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**Datasheet for the decision  
of 24 April 2023**

**Case Number:** T 0139/22 - 3.2.04

**Application Number:** 13711687.7

**Publication Number:** 2831381

**IPC:** F02C9/48, F01D21/14, F01D21/02,  
F01D21/00, F01D19/00

**Language of the proceedings:** EN

**Title of invention:**  
METHOD OF OPERATING A TURBINE ENGINE AFTER FLAME OFF

**Patent Proprietor:**  
Ansaldo Energia IP UK Limited

**Opponent:**  
Siemens Aktiengesellschaft

**Headword:**

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
Inventive step - (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
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Case Number: T 0139/22 - 3.2.04

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.04**  
**of 24 April 2023**

**Appellant:** Siemens Aktiengesellschaft  
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**Representative:** Siemens Aktiengesellschaft  
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**Respondent:** Ansaldo Energia IP UK Limited  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
29 November 2021 concerning maintenance of the  
European Patent No. 2831381 in amended form.**

**Composition of the Board:**

**Chairman** C. Heath  
**Members:** G. Martin Gonzalez  
S. Hillebrand

## **Summary of Facts and Submissions**

I. The appeal was filed by the appellant (opponent) against the interlocutory decision of the opposition division to maintain the patent in amended form.

II. The division held inter alia that the upheld claims involved an inventive step.

III. In preparation for oral proceedings the Board issued a communication setting out its provisional opinion.

Oral proceedings were held before the Board on 24 April 2023.

IV. The appellant opponent requests that the decision under appeal be set aside and the patent be revoked.

The respondent proprietor requests that the appeal be dismissed, or, in the auxiliary, that the decision under appeal be set aside and the patent be maintained on the basis of one of auxiliary requests 1 - 5 all filed with the reply to the grounds of appeal dated 6 July 2022.

V. The independent claim of the main request (as upheld by the opposition division) reads as follows:

"A method of decelerating a turbine rotor (12) of a turbine engine (1), wherein at least one electric motor (30) is engaged with the turbine rotor (12), wherein a braking system (40) is engaged with the at least one electric motor (30) so as to use the at least one electric motor (30) to apply a negative torque on the turbine rotor (5 12), characterized in that, after

flame off, the braking system (40) is used for dissipating kinetic energy available in the turbine engine (1) after flame off by means of the at least one electric motor (30),

wherein

the electric motor (30) is an electric generator (30), the electric generator (30) being preferably provided for supplying a high-voltage network (60) with power during normal operation of the turbine engine (1), wherein the braking system (40) is used for transforming the kinetic energy into electric energy by means of the electric generator (30),

wherein

the electric energy is fed into the high-voltage network (60) while a generator output meets requirements of a high-voltage network in-feed and/or

the electric energy is fed into a medium-voltage network (61) while a generator output meets requirements of a medium-voltage network in-feed, and/or

the electric energy is fed, preferably via the medium-voltage network (61), into a battery element, so as to dissipate at least part of the electric energy, wherein the electric energy is preferably dissipated by recharging the battery element."

VI. In the present decision, reference is made to the following documents:

(E1) US 5,783,932

(E2) EP 1 507 068 A1

(E6) WO 2010/018194 A2

(E8) Wikipedia Article "Battery (electricity)" as available in Internet on 30 November 2011: The Wayback

Machine - [https://web.archive.org/web/20111130221618/http://en.wikipedia.org/wiki/Electric\\_battery](https://web.archive.org/web/20111130221618/http://en.wikipedia.org/wiki/Electric_battery).

VII. The appellant's arguments can be summarised as follows:

Claim 1 of the main request lacks inventive step starting from E2 or E1 in combination with common general knowledge, E8 or E6.

VIII. The respondent's arguments can be summarised as follows:

The independent claim of the main request involves an inventive step over the cited prior art.

### **Reasons for the Decision**

1. The appeal is admissible.
2. Background

The invention relates to a method for turbine rotor deceleration after flame off (interruption of fuel flow) so that run-down time is reduced, see specification paragraph [0001]. An electric generator coupled to the turbine rotor is used for braking. The electric energy produced by the generator is fed into a high-voltage network, a medium-voltage network or into a battery element, see paragraphs [0034]-[0040]. This improves the overall performance of the engine by partially recovering the kinetic energy stored in the turbine engine after flame off, see paragraphs [0038], [0048].

3. Main request - Inventive step
  - 3.1 The appellant contests the findings of the opposition division as regards inventive step of the upheld claims.
  - 3.2 It is common ground that E2 can be considered as starting point for the assessment of inventive step. This document describes a method for decelerating a gas turbine after flame off, see abstract. Its main embodiment uses hydraulic components (see figure 2). A second embodiment uses an electric motor connected to the gas turbine shaft which in reverse operation works as an electrical generator, see claim 4. The generated electric energy is dissipated in an electric load, see E2 paragraphs [0015].
  - 3.3 It is undisputed that E2 does not anticipate the claimed features of feeding the generated electric power into a high-voltage network, a medium-voltage network or into a battery element.
  - 3.4 The recovery of electric energy during deceleration - including into a battery element - improves the energy production plant efficiency or overall performance, see specification paragraph [0048], that explicitly cites the option of feeding a battery element associated to this technical effect. The differentiating features therefore can be seen as solving the problem of how to increase the efficiency of the system.
  - 3.5 The appellant submits that the third option of claim 1, to feed the generated electric power into a battery element is obvious in the light E2 combined with common general knowledge and on the basis of a different formulation of the technical problem.

Document E2 teaches, for the electric variant of the method, to dissipate the electric energy produced by the motor used as electric generator in an electric load ("Verbraucher"), cf. E2, para [0015], without further specification. The appellant thus reformulates the objective technical problem to the less ambitious version of how to realise in practice the unspecified electric load when carrying out the method disclosed in E2. According to the appellant, a rechargeable battery is a well known electric load. The appellant cites E8, a Wikipedia article about batteries in general also including rechargeable batteries, in support of this common general knowledge. The skilled person would thus regard the use of a rechargeable battery for realising the electric load of E2 as an obvious and arbitrary selection.

3.6 The Board is not convinced by the argument. There is no suggestion in E2 to recover or reuse the remaining inertia energy in the turbine rotor. The only examples in E2 teach dissipation of the energy. In the hydraulic version, the turbine shaft is connected to a hydraulic pump. The obtained oil pressure is dissipated with the help of pressure control valves 24 and 27, cf. para [0033]. In the electric braking version, only an internal resistance of the generator that dissipates the obtained electric energy is suggested, cf. para [0038]. There is therefore no indication in E2 to deviate from the idea of a load that dissipates energy.

3.7 The method of E2 is directed at decelerating the turbine. The skilled person would thus be driven in the selection of an electric load by the requirements of the braking procedure, as is taught by E2. Indeed, paragraph [0015] further specifies to select an



electric load that provides sufficient dissipation for braking the turbine in a short time until it has come to a standstill. The load is moreover connected to an electric generator generating an electric power that decreases and varies in terms of power, voltage and/or frequency, as corresponds to the braking process. The cited paragraph of E2 adds that a variable load would be preferable. The appellant has submitted no evidence that the electric load provided by the charging process of a battery meets the required conditions, that it can be readily adapted to them or that its adaptation to such a process is a matter of common knowledge or common usage. It is also not readily apparent to the Board that it would be so. The Board can thus not conclude that based on the teachings of E2 and common general knowledge or E8, the use of a rechargeable battery is an obvious choice for the skilled person. This is the more so in the light of other patently applicable electric loads available from common general knowledge that readily fulfil the described load characteristics, for example an electric resistance properly dimensioned as suggested by the respondent proprietor, or a variable resistance.

- 3.8 Thus the appellant's lack of inventive step objection starting from E2 is not convincing.
- 3.9 Document E1 is also regarded by the parties as a suitable starting point. This document describes an emergency power supply method in case of failure of the in-house power supply unit to supply the internal network 62 of the power plant. It includes interruption of fuel supply to the turbine, see column 3, lines 27-36. Thus, a flame off situation is also disclosed by E1.

In the method of E1, generator 2 extracts electric power from the inertia persisting in the turbine rotor shaft, thereby decelerating it, to feed emergency motor 4. Motor 4 in turn moves emergency AC generator 5, which supplies the emergency power to the internal network 62. Realising network 62 as a medium-voltage network appears to be obvious in the light of the teachings in E6. E6, cf. page 6, lines 1-2; or page 9, line 31 to page 10, line 5, teaches that the power plant's internal electricity grid is typically designed as a medium-voltage grid.

- 3.10 It is common ground that E1 neither discloses feeding the electric energy to a high-voltage network nor into a battery element. Thus, the first and the third claimed options are not disclosed by E1.
- 3.11 It is in dispute whether the second option, to feed the generated electric power into a medium-voltage network, this being internal network 62, is disclosed by E1. The claimed feature requires that *the electric energy is fed into a medium-voltage network while a generator output meets requirements of a medium-voltage network in-feed*. The appellant submits that the claimed feature does not require directly feeding the generator 2 output into the network. Thus, the system of E1 would fulfil this feature insofar as generator 2 output is indirectly fed, through motor 4 and generator 5, into net 62. However, the claimed feature also requires that the electric energy produced by generator 2 must meet the requirements of a medium-voltage net. In E1, this electric energy is fed to a single motor 4, not to internal net 62. It is thus not apparent from E1 that the output of generator 2 meets the requirements of a medium-voltage net in-feed, as claimed, even if the internal network 62 of E1 is a medium-voltage network.

3.12 The appellant also reads the contested feature as allowing the second requirement, a medium voltage in-feed compliance, to be met by the output of a different generator, not necessarily the braking generator, generator 2 in E1. They then thus argue that output of the second generator 5, run by motor 4, meets the in-feed requirements of net 62, which would anticipate the contested feature.

However, as variously stated in case law, the skilled person should read a claim with synthetical propensity, i.e. building up rather than tearing down, and with a mind willing to understand, see Case Law of the Boards of Appeal, 10th edition 2022 (CLBA), II.A.6.1. The contested feature is directed to *the* electric energy, which clearly refers to the previously introduced electric energy produced by the electric generator of the braking system, cf. antecedent feature "...the braking system (40) is used for transforming the kinetic energy into electric energy by means of the electric generator (30),...". The ensuing qualification refers logically, reading the claim with synthetical propensity and a mind willing to understand, to that electric energy, produced by the braking generator, generator 2 in E1. Moreover, only this generator 2, not the second generator 5, is also an electric motor as required by claim 1. That the electric energy produced by a different generator, emergency generator 5 of E1, may be compliant with a medium-voltage in-feed requirements does not anticipate the claimed condition that an output of the braking generator meets the requirements of a medium-voltage net in-feed.

3.13 Thus even if in the light of the teachings of E6, it would be obvious to carry out the internal network 62 as a medium-voltage network, that combination of E1 and E6 would not result in the claimed subject-matter.

3.14 Therefore, none of the appellant's lack of inventive step objections convince the Board.

4. The appellant's lack of inventive step objections fail. As they have only challenged the decision's findings regarding inventive step, their appeal fails.

**Order**

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

**The appeal is dismissed.**

The Registrar:

The Chairman:



G. Magouliotis

C. Heath

Decision electronically authenticated