Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 9 February 2022

Case Number: T 1846/17 - 3.2.03

Application Number: 08836812.1

Publication Number: 2212640

IPC: F28F27/00, F28C1/00, F04D19/00, F04D27/02, F04D27/00, H02K1/27

Language of the proceedings: EN

Title of invention:
INTEGRATED FAN DRIVE SYSTEM FOR COOLING TOWER AND METHOD OF OPERATING WET COOLING TOWER

Patent Proprietor:
Prime Datum Inc.

Opponent:
Baldor Electric Company

Headword:

Relevant legal provisions:
EPC Art. 123(2)
RPBA 2020 Art. 13(2)

Keyword:
Late-filed request
Amendment to appeal case - amendment detrimental to procedural economy (no)
Amendments - added subject-matter (yes)

Decisions cited:
T 0764/16, T 1187/16, J 0014/19

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1846/17 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 9 February 2022

Appellant: (Opponent)	Baldor Electric Company 5711 R.S. Boreham Jr. Street Fort Smith, Arkansas 72901 (US)
Representative:	Schicker, Silvia Wuesthoff & Wuesthoff Patentanwälte PartG mbB Schweigerstraße 2 81541 München (DE)
Respondent: (Patent Proprietor)	Prime Datum Inc. 4085 Route 247 Canandaigua, NY 14424 (US)
Representative:	MacLachlan & Donaldson Unit 10, 4075 Kingswood Road Citywest Business Campus Dublin D24 C56E (IE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 28 June 2017 concerning maintenance of the European Patent No. 2212640 in amended form.**

Composition of the Board:

Chairman	C. Herberhold
Members:	B. Goers
	N. Obrovski

Summary of Facts and Submissions

I. European patent No. 2 212 640 (hereinafter: "the patent") relates to a wet cooling tower for cooling water and a method for its operation, the cooling tower comprising a fan and a fan-drive system for rotating of the fan.

II. The opponent (hereinafter: "the appellant") appealed against the opposition division's decision to maintain the patent in amended form on the basis of the main request at that time.

III. With the parties' consent, oral proceedings before the board were held on 9 February 2022 by videoconference using the Zoom platform.

IV. At the end of the oral proceedings, the appellant confirmed the following requests:

- that the decision under appeal be set aside
- that the patent be revoked

The patent proprietor (hereinafter: "the respondent") requested that the patent be maintained in amended form:

- on the basis of auxiliary request 2 filed with the submission dated 22 January 2021 or
- on the basis of auxiliary request 4 filed with the submission dated 11 March 2021 or
- on the basis of auxiliary request 5 submitted during the oral proceedings before the Board.

V. In this decision the references to the application as filed are based on the A-publication WO 2009/048736.

VI. Independent claims

(a) Independent claims 1 and 2 of auxiliary request 2 read as follows (feature numbering added by the board in "[]"; amendments compared with claims 1 and 2 of the patent as maintained by the decision under appeal are shown in bold and strike-through).

Claim 1:

"[a1] *A wet cooling tower for cooling water used in an industrial process,*
[aa1] *wherein the wet-cooling tower has a fan deck (12); a fan cylinder (1) positioned on the fan deck (12),*
[b1] *a fan (27) that causes an airflow that cools the water, the fan (27) located within the fan cylinder (10) and comprising a hub (28) to which are connected a plurality of fan blades (30), a fan-drive system for causing rotation of the fan (27) and a basin for collecting cooled water,*
characterised in that
[c1] *the fan-drive system is a direct-drive system comprising:*
[d1] *a high-torque, low variable speed permanent magnet motor (52) positioned beneath the fan hub (28) and having a rotatable shaft (56) directly coupled to the fan hub (28),*
[e1] *a stator (94) and two sealed bearings (90,92),*
[f1] *wherein the high torque, low variable speed permanent magnet motor (52) is configured to have* ***performance characteristics of*** *a speed range of 0-250 RPM and maximum power of 133HP/100KW;*

[g1] *a variable frequency drive device (50) to generate electrical signals that effect rotation of the rotatable shaft (56) of the motor (52) in order to rotate the fan (27),*
[g1a] *wherein the variable frequency drive device (50) is configured to control the speed, direction and torque of the high-torque, low variable speed permanent magnet motor (52) and*
[h1] *wherein the variable frequency drive device (50) is configured to receive control signals that represent a desired motor rotational speed, and in response, generate electrical signals for input into the motor (52) to cause the motor (52) to operate at a rotational speed that is the same as the desired rotational speed, wherein the variable frequency drive device (50) comprises:*
[h1a] *a variable frequency controller that has an input for receiving AC power and an output for providing the electrical signals that control the speed of the permanent magnet motor; and*
[h1b] *a user interface in electronic data signal communication with the variable frequency controller to allow a user to input data representing the desired rotational speed of the motor;* ~~*and*~~
[i1] *heat and vibration sensors (200, 202) in proximity to the bearings (90, 92) for measuring heat and vibrations of the bearings and outputting signals representing the measured heat and vibrations;*
[j1] *a temperature sensor (204) on stator (94) for measuring heat of the stator (94) and outputting signals representing the measured heat;*
[k1] *a temperature sensor (208) located in the basin for outputting a signal representing the temperature of the water in the basin;*

[l1] *an airflow sensor (206) positioned downstream of the airflow of the cooling tower fan (27) to measure airflow and output signals representing the airflow;*
[m1] *and a computer (300) external to both the permanent magnet motor (52) and the variable frequency device (50) and in electronic signal communication with the variable frequency drive device (50),*
[n1] *wherein the computer (300) processes the signals representing (i) the measured heat of the motor stator ~~and bearings~~,* (ii) *the measured vibrations* ***and heat*** *of the motor bearings, (iii) the measured temperature of the water in the basin and (iv) the measured airflow,*
[o1] *wherein the computer, the variable frequency drive device and all of the sensors form a feedback loop,*
[p1] *wherein the computer generates the control signals for input into the variable frequency drive device in order to adjust the speed of the high-torque, low variable speed permanent magnet motor (52) in response to the processed signals,*
[q1] *wherein the computer (300) further comprises a display screen device (302) that enables a user or operator to visually monitor the signals outputted by the heat* ***and vibration sensors, the*** *temperature* ***sensors,*** *~~vibration~~ and* ***the*** *air-flow sensor~~s~~.*"

Claim 2

"[a2] *A method of operating a wet cooling tower for cooling water used in an industrial process,*
[b2] *wherein the wet cooling tower has a fan deck (12); a fan cylinder (1) positioned on the fan deck (12), a fan (27) for causing an airflow that cools the water, the fan (27) located within the fan cylinder (10) and comprising a hub (28) to which are connected a plurality of fan blades (30), a basin for collecting*

cooled water, and a fan-drive system for causing rotation of the fan,
characterized in that
[c2] *the fan-drive system is a direct-drive system comprising*
[d2] *a high-torque, low variable speed permanent magnet motor (52) positioned beneath the fan hub (28) and comprising a rotatable shaft (56) directly coupled to the fan hub (28)*
[e2] *wherein the high torque, low variable speed permanent magnet motor (52) is configured to have* ***performance characteristics of*** *a speed range of 0-250 RPM and maximum power of 133HP/100KW,*
[f2] *a stator (94) and two sealed bearings (90, 92),*
[g2] *and a variable frequency drive device (50) to generate electrical signals that effect rotation of the rotatable shaft (56) of the motor (52) in order to rotate the fan (27),*
[g2a] *wherein the variable frequency drive device (50) is configured to control the speed, direction and torque of the high-torque, low variable speed permanent magnet motor (52) and*
[h2] *wherein the variable frequency drive device (50) is configured to receive control signals that represent a desired motor rotational speed, and in response, generate electrical signals for input into motor (52) to cause the motor (52) to operate at a rotational speed that is the same as the desired rotational speed wherein the variable frequency drive device (50) comprises:*
[h2a] *a variable frequency controller that has an input for receiving AC power and an output for providing the electrical signals that control the speed of the permanent magnet motor; and*
[h2b] *a user interface in electronic data signal communication with the variable frequency controller to*

allow a user to input data representing the desired rotational speed of the motor, wherein the method of operating the wet cooling tower comprises the steps of:
[i2] *utilizing heat and vibration sensors (200, 202) positioned in proximity to the bearings (90, 92) to measure heat and vibrations of the bearings (90, 92) and output signals representing the measured heat and vibrations; utilizing a temperature sensor (204) on the stator (94) to measure heat of the stator (94) and providing output representing the measured heat;*
[k2] *utilizing an airflow sensor (206) positioned downstream of the airflow created by the fan (27) to measure airflow produced by the fan (27) and output signals representing the measured airflow;*
[l2] *utilizing a temperature sensor (208) located in the basin to measure the temperature of the water in the basin;*
[m2] *utilizing a computer (300) external to both the permanent magnet motor (52) and the variable frequency drive device (50) to process the signals representing (i) the measured heat of the motor stator ~~and bearings~~ (94), (ii) the measured vibrations **and heat** of the motor bearings (90, 92), (iii) the measured airflow, and (iv) the measured temperature of the water in the basin;*
[n2] *and generating control signals for input into the variable frequency drive device (50) in order to adjust the speed of the motor (52) in response to the processed signals*."

(b) The amendments to claims 1 and 2 in auxiliary request 4 compared with auxiliary request 2 are as follows (marked in bold and strike-through).

Amendments to feature groups [f1] (claim 1) and [e2] (claim 2):

"*wherein the high torque, low variable speed permanent magnet motor (52) is configured to have* ***operational and*** *performance characteristics of a speed range of 0-250 RPM* ~~*and*~~***, a*** *maximum power of 133HP/100KW 100KW,* ***16 poles, a motor service factor of 1:1, a rated current of 62 A (rms), a peak current of 95 A, a rated voltage of 600 V and drive inputs of 460 V, 3 phase, 60 Hz, 95A (rms max. continuous);"***

Amendments to feature group [n1] (claim 1):

"wherein the computer (300) ***is configured to implement a reliability algorithm using the data outputted by sensors (200), (202), (204), (206) and 208 and in response, output appropriate control signals that are inputted into user interface (62) via data port (80) such that the computer (300)*** *processes the signals representing (i) the measured heat of the motor stator, (ii) the measured vibrations and heat of the motor bearings, (iii) the measured temperature of the water in the basin and (iv) the measured airflow,"*

The following feature group was introduced in claim 2 after feature group [n2]:

"[n2a] **wherein the computer (300) is configured to implement a reliability algorithm using the data outputted by sensors (200), (202), (204), (206) and 208 and in response, output appropriate control signals that are inputted into user interface (62) via data port (80) such that the computer (300), the variable frequency drive device and all of the sensors form a feedback loop and wherein the computer (300) further comprises a display screen device (302) that enables a user or operator to visually monitor the signals**

outputted by the heat and vibration sensors, the temperature sensors, and the air-flow sensor."

(c) The following amendments have been made in claims 1 and 2 of auxiliary request 5 compared with auxiliary request 4.

Feature group [h1] of claim 1 has the following addition marked in bold (a corresponding amendment is made to feature group [h2] of claim 2).

"*wherein* ***the user interface of*** *the variable frequency drive device (50) is configured to receive control signals that represent a desired motor rotational speed, and in response, generate electrical signals for input into the motor (52) to cause the motor (52) to operate at a rotational speed that is the same as the desired rotational speed, wherein the variable frequency drive device (50) comprises: ...*"

The following additional feature group is introduced between features [l1] and [m1] of claim 1 and between features [n2] and [n2a] of claim 2:

"*wherein all sensor output signals applied to sensor signal inputs (82, 84, 86, 88, 89) are inputted into the user interface (62) of the variable frequency drive (50)*"

VII. The appellant's arguments relevant to the present decision can be summarised as follows:

(a) Auxiliary request 2 - admittance

Auxiliary request 2 was filed late without justification of any exceptional circumstances, as

would be required by Article 13(2) RPBA 2020. Moreover, it not only failed to address all the objections under Article 123(2) EPC raised by the opponent in the statement of grounds, but it did not even overcome the objections identified by the Board in points 3.2.2, 3.2.5, 3.4.2 and 3.4.3 of the preliminary opinion. Auxiliary request 2 was thus *prima facie* not allowable and should not be admitted. Furthermore, adding the wording "performance characteristics" gave rise to new objections under Article 84 EPC.

(b) Auxiliary request 4 - admittance

Auxiliary requests 4 was also filed late without justification of any exceptional circumstances. Furthermore, it was *prima facie* not allowable either since it also failed to address all the objections under Article 123(2) EPC raised by the opponent in the statement of grounds. In addition the added feature "reliability algorithm" violated the requirements of Article 83 EPC, giving rise to new issues. It should therefore not be admitted into the proceedings either.

(c) Auxiliary request 4 - added subject-matter

Features [h1] (claim 1) and [h2] (claim 2) did not specify how the sensor output signals were fed into the computer of the feedback loop (features [o1] and [n2a]). This had to be considered an unallowable intermediate generalisation over the application as filed, which explicitly disclosed that the sensor signals were input into the user interface first and only then transferred to the computer via the data communication port. This was apparent from claim 10 as well as page 12, lines 3 and 4.

(d) Auxiliary request 5 - admittance

Auxiliary request 5 should not be admitted, since it was late filed and gave rise to a new Article 123(2) EPC objection. The application as filed did not disclose that the user interface of the variable frequency drive generated electrical signals for input into the motor. Any such electrical signals were consistently described as being generated by the variable frequency controller.

VIII. The respondent's arguments relevant to the present decision can be summarised as follows:

(a) Auxiliary request 2 - admittance

The request was not filed late since it addressed points raised in the Board's preliminary opinion with respect to features [f1] and [e2]. Adding the term "performance characteristics" meant that the claims now defined all the characteristics related to the quality of functioning of the motor. The other motor characteristics disclosed on pages 10 and 11 were merely operational characteristics unrelated to the motor's performance. Furthermore, the sensors had been further defined. All outstanding issues had thus *prima facie* been overcome, so auxiliary request 2 should be admitted.

(b) Auxiliary request 4 - admittance

Auxiliary request 4 clearly addressed all the issues the Board had deemed relevant in its preliminary opinion, owing to the addition in particular of all the motor characteristics and the definition of the reliability algorithm and the feedback loop. In view of

the large number of complex Article 123(2) EPC objections raised by the appellant, not submitting the amendments until the response to the board's communication contributed to procedural economy. The new feature "reliability algorithm" was sufficiently disclosed on pages 12 and 13 of the specification in consideration of the skilled person's common technical knowledge.

(c) Auxiliary request 4 - added subject-matter

The claims of auxiliary request 4 did not violate the requirements of Article 123(2) EPC. Original claims 9 and 10 and Figure 5 provided general teaching that control data were exchanged between the computer and the variable frequency drive. The disclosure was therefore not limited to sensor signals being input only into the user interface.

(d) Auxiliary request 5 - admittance

Auxiliary request 5 addressed all the issues which had come up when discussing auxiliary request 4 and did not give rise to any new ones. According to claims 9 and 10 and Figure 5 of the application as filed, the variable frequency drive generated electrical signals for input into the motor. This was still reflected by the wording of claims 1 and 2 as amended. The requirements of Article 123(2) EPC were thus fulfilled.

Reasons for the Decision

Auxiliary request 2 - admittance

1. Auxiliary request 2 is not considered in the proceedings.

1.1 The respondent submitted auxiliary request 2 by letter dated 22 January 2021, i.e. after the notification of the summons to oral proceedings dated 9 April 2020. Consequently, Article 13(2) RPBA 2020 applies (Article 25(1) and (3) RPBA 2020).

1.2 Auxiliary request 2 constitutes an amendment to the respondent's appeal case (see J 14/19, Reasons 1.5). Under Article 13(2) RPBA 2020 any such amendment made after notification of a summons to oral proceedings shall, in principle, not to be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.

1.3 Contrary to the respondent's view, a party cannot invoke exceptional circumstances under Article 13(2) RPBA 2020 on the basis of the fact that a Board's preliminary opinion in a communication under Article 15(1) RPBA 2020 diverges from the opposition division's assessment of a certain issue in the decision under appeal (see e.g. T 764/16, Reasons 3.3.2 or T 1187/16, Reasons 3.2).

1.4 The Board did not raise any new objections in its communication under Article 15(1) RPBA 2020 either. Although it came to a different conclusion than the opposition division, the Board considered the same features in its communication as the opposition

division did in its decision, namely the combination of the speed range with only the maximum power in feature groups [f1] and [e2], the omission of the "reliability algorithm" in the feedback loop according to features [n1], [o1] and [q1], and the complete omission of the feedback loop in claim 2.

1.5 At the third level of the convergent approach, which applies here (see document CA/3/19, page 43, explanatory remarks on Article 13(2) RPBA 2020), when exercising its discretion the Board may rely also on criteria applicable at the second level, which include:

(a) procedural economy;
(b) *prima facie* suitability of the amendments to overcome the issues raised by the other party and the board;
(c) the amendments not giving rise to new issues.

Applying criteria (b) and (c) also suggests that auxiliary request 2 should not be admitted.

1.5.1 Firstly, the amendments do not overcome all the objections under Article 123(2) EPC considered relevant in the board's preliminary opinion. In particular, the reliability algorithm is not considered in the amended claims and the feedback loop is not defined in claim 2.

1.5.2 Secondly, the amendments also give rise to new objections at least under Article 84 EPC. In particular, the amendments made to feature groups [f1] and [e2] (addition of the wording "performance characteristics") do not include the other motor characteristics disclosed in the A-publication in the paragraph bridging pages 10 and 11, despite all the motor parameters being disclosed as "operational and

performance characteristics". The respondent argued that the speed range and maximum power were to be considered performance characteristics while the other features not considered in the claims were operational characteristics. This distinction, however, is not clearly and unambiguously derivable from the application as filed. Therefore, it is not clear which further restriction of the subject-matter is added by the wording "performance characteristics".

Introducing this wording into claim 1 is thus also not a convincing argument for omitting the other disclosed motor characteristics either.

1.6 In view of the above, the Board exercised its discretion under Article 13(2) RPBA not to admit auxiliary request 2 into the appeal proceedings.

Auxiliary request 4 - admittance

2. Auxiliary request 4 is considered in the proceedings.

2.1 The respondent submitted auxiliary request 4 by letter dated 11 March 2021. Consequently, Article 13(2) RPBA 2020 applies (Article 25(1) and (3) RPBA 2020).

2.2 In contrast to auxiliary request 2, the amendments to claims 1 and 2 of auxiliary request 4 address all the objections under Article 123(2) EPC considered relevant by the board in its preliminary opinion under Article 15(1) RPBA 2020.

2.3 While auxiliary claim requests countering all the objections raised by the opponent should be filed at the earliest possible moment, in the case in hand the

appellant had raised a large number of exceptionally complex and interrelated objections under Article 123(2) EPC, based mostly on allegedly unallowable intermediate generalisations. In its preliminary opinion, the Board considered only some of these objections to be relevant.

Under these circumstances, filing an amended claim request which appears to immediately resolve all the relevant objections under Article 123(2) EPC can exceptionally be considered as a procedurally efficient, straightforward attempt to overcome the issues raised. Moreover, while arguably not filed at the earliest possible opportunity, auxiliary request 4 was still filed almost a year before the oral proceedings and was strictly limited to addressing the relevant objections under Article 123(2) EPC. It did not, *prima facie*, give rise to any new objections either and could not have come as a surprise to the appellant, which had previously argued that the added features were missing under Article 123(2) EPC.

2.4 Overall, the Board considered the above circumstances to be exceptional within the meaning of Article 13(2) RPBA 2020 and admitted auxiliary request 4 into the proceedings.

Auxiliary request 4 - allowability

3. Auxiliary request 4 is not allowable in view of added subject-matter. In particular, claims 1 and 2 of auxiliary request 4 do not comply with the requirements of Article 123(2) EPC.

3.1 During the substantive discussion of added subject matter, the appellant further refined and clarified its objection related to feature groups [ga1]/[ga2] and [h1]/[h2]. The appellant put forward that as per the current claim language the sensors did not have to be in electronic data communication with the user interface 62. This was inconsistent with the requirements of Article 123(2) EPC since it encompassed embodiments wherein the sensors are directly connected to the computer; this was new technical information with respect to the original disclosure.

3.2 The requirements of Article 123(2) EPC are indeed violated by this omission. The claim wording of auxiliary request 4 only specifies that the sensor data are "used by the computer" (features [n1] and [n2a]). However, as is apparent from Figure 3, the sensor data are originally disclosed as being input into the user interface of the variable frequency drive. Only then are they transferred to the computer via the bi-directional data connection 80. This is also reflected in the wording of claim 10 of the application as filed ("a plurality of sensors in electronic data signal communication with the user interface..."), in the disclosure on page 12, lines 3 and 4 ("All sensor output signals applied to sensor signal inputs ... are inputted [sic] into user interface 62 of VFD device 50 and then routed to an external processing device ... "; see also claims 11 and 12 as filed) and Figure 3.

3.3 The respondent's arguments that the disclosure of Figure 5 was more general in that respect is without merit. Firstly, Figure 5 relates to the same embodiment as Figure 3. Secondly, even according to this figure the sensor signals are input into the variable

frequency drive unit and only then transmitted further to the computer 300. Therefore the wording of features [h1] and [h2] constitutes an unallowable intermediate generalisation even in view of Figure 5.

Auxiliary request 5 - admittance

4. Auxiliary request 5 submitted during oral proceedings is not considered in the proceedings under Article 13(2) RPBA 2020, already for the reason that the amendments made give rise to further issues.

4.1 Claims 1 and 2 of auxiliary request 5 have *inter alia* been amended such that now only "the user interface of the variable frequency drive device (50)" is defined to "generate electrical signals for input into motor (52)" instead of the overall unit "variable frequency drive".

4.2 This is not disclosed in the application as filed. From both Figure 3 and page 6, lines 15 to 20, it is apparent that the user interface is in electrical signal communication with the variable frequency controller. Only the variable frequency controller is disclosed as providing electrical signals to the motor. Since the variable frequency controller processes the input signals and current in order to generate electrical signals to the motor, the data provided by the user interface are not disclosed as being transferred to the motor either directly or indirectly.

5. Since the claim requests on file are either not allowable or were not admitted into the proceedings, the patent is to be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

C. Spira C. Herberhold

Decision electronically authenticated