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(71) Applicant (for all designated States except US):
HUNTER DOUGLAS INDUSTRIES B.V. [NL/NL];
Piekstraat 2, NL-3071 EL Rotterdam (NL).

(72) Inventors; and

(75) Inventors/ Applicants (for US only): **TICOALU, Johann Rouben Reinier** [DE/NL]; Vergiliusstraat 35, NL-23 14 CK Leiden (NL). **BOHLEN, Jorg** [DE/DE]; Am Ritzeberg 7, 27607 Langen (DE).

(74) Agents: **SMITH, Samuel Leonard** et al; J.A. Kemp & Co., 14 South Square, Gray's Inn, London WC1R 5JJ (GB).

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(54) Title: PULL CORD ON HEADRAIL FOR OPERATING A MOTORIZED BLIND

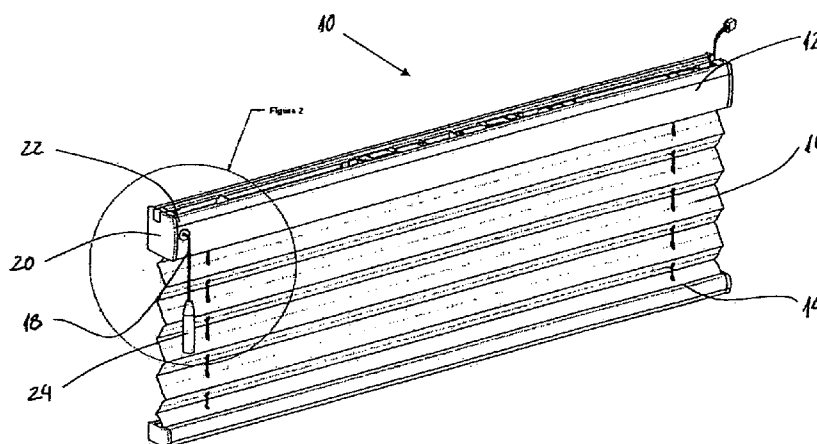


Figure 1

(57) Abstract: A motorized blind (10) having a pull cord (18). The pull cord is mechanically connected to an electrical switch (48) in a headrail (12) of the blind, the switch being electrically connected to an electric motor (30) within the headrail. The pull cord (18) also extends outwardly of an end of the headrail and then outwardly and downwardly of the blind through a hole (50) in the front of an end cap on the headrail.



Pull Cord on Headrail for Operating a Motorized Blind

The invention relates to a motorized blind that is operated by a pull cord. The invention particularly relates to a blind with a pull cord which is mechanically connected to an electrical switch that is within the headrail of the blind and that is electrically connected to an electric motor within the headrail.

In known motorized blinds, manually-operated, electrical switches have been provided on the front of their headrails for allowing the owners of the blinds to turn on and off electric motors in the headrails to raise and lower window covering fabrics, slats or cells of the blinds. See US 5990646. However, it has been rather inconvenient for owners of such motorized blinds to have to reach up to the switches on the headrails of such blinds each time that they wish to raise and lower the window coverings of the blinds.

Accordingly, it is an object of this invention to provide a more convenient way for an owner of such a motorized blind to raise and lower the window covering of the blind by providing the blind with a pull cord which is mechanically connected to an electrical switch in a headrail of the blind; the switch being electrically connected to an electric motor within the headrail; and the pull cord also extending outwardly of an end of the headrail and then outwardly of the front of the blind.

Advantageously, the pull cord extends outwardly of the end of the headrail through a first hole in the end of the headrail.

Also advantageously, the pull cord extends outwardly of the front of the blind, through a second hole in the front of a removable end cap on the end of the head rail. In this regard, it is especially advantageous that the pull cord then extends downwardly from the second hole and that a bottom portion of the pull cord is attached to a cord weight beneath the end cap.

Further advantageously, a top portion of the pull cord is attached to the interior of the end of the headrail and extends, from there, through a third hole in a movable lever that is mechanically connected to the electrical switch within the headrail and, from there, through a first hole in the end of the headrail. It is particularly advantageous that the pull cord extends frontally from the first hole in the end of the headrail through the second hole in the front of the end cap. It is quite particularly advantageous that the pull cord

extends downwardly from the second hole in the end cap and a bottom portion of the pull cord is attached to a cord weight beneath the end cap.

Further advantageous aspects of the invention will become clear from the following description of a preferred embodiment and from the claims. The invention will now be described with reference to the accompanying drawings, in which:

- Figure 1 is a perspective view of a blind with a pull cord extending downwardly from a hole in the front of an end cap on a left end of a headrail of the blind;
- Figure 2 is a detailed view of the pull cord extending downwardly from the hole in the end cap of the blind in Figure 1;
- Figure 3 is a perspective view of the blind of Figure 1 with its headrail removed;
- Figure 4 is a detailed view of the pull cord extending downwardly from the hole in the end cap of the blind as shown in Figure 3;
- Figure 5 is a front view of the interior of the left end of the headrail of the blind as shown in Figure 3 with the end cap removed;
- Figure 6 is a left side view of the interior of the left end of the headrail of the blind as shown in Figure 5;
- Figure 7 is a top view of the interior of the left end of the headrail of the blind as shown in Figure 5;
- Figure 8 is a perspective view of the interior of the left end of the headrail of the blind as shown in Figure 5; and
- Figure 9 is an exploded view of the interior of the left end of the headrail of the blind as shown in Figure 5.

Figures 1 and 2 show a motorized blind 10 with a headrail 12, bottom rail 14 and a pleated fabric shade material 16 as a window covering between the rails 12,14. A pull cord 18 extends outwardly of the front of the blind 10 through a removable end cap 20 on the left end 22 of the headrail 12. From there, the pull cord 18 extends downwardly of the blind to a conventional cord weight 24 on the bottom of the pull cord 18, beneath the left end cap 20.

Figures 3 and 4 show the motorized interior of the headrail 12 of the blind 10. In this regard, the headrail contains an electric motor 30 with electrical connection cables 32, extending out of the headrail toward a conventional source of electric power (not shown). The motor is adapted to wind and unwind lift cords 34, the bottom of each of which is attached to the bottom rail 14, to raise and lower the fabric shade material 16. In this regard, the motor 30 is mechanically connected, by means of a conventional longitudinally-extending shaft 36, to conventional winding spools 38, each of which is attached to the top of one of the lift cords 34. As best seen in Figure 3, the shaft 36 extends longitudinally through the headrail 12 (not shown) and through the winding spools 38. Rotation of the motor 30 in one direction can wind the lift cords 34 about the winding spools 38, and rotation of the motor in an opposite direction can unwind the lift cords 34 from about the winding spools 38. A limit switch (not shown) is preferably provided in the motor 30 to prevent it from over-rotating in either direction.

Figures 3-9 show the interior of the headrail 12 and the hardware components therein. As best seen in Figures 5-9, a top portion 40 of the pull cord 18 is attached to the interior of the left end 22 of the headrail 12 and extends, from there, rightwardly and frontwardly to a free end 44 of a movable lever 46. The lever 46 is mechanically connected to an electrical switch 48 within the headrail. The lever 46 and switch 48 are mounted in a holder 49 attached to the top of the left end of the blind 10 within the headrail 12. The pull cord 18 is mechanically and slidably connected to the free end 44 of the lever 46 which extends from the switch 48 towards the left end 22 of the headrail. The switch 48 is electrically connected to the electric motor 30 within the headrail. From the free end 46 of the movable lever 46, the pull cord 18 extends leftwardly and rearwardly out of the left end 22 of the headrail 12, and from there, the pull cord 18 extends frontwardly through the front of the left end cap 20 and then downwardly to the cord weight 24 on the bottom of the pull cord 18, beneath the left end cap 20, as shown in Figures 1-4.

The motor 30 can be any conventional DC motor for the headrail of retractable window coverings. The motor (30) is preferably a DC motor as described, for example, in US 5990646 and WO2010/011751.

Likewise, the switch 48 can be any conventional mechanical switch for providing an electric signal to the motor 30 to change its direction of rotation as described, for example, in US 7399940 and US 7652439.

As best seen in Figures 5-9, a first rounded, longitudinally-extending hole 50 is provided in the left end 22 of the headrail 12 and the holder 49 therein to facilitate the passage of the pull cord 18 outwardly of the headrail and actuator. A first friction-reducing grommet 52 is preferably provided in the first hole 50.

As best seen in Figures 1-4, a second rounded, laterally-extending hole 54 is provided in the front of the removable left end cap 20 on the headrail 12 to facilitate the passage of the pull cord 18 outwardly of the left end cap. A second friction-reducing grommet 56 is preferably provided in the second hole 54.

As best seen in Figures 5 and 7, a third rounded vertically-extending hole 58 is provided in the free end 44 of the movable lever 46 to facilitate the sliding and mechanical connection of the pull cord 18 with the lever's free end 44. A third friction-reducing grommet 60 is preferably provided in the third hole 58.

Preferably, as shown in Figure 7, the pull cord 18 forms approximately a right angle at the first hole 50. As also shown in Figure 7, the two strands 18A and 18B of the pull cord 18, connected to the lever's free end 44, preferably form an acute angle at the third hole 58, particularly an angle of about 25-45 degrees. Thereby, the two pull cord strands 18A, 18B form a pulley arrangement to make it easier to move the lever 46 by pulling on the bottom portions of the pull cord.

As best seen in Figures 6-8, a fourth laterally-extending hole 62 is preferably provided in the left rear end 44 of the holder 49, and the top portion 40 of the pull cord 18 extends outwardly of the holder 49 through the fourth hole 62. The top end of the pull cord 18, outside the holder 49, is preferably knotted to hold the pull cord on the blind 10.

The pull cord 18 can be made of any conventional high-strength polymer material such as nylon or polyester.

It is believed that the operation and construction of the invention will be apparent from the foregoing description. To one skilled in this art, it will be

clear that the invention is not limited to the embodiment described herein. Also kinematic inversions are considered inherently disclosed and to be within the scope of the invention. Further, expressions such as: "top", "bottom", "interior", "downwardly", "front", "rear", "laterally" and "longitudinal" should be construed as relative terms which include equivalents for the structures disclosed. For example, the removable left end cap 20 with its second hole 54 and the outwardly-extending portions of the pull cord 18 and the holder 49 with the switch 48 and lever 46 could all be on the right end, rather than the left end, of the headrail 12 of the blind 10.

CLAIMS

1. A motorized blind having a pull cord; said pull cord being mechanically connected to an electrical switch in a headrail of said blind; said switch being electrically connected to an electric motor within said headrail; said pull cord also extending outwardly of an end of said headrail and then outwardly of the front of said blind.
2. The blind of claim 1 wherein said pull cord extends outwardly of said end of said headrail through a first hole in said end.
3. The blind of claim 1 or 2 wherein said pull cord extends downwardly of the front of said blind and a bottom portion of said pull cord is attached to a cord weight.
4. The blind of claim 1 or 2 wherein said pull cord extends outwardly of the front of said blind through a second hole in the front of a removable end cap on said end of said headrail.
5. The blind of claim 4 wherein said pull cord extends downwardly from said second hole and a bottom portion of said pull cord is attached to a cord weight beneath said end cap.
6. The blind of any one of claims 2-5 wherein a top portion of said pull cord is attached to the interior of said end of said headrail and extends, from there, to a free end of a movable lever that is mechanically connected to said electrical switch within said headrail and extends, from there, through said first hole in said end of said headrail; said pull cord being slidably and mechanically connected to said free end of said lever.
7. The blind of claim 6 wherein said pull cord is slidably and mechanically connected to a third hole in said free end of said lever.

8. The blind of claim 6 or 7 wherein said pull cord extends frontally from said first hole in said end of said headrail through said second hole in the front of said end cap.

9. The blind of any one of claims 2-8 wherein a friction-reducing grommet is provided in one or more of said first, second and third holes.

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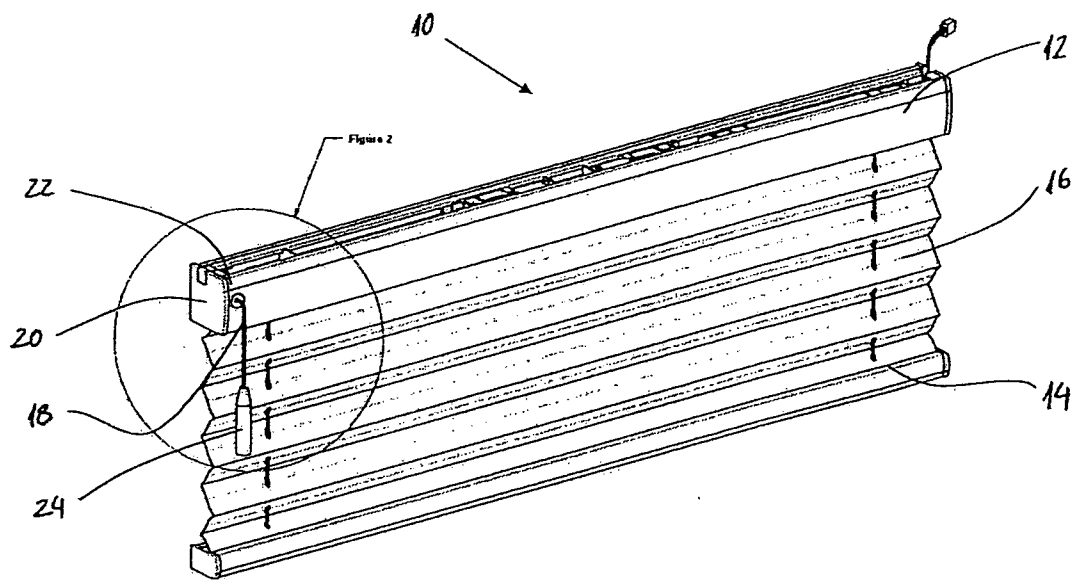


Figure 1

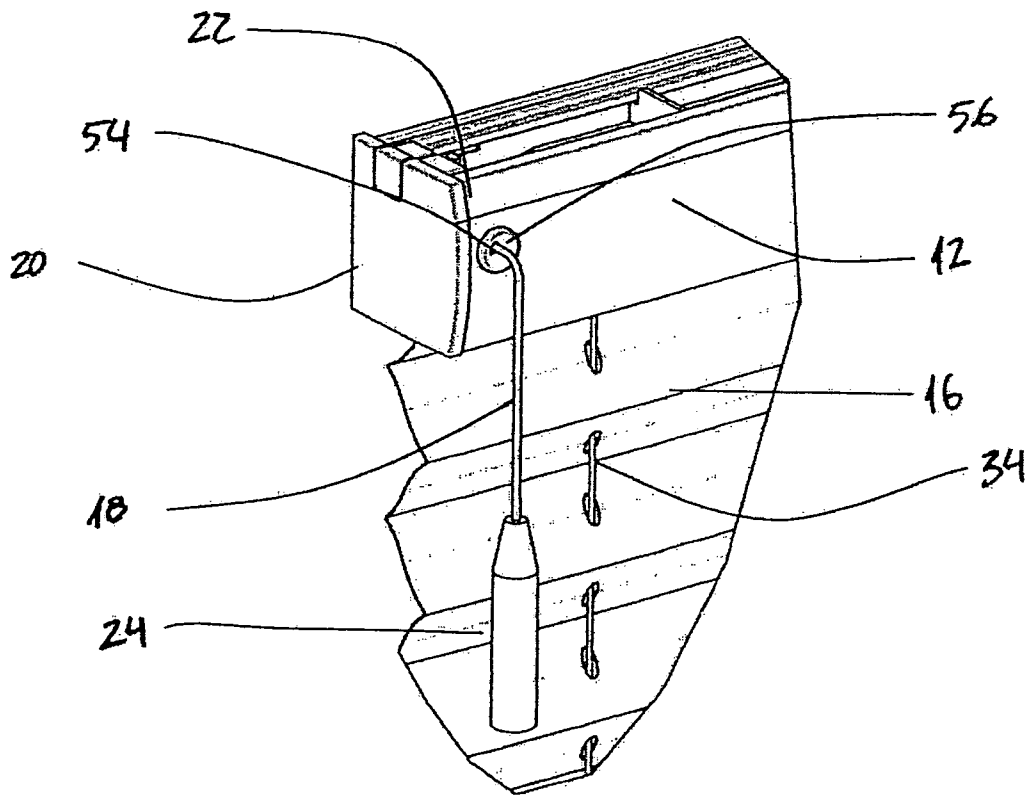


Figure 2

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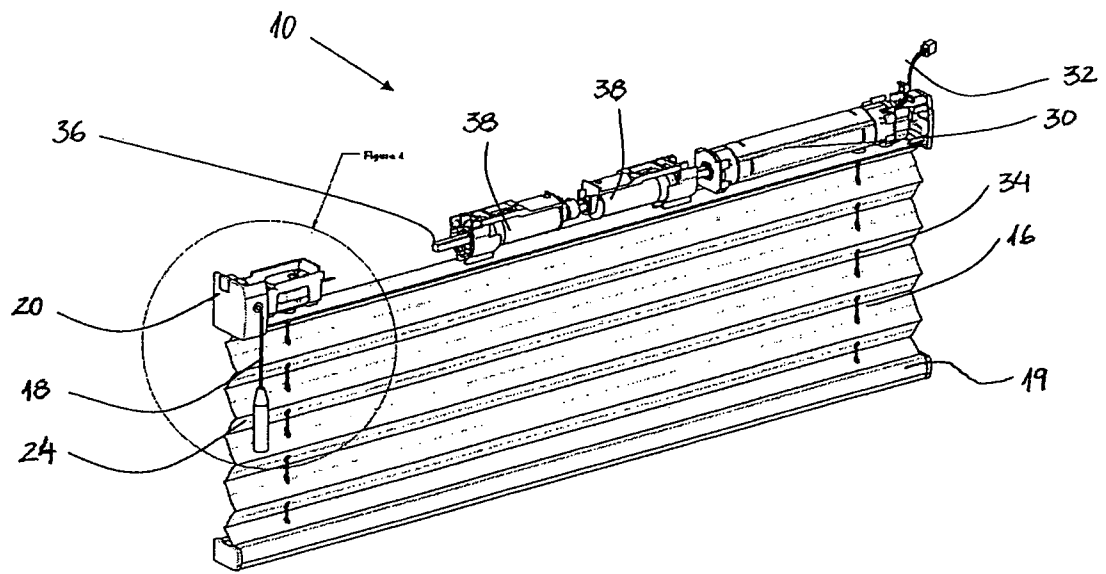


Figure 3

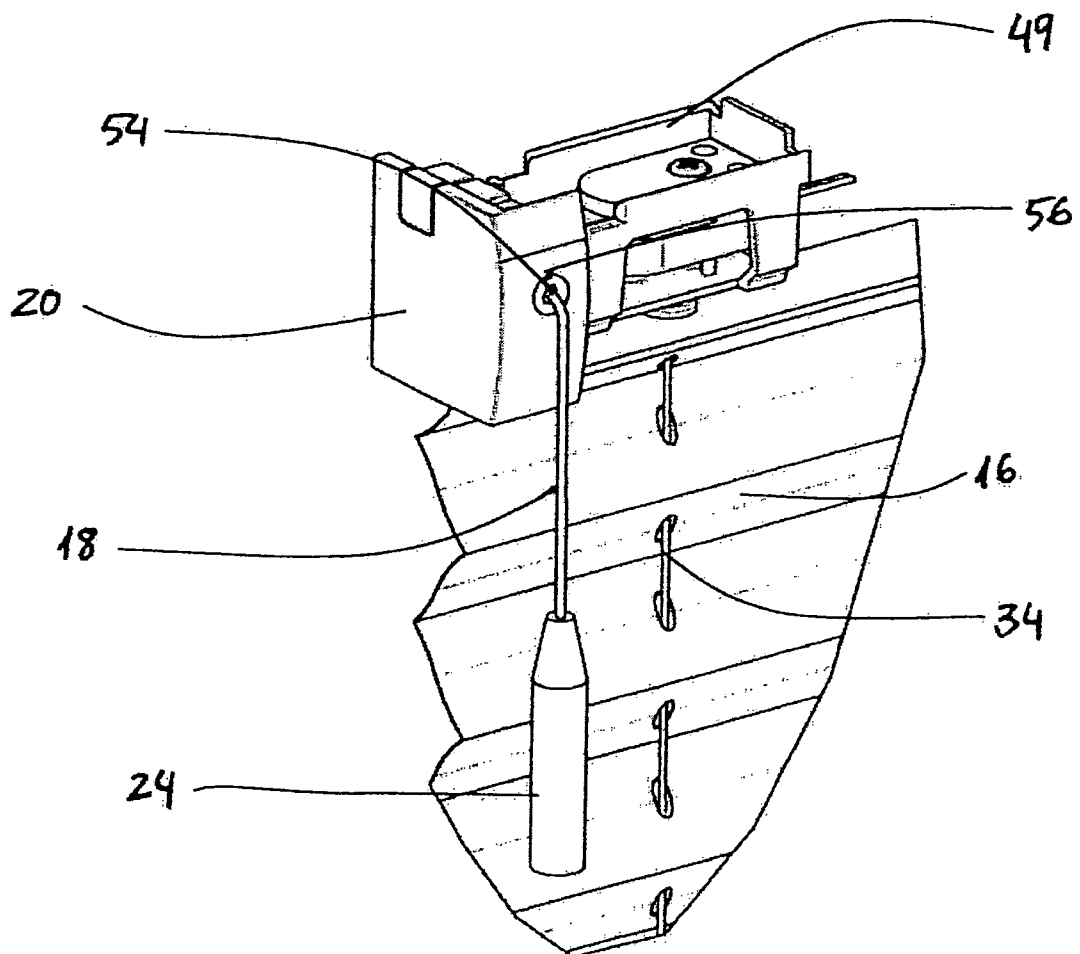


Figure 4

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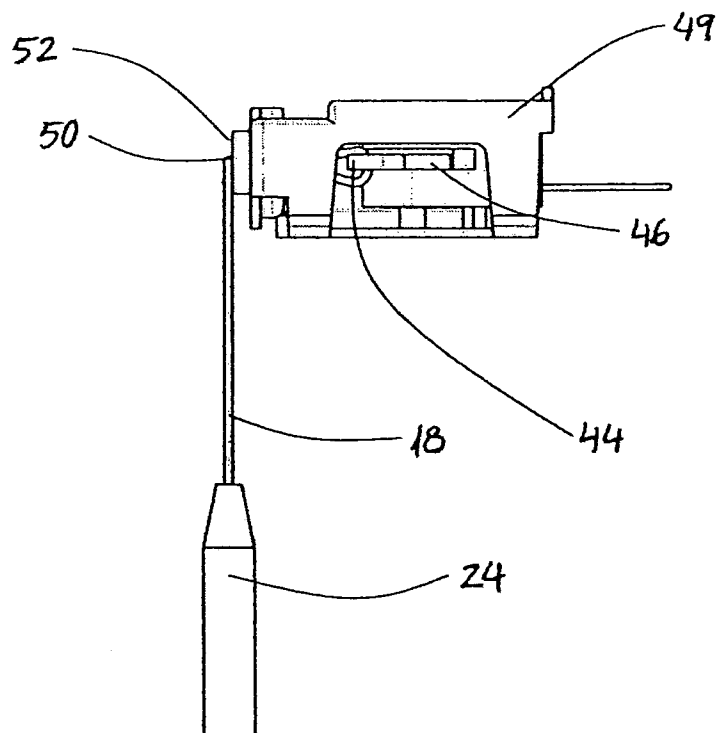


Figure 5

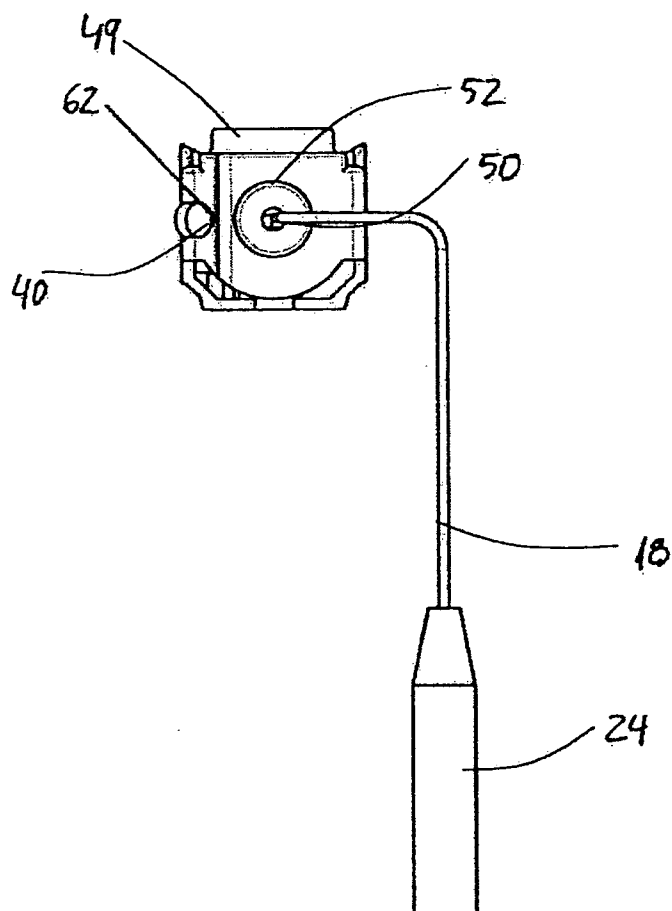


Figure 6

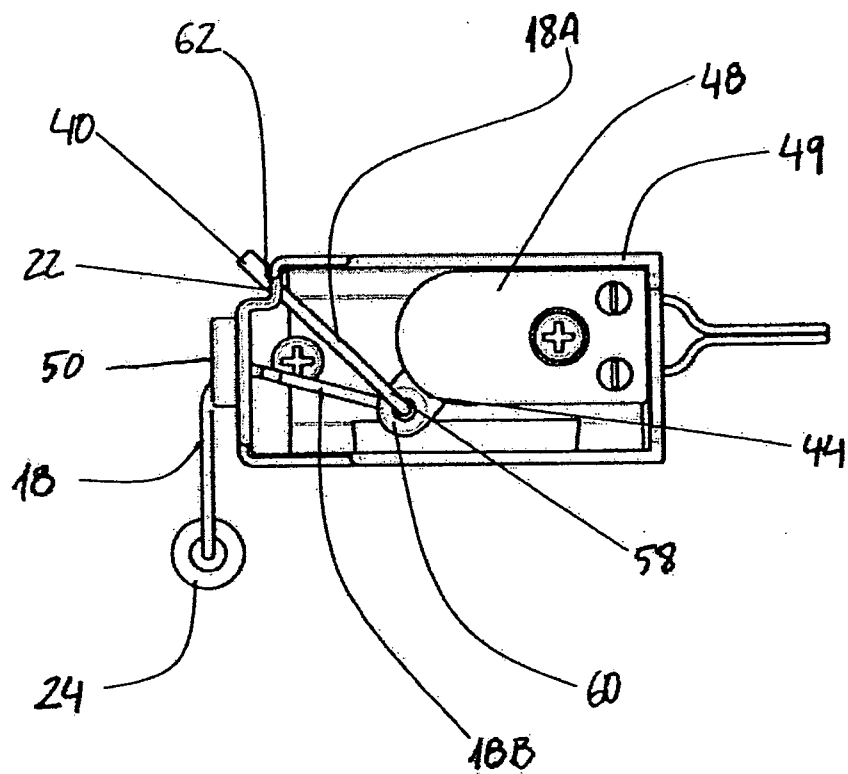


Figure 7

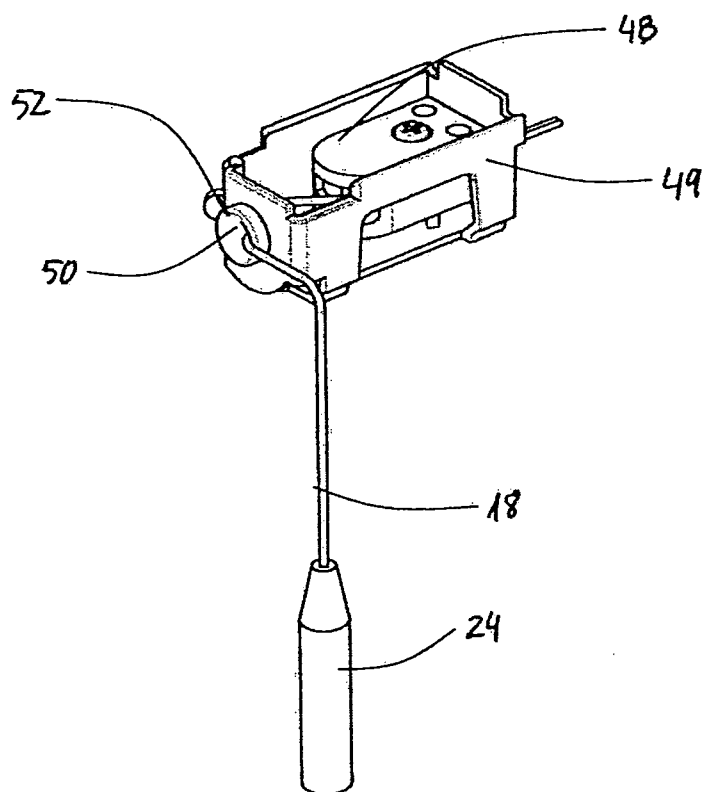


Figure 8

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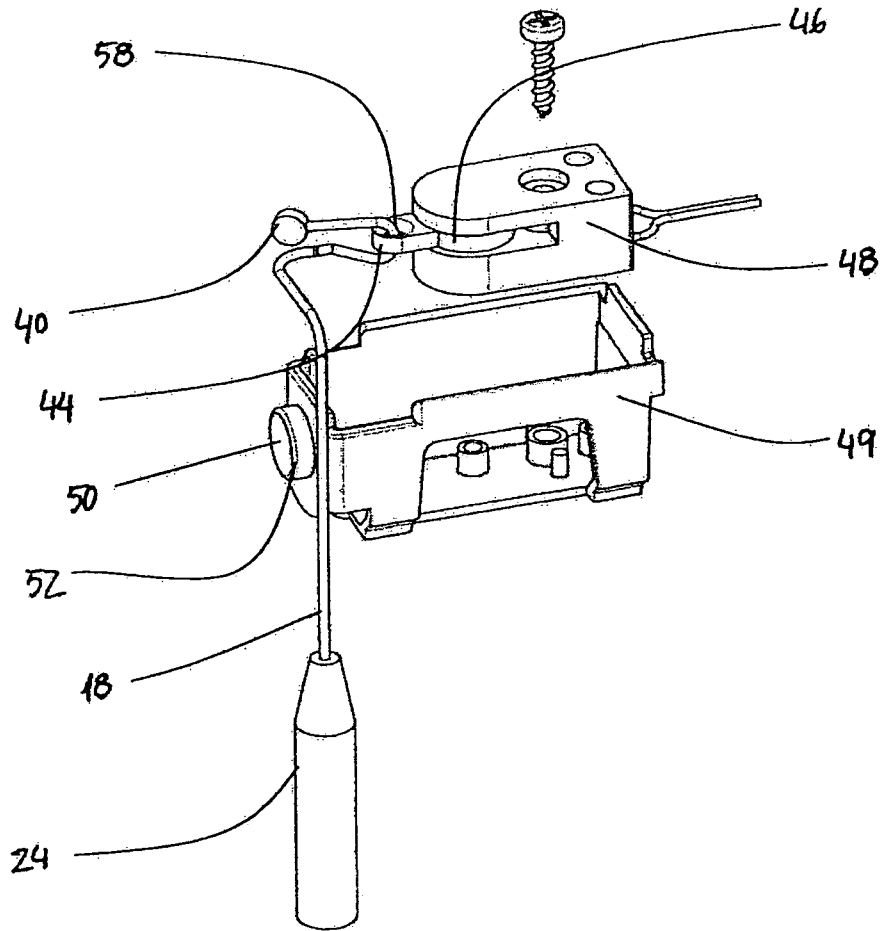


Figure 9

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2011/003117

A. CLASSIFICATION OF SUBJECT MATTER
 INV. E06B9/262 E06B9/78
 ADD.

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)
 E06B

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

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 990 646 A (KOVACH JOSEPH E [US] ET AL) 23 November 1999 (1999-11-23) cited in the application the whole document -----	1-9
Y	US 2009/039805 A1 (TANG YUNG YU [TW]) 12 February 2009 (2009-02-12) the whole document -----	1-9



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search

27 October 2011

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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

Merz, Wolfgang

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2011/003117

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