

BESCHWERDEKAMMERN
DES EUROPÄISCHEN
PATENTAMTS

BOARDS OF APPEAL OF
THE EUROPEAN PATENT
OFFICE

CHAMBRES DE RECOURS
DE L'OFFICE EUROPEEN
DES BREVETS

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen

D E C I S I O N
of 17 January 1994

Case Number: T 0075/93 - 3.5.2

Application Number: 87107593.3

Publication Number: 0247564

IPC: H01H 37/54

Language of the proceedings: EN

Title of invention:
Thermostat

Applicant:
Fuji Xerox Co., Ltd.

Opponent:
-

Headword:
-

Relevant legal norms:
EPC Art. 56

Keyword:
"Inventive step (yes, after amendment)"
"Procedural violation (no)"

Decisions cited:
T 0113/89, T 0243/89, T 0300/89, T 0668/89

Catchword:
-



Europäisches
Patentamt

European
Patent Office

Office européen
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0075/93 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 17 January 1994

Appellant:

Fuji Xerox Co., Ltd.
No. 3-5, Akasaka 3-chome
Minato-ku
Tokyo 107 (JP)

Representative:

Boeters, Hans Dietrich, Dr.
Patentanwälte Boeters Bauer Koepe
Bereiteranger 15
D - 81541 München (DE)

Decision under appeal:

Decision of the Examining Division of the European
Patent Office dated 8 September 1992 refusing
European patent application No. 87 107 593.3
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: R.E. Persson
Members: A.G. Hagenbucher
M.R.J. Villemin

Summary of Facts and Submissions

- I. The Appellant contests the decision of the Examining Division refusing Appellant's European patent application No. 87 107 593.3.
- II. The reason given for the refusal was that the subject-matter of Claim 1 then on file did not involve an inventive step, having regard to documents:

D2: US-A-2 954 447,

D4: US-A-3 227 845.

and general knowledge.

The decision under appeal referred also to

D1: US-A-3 014 105 and

D3: US-A-4 079 348.

- III. In response to objections of the Board, the Appellant filed two new claims (received 18 October 1993) which replaced the claims filed with the grounds of appeal (main and auxiliary requests) and amendments to the description and drawings.
- IV. When a uniform spelling of "disk" is used, independent Claim 1 is now worded as follows:

"A thermostat (1), comprising

- a generally circular supporting frame (10),
- a cap (40) fixed directly to the frame (10),
- a bimetallic disk (20) being movable between two stable positions in response to changes in temperature of the bimetallic disk (20),

- heat conductive spacer means (30) being provided between the frame (10) and the bimetallic disk (20),
- a pin (24) slidably mounted in the spacer means (30) for movement in response to movement of the bimetallic disk (20) between the two stable positions,
- electrical contact means (16, 18) including at least one movable contact (18) responsive to the slidable movement of the pin (24) for opening and closing the contact means (16, 18), characterized in
 - that the spacer means (30) include a plurality of projections (36) for separating the spacer means (30) from direct contact with the bimetallic disk (20),
 - and that the cap (40) has a plurality of claws (44) with insulating means (48) thereon for securing the bimetallic disk (20) on the projections (36)."

V. According to the Examining Division's opinion D2 represented the closest prior art. The thermostat described therein had spacer means which did not include a plurality of projections on the frame, however, and there was no cap having a plurality of claws. The problem to be solved by the present invention, namely the reduction of heat loss of the temperature sensitive switch actuator to the frame, in order to improve the speed of the temperature response of the thermostat, was known from D4. D4 suggested as a basic solution to this problem a low mass connection between the actuator and the retaining body ("suspended from the body by a restricted neck to minimise the heat transfer to the body"; cf. D4, column 4, lines 3 and 4), i.e. reduction of the contacting surface. For solving the problem of improving the thermal response of a thermostat a person skilled in the art would apply the principle of low mass connection known from D4 to the thermostat design known from D2. The use of a plurality of projections reducing the contacting surface in order to limit the heat flow between two contacting items having a different

temperature was commonly known from daily life experience (e.g. a cooking pot that is put on a gas stove) and the use of a cap having claws were just obvious possibilities for solving the principle of low mass connection known from D4.

VI. The Appellant drew attention to the fact that the present application started from the prior art illustrated in Figures 5 and 6 of the application. The spider-shaped bimetallic element of D4 did not have projections in the sense of the present application which constituted a bearing for the bimetallic element. Although the movable bimetallic disk means needed a mechanically stable bearing, the solutions in D4 had small bearing surfaces in order to allow freedom of actuation of the spider element. D2 showed the use of a bimetallic disk but was concerned with improving the contact movement in order to prevent arcing. It did not aim at improving the thermal response of the thermostat. The essential features of the present invention, namely spacer means with a plurality of projections on the frame and a cap having a plurality of claws were neither known from the prior art nor obvious from daily life experience.

VII. The Appellant requested that the decision of the Examining Division be set aside and a patent be granted on the basis of the following documents:

Claims: 1, 2 received on 18 October 1993 with the letter of 14 October 1993;

Description: pages 1, 7, 9, 13, 15, 17 received on 28 September 1993 with the letter of 28 September 1993;
page 1a received on 29 January 1993 with the letter of 8 January 1993;

pages 2 to 6, 8, 11, 12, 14, 16, 18 to 22
as originally filed;

page 10 received on 18 October 1993 with
the letter of 14 October 1993;

Drawings: Figures 1 to 4 (2 sheets) received on
29 June 1987 with the letter of 25 June
1987;

Figures 5 to 7 (1 sheet) received on
1 October 1993 with the letter of
28 September 1993.

VIII. Furthermore, the Appellant requested reimbursement of the appeal fee because, in his opinion, the request for a telephone call or interview had been overlooked by the Examining Division. It was clear from the whole procedure that the Appellant was prepared to adapt the application in a flexible manner taking into consideration the prior art cited and the Examiner's view. The fact that no oral proceedings were held under these circumstances represented a procedural violation in accordance with decisions T 300/89 and T 668/89.

Reasons for the Decision

1. The appeal is admissible.
2. The amendments made to the claims and the description comply with the requirements of Article 123(2) EPC; all the features in Claim 1 can be found in original Claims 1 to 4 in conjunction with the description of Figures 1 to 3.

3. *Novelty*

3.1 The prior art illustrated by means of Figures 5 and 6 of the present application comprises the features defined by the wording of the precharacterising part of Claim 1. The spacer means of this conventional thermostat do not include a plurality of projections for separating the spacer means from direct contact with the bimetallic disk. Moreover, the cap has no claws with insulating means thereon for securing the bimetallic disk on the projections.

3.2 Although the thermostat of D4 serves the object of providing an improved apparatus efficiency and a rapid temperature response, its construction is different from that of the present invention. The outer shell section 24 of the thermostat in D4 may be called spacer means. These spacer means have no projections, however, and the outer shell section 25 is not directly fixed to the frame. There are no claws and the thermostat uses a spider-shaped bimetallic element rather than a disk.

3.3 Although D1, D2 and D3 show thermostats using disks as bimetallic elements, they are not concerned with the reduction of heat transfer from the disk to the frame but with the problem of avoiding arcing. Their construction is completely different from that of the claimed subject-matter.

3.4 Thus, the subject-matter of Claim 1 is considered novel in the sense of Article 54 EPC.

4. *Inventive step*

4.1 It is explained in the present application that the present invention improves thermostats which are highly heat-resisting in order to be suitable e.g. for copying

machines. In conventional thermostats such as shown in Figures 5 and 6 much of the heat absorbed by the bimetallic disk is conducted to other members such as the disk holder, the moving pin and the fixed cap provided on the housing and covering the disk holder. Therefore, not all the heat transmitted to the bimetallic disk is used to actuate it but is partly transmitted to other parts of the thermostat. As a result, the accuracy of the thermal control is decreased.

4.2 Hence, starting from the latest conventional thermostats as illustrated in Figures 5 and 6 of the present application as most relevant prior art, the objective problem underlying the present invention is to increase the accuracy and thermal response of a thermostat suitable for high temperatures.

4.3 According to Claim 1 this problem is solved:

- (a) by providing the spacer means with the plurality of projections for separating the spacer means from direct contact with the bimetallic disk and
- (b) in that the cap has a plurality of claws with insulating means thereon for securing the bimetallic disk on the projections.

The provision of holding projections according to feature (a) reduces the contact area between the disk and the disk holder and therefore also the heat transfer from the disk to the disk holder which is in good thermal contact with the frame. The insulating means on the plurality of claws for securing the bimetallic disk on the projections according to feature (b) reduces heat transfer to the fixed cap 40 which is also in direct contact with the frame.

4.4 The principle of this solution is nowhere mentioned or hinted at in the cited prior art documents.

Whilst documents D1 to D3 concern medium temperature thermostats designed for avoiding or suppressing arcing, only D4 discloses a thermostat which is suitable for high temperatures and serves the object of providing an improved operating efficiency and a rapid temperature response. The design of the thermostat according to D4 is different from the closest prior art illustrated by means of Figure 5 and 6 of the present application, however, so that the specific problems of the design explained by means of Figures 5 and 6 and being the starting point of the present invention do not arise there. In contrast to a cap being directly fixed to the frame according to the present application, according to D4 the outer shell section 25 is not directly fixed to the body 2 but only through the intermediary of a heat conductive outer shell section 24. Although the outer shell section 24 of D4 is indirectly provided between the body 2 and the bimetallic element and may therefore be called spacer means it is separated from the bimetallic element by a portion of the outer shell section 25 which is the only part in contact with the bimetallic element. Heat transfer from the bimetallic element to the outer shell section 25 is reduced by the use of a very thin sheet metal for the outer shell section 24. In contrast to the disk of the present application the bimetallic element of D4 has a spider shape with a plurality of legs supported rockably and slidably in a groove or in several wells. Although the spider form of the bimetallic element automatically provides a reduced contact area, the envisaged purpose of the spider shape and of the supporting continuous or discontinuous groove or wells for each foot is "freedom of action of the spider element" which "permits the bimetallic unit to assume any circumferential

orientation". Since according to D4 heat transfer from the spider shaped bimetallic element to the outer shell sections 24 and 25 is assumed to take place, heat transfer to the body is minimised by providing the control chamber with a restricted neck. Projections in the sense of the present application which constitute a bearing for the bimetallic element cannot be found in D4. Nor is there any hint at providing a cap with a plurality of insulated claws for securing the bimetallic disk on such projections.

Neither daily life experience (e.g. protection of the finger tips for gripping something hot) nor documents D1 to D3 lead to the idea of creating a bearing for a movable disk with a relatively small bearing surface for reducing heat transfer. Claws in the sense of the present application are not disclosed in any of the documents D1 to D3. As far as insulation is mentioned in these documents, it concerns electrical insulation (e.g. between a bimetallic disk and conducting material or frame in D1) but no heat insulation as in the present application.

4.5 Hence, in the Board's judgment, the subject-matter of Claim 1 involves an inventive step in the sense of Article 56 EPC. Therefore, this claim is allowable.

4.6 Dependent Claim 2, according to which the direct contact of the pin with the bimetallic disk is limited, is likewise allowable.

5. *Refund of the appeal fee*

5.1 The request for refund of the appeal fee was based on the assertion that although the Appellant had asked for a telephone call or an interview and shown his willingness to adapt the demand for protection in a

flexible manner, he was not given any chance to discuss the application in an interview or oral proceedings and that these requests were overlooked. This constituted a procedural violation.

In the replies dated 21 October 1991 and 2 June 1992 the Appellant requested auxiliarily a telephone call or an informal interview, not the appointment of oral proceedings such as provided by Article 116(1) EPC as a matter of right. By exercising objectively its discretion given by Article 96(2) EPC in the present circumstances the Examining Division deemed it unnecessary to continue with the procedure and consequently rightly issued the refusal; cf. decisions T 113/89, T 243/89 and T 300/89.

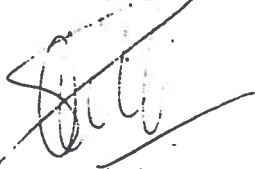
5.2 In view of the above considerations, the Board comes to the conclusion that the proceedings before the Examining Division did not in the present case suffer from a violation of the procedure laid down in accordance with the EPC. Therefore, in the Board's judgment, there is no basis for a refund of the appeal fee under Rule 67 EPC.

Order

For these reasons, it is decided that:

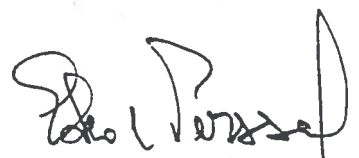
1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of the documents cited in section VII above, using however a uniform spelling of "disk".
3. The request for refund of the appeal fee is refused.

The Registrar:



M. Kiehl

The Chairman:



E. Persson