(19) Europäisches Patentamt
European Patent Office
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(11) **EP 1 990 500 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
12.11.2008 Bulletin 2008/46

(51) Int Cl.:
E06B 9/322 *(2006.01)*

(21) Application number: **07108075.8**

(22) Date of filing: **11.05.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK RS

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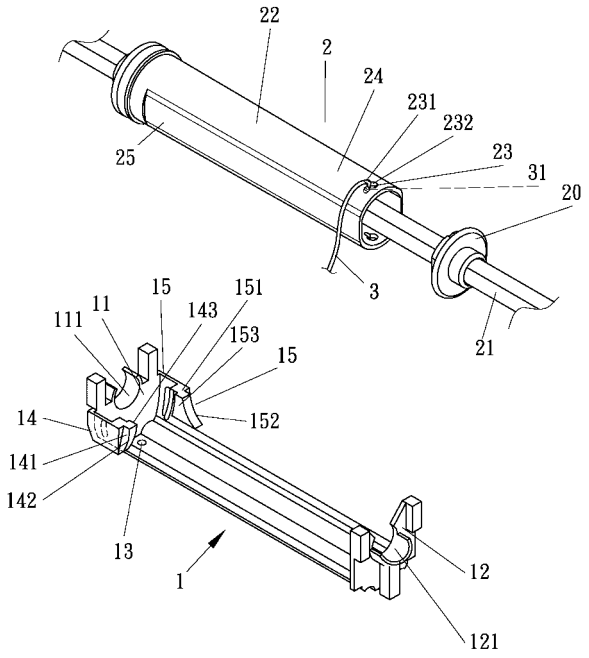
(54) **Cord seat assembly**

(57) A cord seat assembly includes a seat (1) having a through-hole (13), a spool (2) rotatably supported by the seat (1), and a cord (3). The spool (2) includes a cord winding section (22) having a cord coupling section (23) on an end thereof distant to the through-hole (13) of the seat (1) through which the cord (3) extends. The cord winding section (22) includes a cross-section having a pair of diametrically opposed clamping sections (24) and a pair of diametrically opposed buffering sections (25) orthogonal to the clamping sections (24). A distance (h) between the buffering sections (25) is smaller than that (g) between the clamping sections (24). Each clamping section (24) includes an arcuate outer face for providing tight engagement with the cord (3). Each buffering section (25) includes an arcuate outer face for providing less tight engagement with the cord (3) than the clamping sections (24).



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Description

Field of the Invention

[0001] The present invention relates to a cord seat assembly and, more particularly, to a cord seat assembly allowing smooth winding with a force-saving effect.

Background of the Invention

[0002] A conventional cord seat assembly includes a cord for moving an object such as a curtain, Venetian blind, etc upward or downward. The cord is wound around a spool and movable in a retrieving direction and a releasing direction. Figs. 9 and 10 of the drawings illustrate a conventional cord seat assembly capable of avoiding the cord from overlapping and getting stuck on the spool during winding. As illustrated in the drawings, the cord seat assembly includes a seat 1', a substantially cylindrical spool 2', and a cord 3'. The seat 1' includes an axial hole 11' in each of two ends thereof through which an axle 21' of the spool 2' rotatably extends. The seat 1' further includes a through-hole 12' in a bottom thereof through which the cord 3' extends. Formed on an end of the spool 2' is a coupling section 22' to which an end of the cord 3' is fixed, with the other end of the cord 3' extending out of the seat 1' via the through-hole 12' for attachment to an object such as a curtain, blind, etc. A conic guiding section 23' is formed on the other end of the spool 2' and tapers toward the coupling section 22' of the spool 2'. When the spool 2' is turned in the retrieving direction of the cord 3', the cord 3' is wound around the spool 2' and moves toward the coupling section 22' due to provision of the conic guiding section 23', preventing the cord 3' from overlapping and getting stuck.

[0003] However, the conic guiding section 23' results in an increase in the overall size of the seat 1', which limits installation of the cord seat assembly and adversely affects the appearance when the cord seat assembly is mounted outdoors. With reference to Fig. 10, during retrieving operation, the cord 3' is tightly wound around the circumference of the spool 2' having a circular cross-section, resulting in excessive tightness between the cord 3' and the spool 2' and not allowing smooth movement of the cord 3' during winding. The spool 2' cannot be turned easily, and the burden of the motor for driving the spool 2' is increased. With reference to Fig. 9, overlapping of the cord 3' is still possible at the intermediate section a' of the spool 2' as the intermediate section a' is smooth and cannot provide a guiding effect as the conic guiding section 23'. Furthermore, the seat 1' does not provide any assistance in guiding the cord 3' during winding such that the cord 3' is still apt to overlap and get stuck.

Summary of the Invention

[0004] A cord seat assembly in accordance with the present invention comprises a seat having a through-hole, a spool rotatably supported by the seat, and a cord. The spool includes a cord winding section having a cord coupling section on an end thereof distant to the through-hole of the seat. The cord winding section includes a cross-section having a pair of diametrically opposed clamping sections and a pair of diametrically opposed buffering sections orthogonal to the clamping sections. A distance between the buffering sections is smaller than that between the clamping sections. Each clamping section includes an arcuate outer face for providing tight engagement with the cord. Each buffering section includes an arcuate outer face for providing less tight engagement with the cord than the clamping sections. The cord includes a first end fixed to the cord fixing section of the spool and a second end extending through the through-hole of the seat. The cord is movable along a retrieving direction and a releasing direction.

[0005] Preferably, the cord winding section has increasing diameter toward the through-hole.

[0006] Preferably, the first end of the cord is an enlarged end. The cord fixing section includes a through-hole having a diameter larger than that of the first end of the cord. The cord fixing section further includes a coupling section in communication with the through-hole of the cord fixing section and having a diameter smaller than that of the first end of the cord.

[0007] Preferably, the seat includes an end with an end wall adjacent to the through-hole of the seat. A first lateral extension wall extends from a first side of the end wall along a first lateral side of the seat and includes a first guiding section. The first guiding section includes a first guiding face toward the other end of the seat. The cord that has passed through the through-hole abuts against and is guided by the first guiding face onto the spool when the spool is turned in the retrieving direction of the cord.

[0008] Preferably, a distance between the first guiding face and the through-hole gradually increases upward.

[0009] Preferably, the end wall of the seat further comprises a second lateral extension wall extending from a second side of the end wall opposite to the first side of the end wall along a second lateral side of the seat opposite to the first lateral side of the seat. The second lateral extension wall includes a second guiding section having a second guiding face opposite to the first guiding face. The second guiding face guides the cord that has passed through the through-hole onto the spool when the spool is turned in the retrieving direction of the cord.

[0010] Preferably, a distance between the second guiding face and the through-hole gradually increases downward.

[0011] Preferably, the cord comes into contact with the first guiding face of the first lateral extension wall before the cord comes into contact with the second guiding face of the second lateral extension wall.

[0012] Preferably, a distance between an inner face of the first guiding section and an outer periphery of the spool is smaller than a diameter of the cord, and a distance between an inner face of the second guiding sec-

tion and the outer periphery of the spool is smaller than the diameter of the cord.

[0013] Other objectives, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

Brief Description of the Drawings

[0014]

Fig. 1 shows an exploded perspective view of a cord seat assembly in accordance with the present invention.

Fig. 2 shows a side view of a spool of the cord seat assembly in accordance with the present invention.

Fig. 3 shows a cross-section of the spool of Fig. 2.

Fig. 4 shows a side view of the cord seat assembly of Fig. 1 after assembly.

Fig. 5 shows a cross-section of the spool of Fig. 4.

Fig. 6 is a side view similar to Fig. 4, illustrating rotation of the spool of the cord seat assembly in a retrieving direction of a cord.

Fig. 7 is a side view similar to Fig. 6, illustrating further rotation of the spool in the retrieving direction of the cord.

Fig. 8 is an enlarged view of a portion of the cord seat assembly of Fig. 7.

Fig. 9 is a sectional view of a conventional cord seat assembly.

Fig. 10 is a sectional view illustrating winding operation of the cord seat assembly of Fig. 9.

Detailed Description of the Preferred Embodiment

[0015] Referring to Figs. 1-5, a cord seat assembly in accordance with the present invention comprises a seat 1, a spool 2, and a cord 3. The spool 2 is rotatably supported by the seat 1. In the illustrated embodiment, the seat 1 includes an axial hole 111, 112 in each of two end walls 11 and 12 thereof. A through-hole 13 is defined in a bottom of the seat 1 and preferably adjacent to the end wall 11. The seat 1 further includes two lateral wall extensions 14 and 15 extending from two sides of the end wall 11 adjacent to the through-hole 13 along two lateral sides of the seat 1. The lateral wall extension 14 includes a guiding section 141 that has a guiding face 142 facing the other end wall 12. Further, the guiding section 141 of the lateral wall extension 14 includes an inner face 143 adjacent to and facing an end of the spool 2 received in the through-hole 111. Similar, the lateral wall extension 15 includes a guiding section 151 that has a guiding face 152 facing the other end wall 12. Further, the guiding section 151 of the lateral wall extension 15 includes an inner face 153 facing the end of the spool 2 and opposite to the inner face 143 of the guiding section 141.

[0016] With reference to Fig. 7, a distance between the guiding face 142 and the through-hole 13 gradually increases upward. In other words, a distance between a relatively upper point on the guiding face 142 and the through-hole 13 is greater than that between a relatively lower point on the guiding face 142 and the through-hole 13 ($a < b$). Furthermore, a distance between the guiding face 152 and the through-hole 13 gradually increases downward. In other words, a distance between a relatively upper point on the guiding face 152 and the through-hole 13 is smaller than that between a relatively lower point on the guiding face 152 and the through-hole 13 ($c < d$).

[0017] The spool 2 includes a substantially cylindrical cord winding section 22. The spool 2 is securely mounted on an axle that rotatably extends through the axial holes 111 and 112 of the seat 1. Provided on an end of the cord winding section 22 is a cord fixing section 23 to which an enlarged end 31 of the cord 3 is fixed. The cord fixing section 23 includes a through-hole 232 having a diameter larger than that of the enlarged end 31 of the cord 3. The cord fixing section 23 further includes a coupling section 231 in communication with the through-hole 232 and having a diameter smaller than that of the enlarged end 31 of the cord 3. Thus, the enlarged end 31 of the cord 3 can be extended through the through-hole 232 of the cord fixing section 23 without removing an end cap 20 mounted to an end of the spool 2. The enlarged end 31 of the cord 3 is then moved to the coupling section 231 of the cord fixing section 23 to thereby position the cord 3. The other end of the cord 3 extends through the through-hole 13 of the seat 1 and is attached to an object (such as a curtain, Venetian blind, etc.) to be moved upward or downward.

[0018] With reference to Fig. 2, the cord winding section 22 has increasing diameter toward the through-hole 13 ($e > f$). Furthermore, a cross-section of the cord winding section 22 includes a pair of diametrically opposed clamping sections 24 and a pair of diametrically opposed buffering sections 25 orthogonal to the clamping sections 24. A distance between the buffering sections 25 is smaller than that between the clamping sections 24 ($h < g$), as shown in Fig. 3. Each clamping section 24 includes an arcuate outer face for providing tight engagement with the cord 3. Each buffering section 25 includes an arcuate or planar outer face (arcuate in the illustrated example) for providing less tight engagement with the cord 3 than the clamping sections 24. A joint section between each buffering section 25 and an adjacent clamping section 24 is arcuate to reduce shock during winding (or retrieving) operation.

[0019] With reference to Fig. 8, after assembly, a distance "i" (Fig. 6) between the inner face 143 of the guiding section 141 of the lateral wall extension 14 and an outer periphery of the spool 2 is smaller than a diameter of the cord 3. Similarly, a distance "j" between the inner face 153 of the guiding section 151 of the lateral wall extension 15 and the outer periphery of the spool 2 is smaller than the diameter of the cord 3.

[0020] With reference to Figs. 4 and 5, when the spool

2 is turned in a retrieving direction of the cord 3, a portion of the cord 3 wound around the clamping sections 24 of the spool 2 is tightly engaged with the spool 2 whereas another portion of the cord 3 wound around the buffering sections 25 is not as tight as the portion of the cord 3 wound around the clamping sections 24. This reduces the tightening force of the cord 3 imparted to the spool 2, allowing smooth winding operation of the spool 2 in a force-saving manner. The tapering design of the cord winding section 22 of the spool 2 allows the cord 3 to be smoothly wound toward an outer portion of the cord winding section 22 distant to the through-hole 13 of the seat 1.

[0021] With reference to Figs. 6 and 8, during the winding of the cord 3 around the spool 2, the cord 3 that has passed through the through-hole 13 abuts against and guided by the guiding face 142 of the lateral wall extension 141. When the spool 2 is further turned, the cord 3 comes into contact with and is, thus, guided by the guiding face 152 of the lateral wall extension 151. The cord 3 is, thus, guided so as to be wound around the cord winding section 22 of the spool 2 in a smooth manner while avoiding the cord 3 from overlapping or getting stuck. Since the distance "i", "j" (Fig. 8) between the inner face 143, 153 of the guiding section 141, 151 of the lateral wall extension 14, 15 and the outer periphery of the spool 2 is smaller than the diameter of the cord 3, the cord 3 is prevented from getting stuck in the gap between the spool 2 and the guiding section 141, 151. The overall size of the cord seat assembly is smaller than the conventional design, which allows more flexible application of the cord seat assembly from the standpoint of the installation location.

[0022] Although a specific embodiment has been illustrated and described, numerous modifications and variations are still possible without departing from the teachings according to the present invention. The scope of the invention is limited by the accompanying claims.

Claims

1. A cord seat assembly comprising:

a seat (1) including a through-hole (13);
a spool (2) rotatably supported by the seat (1), the spool (2) including a cord winding section (22) having a cord coupling section (23) on an end thereof distant to the through-hole (13) of the seat (1), with the cord winding section (22) including a cross-section having a pair of diametrically opposed clamping sections (24) and a pair of diametrically opposed buffering sections (25) orthogonal to the clamping sections (24), with a distance (h) between the buffering sections (25) being smaller than that (g) between the clamping sections (24), with each said clamping section (24) including an arcuate outer face for providing tight engagement with the cord (3), with each said buffering section (25) including an arcuate outer face for providing less tight engagement with the cord (3) than the clamping sections (24); and
a cord (3) including a first end (31) fixed to the cord fixing section (23) of the spool (2) and a second end extending through the through-hole (13) of the seat (1), with the cord being movable along a retrieving direction and a releasing direction.

2. The cord seat assembly as claimed in claim 1 with the cord winding section (22) having increasing diameter toward the through-hole (13).

3. The cord seat assembly as claimed in claim 1 with the first end (31) of the cord (3) being an enlarged end, and with the cord fixing section (23) including a through-hole (232) having a diameter larger than that of the first end (31) of the cord (3), with the cord fixing section (23) further including a coupling section (231) in communication with the through-hole (232) of the cord fixing section (23) and having a diameter smaller than that of the first end (31) of the cord (3).

4. The cord seat assembly as claimed in claim 1 with the seat (1) including an end with an end wall (11) adjacent to the through-hole (13) of the seat (1), with a first lateral extension wall (14) extending from a first side of the end wall (11) along a first lateral side of the seat (1) and including a first guiding section (141), with the first guiding section (141) including a first guiding face (142) toward the other end of the seat (1), and with the cord (3) that has passed through the through-hole (13) abutting against and being guided by the first guiding face (142) onto the spool (2) when the spool (2) is turned in the retrieving direction of the cord (3).

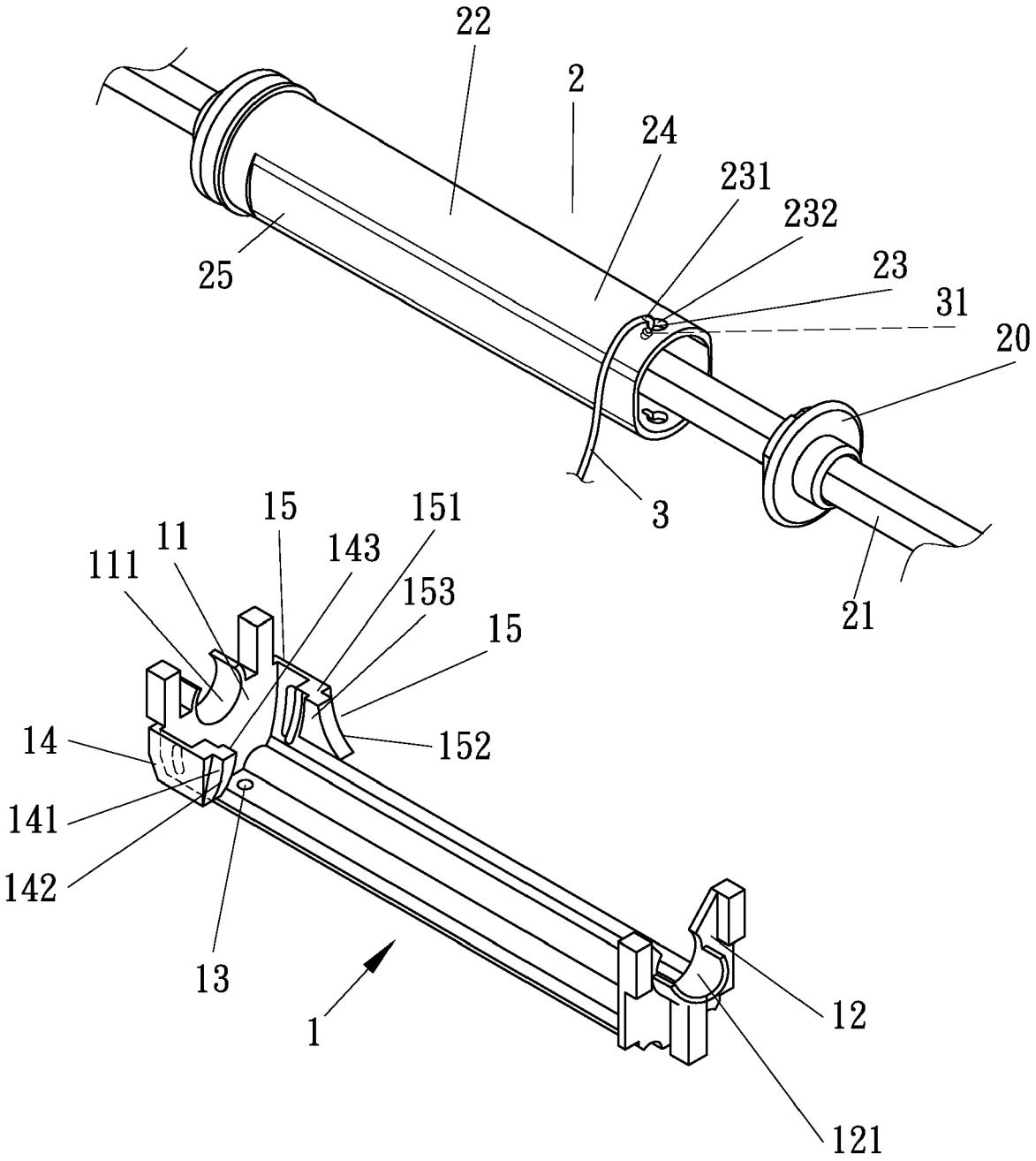
5. The cord seat assembly as claimed in claim 4 with a distance between the first guiding face (142) and the through-hole (13) gradually increasing upward ($a < b$).

6. The cord seat assembly as claimed in claim 4 or 5 with the end wall (11) of the seat (1) further comprising a second lateral extension wall (15) extending from a second side of the end wall (11) opposite to the first side of the end wall (11) along a second lateral side of the seat (1) opposite to the first lateral side of the seat (1), with the second lateral extension wall (15) including a second guiding section (151) having a second guiding face (152) opposite to the first guiding face (142), with the second guiding face (152) guiding the cord that has passed through the through-hole (13) onto the spool (2) when the spool (2) is turned in the retrieving direction of the cord (3).

7. The cord seat assembly as claimed in claim 6 with a distance between the second guiding face (152) and the through-hole (13) gradually increasing downward (c < d).

8. The cord seat assembly as claimed in claim 6 or 7 with the cord (3) coming into contact with the first guiding face (141) of the first lateral extension wall (14) before the cord (3) comes into contact with the second guiding face (152) of the second lateral extension wall (15).

9. The cord seat assembly as claimed in claim 8 with a distance (i) between an inner face (143) of the first guiding section (141) and an outer periphery of the spool (2) being smaller than a diameter of the cord (3), and with a distance (j) between an inner face (153) of the second guiding section (151) and the outer periphery of the spool (2) being smaller than the diameter of the cord (3).


22
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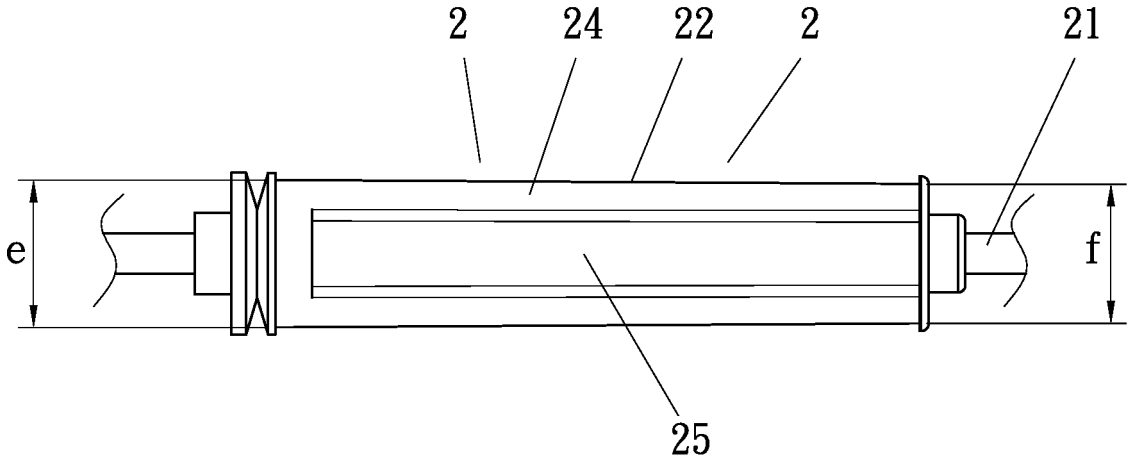


FIG.2

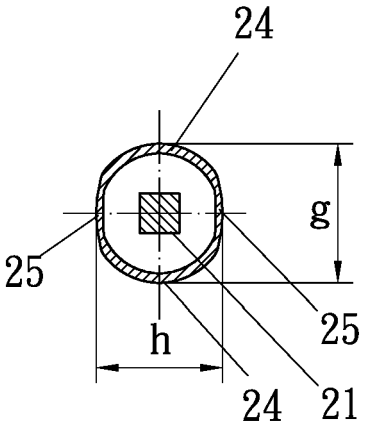


FIG.3

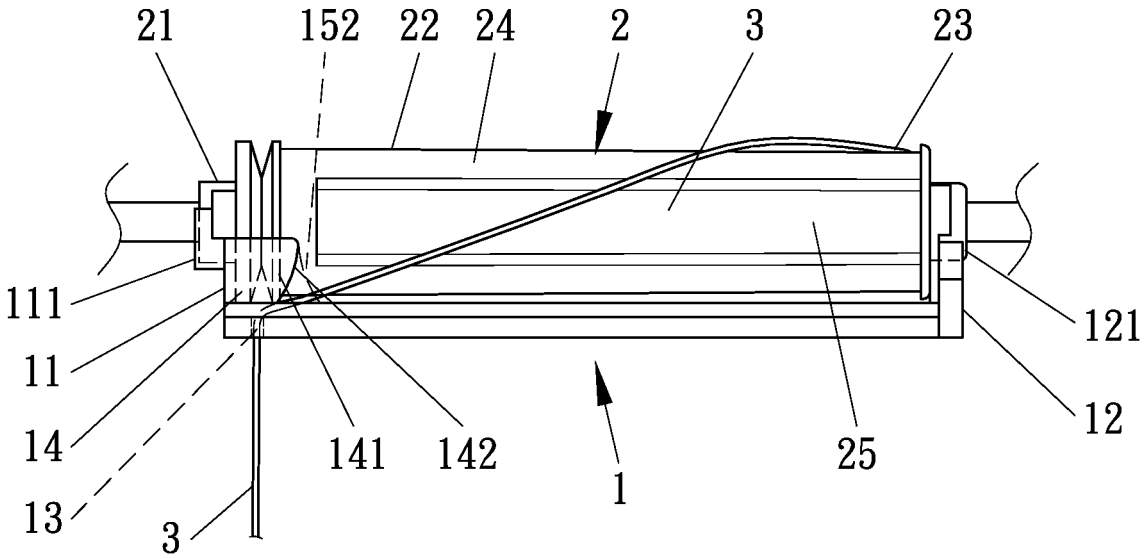


FIG. 4

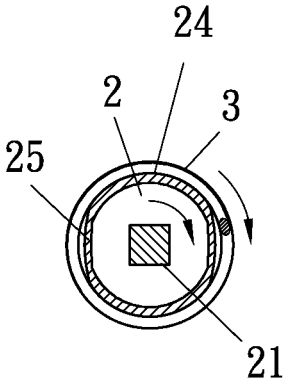
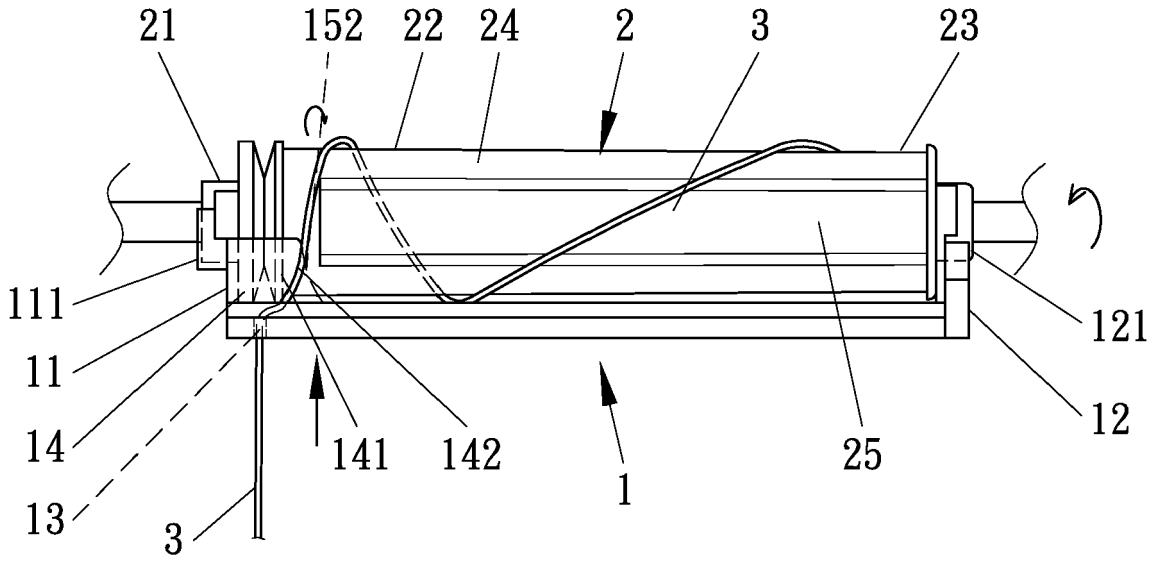


FIG. 5



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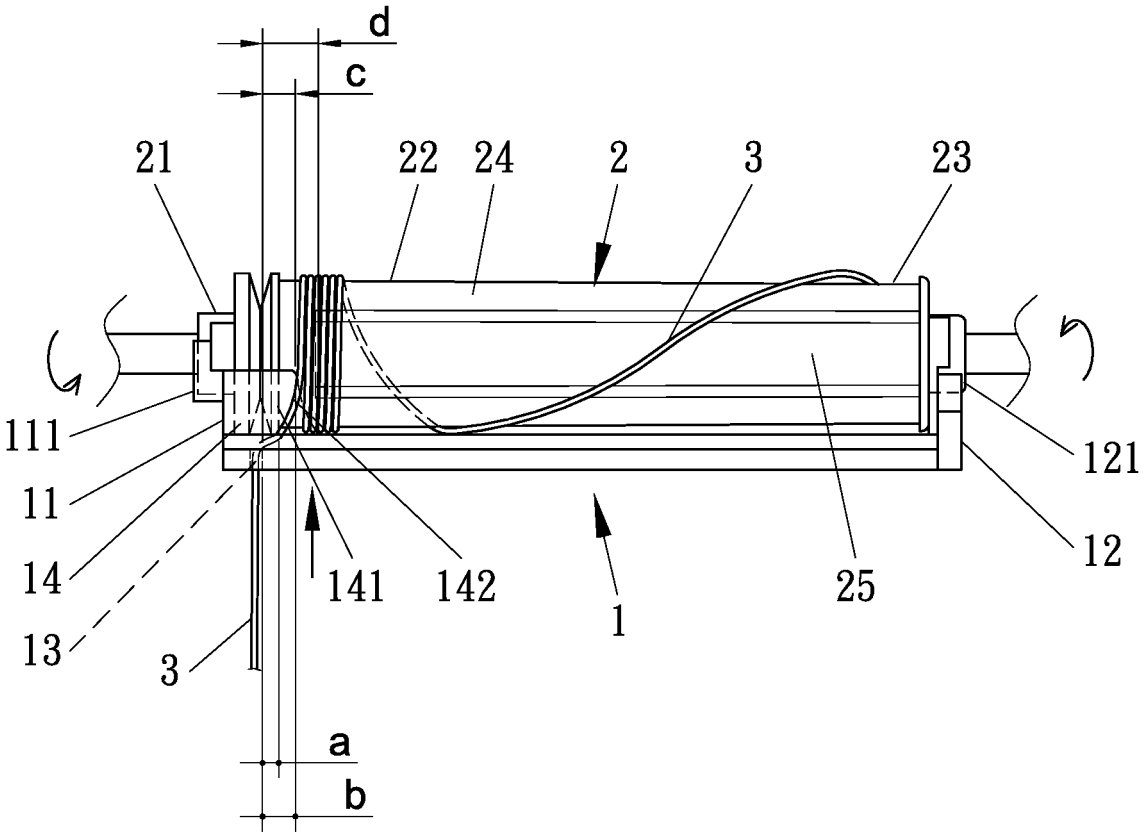

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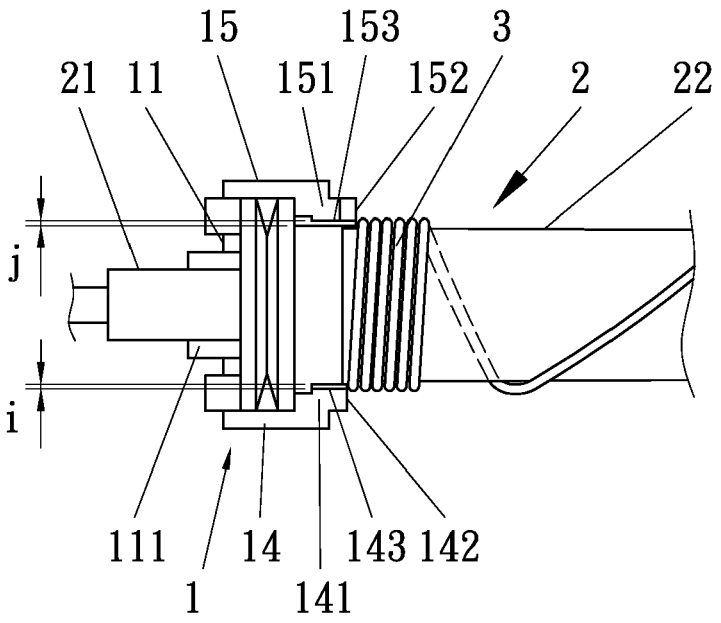

FIG.8

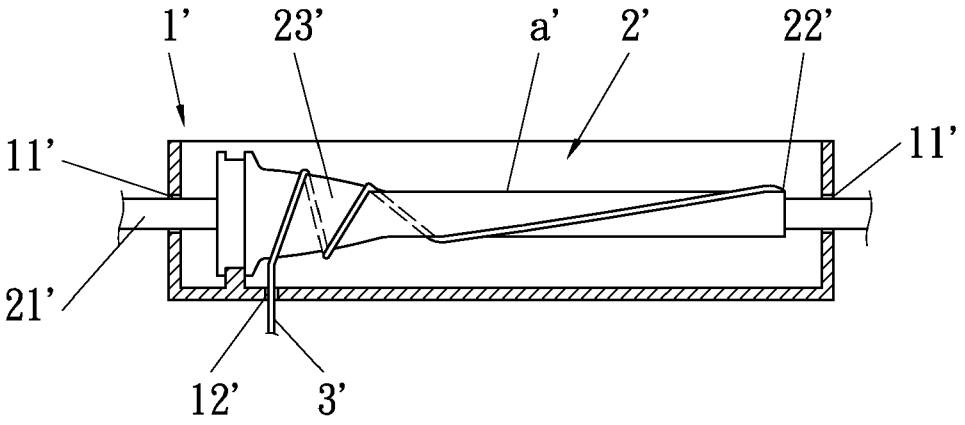

FIG.9(PRIOR ART)

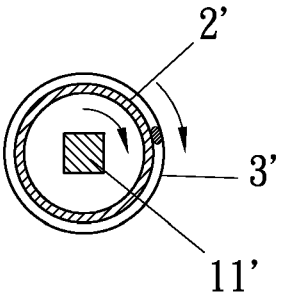

FIG.10(PRIOR ART)

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 10 8075

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	DE 20 2007 000455 U1 (HSU MU CHUAN [TW]) 19 April 2007 (2007-04-19) * the whole document *	1-4	INV. E06B9/322
Y		5-9	

Y	US 2006/237571 A1 (HSU MU-CHUAM [TW]) 26 October 2006 (2006-10-26) * the whole document *	5-9	

TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 October 2007	Geivaerts, Dirk

CATEGORY OF CITED DOCUMENTS

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23-10-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202007000455 U1	19-04-2007	TW 300087 Y	01-11-2006
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