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**D E C I S I O N**  
**of 23 September 2004**

**Case Number:** T 0205/02 - 3.5.2

**Application Number:** 94919344.5

**Publication Number:** 0702854

**IPC:** H02K 23/00

**Language of the proceedings:** EN

**Title of invention:**

Head rail-mounted mini-blind actuator

**Patentee:**

Harmonic Design, Inc.

**Opponent:**

01: HUNTER DOUGLAS Industries B.V.

02: Techniku B.V.

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 56, 84, 123(3)

**Keyword:**

"Extension of protection (yes)"

"Inventive step (no)"

"Clarity of claim (to some extent lacking)"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0205/02 - 3.5.2

**D E C I S I O N**  
**of the Technical Board of Appeal 3.5.2**  
**of 23 September 2004**

**Appellant:** Harmonic Design, Inc.  
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**Representative:** -

**Respondent:** Techniku B.V.  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
21 December 2001 concerning maintenance of  
European patent No. 0702854 in amended form.**

**Composition of the Board:**

**Chairman:** W. J. L. Wheeler  
**Members:** J.-M. Cannard  
C. Holtz

## Summary of Facts and Submissions

I. The proprietor appealed against the decision of the opposition division concerning the maintenance of European patent No. 0 702 854 in amended form in accordance with the proprietor's auxiliary request filed, and subsequently amended, on 15 October 2001 during oral proceedings before the opposition division.

II. Independent claims 1 and 8 as granted read as follows:

Claim 1:

"A window blind actuator (300), comprising:

a window blind (308) having a head rail (306) and a tilt rod (302) rotatably mounted therein;  
a sensor (320, 322) for detecting a light signal and generating a control signal in response thereto;  
a coupling (312) engaged with the tilt rod (302) such that movement of the coupling causes rotation of the tilt rod (302);  
a reversible electric direct current (dc) motor (314) operably engaged with the coupling (312) to move the coupling (312);

characterised in that:

at least one dc battery (316) is mounted at the head rail (306) and is electrically connected to the motor (314);  
an electronic circuit (336) is electrically connected to the light sensor (320) and the battery (316) for processing the control signal from the light sensor to

cause the battery (316) to energize the motor (314), and power conservation means is provided in the circuit comprising power transistors, and the light sensor (320) has a dark current equal to or less than  $10^{-5}$  amperes, whereby power in the battery is conserved to prolong the life of the power supply."

Claim 8:

"A method for moving the slats of a blind by rotating the tilt rod of the blind, comprising the steps of:

(a) providing a motor (314), a power source (316), and an electronic circuit (336) for receiving a control signal and processing the control signal to cause the power source (316) to energize the motor (314),

characterised in that the method comprises the additional steps of:

(b) coupling a rotor (76) of the motor (314) with a tilt rod (302); by means of a coupling (312) engaged with the tilt rod (302) such that movement of the coupling causes rotation of the tilt rod (302).

(c) sensing a predetermined electromagnetic signal to generate the control signal and cause the electrical circuit between the power source and the motor to be completed to rotate the tilt rod (302);

(d) providing a reversible electric direct current (dc) motor (314) operably engaged with the coupling (312) to move the coupling (312);

(e) providing at least one direct current (dc) battery (316) electrically connected to the motor (314);

(f) providing an electronic circuit (336) electrically connected to the light sensor (320) and the battery (316) for processing the control signal from the light sensor to cause the battery (316) to energize the motor (314);

(g) mounting the dc motor (314), the dc battery (316) and the electronic circuit (336) in a head rail (306) of the window blind; and

(h) providing power conservation means in the circuit comprising power transistors, and light sensor (320) having a dark current equal to or less than  $10^{-5}$  amperes, whereby power in the battery is conserved to prolong the life of the power supply."

III. Amended claims according to a main request and eight auxiliary requests were filed with the grounds of appeal.

IV. After summons to oral proceedings, the appellant proprietor filed with a letter dated 23 August 2004 sets of amended claims according to a main request and first to twenty-first auxiliary requests.

Claim 1 according to the main request reads as follows:

"A window blind actuator (300), comprising:  
a window blind (308) having a head rail (306) and a tilt rod (302) rotatably mounted therein;  
a sensor (320, 322) for detecting a light signal and generating a control signal in response thereto;  
a coupling (312) engaged with the tilt rod (302) such that movement of the coupling causes rotation of the tilt rod (302);

a reversible electric direct current (dc) motor (314) operably engaged with the coupling (312) to move the coupling (312);

characterised in that

at least one dc battery (316) is mounted at the head rail (306) and is electrically connected to the motor (314); and

the light sensor (320) has a dark current equal to or less than  $10^{-5}$  amperes, whereby power in the battery is conserved to prolong the life of the power supply."

Claim 1 according to the first auxiliary request differs from claim 1 according to the main request in that the feature "at least one dc battery (316) is mounted at the head rail (306)" has been replaced by the feature "at least one dc battery (316) is mounted in the head rail (306)".

Claim 1 according to the second auxiliary request differs from claim 1 according to the first auxiliary request in that the feature "and the light sensor includes a phototransistor having a dark current equal to or less than  $10^{-8}$  amperes" has been incorporated after the expression "a dark current equal to or less than  $10^{-5}$  amperes".

Claim 1 according to the third auxiliary request differs from claim 1 according to the first auxiliary request in that the feature "power conservation resistors are provided in the circuit comprising power transistors" has been incorporated before the feature "and the light sensor (320) has a dark current equal to or less than  $10^{-5}$  amperes".

Claim 1 according to the fourth auxiliary request differs from claim 1 according to the third auxiliary request in that the feature "and the light sensor includes a phototransistor having a dark current equal to or less than  $10^{-8}$  amperes" has been incorporated after the expression "a dark current equal to or less than  $10^{-5}$  amperes".

Independent claim 8 according to the fifth auxiliary request reads as follows:

"A method for moving the slats of a blind by rotating the tilt rod of the blind, comprising the steps of:

- (a) providing a motor (314), a power source (316), and an electronic circuit (336) for receiving a control signal
- (b) coupling a rotor (76) of the motor (314) with a tilt rod (302); by means of a coupling (312) engaged with the tilt rod (302) such that movement of the coupling causes rotation of the tilt rod (302);
- (c) providing a handheld user command signal generator (31) for selectively generating a user command signal and sensing the user command signal to generate the control signal and cause the electrical circuit between the power source and the motor to be completed to rotate the tilt rod (302);
- (d) providing a reversible electric direct current (dc) motor (314) operably engaged with the coupling (312) to move the coupling (312);
- (e) providing at least one direct current (dc) battery (316) electrically connected to the motor (314);
- (f) providing an electronic circuit (336) electrically connected to the light sensor (320) and the battery (316) for processing the control signal from the light

sensor to cause the battery (316) to energize the motor (314), the electronic circuit (336) comprises a power switch having an open configuration and a closed configuration for selectively energizing the motor (314) and for sensing the control signal with comparatively little expenditure of the battery energy;

(g) mounting the dc motor (314), the dc battery (316) and the electronic circuit (336) in a head rail (306) of the window blind; and

(h) providing power conservation resistors in the circuit comprising power transistors, and light sensor (320) having a dark current equal to or less than  $10^{-5}$  amperes, whereby power in the battery is conserved to prolong the life of the power supply."

Claim 1 according to the sixth auxiliary request reads as follows:

"A window blind actuator (300), comprising:

a window blind (308) having a head rail (306) and a tilt rod (302) rotatably mounted therein;

a signal sensor (320, 322) for detecting a light user command signal and generating a control signal in response thereto;

a handheld user command signal generator (31) for selectively generating the light user command signal;

a coupling (312) engaged with the tilt rod (302) such that movement of the coupling causes rotation of the tilt rod (302);

a reversible electric direct current (dc) motor (314) operably engaged with the coupling (312) to move the coupling (312);

characterised in that



at least one dc battery (316) is mounted in the head rail (306) and is electrically connected to the motor (314); and power conservation resistors are provided in the circuit comprising power transistors, and the light sensor (320) has a dark current equal to or less than  $10^{-5}$  amperes, and further characterized in that an electronic circuit (336) is electrically connected to the light sensor (322) and the battery (316) for processing the control signal from the light sensor to cause the battery (316) to energize the motor (314) and the electronic circuit (336) comprises a power switch having an open configuration and a closed configuration for selectively energizing the motor (314) and for sensing the control signal with comparatively little expenditure of the battery energy, whereby power in the battery is conserved to prolong the life of the power supply."

Claim 1 according to the seventh auxiliary request differs from claim 1 according to the third auxiliary request in that the feature "a limit switch is adapted to deactivate the motor when the blind is in a predetermined configuration" has been inserted after the expression "characterised in that".

Claim 1 according to the eighth auxiliary request differs from claim 1 according to the third auxiliary request in that the feature "the motor being operably engaged through a gear box" and the feature "a limit switch is operated by a gear (94) of the gear box and is adapted to deactivate the motor when the blind is in a predetermined configuration" have been respectively

inserted before and after the expression "characterised in that".

Claim 1 according to the ninth auxiliary request differs from claim 1 according to the third auxiliary request in that the feature "a limit switch is adapted to deactivate the motor when the blind is in a manually adjustable predetermined configuration" has been inserted after the expression "characterised in that".

Claim 1 according to the tenth auxiliary request differs from claim 1 according to the eighth auxiliary request in that the expression "when the blind is in a predetermined configuration" has been replaced by the expression "when the blind is in a manually adjustable predetermined configuration".

The claims for the eleventh to twentieth auxiliary requests are respectively identical to the claims for the first to tenth auxiliary requests, with the exception that claim 2 in the latter requests has been deleted and the following claims have been renumbered accordingly.

The twenty-first auxiliary request is for the maintenance of the patent in the version maintained by the opposition division.

V. The following documents:

D14: Toshiba Corporation, "Photo Sensors Data Book",  
3<sup>rd</sup> Edition, August '86,

D16: "Understanding Solid-State Electronics", Radio Shack, 3<sup>rd</sup> Edition, 1972, 1978, Texas Instruments,

D17: JP-A-61109890, and

D17': English translation of JP-A-61109890,

considered during the proceedings before the opposition division remain relevant to the present appeal.

VI. Oral proceedings were held on 23 September 2004.

The Board observed first that claim 1 for all the requests, except for the fifth, sixth, fifteenth and sixteenth auxiliary requests infringed Article 123(3) EPC because a restrictive feature, namely "an electronic circuit (336) is electrically connected to the light sensor (320) and the battery (316) for processing the control signal from the light sensor to cause the battery (316) to energize the motor (314)" which was present in claim 1 as granted had been omitted from claim 1.

Furthermore, the Board observed that claim 8 of the fifth auxiliary request and claim 7 of the fifteenth auxiliary request infringed Article 123(3) EPC because a restrictive feature, namely "a predetermined electromagnetic signal", which was present in claim 8 as granted had been omitted from these claims.

It was decided that as the appellant had already filed 31 requests, no further opportunity to amend the broadened claims would be allowed. The oral proceedings

continued with a discussion of the sixth and sixteenth auxiliary requests.

VII. The arguments of the appellant proprietor in respect of the sixth auxiliary request can be summarised as follows:

The light sensor referred to in claim 1, which had a dark current equal or less than  $10^{-5}$  amperes, would be interpreted by the skilled person as a sensor comprising a phototransistor and other components for providing a digital output signal, and not as a photodiode or a phototransistor per se, which at the time of the invention had dark currents less than about  $2 \times 10^{-9}$  amperes. This interpretation was supported by the description of the application, which recited that "a sensor detects a light signal and generates a control signal in response to the light signal" (published application WO-A-94/29943, page 5, lines 16 ff.). For the skilled person, such a control signal was a digital signal. On the basis of the description with reference to figure 7, the light sensor should be interpreted as comprising, for sensing the light signal and delivering a digital signal, photodiode 29, Schmidt trigger 142 and resistor R1.

A light sensor having the features recited in the properly interpreted claim 1 was not disclosed in the prior art, in particular not in document D17, which disclosed a window blind actuator merely comprising a phototransistor for receiving infra red signals. The objective technical problem was to reduce power consumption in the blind actuator. But there was no suggestion in D17, which considered the use of

integrated circuits for reducing the energy consumed, or in any other cited prior art document, that the reduction of power consumption might be achieved by improving the light sensor. Reading D17 in this way involved ex-post-facto reasoning. Even if one considered (inadmissibly) the technical problem to be reducing consumption of the light sensor, the skilled person would not be directed to the invention by the cited prior art, in particular not by documents D14 or D16 which merely disclosed photodiodes and phototransistors per se, and not a light sensor which provided a digital control signal.

VIII. The arguments of the respondent opponent 02 can be summarised as follows:

The proprietor made an artificial interpretation of the expression "dark current". A dark current was the current flowing in the absence of light in a photo detector, but this expression had no well recognized meaning for a circuit comprising a phototransistor and other electrical components. Nor was there any support in the application as filed, according to which the light sensor was a phototransistor per se, for interpreting the light sensor in claim 1 of the sixth auxiliary request as including a phototransistor and other electrical components (published application, page 10, lines 18 to 23 and page 26, lines 6 to 11; figure 7). According to claim 1, the light sensor was connected to an electronic circuit (336); if the appellant's interpretation were correct, the number of components to be included in the light sensor would be arbitrary and unclear. A light sensor providing a digital control signal was neither recited, nor

implied, in the patent in suit or in the application as filed.

In D17, the reduction of the power consumption was an issue (see page 4). Moreover, it was obvious to attempt to reduce further the power consumption of the actuator disclosed in D17 by choosing low power components, particularly photodiodes or phototransistors with low dark currents, since the light sensor was continuously working and consuming power - unlike the motor. At the time of filing of the application, all available phototransistors had a dark current less than  $10^{-5}$  amperes. The use of the available phototransistors in the window blind actuator according to D17 was obvious and the subject-matter of claim 1 of the sixth request lacked an inventive step.

- IX. The appellant (patentee) requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of one of the main request or first to twenty-first auxiliary requests in the letter of 23 August 2004.
  
- X. The respondent (opponent 02) requested that the appeal be dismissed.
  
- XI. Opponent 01 withdrew its opposition (letter dated 10 January 2001).

## **Reasons for the Decision**

- 1. The appeal is admissible.

*Main request, first to fifth, seventh to fifteenth, and seventeenth to twentieth auxiliary requests*

2. As mentioned in the oral proceedings, the main request, the first to fifth, seventh to fifteenth, and seventeenth to twentieth auxiliary requests contravene Article 123(3) EPC.

2.1 All these requests, except for the fifth and the fifteenth auxiliary requests, contain independent apparatus claims which do not include all the features of the only independent apparatus claim (claim 1) as granted, so as to extend the protection conferred. One of the features in question is recited at lines 21 and 22 of page 13 of the published patent and reads "an electronic circuit (336) is electrically connected to the light sensor (320) and the battery (316) for processing the control signal from the light sensor to cause the battery (316) to energize the motor (314)".

2.2 Method claim 8 of the fifth auxiliary request and method claim 7 of the fifteenth auxiliary request do not include all the features of the only independent method claim (claim 8) as granted, so as to extend the protection conferred. More specifically, the feature "a predetermined electromagnetic signal", recited in the last line of page 13 of the published patent, does not appear in the method claims of these auxiliary requests.

2.3 For the above reasons, all the above mentioned requests have to be refused. In the oral proceedings, the appellant requested to be allowed to reinsert the omitted features. By that time the appellant had already filed 31 requests, allowing the requested

reinsertion would bring the total number of requests to 50. This would place an unreasonable burden on the respondent and the Board at a late stage of the proceedings. In such circumstances, the Board considered it appropriate to refuse the request to amend.

*Sixth and sixteenth auxiliary requests - Scope of claim 1*

3. The light sensor (320) referred to in claim 1 of the sixth auxiliary request (lines 20 to 24) has a dark current equal or less than  $10^{-5}$  amperes and provides the electronic circuit (336) with a control signal. This light sensor does not clearly refer back to the signal sensor (320, 322) for detecting a light user command signal and generating a control signal in response thereto (claim 1, lines 7 and 8) and has no antecedent in the claim. Therefore, claim 1 according to the sixth auxiliary request is unclear.

3.1 According to the proprietor, the light sensor according to claim 1 should be interpreted (second interpretation in the letter dated 23 August 2004) as comprising, for sensing the signal: photodiode 29, Schmidt trigger 142 and resistor R1, and for sensing daylight signal: photodiode 28, resistors R3 - R8 and R12, transistors Q1 and Q2, and NAND gate 182.

4. While an arrangement according to the proprietor's second interpretation may fall within the scope of claim 1 according to the sixth auxiliary request, this claim is broad enough to cover also a window blind actuator having a light sensor which is a low dark



current photodiode, or phototransistor, per se with a dark current of less than  $10^{-5}$  amperes.

4.1 The signal sensor according to claim 1 of the sixth auxiliary request, which detects a light signal, is a light sensor. This signal sensor generates a control signal in response to the light signal, as does the light sensor mentioned in claim 1, which can thus be understood as referring to the signal sensor. This interpretation is consistent with the only definition of a signal sensor which is given in the claims of the granted patent (claim 3) and with the scope of granted claim 1. This claim covers a light sensor having a dark current equal to or less than  $10^{-5}$  amperes for generating a control signal in response to a light signal, **which is a signal sensor** when the control signal for the electronic circuit (336) is generated by a signal sensor in response to a user command signal, because this last feature is recited in dependent claim 3.

4.2 Claim 5 of the granted patent, or claim 4 of the sixth auxiliary request, specifies that the light sensor is a phototransistor having a dark current equal or less than  $2 \times 10^{-9}$  amperes. The expression "signal sensor" in claim 1 may be understood on the basis of the application as filed (published application WO-A-94/29943, page 10 of the description, lines 18 to 23; figure 7, signal sensor 29), more generally, as specifying a low dark current photodiode, or phototransistor, per se. At the date of filing of the application, as acknowledged by the proprietor, photo-detectors had dark currents of less than  $10^{-8}$  ampere,

and consequently less than  $10^{-5}$  ampere, consistent with the formulation of claim 1.

4.3 The above interpretation of the light sensor in claim 1 of the sixth auxiliary request is also supported by the passages on page 26, second paragraph and page 28, fourth paragraph of the application read in conjunction with the passage mentioned above and figure 7. For instance, the light sensor 29 that has a low dark current on page 26 of the description is the same as the signal sensor 29 mentioned on page 10, at lines 18 to 23, which has a low dark current and is a phototransistor or a photodiode per se as shown in figure 7. The other references to the light sensor made in the patent application (page 5, second paragraph and page 7, second paragraph) are more general definitions of a light sensor which do not contradict the interpretation of the light sensor made by the Board.

4.4 According to the proprietor, the three orders of magnitude between the dark current of the light sensor ( $10^{-5}$  ampere) recited in claim 1 and the available phototransistors ( $10^{-8}$  ampere) and the description that the control signal was generated in response to the light signal detected by the sensor (page 5, lines 16 and 17 of the description of WO-A-94/29943) proved that the proprietor's interpretation of the term light sensor was the correct one. It was implicit that the control signal was a digital signal.

4.5 However, the Board could not find in the description any disclosure of a **physical entity** including a phototransistor and other electrical components for providing a digital output signal which in absence of

light would be less than  $10^{-5}$  ampere. Nowhere in the patent application is it recited that the control signal generated by the light sensor is a digital signal and a control signal does not necessarily imply a digital signal for the skilled person. The disclosure of a patent application may be interpreted only within the limits of what the skilled person would directly and unambiguously derive, using common knowledge, at the date of filing, from the whole of this application. Accordingly, the Board judges that the light sensor 29 (on page 26 of the description) cannot be understood as a piece of circuitry including among other components a phototransistor, with the signal sensor 29 (on page 10) being a phototransistor included therein. This does not mean that the application as filed does not cover the proprietor's interpretation of the light sensor, but it does not rule out the interpretation of claim 1 made by the Board, which is supported by the application as filed and makes technical sense because it does not imply unreasonable values for the low dark current of the phototransistor forming the light sensor.

- 4.6 The same considerations apply to claim 1 of the sixteenth auxiliary request.

*Claim 1 of the sixth and sixteenth auxiliary requests -  
Inventive step*

5. It is common ground that document D17 forms the closest prior art. The proprietor has not disputed that the window blind actuator according to claim 1 of the sixth auxiliary request differs from the window blind actuator disclosed in D17 only in that a light sensor

having a dark current equal to or less than  $10^{-5}$  amperes is not disclosed in D17.

- 5.1 Since claim 1 covers a window blind actuator which comprises a light sensor having a low dark current photodiode or phototransistor per se, such a light sensor is the only feature of this particular actuator as covered by claim 1 which is not disclosed in D17, in particular, not in Figure 2 and not in the translation D17', Working Examples, pages 3 to 5.
  
6. It is not denied by the proprietor (see above) that all photodiodes or phototransistors had a dark current lower than  $10^{-5}$  amperes at the date of filing of the application. This is supported, for instance, by documents D14 and D16 which show specification data of photodiodes or phototransistors having dark currents lower than  $10^{-8}$  amperes.
  - 6.1 The skilled man starting from D17 and wishing to put into practice the teaching of this document would simply use the photo detectors available at the time of filing of the application for receiving the light signals transmitted by the transmitter 24 of D17. This obvious use would result in a window blind actuator, which comprises a light sensor having dark currents lower than  $10^{-5}$  amperes, and thus all the features recited in claim 1 of the sixth auxiliary request, as interpreted by the Board. Moreover, in a device powered by batteries, reducing the power consumption anywhere in the device is a standing problem for the skilled man, and no unexpected effects would result from the obvious combination of the teaching of the closest prior art document D17 with the common practice of the skilled

person. The above considerations apply to claim 1 according to the sixteenth auxiliary request as well.

7. The Board concludes therefore that the grounds for opposition mentioned in Article 100 EPC prejudice the maintenance of the patent in any one of the amended forms according to the present main and first to twentieth auxiliary requests. The appellant's twenty-first auxiliary request is concerned with the maintenance of the patent in the version maintained by the opposition division. Since the proprietor is the sole appellant against the interlocutory decision maintaining the patent in amended form, the appellant's twenty-first auxiliary request is redundant. The appeal has to be dismissed and the patent maintained in the version approved by the opposition division.

## **Order**

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

D. Sauter

W. J. L. Wheeler