(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 816 297 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.08.2007 Bulletin 2007/32

(51) Int Cl.:
E05F 15/00 *(2006.01)* ***E06B 9/88*** *(2006.01)*

(21) Application number: **07250484.8**

(22) Date of filing: **06.02.2007**

(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 NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **07.02.2006 GB 0602383**

(71) Applicant: **Ansa Door Systems Limited**
Brierley Hill,
DY5 3EL (GB)

(72) Inventor: **Pincher, Steven**
Wordsley, West Midlands DY8 5PE (GB)

(74) Representative: **Moffat, John Andrew**
Marks & Clerk
Alpha Tower
Suffolk Street Queensway
Birmingham B1 1TT (GB)

(54) Improvements in and relating to doors

(57) The present invention relates to an improvement to roller shutter doors comprising a curtain of linked slats operating between channels at the side of the door opening in a plane of opening between a retracted position allowing access and a deployed position closing such access. It is an advantage of the present invention that it allows for ready detection when the door encounters an obstacle while allowing for the construction of a robust and durable weather strip. In a first aspect a roller shutter door assembly comprises a central control unit (6), a motor (8) actuable by the central control unit to drive a roller (4), and a roller shutter curtain (2) connected to the roller and comprising a plurality of interlocking slats including at least a first slat and an adjacent second slat, each of the plurality of slats having a degree of play therebetween and being connected for pivoting movement therebetween, guide means (10) to each side of the curtain to guide the movement of the curtain, and signal means (52), in which the roller shutter door assembly further comprises a detection means (20) such that a predetermined relative vertical displacement between the first slat and the second slat will cause the detection means to actuate the signal means to send a signal to the central control unit (6), the central control unit then operating to stop the motor (8). In a second aspect the invention comprises a detection means (20,120) for fitting to a roller shutter door comprises a switch assembly itself comprising a signalling means (50,150), an actuating lever (26,126) and a return means.

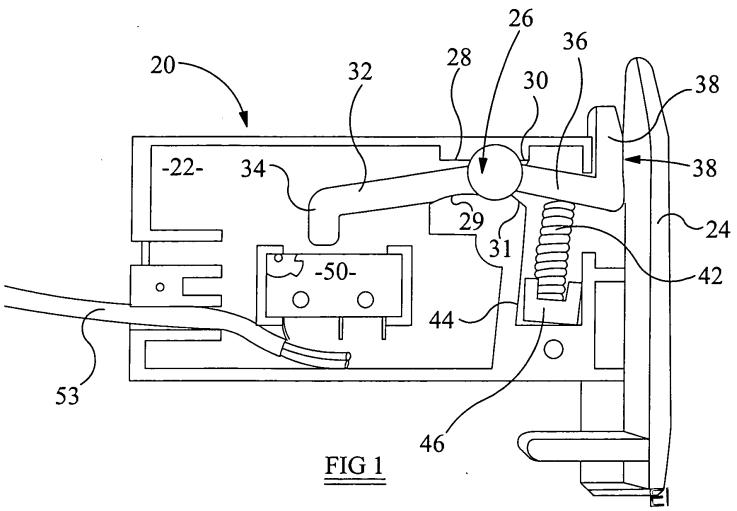

FIG 1

EP 1 816 297 A2

Description

[0001] The present invention relates to an improvement to doors and in particular to roller shutter doors. Such doors have many applications but are becoming increasingly common in a domestic situation for example as garage doors.

[0002] Such doors comprise a curtain of linked slats operating between channels at the side of the door opening in a plane of opening between a retracted position allowing access and a deployed position closing such access. The leading edge of the roller door is typically provided with a weather seal or strip along a bottom edge of a lowermost slat. End lock units in the form of plastics mouldings may be provided at the ends of the slats to aid in the control of movement of the slats in the channels. In normal operation, a control unit actuates a roller drive to raise and lower the curtain. The control unit conveniently operates in response to signals from a remote control device such as a hand held key fob transmitter.

[0003] There are a number of requirements for such doors. These include a number of safety requirements. For example, such doors should not close onto a vehicle or other obstruction in the line of closing of the door. This may be avoided by the use of an optical detector arranged such that if a beam across the plane of the door is broken, the roller door will be actuated to retract to move a leading edge of the door away from the floor.

[0004] It is also a safety requirement that the door should be able to detect an impact, for example if the optical beam remains unbroken while the roller door is being deployed. It is known in this regard it is known to locate a switch such as an electrical contact strip switch within the weather seal such that impact with an obstruction will cause the strips to touch, causing a signal to be generated such that the roller door will be actuated to retract to move a leading edge of the door away from the floor.

[0005] However, there is then a conflict in the requirements for the weather strip. The weather strip must be robust to provide a suitable seal in bad weather. However, the weather strip must also be sufficiently flexible to allow for deformation of the bimetallic strip upon encountering an obstacle. Since the weather strips are predominantly made of rubber, if the weather strip is too thin (to allow for flexibility) it may perish during the operational life of the door, requiring replacement.

[0006] Other forms of switches have been proposed. For example, a pneumatic system where the weather strip is formed as a hollow member connected to a pressure switch by way of a capillary tube. On encountering an obstruction the weather strip is compressed actuating the pressure switch thereby signalling an obstruction has been encountered. However, again the need to construct a suitably flexible weather strip runs counter to the durability requirement for the weather strip.

[0007] It is an advantage of the present invention that it allows for ready detection when encountering an obstacle and allows for the construction of a robust and durable weather strip.

[0008] According to a first aspect of the present invention a roller shutter door assembly comprises a central control unit, a motor actuable by the central control unit to drive a roller, and a roller shutter curtain connected to the roller and comprising a plurality of interlocking slats including at least a first slat and an adjacent second slat, each of the plurality of slats having a degree of play therebetween and being connected for pivoting movement therebetween, guide means to each side of the curtain to guide the movement of the curtain, and signal means, characterised in that the roller shutter door assembly further comprises a detection means such that a predetermined relative vertical displacement between the first slat and the second slat will cause the detection means to actuate the signal means to send a signal to the central control unit, the central control unit then operating to stop the motor.

[0009] Preferably, on receipt of the signal, the central control unit operates first to stop and then reverse the motor.

[0010] Preferably the first slat is a lowermost slat.

[0011] Preferably, the detection means comprises a switch assembly comprising the signal means, an actuating lever and a return means. Conveniently, the return means comprises a helical spring.

[0012] More preferably, the detection means comprises two such switch assemblies.

[0013] According to a second aspect of the present invention a detection means for fitting to a roller shutter door comprises a switch assembly comprising a signal means, an actuating lever and a return means. Conveniently, the return means comprises a helical spring.

[0014] The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 shows a schematic view of a first embodiment of an end lock unit in accordance with the present invention;

Figure 2 shows a schematic view of the electronic components of the roller shutter door assembly in accordance with the present invention;

Figure 3 shows a schematic side view of a roller shutter door;

Figure 4 shows a schematic view of the first embodiment of an end lock unit together with a lower part of a roller shutter door;

Figure 5 shows the end lock unit and the lower part of the roller shutter door located in an operating position; and

Figure 6 shows a schematic view of a second embodiment of an end lock unit together with a lower part of a roller shutter door.

[0015] A roller shutter door comprises a number of elements. A flexible curtain 2 comprising a plurality of elon-

gate slats connected along their horizontal edges is wound and unwound about a driven roller 4 located above an opening, such as a door opening. The driven roller 4 is conveniently located behind a lintel 5 extending across the opening. The vertical ends of the slats are adapted to run in guide means or channels 10 located on each side of the opening. The lowermost slat 12 is typically provided along a bottom edge with a weather strip 16 to seal the opening when the curtain is deployed. References to horizontal and vertical will be understood to refer to these orientations when the flexible curtain is deployed.

[0016] The connection between adjacent slats along their horizontal edges comprises interlocking scroll joints, such that there is a degree of vertical play between adjacent slats as well as a continuously formed hinged joint. Conveniently, the slats are formed from lightweight aluminium roll formed to shape and filled with an insulating foam. However, slats formed in other ways enjoying a degree of vertical play between adjacent hingedly connected slats may be used.

[0017] Referring to Figure 1, there is shown a detection means 20 for use in accordance with the present invention. The detection means 20 is shown in the illustrated embodiments (Figures 4 and 5) as fitted to the lowermost slat 12 of the curtain 2. However, it will be understood that many of the advantages of the present invention may be obtained by locating such a detection means in other of the slats of the curtain.

[0018] The detection means 20 comprises a housing 22 in which the other elements of the detection means may be contained and an end piece 24 adjacent the housing. The end piece 24 conveniently may be formed integrally with the housing 22. The end piece 24 serves the function of known end lock units and serves to assist in the control of movement of the slats in the channels 10.

[0019] A biased actuating lever 26 is located within the housing 22 for pivoting movement about a pivot pin (not shown). The pivot pin may be secured to the housing 22 or formed integrally therewith. The housing 22 conveniently provides abutment surfaces 28,29,30,31 to each side of the actuating lever 26 to limit the movement of the actuating lever 26.

[0020] At a first side, the actuating lever 26 comprises a first member 32 having a depending foot 32. At a second, opposite side the actuating lever 26 comprises a second member 36 having an upwardly directed finger 38. The upwardly directed finger 38 extends through a window 40 in the housing 22. The window 40 is located adjacent to the end piece 24 of the detection means 20.

[0021] The actuating lever 26 is biased by biasing means into a first position. In the illustrated embodiment, this is achieved by a helical spring 42. The helical spring 42 is located in a well 44 defined in the housing 22. In the illustrated embodiment, the helical spring 42 is located between an abutment member 46 located at bottom surface of the well and the second member 36 to the second side of the actuating lever 26.

[0022] In the first position the foot 34 of the actuating lever 26 abuts a microswitch 50. The microswitch 50 is electrically connected to a signal means 52, by wires 53. In use, the wires 53 are connected to the microswitch 50. The microswitch 50 acts as a signalling means for the signal means 52. The signal means 52 is in turn adapted to send a signal to a central electronic control unit 6. Conveniently, the signal means 52 is mounted to a rear of the slat within which the detection means 20 is located. With the actuating lever 26 in the first position, the electronic control unit 6 may operate the door curtain 2 freely, for example in response to signals from a remote control unit such as a key fob unit 55.

[0023] As shown in Figure 5, the detection means 20 may be located in one end of the lowermost slat 12. In contrast with known roller door construction, the lowermost slat 12 is slightly shorter than the slats above it in the door curtain 2. As a result, the finger 38 extends through the window 40, towards a lower surface 54 of the adjacent slat 14 located above the lowermost slat 12.

[0024] In use, should an obstacle be encountered during deployment of the curtain 2, the lowermost slat 12 will be prevented from further movement. Initially the adjacent slat 14 will continue to be driven and moves toward the lowermost slat 12. The lower surface 54 of the adjacent slat 14 will then cause the finger 38 to be depressed against the force of the biasing means in the form of the helical spring 42 and the actuating lever 26 to break contact with the microswitch 50. The microswitch 50 then causes the signal means 52 to signal the control unit 6. The control unit 6 then causes the motor 8 operating the driven roller 4 to stop and reverse thereby raising the roller curtain 2.

[0025] As the roller curtain 2 rises, the lower surface 54 of the adjacent slat 14 is drawn away from the lowermost slat 12 allowing the actuating lever 26 to be returned to the first position under the action of the biasing means.

[0026] The biasing means are so chosen such that chatter does not cause displacement of the actuating lever 26 sufficient to cause the microswitch to actuate the signal. Chatter is the relative movement between the slats during normal deployment of the roller curtain 2 caused by drag between the curtain and the side channels 10. The side channels 10 are typically provided with brush seals.

[0027] Conveniently, detection means 20 such as that described are located to each side of the curtain and are connected together, in such a way that actuation of one or both of the microswitches in the detection means 20 may actuate the signal means 52 to provide the signal to the control unit 6 thereby to provide a fail safe design.

[0028] While in the preferred embodiment the detection means are located in the lowermost slat 12, which is already of different construction to the other slats - the lowermost slat typically has a T-shaped slot to receive the weather strip 16 - location of the detection means 20 described in other of the slats is possible. While in the illustrated embodiment the lowermost slat is shortened

as compared to other slats, it will be understood that similar result will be obtained if a cut away portion or notch is cut in an upper part of the end of the lowermost slat 12, provided that the upwardly directed finger 38 is able to come into contact with the lower surface 54 of the adjacent slat 14 when movement of the lowermost slat 12 is halted by encountering an obstacle.

[0029] The shape of the actuating lever 26 and location of the pivot point for the actuating lever 26 may be chosen to suit the available height of the slat to which the detection means is to be fitted and the amount of acceptable play to be accommodated between adjacent slats. Typically, the actuating lever is designed such that movement of the upwardly directed finger 38 over a first third of its travel will not cause the microswitch to actuate the signal means, movement over the middle third will cause the microswitch to actuate, and movement over the final third allows for overtravel of the actuating lever.

[0030] An alternative embodiment is shown in Figure 6. Like reference numerals have been used to utilise like parts save for the addition of 100 to the relevant reference numeral.

[0031] In view of the smaller space available, the second member 136 of the actuating lever 126 is much shorter such that finger 138 is nearer the pivot point of the actuating lever 126. As a result a smaller deflection of the finger 138 is required to cause the foot 134 of the first member 132 to be deflected away from the microswitch 150. Due to the smaller movement of the actuating lever 126 fewer abutment surfaces 129 are required in the housing 120. The housing 122 may conveniently be provided with a removable cover 123. When in position within the slat 112, the cover 123 is held in place and serves to limit the possibility of ingress of dirt into the detection means 120.

[0032] It will be understood that the detection means of the present may be fitted to existing roller shutter doors, such as those known roller shutter doors described above, with little modification to such doors. The slat to which the detection means are to be fitted need only be shortened. The wires leading from the microswitch can be connected to the existing signal means used on the roller shutter door or a replacement signal means may be attached to the shortened slat. The use of the detection means of the present invention then allows the replacement of the weather strip of the existing roller shutter door with a more robust weather strip.

Claims

1. A roller shutter door assembly comprising a central control unit (6), a motor (8) actuable by the central control unit to drive a roller (4), and a roller shutter curtain (2) connected to the roller and comprising a plurality of interlocking slats including at least a first slat and an adjacent second slat, each of the plurality of slats having a degree of play therebetween and being connected for pivoting movement therebetween, guide means (10) to each side of the curtain to guide the movement of the curtain, and signal means (52), is **characterised in that** the roller shutter door assembly further comprises a detection means (20,120) such that a predetermined relative vertical displacement between the first slat and the second slat will cause the detection means (20,120) to actuate the signal means (52) to send a signal to the central control unit (6), the central control unit (6) then operating to stop the motor (8).

2. A roller shutter door assembly according to claim 1, **characterised in that** on receipt of the signal, the central control unit (6) operates first to stop and then reverse the motor (8).

3. A roller shutter door assembly according to claim 1 or claim 2, **characterised in that** the first slat is a lowermost slat (12).

4. A roller shutter door assembly according to any previous claim, **characterised in that** the detection means (20,120) comprises a switch assembly comprising a signalling means (50,150), an actuating lever (26,126) and a return means.

5. A roller shutter door assembly according to claim 4, **characterised in that** the return means comprises a helical spring (42,142).

6. A roller shutter door assembly according to claim 4 or claim 5, **characterised in that** detection means (20,120) comprises two such switch assemblies.

7. A detection means for fitting to a roller shutter door comprises a switch assembly **characterised in that** it comprises a signalling means (50,150), an actuating lever (26,126) and a return means.

8. A roller shutter door assembly according to claim 7, **characterised in that** the return means comprises a helical spring (42,142).

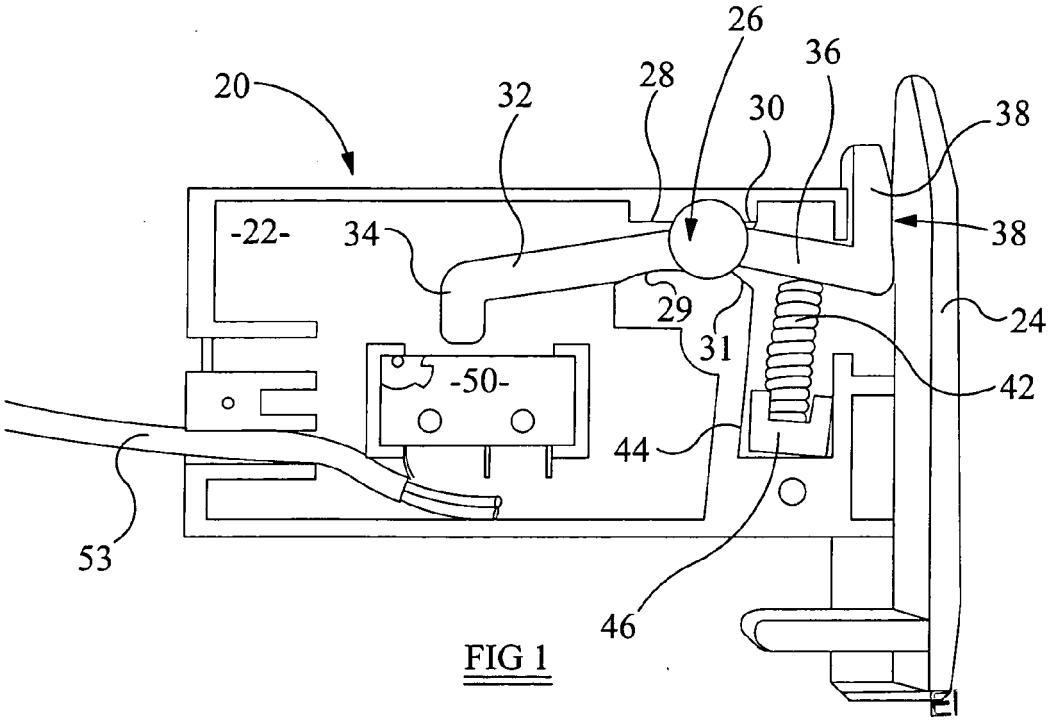
20
32
28
26
36
30
38
38
-22-
34
29
31
24
42
-50-
44
53
46

FIG 1

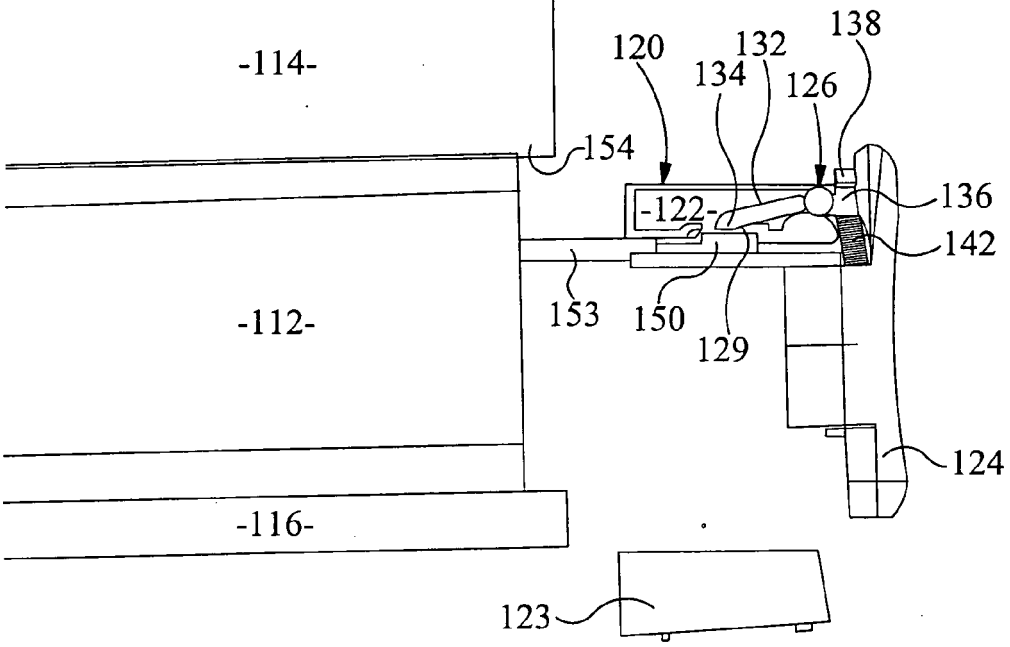
-114-
120
132
138
134
126
154
-122-
136
142
-112-
153
150
129
124
-116-
123

FIG 6

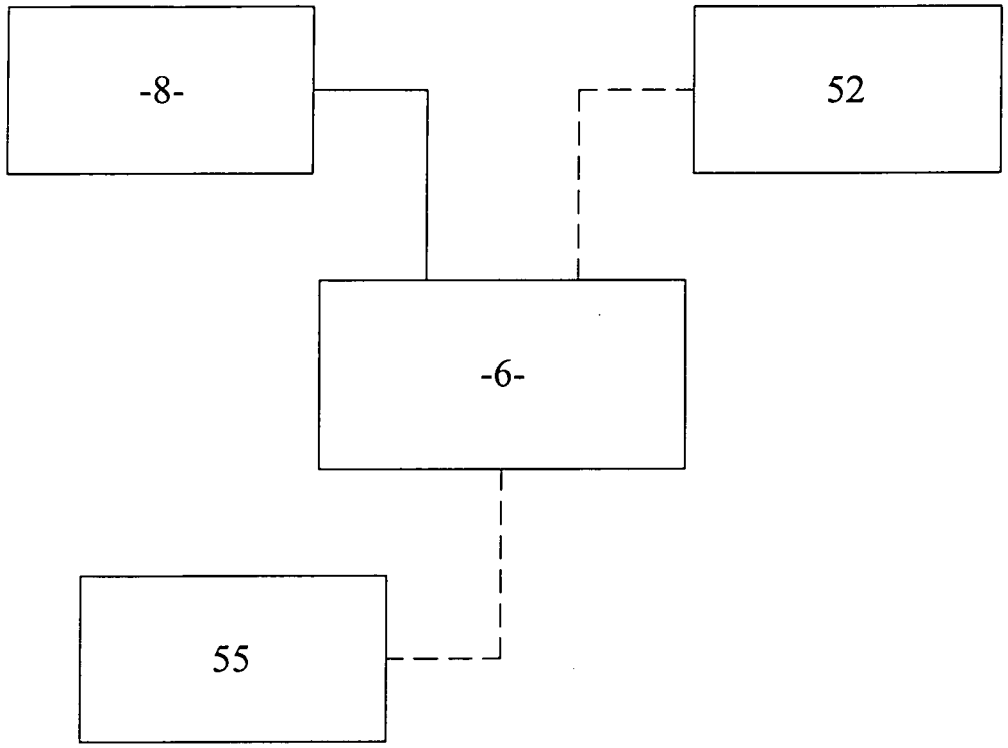

FIG 2

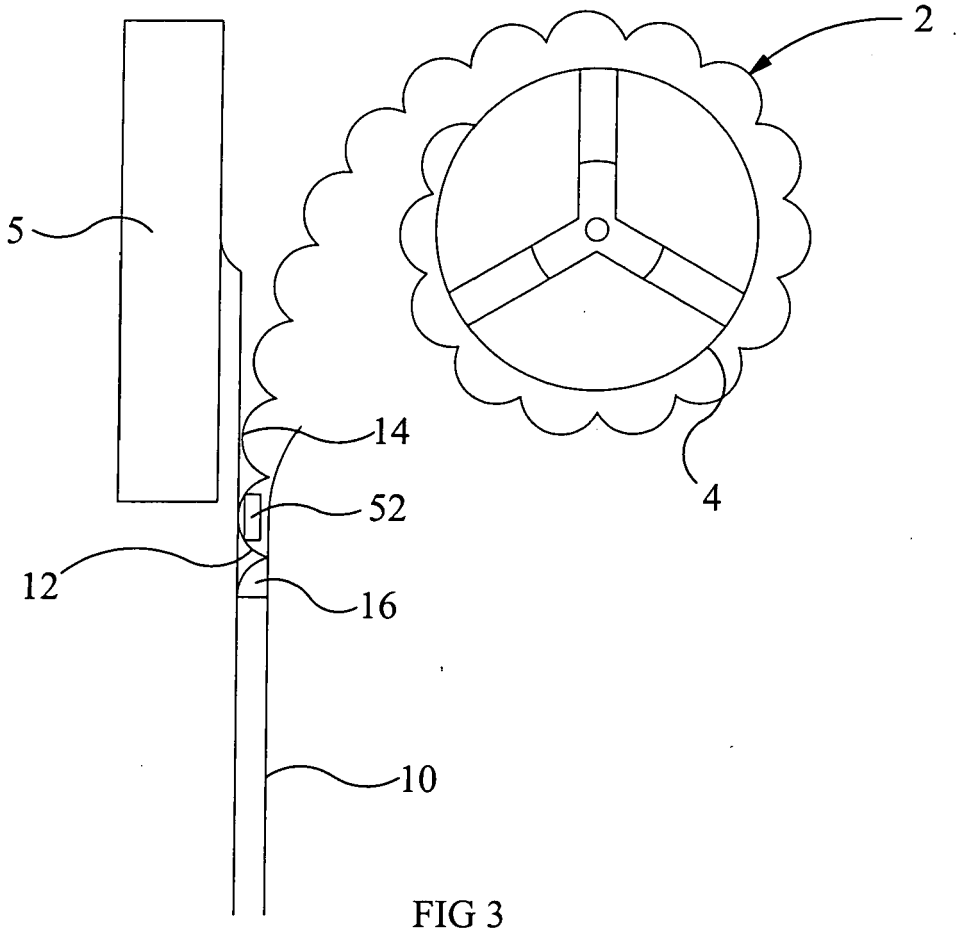

FIG 3

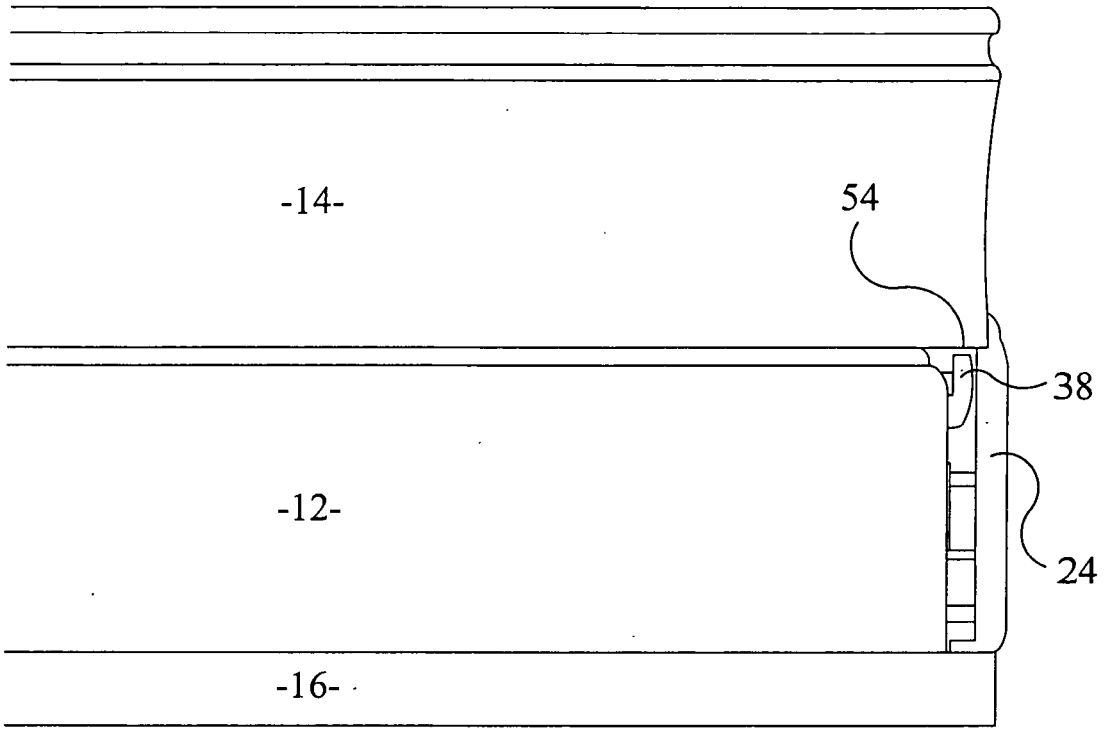

FIG 4

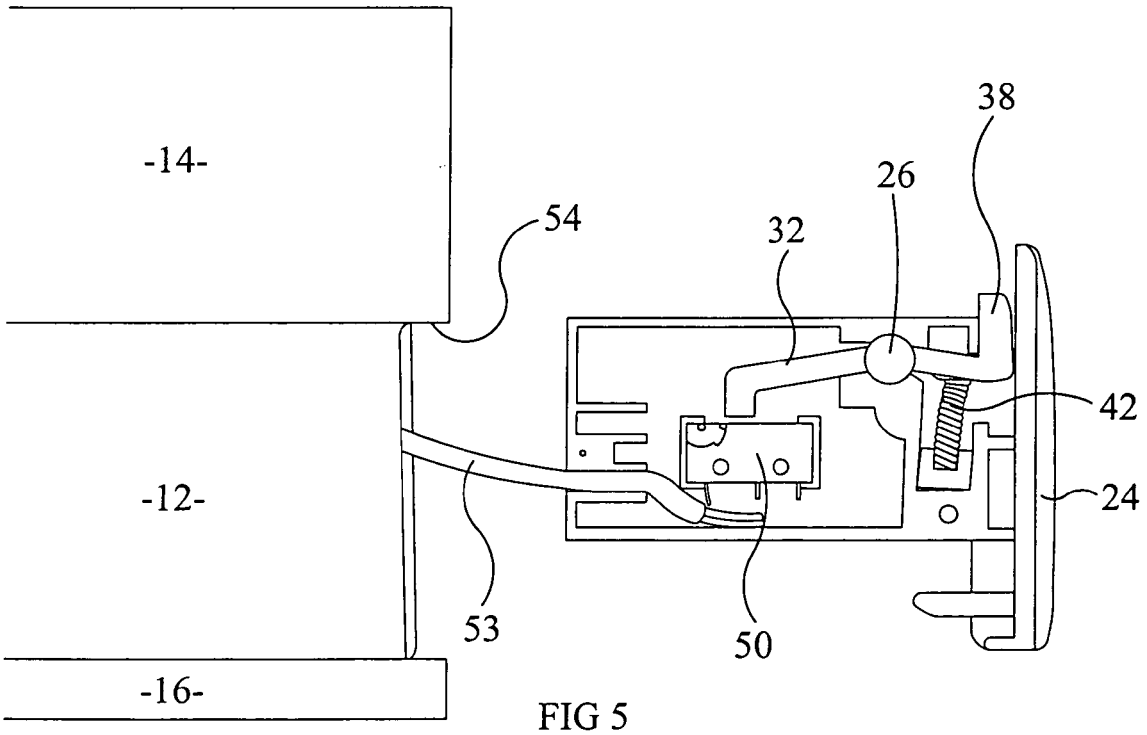

FIG 5