

(21) Application No 9823914.8

(22) Date of Filing 03.11.1998

(71) Applicant(s)

Ulland Islwyn Watkins
51 Baglan Heights, BAGLAN, SA12 8UF,
United Kingdom

Stephen Henry Colclough
4 Vaindre Drive, St Mellons, CARDIFF, CF3 0LL,
United Kingdom

(72) Inventor(s)

Ulland Islwyn Watkins
Stephen Henry Colclough

(74) Agent and/or Address for Service

Urquhart-Dykes & Lord
Alexandra House, 1 Alexandra Road, SWANSEA,
SA1 5ED, United Kingdom

(51) INT CL⁷

A61G 7/018 , A47C 7/00 17/86 , A61G 5/10

(52) UK CL (Edition R)

A4L LCX L101 L107 L111 L114

(56) Documents Cited

WO 98/33418 A1 DE 003003423 A FR 002770396 A
US 4628556 A US 4463463 A
WPI Abstract Acc No 1997-452044 & JP9-206153A PAJ
Abstract No JP61037549 & JP61-037549A PAJ
Abstract No JP61037546 & JP61-037546A PAJ
Abstract No JP60094840 & JP60-094840A

(58) Field of Search

UK CL (Edition Q) A4L LBEO LCC LCX
INT CL⁶ A47B 9/00 , A47C 7/00 17/86 19/02 , A61G
7/018
Online : EPODOC,WPI,JAPIO

(54) Abstract Title

Safety control of powered furniture

(57) Powered furniture, eg a chair or bed, movable by power between configurations, has a safety mechanism which detects the presence of a foreign object in the path of movement and acts on the power control to reverse and/or stop the movement. The furniture item may be mounted on a plinth or base around which is fixed an elongate flexible detector switch 1 having internal contacts (8,9 Fig 2) which meet under pressure. Electronic circuitry 2 detects contact being made and causes the movement to stop, preferably after a reversal of movement. The switch may also be mounted on the moving furniture part.

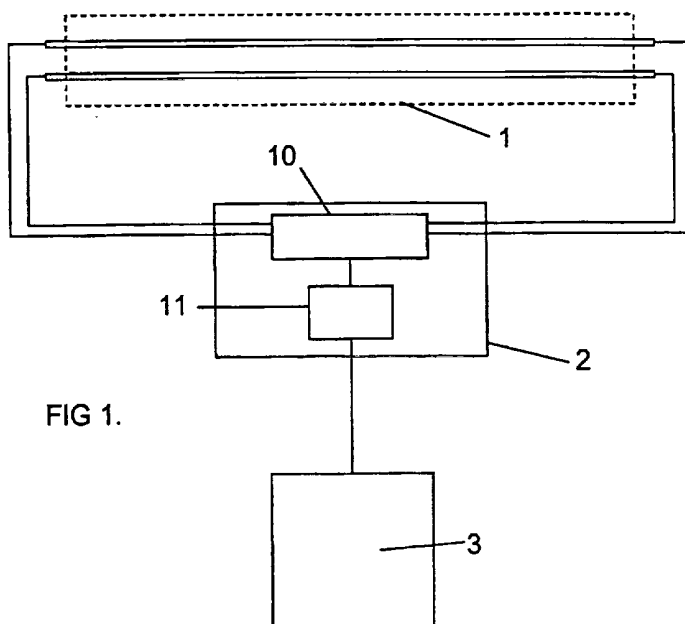
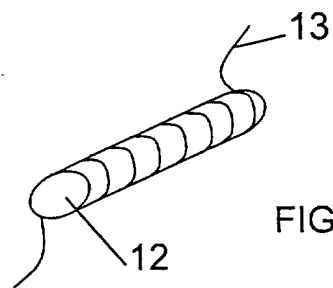
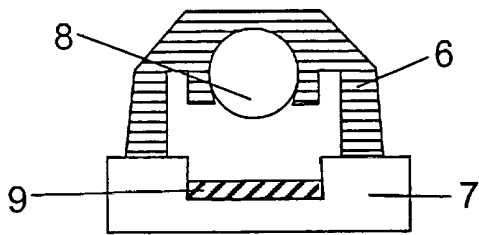
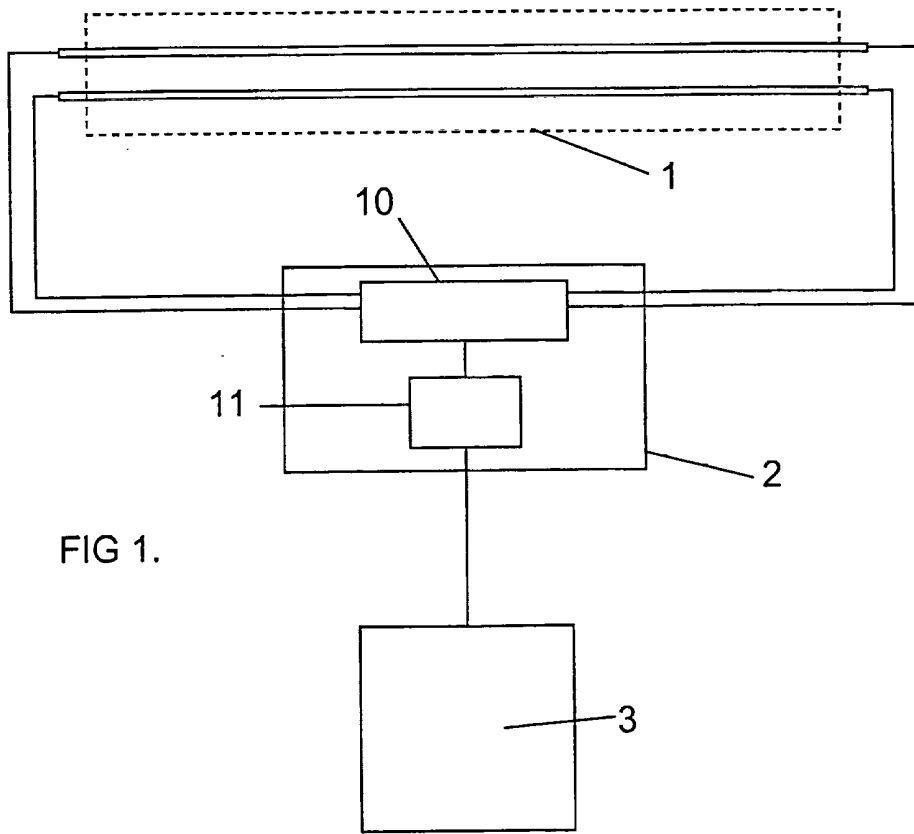
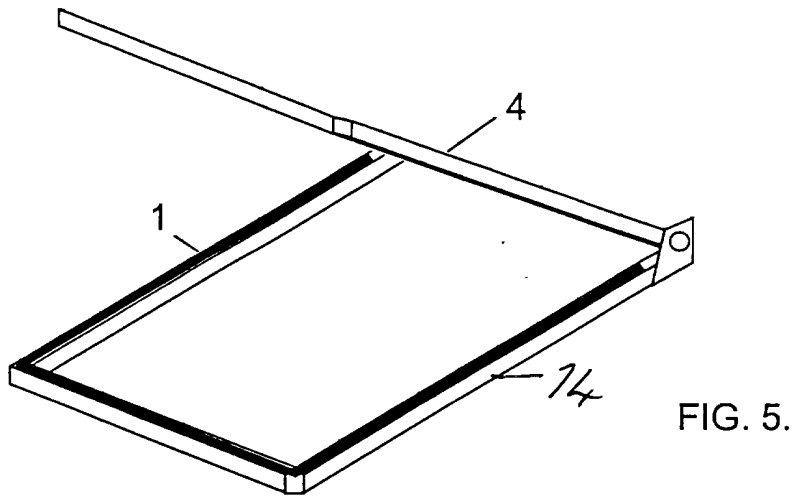
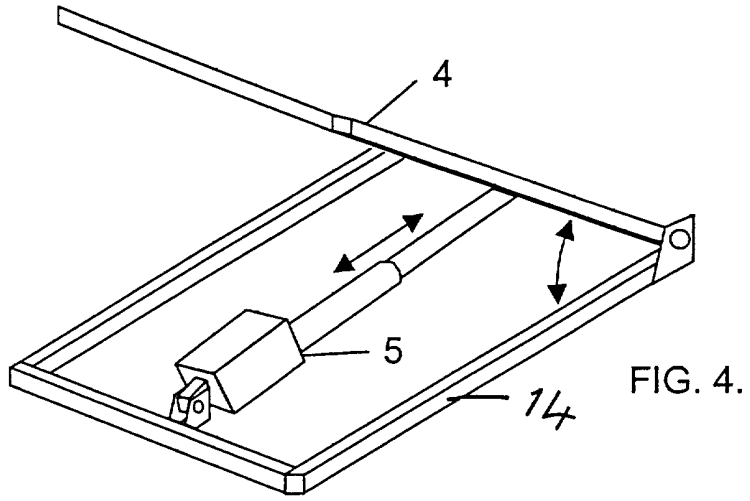


FIG 1.

1/2





Control of Powered Furniture

The present invention relates to the control of powered furniture.

5

Chairs, beds and other furniture are available which include mechanisms and power units that enable the occupant to be moved. These devices are particularly useful for people with physical disabilities and typically have the power to lift as much as 250kg. The same power is typically available when the mechanism is lowered or closed. It is normal that when the mechanism is in its raised position, access can be gained to the workings of the mechanism. This access is not necessarily required, but is inherent in the design of such mechanisms. It is possible that a person, small child, animal or equipment such as a power cord may have moved into a position where injury or damage may occur if the mechanism is subsequently lowered.

20

Improved furniture has now been devised.

According to a first aspect, the invention provides furniture comprising:

25

- i) a furniture piece movable between a first configuration and a second configuration;
- ii) motive means for moving the furniture between the first and second configurations;
- iii) control means controlling the operation of the motive means; and,
- iv) a detector arrangement for detecting the

30

35

presence of foreign bodies in the vicinity of the furniture piece, the detector arrangement being connected to the control means and arranged to modify the output of the motive means where a foreign body is detected.

5
10
The detector arrangement is preferably arranged to detect the presence of foreign bodies positioned between the furniture piece and the floor or wall of a building, or more preferably, the furniture piece and a plinth or base of the furniture piece, relative to which the furniture piece is moveable.

15
The furniture therefore preferably comprises a base mount or plinth for supporting the movable furniture piece, and relative to which the furniture piece is movable, preferably by tilting.

20
Desirably, the detector arrangement is positioned on a portion of the arrangement which remains substantially stationary whilst the furniture piece moves between the first and second configurations.

25
The detector arrangement preferably comprises a an elongate flexible detector, desirably extending about the base mount or plinth or the base or plinth contacting portion of the furniture piece.

30
The detector arrangement comprises electrical contacts normally biased away from one another but capable of being brought into contact by an applied operating force which is substantially in the range 5N or less.

35
The detector arrangement preferably comprises an elongate housing resiliently compressible in a direction transverse

to its longitudinal direction, which housing preferably carries an elongate electrical contact. The contact is preferably received in a receiving formation of the housing which receiving formation is preferably arranged to releasably retain the contact, desirably in releasable gripping engagement. A second contact desirably runs adjacent the first contact in the housing desirably received in a channel provided in a base portion of the housing.

5

10

In one embodiment at least one of the contacts may comprise an electrically conductive wire wound about an elongate flexible former. It is believed that a detector arrangement as herein defined is novel and inventive per se.

15

Desirably, the control means is arranged to modify the output of the motive means in response to change in the contact status of the detector arrangement. The motive means is preferably caused to cease operation or reverse in operation in response to output from the detector arrangement corresponding to the contacts touching. Desirably, the motive means is caused to reverse in operation before ceasing operation, in such circumstances.

20

25

The motive means is preferably arranged to operate the furniture piece to tilt between the first and second configuration.

30

In a preferred embodiment, the invention provides a tilting chair or bed arrangement comprising:

- i) a tilting bed or chair movable between a first configuration and a second configuration tilted relative to the first configuration;

35

- ii) a base mount or plinth for the chair or bed;
- 5 iii) motive means for tilting the bed or chair from
 the first to the second configuration;
- iv) control means controlling the operation of the
 motive means; and,
- 10 v) a detector arrangement for detecting the
 presence of foreign bodies between the base
 mount or plinth and the bed or chair, the
 detector arrangement being connected to the
 control means and arranged to modify the output
15 of the motive means where a foreign body is
 detected, the detector means comprising an
 elongate detector element extending about the
 base of the bed or chair, or (more preferably)
 the base mount or plinth and having elongate
20 portions extending in substantially mutually
 perpendicular directions.

The chair or bed is preferably connected to the base mount
or plinth at a tilt axis connection. Desirably, the
25 motive means is arranged to extend and retract a pivotal
 arm connected to the bed or chair and the base mount or
 plinth.

The invention will now be further described in a specific
30 embodiment, by way of example only, and with reference to
 the accompanying drawings, in which:

Figure 1 is a schematic representation of an
arrangement for controlling the operation of
35 furniture according to the invention;

Figure 2 is a schematic sectional view of a detector arrangement comprising furniture according to the invention;

5 Figure 3 is a schematic perspective view of the construction of a flexible continuous conductor shown in figure 2;

10 Figure 4 is a schematic perspective view of a support frame for powered tilting furniture according to the invention; and,

15 Figure 5 is a view corresponding to figure 4, showing a detector arrangement according to the invention in position.

Referring to the drawings, as shown in Figure 1, an elongate flexible detector 1 is connected to an electronic circuit 2, which can be interfaced as required to the control unit of the powered furniture 3. The electronic circuit comprises a monitor section 10 and a latch 11.

20 The detector 1 comprises two continuous metal contacts 8 and 9, supported in a rigid non-conducting base 7 and a flexible non-conducting cover 6 as shown in Figure 2. The cover 6 has sufficient flexibility to allow the contacts 8 and 9 to touch when pressure is applied and sufficient recovery strength to separate the contacts 8 and 9 when the pressure is removed. To ensure that the upper contact 8 has sufficient flexibility in all dimensions it may be made of a thin metal material, or as shown in Figure 5 it may be constructed as a wire 13 wound onto a non-conducting flexible, non-stretch former 12.

35 Under normal circumstances, when it is safe for the

furniture to be operated (for example tilted to a lowered position from a raised position), the output of the latch 11 in the electronic circuit 2 will be in a reset state. The monitor 10 in the electronic circuit 2 detects if the
5 contacts 8 and 9 in the detector device break along their length or if they come into contact. If either event happens, the monitor 10 will set the output of the latch 11.

10 The changed output state of the latch 11 can be used by the machine's control unit 3 to initiate the most desirable action, for example to stop or reverse the machine's power unit 5.

15 The latch 11 will remain with a changed output state until the contacts 8 and 9 separate and the latch 11 subsequently receives a separate reset signal.

As an example, for the case of a lifting chair, which is
20 used to help the chair's occupant to stand from a sitting position, the chair's mechanism will be opened by its power unit 5 as shown in Figure 4. The detector 1 is fitted to a base mount frame 14 to extend around three sides of the frame enclosing the opening area of the
25 mechanism 4 as shown in Figure 5, so that any body of sufficient weight entering the opening in the machine will press the contacts 8 and 9 in the detector device together. Alternatively, if an object with insufficient weight, such as a power cord enters the mechanism, the
30 contacts 8 and 9 in the detector device 1 will come together as the mechanism 4 closes on it. The amount of movement allowed in the detector device will ensure that damage is not caused to the obstructing object before the mechanisms' movement is stopped or reversed.

35

Claims:

1. Furniture comprising:

5 i) a furniture piece movable between a first configuration and a second configuration;

ii) motive means for moving the furniture between the first and second configurations;

10 iii) control means controlling the operation of the motive means; and,

15 iv) a detector arrangement for detecting the presence of foreign bodies in the vicinity of the furniture piece, the detector arrangement being connected to the control means and arranged to modify the output of the motive means where a foreign body is detected.

20 2. Furniture according to claim 1, wherein the detector arrangement is arranged to detect the presence of foreign bodies positioned between the furniture piece and the floor or wall of a building.

25 3. Furniture according to claim 1 or claim 2, wherein the detector arrangement is arranged to detect the presence of foreign bodies positioned between furniture piece and a plinth or base of the furniture
30 piece, relative to which the furniture piece is moveable.

4. Furniture according to any preceding claim, wherein
the furniture further comprises a base mount or
plinth for supporting the movable furniture piece,
5 and relative to which the furniture piece is movable.

5. Furniture according to claim 4, wherein the furniture
piece is movable relative to the plinth or base by
tilting.

10

6. Furniture according to any preceding claim, wherein
the detector arrangement is positioned on a portion
of the arrangement which remains substantially
stationary whilst the furniture piece moves between
15 the first and second configurations.

7. Furniture according to any preceding claim, wherein
the detector arrangement comprises a an elongate
flexible detector.

20

8. Furniture according to claim 7, wherein the furniture
further comprises a base mount or plinth for
supporting the movable furniture piece, and relative
to which the furniture piece is movable, the elongate
25 flexible detector extending about the base mount or
plinth.

9. Furniture according to claim 7, wherein the furniture
further comprises a base mount or plinth for
supporting the movable furniture piece, and relative
30 to which the furniture piece is movable, the elongate

flexible detector extending about the base or plinth contacting portion of the furniture piece.

- 5
10. Furniture according to any preceding claim, wherein the detector arrangement comprises electrical contacts normally biased away from one another but capable of being brought into contact by an applied operating force which is substantially in the range 5N or less.
- 10
11. Furniture according to any preceding claim, wherein the detector arrangement includes an elongate housing resiliently compressible in a direction transverse to its longitudinal direction, which housing carries an elongate electrical contact.
- 15
12. Furniture according to claim 11, wherein the contact is received in a receiving formation of the housing which receiving formation is arranged to releasably retain the contact.
- 20
13. Furniture according to claim 12, wherein the contact is retained in releasable gripping engagement by the receiving formation.
- 25
14. Furniture according to any of claims 11 to 13, wherein a second contact extends adjacent the first contact in the housing.
- 30
15. Furniture according to claim 14, wherein the second contact is received in a channel provided in a base

portion of the housing.

- 5 16. Furniture according to any of claims 11 to 15, wherein at least one of the contacts comprises an electrically conductive wire wound about an elongate flexible former.
- 10 17. Furniture according to any preceding claim, wherein the detector arrangement comprises electrical contacts, the control means being arranged to modify the output of the motive means in response to change in the contact status of the detector arrangement.
- 15 18. Furniture according to any preceding claim, wherein the motive means is caused to cease operation or reverse in operation in response to output from the detector arrangement.
- 20 19. Furniture according to claim 18, wherein, the motive means is caused to reverse in operation before ceasing operation.
- 25 20. Furniture according to any preceding claim, wherein the motive means is arranged to operate the furniture piece to tilt between the first and second configuration.
- 30 21. Furniture according to any preceding claim, comprising a tilting chair or bed arrangement comprising:

i) a tilting bed or chair movable between a first configuration and a second configuration tilted relative to the first configuration;

5 ii) a base mount or plinth for the chair or bed;

iii) motive means for tilting the bed or chair from the first to the second configuration;

10 iv) control means controlling the operation of the motive means; and,

v) a detector arrangement for detecting the presence of foreign bodies between the base mount or plinth and the bed or chair, the detector arrangement being connected to the control means and arranged to modify the output of the motive means where a foreign body is detected, the detector means comprising an elongate detector element extending about the base of the bed or chair, or (more preferably) the base mount or plinth and having elongate portions extending in substantially mutually perpendicular directions.

15

20

25

22. Furniture according to claim 21, wherein the chair or bed is connected to the base mount or plinth at a tilt axis connection.

30

23. Furniture according to claim 22, wherein, the motive means is arranged to extend and retract a pivotal arm

connected to the bed or chair and the base mount or plinth.

- 5 24. Furniture substantially as herein described with reference to the accompanying drawings.



Application No: GB 9823914.8
Claims searched: ALL

Examiner: R E Hardy
Date of search: 13 December 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.Q): A4L (LBEQ LCC LCX)
Int CI (Ed.6): A47B (9/00); A47C (7/00 17/86 19/02); A61G (7/018)
Other: Online : EPODOC,WPI,JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	WO98/33418 A1 KEMMERER : Whole document	1-11,14,17,18, 20-23 at least
X	DE3003423 A KEIPER : See the Figures	1,3-5,10,17-20 at least
X	FR2770396 A SUNRISE : See the Figures	1-4,18 at least
X	US4628556 A BLACKMAN : See the Figures	1-5,17,18,20 at least
X	US4463463 A KANEKO : See the Figures	1,3,4,10,17, 18,20 at least
X	WPI Abstract Acc No 1997-452044 & JP9-206153A (MATSUSHITA) - See Abstract and Figure	1,3-5,18,20 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



74

Application No: GB 9823914.8
Claims searched: ALL

Examiner: R E Hardy
Date of search: 13 December 1999

Category	Identity of document and relevant passage	Relevant to claims
X	PAJ Abstract No JP61037549 & JP61-037549A (NIPPON) - See Abstract and Figure	1-6,10,11,17, 18,20 at least
X	PAJ Abstract No JP61037546 & JP61-037546A (NIPPON) - See Abstract and Figure	1-5,7,9-11,14, 17,18 at least
X	PAJ Abstract No JP60094840 & JP60-094840A (NITSUSAN) - See Abstract and Figure	1-5,10,17,18, 20 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.