art lateral pulling devices has been that they do not at all take into account the fact that a user does not always observe that a roller blind, which is for instance to be drawn down, is intended to be operated by means of a lateral pulling device. Therefore, it sometimes happens that the user thinks that it is a conventional roller blind provided with a spring and pulls the actual roller blind to release the supposed spring mechanism. This makes the prior-art lateral pulling devices block, and if the worst comes to the worst this can result in the entire roller blind being torn down from its wall brackets or the blind material being torn.

The reason why the prior-art lateral pulling devices block is that, to maintain the blind in the desired position, they must prevent the blind from being unwound because of its own weight.

An obvious solution to this problem would be a lateral pulling device having a friction brake instead of a blocking means. It is true that a friction brake can prevent an undesired unwinding of the blind, but at the same time it also counteracts the unwinding desired by a user when the blind is to be drawn down and also the winding of the blind when it is to be raised.

Object of the Invention

In virtue of this, the object of the present invention is to provide a lateral pulling device intended for a roller blind, which lateral pulling device does not block when somebody pulls the blind by mistake, maintains the blind in the desired position in a reliable way and runs very easily when the blind is wound and unwound.

Summary of the Invention

This object is achieved by means of a lateral pulling device of the type mentioned by way of introduction and having the characterising features stated in claim 1.

Thanks to the solution with a rotor member, which is displaceable towards the stator member in a vertically limited manner, and with a spring means, which normally applies a brake means but permits a temporary release by means of the pulling cord, a both simple and reliable construction is achieved, which neither poses any technical problems at all to its users nor risks being damaged when somebody pulls the blind web instead of the pulling cord.

Preferably, the brake means consists of at least one brake shoe, which is attached to the stator member below the horizontal plane in which the rotation axis is located, and is arranged to cooperate with a brake path of the rotor member, which brake path is substantially concentric and rotationally symmetric with the rotation axis. Since the brake shoe in this construction is attached to the stationary stator member, a relatively small, thus easy to mount, brake shoe is sufficient to obtain the brake effect strived for.

However, in an alternative embodiment, the brake means consists of at least one brake lining, which is attached to the rotor member concentrically with the rotation axis, and is arranged to cooperate with a brake path of the stator member, which brake path is substantially concentric and rotationally symmetric with the rotation axis. When the brake lining is attached to the

rotatable rotor member, it is in this construction necessary, in order to obtain the desired brake effect independently of the rotational position of the rotor member in relation to the stator member, to provide a circumferential brake means, which, of course, constitutes a somewhat more expensive solution.

Alternatively, the brake means consists of at least one brake shoe, which is attached to the stator member above the horizontal plane in which the rotation axis is located, and is arranged to cooperate with a brake path of the rotor member, which brake path is substantially concentric and rotationally symmetric with the rotation axis. Since in this construction as well, the brake shoe is attached to the stationary stator member, a relatively small, thus easy to mount, brake shoe is sufficient.

Preferably, the spring means consists of at least one helical spring mounted on the stator member, which helical spring applies the rotor member via a sliding means. The helical spring is distinguished by its long durability, to which the sliding means, against which the helical spring abuts, contributes in an advantageous manner.

Said sliding means is either a convex part, which is formed as a segment of a circle and arranged to slide over a corresponding slide path in the rotor member, which slide path is substantially concentric and rotationally symmetric with the rotation axis, or a concave part, which is formed as a segment of a circle and arranged to slide over a corresponding slide path on the outside of the rotor member, which slide path is substantially concentric and rotationally symmetric with the rotation axis. Whatever the solution, the sliding means and the slide paths are always guaranteed an easy running, if a suitable material is chosen, when the roller blind is to be wound or unwound.

Preferably, the stator member has a pivot pin, on which the rotor member is mounted in a rotatable and pi-

votally limited manner. One of the advantages of this solution is that it functions in a reliable way for a long time since there is no displacing movement at the bearing location.

Alternatively, the rotor member can be provided with a pivot pin, which is mounted in a rotatable and substantially vertically displaceable manner in a slot in the stator member extending substantially vertically. This solution is particularly useful if a minimisation of the number of parts for the lateral pulling device is desired.

Finally, the pivot pins are preferably provided with barbs permitting snap locking of the stator member and the rotor member. It is understood that this solution is advantageous particularly as concerns the mounting.

Brief Description of the Drawings

Some embodiments of the invention will be described in detail in the following with reference to the drawings, in which:

Fig. 1 is an overall view showing a roller blind with associated wall brackets and a lateral pulling device according to a preferred embodiment of the invention,

Fig. 2 is a longitudinal sectional view showing the lateral pulling device cut out from Fig. 1 along its vertical centre plane,

Fig. 3 is an end view with a portion broken away showing the lateral pulling device from Figs 1 and 2 in a first operating position from the side located to the left in Fig. 1,

Fig. 4 is an end view corresponding to Fig. 3 showing a second operating position,

Fig. 5 is a longitudinal sectional view showing an alternative embodiment of an inventive lateral pulling device cut along its vertical centre plane,

Fig. 6 is a longitudinal sectional view showing an additional embodiment of an inventive lateral pulling device cut along its vertical centre plane, and

Fig. 7 is a longitudinal sectional view showing an additional embodiment of an inventive lateral pulling device cut along its vertical centre plane.

Description of Embodiments

In Fig. 1, the reference numeral 1 designates an entire roller blind. The roller blind 1 comprises a blind web 2, which is wound on a circular-cylindrical roller blind rod 3, preferably in the form of a tube. At its end located to the right in Fig. 1, the roller blind rod 3 has a pivot pin 4, which is mounted to rotate freely in a first wall bracket 5 associated with the roller blind, and at its end located to the left in Fig. 1, the roller blind rod 3 is connected to a lateral pulling device according to the invention generally designated 10, which lateral pulling device is also part of the roller blind and which is described below in detail. Finally, there is a wall bracket 6 at the left end of the roller blind as well, which wall bracket is non-rotatably connected to the lateral pulling device 10.

In Fig. 2, the lateral pulling device 10 is shown enlarged in the form of a longitudinal section along the vertical centre plane of the lateral pulling device 10, in which centre plane the longitudinal axis a of the lateral pulling device 10 is located.

The lateral pulling device 10 consists of a stationary stator member 11, a rotor member 12, which is rotatable in relation to the stator member 11, and a pulling cord 13 running over the rotor member 12 and having parts 13' hanging down on each side of the rotor member 12. The stator member 11, which in conformity with the rotor member 12 is suitably made of a hard plastic material, has a substantially circular-cylindrical spindle portion 14, which is, with some play, surrounded by a corresponding substantially circular-cylindrical hub portion

15 of the rotor member 12. The hub portion 15 is arranged, as shown in Fig. 1, to be non-rotatably inserted into the roller blind rod 3. At its right end in Fig. 2, the hub portion 15 has, as is apparent, a terminal wall 16, in which a central hole 17 is made for a corresponding pivot pin 18 on the spindle portion 14. The hub portion 15 is arranged in an easily rotatable and pivotally limited manner on the pivot pin 18 and held thereon by means of barbs 19.

On its underside, the spindle portion 14 has a recess 20 formed at a distance from the pivot pin 18, in which recess a brake shoe 21 of a friction rubber material is fixed. The brake shoe 21 has on the outside a convex form corresponding to the substantially circular-cylindrical form of the spindle portion 14, but protrudes somewhat over the surface of the spindle portion 14 in the direction of the inner wall opposite to the hub portion 15.

In direct association with its spindle portion 14, the stator member 11 has a substantially circular-cylindrical widened portion 22, which is concentric with the spindle portion 14. In its upper side, i.e. opposite to the underside of the spindle portion 14 with the recess 20, the widened portion 22 also has a recess 23. This recess 23 has a flat bottom, in the centre of which a radially aligned blind hole 24 is made. The blind hole 24 is intended for a helical spring 25, which is arranged to press a separate cylinder segment 26, positioned in the recess 23 of the widened portion, radially outwards, so that it projects with its convex outside, substantially corresponding to the periphery of the widened portion 22, over the periphery of the widened portion 22. The cylinder segment 26 is also advantageously made of the same hard plastic material as the stator and rotor members 11, 12.

To cooperate with the widened portion 22 of the stator member 11, the rotor member 12 has a cord roll 27

integral with the hub portion 15, but having a considerably greater diameter than this portion. The cord roll 27 comprises a circular-cylindrical space 28, which surrounds the widened portion 22 and against the inside of which the cylinder segment 26 abuts, which is applied by the spring 25. Externally, the cord roll 27 of the rotor member 12 has a circumferential key groove 29, which is intended for the pulling cord of the lateral pulling device and which suitably has some kind of friction-increasing means (not shown) to prevent the pulling cord 13 introduced into the key groove 29 from sliding.

The cord roll 27 itself is surrounded by a housing 30 having a cylindrical periphery wall 31, which encloses the key groove 29 and the part of the pulling cord 13 therein, and an end wall 32 arranged among other things to hold and outwardly protect the cylinder segment 26.

The periphery wall 31 has in its lower part two openings 33, which are intended for the two parts 13' of the pulling cord 13 and are located in the extension of the two vertical tangents of the key groove 29, and the end wall 32 has a central tubular portion 34, which extends in the axial direction of the lateral pulling device 10 and in which a corresponding pin 35 is non-rotatably fixed on the stationary first member 11 and attached by means of a screw 36. The tubular portion 34 has preferably a non-circular cross-section and is used for a non-rotatable fixing of the stationary first member 11 of the lateral pulling device 10 to a wall bracket 6.

The function of the lateral pulling device 10 described above is described in the following with reference to Fig. 1 as well as Figs 3 and 4, in which the same reference numerals are used and in which parts of the lateral pulling device 10 are shown in two different operating positions.

More particularly Fig. 3 shows a locking position, in which the helical spring 25, as is shown, causes the opposite brake shoe 21 to be applied against the inner

wall of the rotor member 12 and thus put a brake on the rotor member. This results in a brake being applied also to the roller blind rod 3, which is non-rotatably connected to the rotor member 12, and thus the blind web 2 maintains its current position.

On the other hand, Fig. 4 shows a neutral position, in which the helical spring 25 has been somewhat compressed and in which the brake shoe 21 no longer abuts against the inner wall of the rotor member 12, i.e. a position in which the rotor member 12 (and thus the roller blind rod 3 with the blind web 2) is very easy to rotate. The neutral position is only available as long as a user either with a view to drawing down the roller blind is pulling the blind web 2 or the hanging part 13' of the pulling cord 13 (arrow 37) on the corresponding side of the roller blind rod 3, or with a view to drawing away the roller blind 1 is pulling the hanging part 13" of the pulling cord (arrow 38) on the opposite side of the roller blind rod 3, and thus automatically occurs when the position of the roller blind 1 is to be altered.

In Figs 5, 6 and 7, in which the same reference numerals as before will be used for the equivalent details, alternative embodiments of inventive lateral pulling devices 10 are shown in views corresponding to the one in Fig. 2. These embodiments will be described in more detail below to the extent as is necessary to emphasise the present differences compared to the first embodiment which has been thoroughly described above.

As is shown in the second embodiment in Fig. 5, the spindle portion 14 of the stator member 11 is circular-cylindrical throughout and has no recess at all for a brake shoe, such as the recess 20 in the first embodiment. A recess 39 with a corresponding function is instead made in the periphery of the widened portion 22 of the stator member 11 diametrically opposite to the helical spring 25 and the associated cylinder segment 26.

One advantage of the second embodiment is that it is somewhat easier to assemble. Since the brake shoe 21 has to have an active surface of a certain size to function in a satisfactory manner, the widened portion 22 must, however, have somewhat greater dimensions than in the first embodiment, which results in a more unwieldy and less aesthetically appealing appearance than in the first embodiment, where the brake shoe 21 is positioned in the spindle portion 14, which in a complete roller blind 1 is concealed inside the roller blind rod 3.

In the third embodiment of the invention shown in Fig. 6, the spindle portion 14 of the stator member 11 is also circular-cylindrical throughout and both the spindle portion 14 and the widened portion 22 are completely devoid of a means for receiving a brake shoe. Instead, the hub portion 15 of the rotor member has an internal circumferential groove 40, in which a brake lining 41 of a friction rubber material is attached.

The advantage of the third embodiment is that the brake lining 41 totally has a greater surface than the previously described brake shoes 15 and that this in extreme cases can guarantee a longer durability. However, the assembly must be considered to be somewhat more complicated than in the two embodiments previously described since the mounting of the brake lining 41 in the groove 40 can cause certain difficulties.

Finally, a fourth embodiment of the invention is shown in Fig. 7. In this embodiment, both the stator member 11 and the rotor member 12 have a very different appearance compared to the embodiments previously described since only the cord roll 27 with the key groove 29 and the surrounding housing 30 with its openings 33 are easy to recognise. As to the technical function, there are, however, no real differences. Thus also in the fourth embodiment, there is a brake shoe 21, which is mounted in a recess 20 in the stator member 11, and a helical spring 25 located opposite thereto and pressing a

cylinder segment 26 against the surface of the rotor member 12. Here the brake shoe 21 and the cylinder segment 26 have, however, a concave form, in contrast to the convex form of the previously described elements to suit the current geometrical conditions with a rotatable rotor member 12, which is mounted internally inside a stationary stator member 11. Another difference is that the stator member 11 is cupped and integral with the housing 30 and that the rotor member 12 is mounted therein by means of a pivot pin 42 extending through a hole 43 in an end wall 44 associated with the stator member 11. The hole 43 is not circular but somewhat elongated to permit a limited displacement of the rotor member 12 towards the stator member 11 in the directions of the double arrow 45, and the pivot pin 42 has advantageously barbs 46 to permit a snap locking on the outside of the end wall 44. Finally, the end wall 44 has a tubular portion 34 on its outside of the same type as the one previously described for non-rotatable connection with a wall bracket 6.

It will be appreciated that the lateral pulling device thoroughly described above by means of several embodiments can be further varied within the scope of the invention and that, for instance, a different type of spring, such as a leaf spring, or a different type of pulling cord, such as a ball chain, can be used as well.

CLAIMS

1. A lateral pulling device for a roller blind (1) comprising a blind web (2), which can be wound on a rod (3) about a rotation axis (a) of the lateral pulling device, one end of the rod being non-rotatably connected to a rotor member (12) of the lateral pulling device, which rotor member (12) is rotatably mounted on a stator member (11) of the lateral pulling device about the rotation axis (a) and has a cord roll (27), which is substantially concentric with the rotor axis (a) and over which a pulling cord (13) is running having parts (13', 13") hanging down on each side of the cord roll (27) for the rotation of the cord roll (27) and thus the rod (3) with the blind web (2), c h a r a c t e r i s e d in that the rotor member (12) in an area including at least the cord roll (27) is limited in a substantially vertically displaceable manner in relation to the stator member (11), that a spring means (25) is arranged to displace the rotor member (12) substantially vertically upwards, that the pulling cord (13) is arranged to displace the rotor member (12) substantially vertically downwards when one of its two parts (13', 13") is pulled substantially vertically downwards, and that a brake means (21, 40) in said area is positioned between the rotor member (12) and the stator member (11) to be normally applied with the aid of the spring means (25) and to put a brake on the rotor member (12) or to be temporarily released by means of the pulling cord (13) and permit an easily running rotation of the rotor member (12).

2. A lateral pulling device according to claim 1, c h a r a c t e r i s e d in that the spring means consists of at least one helical spring (25) mounted on the stator member (11), which helical spring applies the rotor member (12) via a sliding means.

3. A lateral pulling device according to claim 1 or 2, c h a r a c t e r i s e d in that the brake means consists of at least one brake shoe (21), which is attached to the stator member (11) below a horizontal plane, in which the rotor axis (a) is located, and that the brake shoe (21) is arranged to cooperate with a brake path of the rotor member (12), which brake path is substantially concentric and rotationally symmetric with the rotor axis (a).

4. A lateral pulling device according to claim 1 or 2, c h a r a c t e r i s e d in that the brake means consists of at least one brake lining (40), which is attached to the rotor member (12) concentrically with the rotation axis (a), and that the brake lining (40) is arranged to cooperate with a brake path of the stator member (11), which brake path is substantially concentric and rotationally symmetric with the rotation axis (a).

5. A lateral pulling device according to claim 1 or 2, c h a r a c t e r i s e d in that the brake means consists of at least one brake shoe (21), which is attached to the stator member (11) above a horizontal plane, in which the rotor axis (a) is located, and that the brake shoe (21) is arranged to cooperate with a brake path of the rotor member (12), which brake path is substantially concentric and rotationally symmetric with the rotor axis (a).

6. A lateral pulling device according to claim 2 and 3 or claim 2 and 4, c h a r a c t e r i s e d in that the sliding means is a convex part (26), which is formed as a segment of a circle and arranged to slide over a corresponding slide path in the rotor member (12), which slide path is substantially concentric and rotationally symmetric with the rotation axis (a).

7. A lateral pulling device according to claim 2 and 5, c h a r a c t e r i s e d in that the sliding means (26) is a concave part (26), which is formed as a segment of a circle and arranged to slide over a corresponding

slide path on the outside of the rotor member (12), which slide path is substantially concentric and rotationally symmetric with the rotation axis (a).

8. A lateral pulling device according to any one of the previous claims, c h a r a c t e r i s e d in that the stator member (11) has a pivot pin (18), on which the rotor member (11) is mounted in a rotatable and pivotally limited manner.

9. A lateral pulling device according to any one of claims 1-7, c h a r a c t e r i s e d in that the rotor member (12) has a pivot pin (35), which is mounted in a rotatable and substantially vertically displaceable manner in a slot (43) in the stator member (11) extending substantially vertically.

10. A lateral pulling device according to claim 8 or 9, c h a r a c t e r i s e d in that the pins (18, 43) are provided with barbs (19, 46) for snap locking.

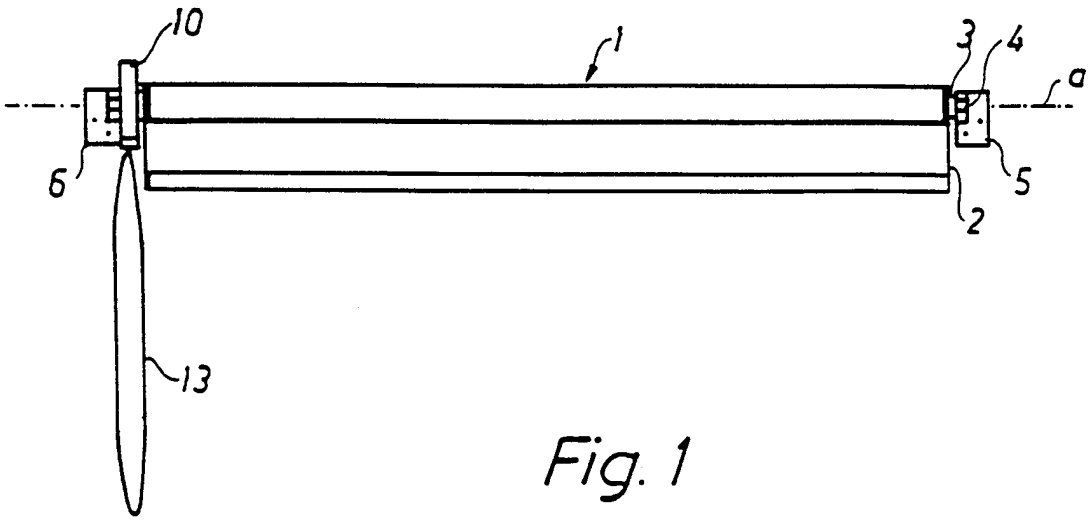
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Fig. 1

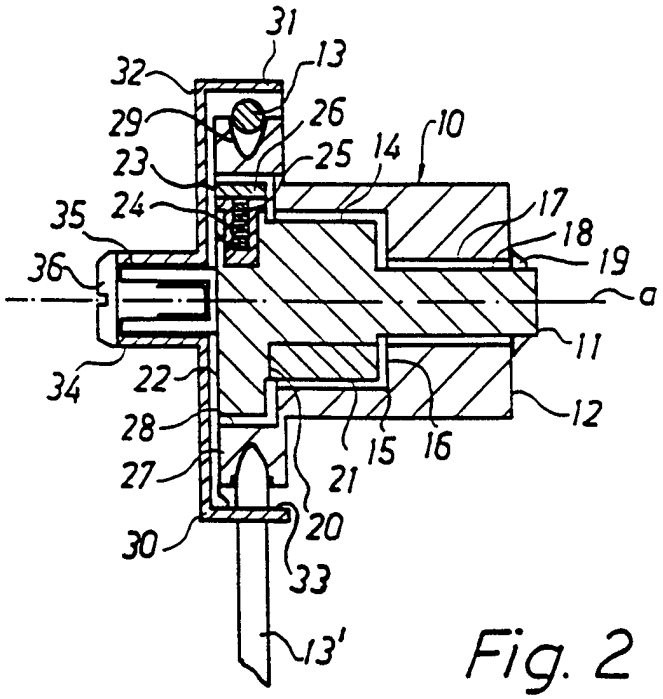
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Fig. 2

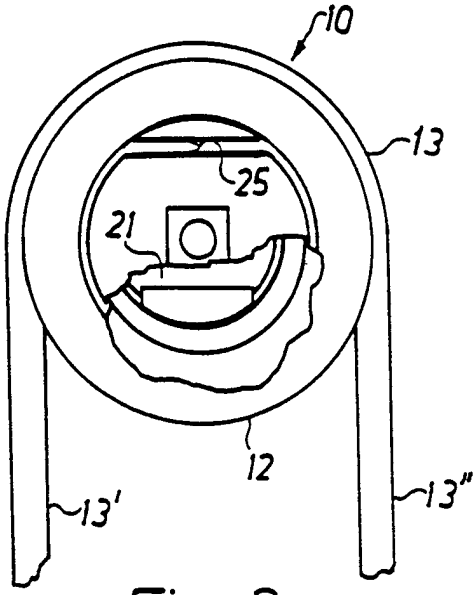

Fig. 3

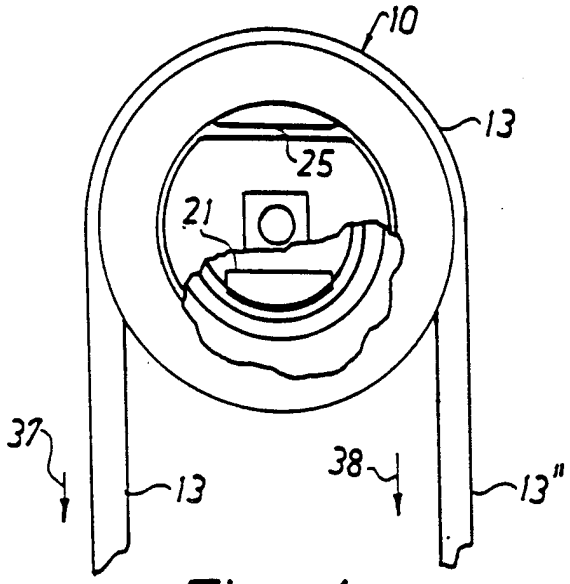

Fig. 4

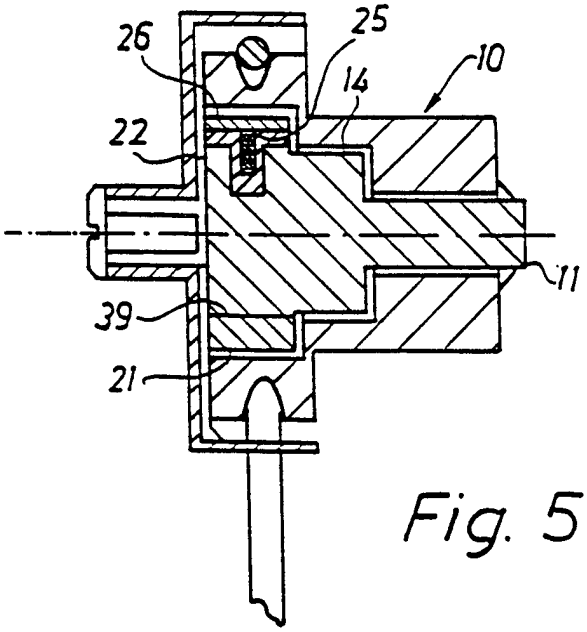

Fig. 5

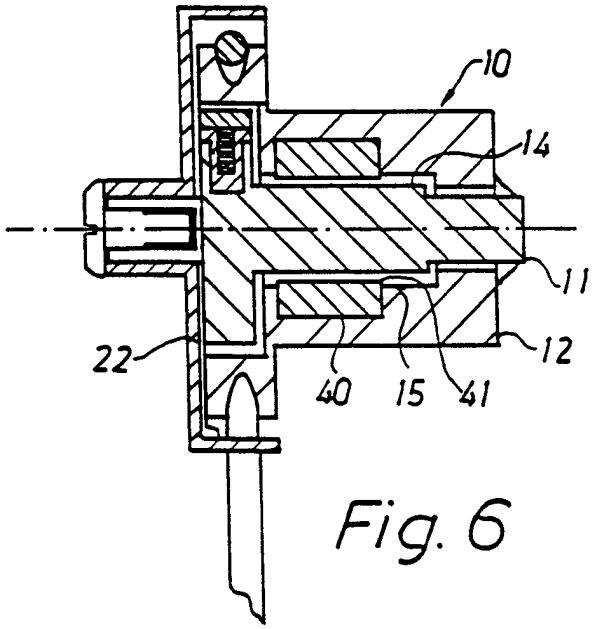
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Fig. 6

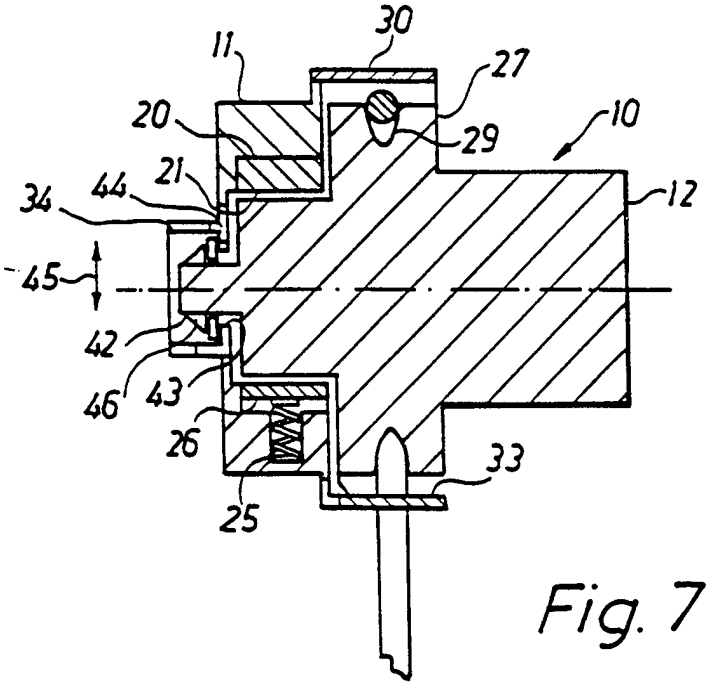
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Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 98/01122

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: E06B 9/90
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)

IPC6: E06B

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

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 3211506 A1 ("MHZ"HACHTEL GMBH & CO.), 6 October 1983 (06.10.83) --	1-10
A	EP 0717166 A1 (MOTTURA S.P.A.), 19 June 1996 (19.06.96) --	1-10
A	EP 0180832 A2 (TOSO KABUSHIKI KAISHA), 14 May 1986 (14.05.86) --	1-10
A	WO 8302976 A1 (BERMAN, J.), 1 Sept 1983 (01.09.83) --	1-10

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
28 August 1998	18-09-1998
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INTERNATIONAL SEARCH REPORT

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PCT/SE 98/01122

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4096904 A (J.D. DONOFRIO), 27 June 1978 (27.06.78) --	1-10
A	US 3870096 A (R.E. HORRELL), 11 March 1975 (11.03.75) --	1-10
A	US 3211212 A (R.J. SMITH), 12 October 1965 (12.10.65) --	1-10
A	US 1841384 A (C.F. SCHMELZ), 19 January 1932 (19.01.32) --	1-10
A	FR 2412484 A1 (SOCIETE INDUSTRIELLE DU METAL USINE), 20 July 1979 (20.07.79) --	1-10
A	JP 2-213582 A (...), 24 August 1990 (24.08.90) -- --------	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

27/07/98

International application No.
PCT/SE 98/01122

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3211506 A1	06/10/83	DE 3250020 C	02/01/92
EP 0717166 A1	19/06/96	AT 155201 T	15/07/97
		DE 69500418 D,T	23/10/97
		ES 2105864 T	16/10/97
		IT 1267206 B	28/01/97
		IT T0941021 A	17/06/96
EP 0180832 A2	14/05/86	JP 1676884 C	26/06/92
		JP 3030678 B	01/05/91
		JP 61102988 A	21/05/86
WO 8302976 A1	01/09/83	EP 0101440 A,B	29/02/84
US 4096904 A	27/06/78	CA 1082587 A	29/07/80
US 3870096 A	11/03/75	NONE	
US 3211212 A	12/10/65	NONE	
US 1841384 A	19/01/32	NONE	
FR 2412484 A1	20/07/79	NONE	
JP 2-213582 A	24/08/90	NONE	