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Datasheet for the decision of 25 November 2015

Case Number: T 0961/12 - 3.2.05

Application Number: 00922390.0

Publication Number: 1194716

IPC: F17C5/06

Language of the proceedings: EN

Title of invention:
Hydrogen Fuel Replenishment Process and System

Patent Proprietor:
Hydrogenics Corporation

Opponent:
L'Air Liquide Société Anonyme pour l'Étude et l'Exploitation des Procédés Georges Claude

Relevant legal provisions:
EPC 1973 Art. 54, 56
EPC Art. 123(2), 123(3)
RPBA Art. 13(1), 13(3)

Keyword:

Novelty -
(no) main request and first and second auxiliary requests
Late-filed first and third auxiliary requests - admitted
Late-filed fourth auxiliary request not clearly allowable
Inventive step - obvious solution (third auxiliary request)
Inventive step -
unsubstantiated arguments against (ninth auxiliary request)
Remittal to the department of first instance - special reasons for not remitting the case
Added subject-matter (yes) seventh auxilliary request

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Case Number: T 0961/12 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 25 November 2015

Appellant II: (Patent Proprietor)	Hydrogenics Corporation 5985 McLaughlin Road Mississauga, Ontario L5R 1B8 (CA)
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Representative:	Emmanuel Jaime De Cuenca L'Air Liquide S.A. Direction Propriété Intellectuelle 75 Quai d'Orsay 75321 Paris Cedex 07 (FR)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 2 March 2012 concerning maintenance of the European Patent No. 1194716 in amended form.**

Composition of the Board:

Chairman	M. Poock
Members:	S. Bridge
	J. Geschwind

Summary of Facts and Submissions

I. Both parties lodged respective appeals against the interlocutory decision of the opposition division proposing to maintain the European patent No. 1 194 716 in amended form.

II. An opposition was filed against the patent as a whole based on Article 100(a) EPC 1973 (lack of novelty and lack of inventive step) and Article 100(b) EPC 1973.

III. Oral proceedings were held before the board of appeal on 25 November 2015.

IV. Appellant I (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

V. Appellant II (patent proprietor) requested that the decision under appeal be set aside and, as main request, that the patent be maintained as granted, alternatively, that the patent be maintained in amended form on the basis of the set of claims according to the first auxiliary request filed with letter of 23 October 2015, the second auxiliary request filed with the statement setting out the grounds of appeal dated 2 July 2012, the third or forth auxiliary requests filed during the oral proceedings, or the seventh and ninth auxiliary requests filed with letter of 23 January 2013.

VI. Claim 1 of the patent in suit as granted (main request) read as follows:

"A hydrogen replenishment system (100) for providing hydrogen to a hydrogen-receiving apparatus (120), said system comprising

(i) an electrolytic cell (112) for providing source hydrogen;

(ii) a compressor means (114) for providing outlet hydrogen at an outlet pressure;

(iii) means (116) for feeding said source hydrogen to said compressor means (114);

(iv) means (118) for feeding said outlet hydrogen to said hydrogen-receiving apparatus; the improvement comprising

(v) central processing unit means (126) for controlling said cell (112) and said compressor (114), comprising means for receiving and treating compression means physical parameter data selected from the group consisting of temperature, inlet and outlet hydrogen pressures and valve status of said compressor means (114); and modulating and controlling said compressor means (114) in consequence of said treatment of said compression means data; and

(vi) user activation means (124) for operably activating said control processing unit means (126)."

VII. Claim 1 according to the first auxiliary request differs from granted claim 1 in that the text "embodied as a filling station" is added after "A hydrogen replenishment system (100)".

VIII. Claim 1 according to the second auxiliary request corresponds to the version of the claims which the opposition division proposed to maintain, i.e. it corresponds to granted claim 1 wherein the term "control" has been replaced by "central" in feature

(vi) and the following text is added at the end of the claim:

"wherein said hydrogen receiving apparatus is a vehicle and said means for feeding said outlet hydrogen to said hydrogen-receiving apparatus comprises vehicle attachment means selectively attachable to the vehicle to provide outlet hydrogen as fuel to the vehicle".

IX. Claim 1 according to the third auxiliary request corresponds to granted claim 1 wherein the term "control" has been replaced by "central" in feature (vi) and the following text is added at the end of the claim:

"wherein said hydrogen receiving apparatus is a vehicle and said means for feeding said outlet hydrogen to said hydrogen-receiving apparatus comprises conduit means (118) and fitting engagement means (122) adapted to be received in sealing engagement by said apparatus wherein said conduit means (118) and fitting engagement means (122) comprises a plurality of conduits (118) and fitting engagement members (122) adapted to receive a plurality of said hydrogen-receiving apparatus (120)".

X. Claim 1 according to the fourth auxiliary request differs from claim 1 according to the third auxiliary request in that in feature (v) the expression "selected from the group consisting of" is replaced by "comprising" and the end of the claim the final expression "hydrogen-receiving apparatus (120)" is replaced by "vehicles (120)".

XI. Claim 1 according to the seventh auxiliary request corresponds to granted claim 1 wherein the term "control" has been replaced by "central" in feature

(vi) and the following text is added at the end of the claim:

"wherein said means (iv) for feeding said outlet hydrogen to said hydrogen-receiving apparatus (120) comprises conduit means (118) and fitting engagement means (122) adapted to be received in sealing engagement by said hydrogen-receiving apparatus (120), wherein said user activation means (124) comprises data receiving means adapted to receive data regarding a demand to provide hydrogen to said hydrogen-receiving apparatus by transmission of said data from said hydrogen-receiving apparatus, and wherein said hydrogen-receiving apparatus is a vehicle (120)".

XII. Claim 1 according to the ninth auxiliary request corresponds to granted claim 1 wherein the term "control" has been replaced by "central" in feature (vi) and the following text is added at the end of the claim:

"wherein said central processing unit means (126) comprises means for receiving and treating data selected from the group consisting of hydrogen demand of said hydrogen-receiving apparatus; and means for determining the amount, rate of delivery and duration of delivery of hydrogen to said apparatus in consequence of said hydrogen demand data".

XIII. The following documents are referred to in the present decision:

D1: US4085709;

D10:"*Reciprocating Compressors for Petroleum, Chemical and Gas Industry Services*", API Standard 618,

Fourth Edition, June 1995, cover sheet and pages 27 and 28;

D11: US-A-3,608,529;

D12: US-A-5,029,622.

XIV. The arguments of appellant I can be summarised as follows:

Main request

Claim 1 must be given its largest reasonable reading and not be read restrictively in the light of features from the description which are not in the claim: in particular, the hydrogen-receiving apparatus is not necessarily not part of the claimed subject-matter. Document D1 discloses in figure 1 a system which is suitable for providing hydrogen to the on-board gas cylinder 14 acting as hydrogen-receiving apparatus.

Feature (v) of claim 1 is kept very vague as to the nature of the modulation and control. The handling of abnormal situations is inherent in any modulating and controlling means to ensure a safe operation: Document D1 discloses that the control circuit 18 does so when it deactivates the compressor (column 3, lines 27 to 44). In addition, the skilled person knows that the flow regulator can only be a valve since it controls the amount of recirculating flow - the pump advanced on behalf of appellant II is not technically realistic in this context. In consequence, the signal from flow regulator 22 concerning the excessive amount of recirculation necessarily also provides an indication of the state of the valve. Thus the system of document D1 fully discloses feature (v) of claim 1. Feature (vi)

of claim 1 is also only of a very general nature and is thus anticipated by the male-female plug arrangement of document D1 (column 3, lines 6 to 15).

Therefore document D1 discloses a system with all the features of claim 1 so that the subject-matter of claim 1 is not new.

First auxiliary request

This request is late filed, does not react to any new facts and introduces further problems concerning clarity, namely, whether only vehicles can be filled as in figure 1 (patent in suit) or whether other items such a gas cylinders may be filled as well. The term "*filling station*" does not limit the subject-matter of claim 1 to a fixed service station in which vehicles can be refuelled. Thus document D1 discloses a filling station which is embedded in a vehicle. Therefore the subject-matter of claim 1 is not new.

Second auxiliary request

The added term "*selectively*" is originally undisclosed and a reference to unspecified criteria and is thus both unclear and constitutes added subject-matter. Furthermore, the amendments do not distinguish the subject-matter of claim 1 from the system disclosed in document D1, because conduit 36 constitutes a vehicle attachment means attached to the hydrogen-receiving cylinder 14. On a vehicle, what is attached can necessarily be subsequently detached, be it only for purposes of maintenance or repair. The subject-matter of claim 1 is not new with respect to document D1.

Third auxiliary request

This late filed request should not be admitted, because it still only addresses the same novelty objection with respect to document D1 which was already raised in the notice opposition.

Document D1 discloses storing the hydrogen gas in several compartments in the chassis or frame of the vehicle thereby disclosing a plurality of said hydrogen-receiving apparatuses (column 4, lines 53 to 60). This in turn implies that said conduit means 36 and fitting engagement means comprises a plurality of conduits 36 and fitting engagement members adapted to this plurality of compartments in the chassis or frame of the vehicle. Therefore the subject-matter of claim 1 is not new.

Document D11 constitutes the closest prior art, was already mentioned in the oral proceedings before the opposition division, discloses a service station replenishing a vehicle with several hydrogen tanks (figure 8) and should be admitted into the proceedings. The high hydrogen pressure (5000 psia - column 9, lines 9 and 10) in the tank can only be generated by compressor means which are thus implicitly disclosed. The subject-matter of claim 1 only differs therefrom in that the minimum necessary control of the compressor is specified explicitly and in that several vehicles may be replenished at the same time. These differences correspond to separate, unrelated problems, namely, ensuring that the required appropriate pressure is produced by the compressor for maintaining the hydrogen pressure in tank 19 and saving time when having to replenish several vehicles. The solution to each of these unrelated problems is immediately obvious to the

skilled person who, on the one hand, will follow the usual practice for "*modulating and controlling compressor means*" (c.f. document D10, sections 3.6.1.1 and 3.6.4.2.1), and who, on the other hand, is familiar with filling stations for conventional fuels which have the necessary plurality of conduits and fitting engagement members for replenishing a plurality of vehicles simultaneously. Therefore, the subject-matter of claim 1 lacks an inventive step. In this respect, text book extracts D10 should be admitted into the proceedings as they disclose common general knowledge of the skilled person with respect to the control and modulation of compressors (sections 3.6.1.1 and 3.6.4.2.1).

Fourth auxiliary request

Replacing the expression "*selected from the group consisting of*" of granted claim 1 by "*comprising*" in feature (v) of claim 1 according to the fourth auxiliary request converts a closed, definitive enumeration into one which is open and may thus include further parameters in addition to those listed in granted claim 1. Late filed fourth auxiliary request should not be admitted into the procedure, because it raises new problems under Article 123(3) EPC.

In addition, page 9, lines 17 to 23 of the application as filed only discloses the use of all parameters (temperature, inlet and outlet hydrogen pressures and valve status) in the context of determining the initial status and page 9, lines 24 to 31 concerns a particular embodiment in which further parameters (anolyte liquid level, catholyte liquid level, KOH concentration) are used. The subject-matter of claim 1 has thus been extended to controlling the compressor in general,

respectively, selecting only some of the disclosed parameters, contrary to Article 123(2) EPC.

In consequence, the late filed fourth auxiliary request should not be admitted into the proceedings.

Request for remittal to first instance

Appellant I contests that the request for the introduction of document D11 into the proceedings be placed on a par with the late filed requests of appellant II.

Seventh auxiliary request

The transmission of "*data regarding a demand to provide hydrogen to said hydrogen-receiving apparatus*" from the "*hydrogen-receiving apparatus*" was not originally disclosed, because according to the paragraph page 9, lines 13 to 16 (application as published) read as a whole, it is the user 124 who defines and transmits the data. However, the text used in claim 1 includes the undisclosed possibility of an automatic vehicle on its own being the initiator of such a transmission.

Similarly, page 6, line 13, point 1 (application as published) discloses that the user interface allows for defined demand in real time. However, the "*user interface*" is more than the "*user activation means*" (page 6, lines 3 and 4).

In consequence, the subject-matter of claim 1 does not meet the requirements of Article 123(2) EPC.

Ninth auxiliary request

Document D1 constitutes the closest prior art. The added features of claim 1 are implicit in the system of document D1, because the parameters ("*amount, rate of delivery and duration of delivery*") are linked by the laws of physics and are required for the proper operation of the system disclosed in document D1 as they are generally necessary for handling a gas under pressure: The rate of delivery is a compromise between temperature increase and duration of delivery as is well known from other replenishment system for gas such as natural gas. In support of these arguments, document D12 should be admitted into the proceedings.

In consequence, the subject-matter of claim 1 is obvious to the skilled person.

XV. The arguments of appellant II can be summarised as follows:

Main request

The subject-matter of claim 1 differs from the system disclosed in document D1 in the following points:

- The expression "*for providing hydrogen to a hydrogen-receiving apparatus*" of claim 1 must be interpreted so that the hydrogen replenishment system is *suitable* for providing hydrogen to a hydrogen-receiving apparatus and must be interpreted in the sense that the "*hydrogen-receiving apparatus*" is not part of the claimed subject-matter in the same way as claim for "*a trap for catching a mouse*" does not include the mouse. The patent in suit, when read as a whole, is intended for filling-up vehicles and uses the the different expression "*combined hydrogen generation and combustion system*" when discussing

a vehicle with on-board hydrogen generation means (paragraph [0012]);

- The system of document D1 is not suitable for refilling vehicles in that it can only refill itself;
- The skilled person would understand the expression "*modulating and controlling said compressor means*" of claim 1 to mean switching the compressor on and off in a duty cycle to achieve variable speed control and thus requires more than merely switching off the compressor, as occurs in document D1. Furthermore, the system of document D1 does not "*modulate and control said compressor means in consequence of said treatment of said compression means data*", because in the patent in suit, the modulation and control matches the quantity and rate of supply to the vehicles being refilled (paragraph [0028], points 4 and 5);
- Since the purpose of the flow regulator 22 of document D1 is to avoid a vacuum at the hydrogen gas outlet 34, the flow regulator is not necessarily a valve, but could reasonably also be a pump for increasing the pressure at the hydrogen gas outlet 34. In only disclosing a flow regulator, document D1 thus does not directly and unambiguously disclose a valve. In consequence, document D1 does not disclose that the control circuit 18 receives and treats a "*valve status*" signal via conductors 40 and 42. Instead the signal supplied via conductors 40 and 42 indicates a failure to produce enough hydrogen;
- The skilled person would understand feature "*user activation means*" of claim 1 to be a user interface as described in the patent and read it in combination with the other features of the claim so that it has to be more than a plug.

Therefore, the subject-matter of claim 1 is new.

First auxiliary request

This request was filed in reaction to the preliminary opinion of the board and does not represent a change of course. It should therefore be admitted into the proceedings.

Although the only literal basis for the term "*filling station*" occurs in connection with the description of the prior art (application as published page 3, line 18, point 7), the description of figure 1 (page 8, lines 28 and 29; page 9, lines 8 to 10) discloses all the major features of a filling station for three vehicles. The requirements of Articles 84 and 123(2) EPC are met.

The term "*filling station*" is to be understood as a place which is suitable for vehicles to drive-up to for refilling with (hydrogen) fuel: Since the system of document D1 is not suitable for this purpose, the limitation of the subject-matter of claim 1 to being "*embodied as a filling station*" establishes novelty over document D1.

Second auxiliary request

The basis for the amendments made to claim 1 is claim 14 as filed and the paragraph spanning pages 4 and 5 of the description as filed. The term "*selectively*" is to be understood as meaning both attachable and detachable. This amendment draws a line between the claimed subject-matter and the vehicle, because the system cannot be both a vehicle itself and be

attachable to a vehicle. The subject-matter of claim 1 is thus new with respect to document D1.

Third auxiliary request

Granted claims 1, 3, 4 and 13 form the basis of this auxiliary request which is intended to overcome the novelty objections with respect to document D1, by limiting the subject-matter of claim 1 to a filling station which vehicles can to drive-up to for refilling with (hydrogen) fuel.

Document D1 is not suitable for refilling a plurality of vehicles. Document D1 only discloses a plurality of compartments but this does not necessarily imply that said conduit means 36 and fitting engagement means comprise a plurality of conduits 36 and fitting engagement members adapted to this plurality of compartments in the chassis or frame of the vehicle. The subject-matter of claim 1 is new with respect to document D1.

Document D11 is late filed and should not be admitted into the procedure. Document D11 does not explicitly disclose a compressor but discloses a service station with a large tank for one vehicle with a plurality of on-board tanks. Document D11 does not disclose filling a plurality of vehicles and does not disclose controlling a compressor to ensure that each of the plurality of vehicles receives hydrogen at an appropriate supply pressure. Document D11 teaches away from document D1, because document D1 avoids filling-up with hydrogen and only needs an electrical supply for trickle replenishing the hydrogen in the tank. The subject-matter of claim 1 is not made obvious by documents D11 and/or D1.

Fourth auxiliary request

Granted feature (v) was already open ended, because the expression "*comprising means for receiving and treating compression means physical parameter data*" allows for additional parameters. The required combination of all the parameters (temperature, inlet and outlet hydrogen pressures and valve status) is disclosed on page 9, lines 17 to 23 of the application as filed. If in doubt, a further disclosure can be found on page 9, lines 24 to 31. The subject-matter of claim 1 thus meets the requirements of Articles 123(2) and (3) EPC and should be admitted into the proceedings.

Request for remittal to first instance

As a result of the introduction of document D11, appellant II requests a remittal to the department of first instance.

Seventh auxiliary request

The user activation means must be suitable for receiving some form of signal from an external item such as the vehicle. Page 9, line 16 discloses the transmission from the vehicle. Further details of the user interface are originally disclosed, page 6, lines 1 to 29 of the application as published. Claim 1 meets the requirements of Article 123(2) EPC.

Ninth auxiliary request

The system of document D1 merely switches off once the tank is full. Document D1 does not require "*determining the amount, rate of delivery and duration of delivery*

of hydrogen to said apparatus in consequence of said hydrogen demand data" and has no means for doing so.

Furthermore, the alleged common knowledge of the skilled person concerning the filling of gas tanks is unsubstantiated. The introduction of a new document D12 at this late stage of the proceedings raises issues which appellant II cannot be reasonably be expected to deal with without adjournment of the oral proceedings. Document D12 should not be admitted in to the proceedings.

The arguments presented by appellant I are based on hindsight and fail the could/would test.

The subject-matter of claim 1 is not obvious to the skilled person.

Reasons for the Decision

1. *Main request - Novelty of the subject-matter of claim 1*

1.1 Document D1 discloses a hydrogen fuel system mounted on a vehicle and comprises gas storage means 14 for storing hydrogen gas, an electrolyzer 12 for generating hydrogen gas which is stored in said gas storage means 14, a control circuit means 18 connected to said electrolyzer 12 and to said gas storage means 14 for controlling the generation and storage of hydrogen gas, said control circuit means 18 being operable from and connectible to a conventional A.C. source (column 1, line 67 to column 2, line 13, column 2, lines 38 to 54, figure 1).

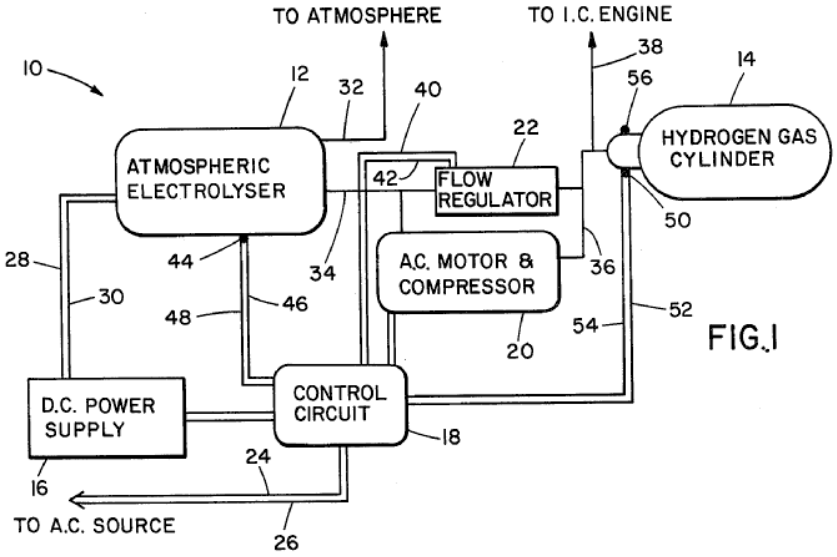

FIG.I

Thus it was not contested that document D1 discloses a system with the following features:

(i) an electrolytic cell 12 for providing source hydrogen;

(ii) a compressor means 20 for providing outlet hydrogen at an outlet pressure;

(iii) means 34 for feeding said source hydrogen to said compressor means 20;

(iv) means 36 for feeding said outlet hydrogen to said hydrogen-receiving apparatus.

1.2 Document D1 discloses that when the lines 24 and 26 are connected to a suitable A.C. source via a male-female plug arrangement, the control circuit 18 will then energize the electrolyzer 12 which in turn begins generating hydrogen (column 3, lines 6 to 11, figure 1).

In consequence, document D1 discloses that a user can use the male-female plug arrangement as "*user activation means*" for operably activating said control processing unit means 18, i.e. feature (vi) of claim 1. Contrary to appellant II's position, the wording of feature (vi) does not imply any additional technical features.

1.3 The control circuit 18 also causes operation of the motor-compressor unit 20 so that hydrogen gas at the outlet 34 of the electrolyzer 12 is compressed and then supplied to the cylinder 14 (column 3, lines 11 to 15, figure 1).

In consequence, document D1 discloses "*a hydrogen replenishment system [which is suitable] for providing hydrogen to a hydrogen-receiving apparatus*", wherein the hydrogen-receiving apparatus is the cylinder 14.

Contrary to appellant II's position, the fact that a system is suitable for providing hydrogen to a hydrogen -receiving apparatus, does not imply that the hydrogen-receiving apparatus necessarily cannot be part of the system. The analogy advanced on behalf of appellant II with a process indication of "*catching a mouse*" not claiming the mouse, fails to go beyond the corresponding process indication in the present claim of "*providing hydrogen*": Thus this analogy does not mention the container in which the mouse is to be caught and thus provides no enlightenment about the status as "*claimed subject-matter*" or as "*unclaimed ancillary detail of the process indication*" of the particular container to which the mouse (i.e. hydrogen in the present claim) is to be "*supplied*".

The fact that the description of the patent in suit uses further additional vocabulary when discussing the prior art does not add technical features to, or remove them from, the subject-matter of claim 1 (Article 84 EPC, first sentence).

It also follows that the fact, that the system of document D1 is not suitable for refilling vehicles

other than itself, cannot establish novelty, because such a capability is not a necessary requirement of the subject-matter of claim 1.

In consequence, document D1 discloses the kind of system designated in claim 1, namely a hydrogen replenishment system (figure 1) for providing hydrogen to a hydrogen-receiving apparatus 14.

1.4 Feature (v) of claim 1

1.4.1 According to document D1 the control circuit 18 monitors various sensors and signals to de-energise the motor-compressor unit 20 when a sufficient amount of hydrogen gas has been generated and stored in the cylinder 14, when an abnormality is detected in the electrolyser 12, and also in the following case: if for some reason the electrolyzer 12 does not produce sufficient hydrogen gas such that the motor-compressor unit 20 creates a vacuum at the hydrogen gas outlet 34, the flow regulator 22 will operate to cause hydrogen gas to be circulated through the motor-compressor unit 20. If the amount of recirculation is excessive, the flow regulator 22 will send a signal via the conductors 40 and 42 to the control circuit 18 to cause the control circuit 18 to de-energize the power supply 16 and the motor-compressor unit 20 (column 3, lines 27 to 44, figure 1).

In consequence, document D1 discloses that the control circuit 18 exerts a modulating, i.e. a modifying or controlling influence on the motor-compressor unit 20 and has the effect of regulating its operation, at least in so far as to de-energize the power supply 16 and the motor-compressor unit 20 either when a sufficient amount of hydrogen gas has been generated

and stored in the cylinder 14, or when the amount of recirculation is excessive as indicated by the signal sent via the conductors 40 and 42. Contrary to what was advanced on behalf of appellant II, the nature of the modulation of the compressor is not further defined in claim 1 and, in particular, is not set out in terms of additional technical features such as requiring an adjustment of a duty cycle for the compressor.

1.4.2 The board is of the opinion, that the skilled person, taking into account the manner in which the system disclosed in figure 1 operates in combination with his common general knowledge, will necessarily, directly and unambiguously understand the flow regulator 22 of document D1 as a valve (for example a check valve) which regulates the amount of hydrogen in the recirculating flow. A pump, as advanced on behalf of appellant II, does not make technical sense, because it would merely pointlessly duplicate the function already provided by the compressor unit 20 and make the system more complex for no reason: The skilled person would thus not consider it possible to implement the flow regulator by means of a pump.

1.4.3 Document D1 does not disclose the exact origin of the signal sent by flow regulator 22 via conductors 40 and 42 when the amount of recirculation is excessive. However, even if this signal did not come directly from the valve constituting the flow regulator 22, but instead came from a separate sensor, it would nevertheless still be indirectly indicative of the open-status of the valve constituting the flow regulator 22, when the recirculation is excessive.

1.4.4 In consequence, document D1 also discloses feature (v) wherein central processing unit means 18 for control-

ling the cell 12 and the compressor 20, comprises means for receiving 40, 42 and treating compression means physical parameter data consisting of valve 22 status of said compressor means 20 and modulating and controlling said compressor means 20 in consequence of said treatment of said valve 22 status constituting compression means data (sent via conductors 40 and 42).

1.5 Since document D1 discloses all the features of claim 1, the subject-matter of claim 1 is not new, contrary to Article 100(a) EPC 1973 in combination with Article 54 EPC 1973.

2. *First auxiliary request*

2.1 Admissibility

Adding "*embodied as a filling station*" to claim 1 is not a complex amendment so that the other party can reasonably be expected to deal with it (Article 13(3) Rules or Procedure of the Boards of Appeal - RPBA).

Although there is no literal basis for this amendment in the application as filed, figure 1 provides a basis for a filling station, in which vehicles, i.e. implicitly their hydrogen fuel tanks, constitute the hydrogen-receiving apparatus(es). The amendment thus complies with the requirements of Article 123(2) EPC.

Contrary to appellant II's position, the term "*filling station*" does not limit the subject-matter to a fixed installation to which vehicles can drive-up to for refilling with (hydrogen) fuel. In the absence of any further technical features, the term "*filling station*" merely designate a station at which filling occurs. The

added expression "*embodied as a filling station*" is thus both broad and clear (Article 84 EPC).

The board thus uses its discretion under Article 13(1) RPBA to admit the first auxiliary request into the procedure.

2.2 Novelty - Article 100(a) EPC 1973 in combination with Article 54 EPC 1973

It also follows from the above, that the system disclosed in document D1 also constitutes a filling station which is mounted on a vehicle. The subject-matter of claim 1 according to the first auxiliary request is thus not new with respect to document D1.

3. *Second auxiliary request*

3.1 The admissibility of the second auxiliary request is not contested, because this request corresponds to the basis on which the opposition division proposed that the patent could be maintained.

3.2 Apart from the term "*selectively*" for which there is no literal disclosure, the basis for the remaining amendments made to claim 1 is claim 14 as filed and the paragraph spanning pages 4 and 5 of the description as filed.

3.3 Document D1 discloses a hydrogen replenishing system mounted on a vehicle wherein the output conduit 36 of the compressor 20 is connected to the hydrogen gas cylinder 14 and provides hydrogen to fuel the vehicle (column 2, lines 49 to 51): such a connection constitutes "*means for feeding said outlet hydrogen to said hydrogen-receiving apparatus*" and necessarily

implies attaching means which are attachable to the hydrogen gas cylinder 14, since otherwise hydrogen would be left to escape.

Furthermore, the hydrogen-receiving apparatus is a hydrogen gas cylinder 14 which is part of the vehicle so that the added feature "*wherein said hydrogen receiving apparatus is a vehicle*" is satisfied in the same manner as in the patent in suit, because it is implicit in figure 1, that the hydrogen will be supplied to the fuel tanks of the vehicles 120. As already noted above, there are no features in claim 1 which require the hydrogen replenishing system to be separate from the vehicle. Thus there is no basis for appellant II's position that the hydrogen replenishing system cannot be both mounted on the vehicle and attached to the (hydrogen fuel tank of that) vehicle.

According to appellant II, the term "*selectively*" is only to be understood as meaning both "*attachable*" and "*detachable*". This also applies to the output conduit 36 of the compressor 20 which is connected to the hydrogen gas cylinder 14, because, as argued by appellant I, the common general knowledge of the skilled person includes that a vehicle and in particular its fuel tank - in this case the hydrogen-receiving apparatus (i.e. hydrogen gas cylinder) - can be disassembled for repairs or maintenance. Thus, in the absence of any indication to the contrary in document D1, it is implicit for the skilled person, that the output conduit 36 can also be detached from the hydrogen gas cylinder. In consequence, document D1 also discloses "*vehicle attachment means selectively attachable to the vehicle to provide outlet hydrogen as fuel to the vehicle*".

Furthermore, appellant II's proposal to further amend claim 1 by adding "*embodied as a filling station*" at the beginning of the claim and cancelling the term "*selectively*" (should it be considered to offend against Article 123(2) EPC) does not affect the above reasoning and thus cannot overcome the following conclusion: Since all of the added features, when understood in the sense advanced by appellant II, are already disclosed in document D1, the subject-matter of claim 1 is not new with respect to the system disclosed in document D1 (Article 54 EPC 1973).

Under these circumstances, it is also not necessary to consider whether the term "*selectively*" was, or was not, originally disclosed in the application as filed.

4. *Third auxiliary request*

4.1 Admissibility

The amendments made to claim 1 are not complex, because they consist of the introduction of granted dependent claims 3, 4 and 14 and are consistent with the arguments advanced heretofore on behalf of appellant II throughout the proceedings. Thus, although only filed during the oral proceedings, the board exercises its discretion under Article 13(1) RPBA to admit this request into the proceedings.

4.2 Novelty - Article 100(a) EPC 1973 in combination with Article 54 EPC 1973

Document D1 (column 4, lines 53 to 68) only discloses a plurality of compartments for storing hydrogen but this does not necessarily imply that there are a plurality of conduits 36 (and fitting engagement members) adapted

to this plurality of compartments in the chassis or frame of the vehicle, because the compartments may be interconnected to form a single storage space fed by a single conduit 36. In consequence, document D1 does not clearly and unambiguously disclose plural cylinders 14 per vehicle so that the subject-matter of claim 1 according to the third auxiliary request is new with respect to document D1.

4.3 Document D11 discloses a service station with a water electrolyser and a storage tank 19 replenishing a vehicle 11 with several on-board hydrogen tanks 16 through a line 22 having a quick connect coupling for connection to a suitable fitting on the vehicle (column 8, line 66 to column 9, line 4, figure 8). The high hydrogen pressure (5000 psia - column 9, lines 9 and 10) in the tank implies the presence of "*a compressor means for providing outlet hydrogen at an outlet pressure*" (i.e. feature (ii) of claim 1) for producing such a high pressure in storage tank 19.

The disclosed subject-matter of document D11 is thus not particularly complex and since this document was already referred to in the oral proceedings before the opposition division (see minutes, point 4.4.1) cannot come as a surprise to appellant II. In consequence, the board exercises its discretion under Article 13(1) RPBA to admit document D11 into the proceedings.

Similarly, extracts from the text book D10 (sections 3.6.1.1 and 3.6.4.2.1) disclose common general knowledge of the skilled person with respect to the control and modulation of compressors in particular on the basis of compression means physical parameter data consisting of temperature. The admissibility of these text book extracts was no longer contested by appellant

II during the oral proceedings. Thus, the board exercises its discretion under Article 13(1) RPBA to admit the extracts D10 into the proceedings.

4.4 Document D11 constitutes the closest prior art.

It was not contested between the parties that the subject-matter of claim 1 only differs therefrom in feature (v) and in that the conduit means and the fitting engagement means comprise a plurality of conduits and fitting engagement members adapted to receive a plurality of said hydrogen-receiving apparatus. The latter feature implying, that, for example, a plurality vehicles - their fuel tanks acting as said plurality of hydrogen-receiving apparatus - may be replenished at the same time. These two features are independent of each other and solve separate partial objective technical problems as is set out below.

4.4.1 The parties disagreed on the significance of feature (v) in that appellant II considered it to be implicit that modulating and controlling said compressor means is to ensure that each of the plurality of hydrogen-receiving apparatus (e.g. vehicles) receives hydrogen at an appropriate pressure. However, the board cannot accept this argument: There is no requirement in feature (v) of claim 1 linking the modulation and control of the compressor means to the particular requirements of each of the plurality of hydrogen-receiving apparatus, because feature (v) only refers to "*modulating and controlling said compressor means in consequence of said treatment of said compression means data*" in general terms: feature (v) is independent of the feature that the conduit means and the fitting engagement means comprise a plurality of conduits and fitting engagement members adapted to receive a

plurality of said hydrogen-receiving apparatus. Thus feature (v) does not go beyond the usual practice of the skilled person with respect to "*modulating and controlling compressor means*" (see document D10, sections 3.6.1.1 and 3.6.4.2.1) for the usual operation thereof.

Since according to document D11 it is necessary to keep the hydrogen in tank 19 at a particular pressure, the skilled person seeking to implement the solution of document D11 is confronted with a (partial) objective technical problem of ensuring that the required appropriate pressure is produced by the compressor for maintaining the hydrogen pressure in tank 19.

As solution the skilled person will follow the usual practice and provide conventional means for "*modulating and controlling said compressor means*" in the sense of feature (v), i.e. *central processing unit means for controlling said cell and said compressor, comprising means for receiving and treating compression means physical parameter data selected from the group consisting of temperature, inlet and outlet hydrogen pressures and valve status of said compressor means; and modulating and controlling said compressor means in consequence of said treatment of said compression means data*.

In consequence, the difference consisting of feature (v) is obvious to the skilled person and cannot justify an inventive step.

4.4.2 Providing a plurality of conduits and fitting engagement members adapted to receive a plurality of said hydrogen-receiving apparatuses allows several

vehicles to be replenished simultaneously thereby saving time when having to replenish several vehicles.

The skilled person having to address the (partial) objective technical problem of saving time when having to replenish several vehicles is familiar with filling stations for conventional fuels which have a plurality of conduits and fitting engagement members adapted to receive a plurality of vehicles to be replenished simultaneously. Thus it is obvious to the skilled person to provide a plurality of conduits and fitting engagement members adapted to receive a plurality of said hydrogen-receiving apparatuses, i.e. for replenishing a plurality of vehicles. Therefore, the second difference also cannot justify an inventive step.

4.4.3 In consequence, the subject-matter of claim 1 according to the third auxiliary request does not involve an inventive step and thus does not meet the requirements of Article 100(a) EPC 1973 in combination with Article 56 EPC 1973.

5. *Fourth auxiliary request*

Replacing the expression "*selected from the group consisting of*" in feature (v) of granted claim 1 according to the third auxiliary request by "*comprising*" in feature (v) of claim 1 according to the fourth auxiliary request converts a closed, definitive enumeration into one which is open and may thus include further parameters in addition to those listed in granted claim 1. Thus it is not prima facie clear that the requirements of Article 123(3) EPC are met.

Page 9, lines 17 to 23 of the application as filed only discloses the use of all parameters (temperature, inlet and outlet hydrogen pressures and valve status) in the context of determining an initial status and page 9, lines 24 to 31 concerns a particular embodiment in which further parameters (anolyte liquid level, catholyte liquid level, KOH concentration) are used. Thus it is not prima facie clear that the requirements of Article 123(2) EPC are met.

Therefore claim 1 according to the late filed fourth auxiliary request does not prima facie satisfy the requirements of Articles 123(2) and (3) EPC. In consequence, the board uses its discretion under Article 13(1) RPBA to not admit this request into the proceedings.

6. *Request for remittal to first instance*

Appellant II's requests for remittal to the department of first instance in consequence of document D11 having been admitted into the proceedings does not make sense at this stage: Document D11 has already been discussed in the appeal proceedings before the board (in the context of the third auxiliary request) and the corresponding conclusions of the board are thus already binding for the opposition division. The request for remittal to the department of first instance is thus refused (Article 111(1) EPC).

7. *Seventh auxiliary request*

7.1 The seventh auxiliary request was at least partially substantiated in the context of dependent claim 3 in the letter of appellant II dated 23 January 2013 (section III.7, page 4/8), so that there is no reason

for the board not to admit this request into the proceedings.

7.2 Article 123(2) EPC

7.2.1 The transmission of "*data regarding a demand to provide hydrogen to said hydrogen-receiving apparatus*" from the "*hydrogen-receiving apparatus*" was not originally disclosed, because according to the page 9, lines 13 to 16 (application as published) read as a whole, it is the user 124 who defines and transmits the data. However, the text used in claim 1 includes the undisclosed possibility of a(n automatic) vehicle on its own being the initiator of such a transmission. Furthermore, the receiving entity is not disclosed in the passage page 9, lines 13 to 16.

7.2.2 Page 6, line 13, point 1 (application as published) discloses that the user interface allows for defined demand in real time. However, the "*user interface*" is more than the "*user activation means*", since it requires the control means as well (application as published, page 6, lines 3 and 4). In addition the means by which the user interface acquires the data is not disclosed.

7.2.3 The statement in the application as published, page 6, lines 9 to 11, that "*the introduction of the user activation means in combination with the CPU allows the advantageous exchange of data flow between the cell (s), compressor, vehicles (s) and sundry process control valves and conduits*" does not disclose the nature of the data, or by which means it flows between the vehicle(s) and the "*user activation means in combination with the CPU*" in particular.

7.2.4 The "*data receiving means*" is only disclosed in the context that "*the CPU preferably comprises the user activation means having data receiving means adapted to receive data from or by transfer means selected from the group consisting of an electronic data card, voice activation means, manually-operable selection and control means, radiated wavelength and electronic or electrical transfer*" (application as published, page 5, lines 13 to 17 and claim 6 as filed). This passage also does not disclose the nature of the received data or its origin.

7.2.5 Thus, the feature of claim 1 concerning "*data receiving means adapted to receive data regarding a demand to provide hydrogen to said hydrogen-receiving apparatus by transmission of said data from said hydrogen-receiving apparatus*" discloses added subject-matter in that the "*data receiving means*" is also adapted to receive specific data "*regarding a demand to provide hydrogen to said hydrogen-receiving apparatus*" by the particular means of "*transmission of said data*" from a particular source, namely "*said hydrogen-receiving apparatus*", i.e the vehicle. This particular combination of recipient of data, nature of data, means of data transfer and source of data is not directly and unambiguously disclosed in the application as filed.

7.2.6 In consequence, the subject-matter of claim 1 does not meet the requirements of Article 123(2) EPC.

8. *Ninth auxiliary request*

8.1 Admissibility

The ninth auxiliary request was at least partially substantiated in the context of dependent claim 8 in

the letter of appellant II dated 23 January 2013 (section III.7, page 5/8), so that there is no reason for the board not to admit this request into the proceedings.

8.2 Novelty - Article 100(a) EPC 1973 in combination with Article 54 EPC 1973

The system of document D1 merely switches on once it is connected to an A.C. source and switches off once the tank is full (column 3, lines 6 to 15 and lines 27 to 30). Document D1 thus does not require "*determining the amount, rate of delivery and duration of delivery of hydrogen to said apparatus in consequence of said hydrogen demand data*", because it merely replenishes the cylinder 14 at the rate determined by the electrolyser 12. Thus document D1 does not disclose any such "*determining means*". The subject-matter of claim 1 according to the ninth auxiliary request is new (Article 54 EPC 1973).

8.3 Common general knowledge of the skilled person handling gas under pressure

It was advanced on behalf of appellant I that the skilled person knows from the laws of physics that the parameters ("*amount, rate of delivery and duration of delivery*") are required for the proper operation of any system dealing with the replenishment of a tank with gas under pressure, because the rate of delivery is a compromise between temperature increase in the tank and the duration of delivery. This is known from other replenishment systems for pressurised gas such as natural gas. However, this alleged common general knowledge of the skilled person concerning the filling

of pressurised gas tanks advanced by appellant I was contested as unsubstantiated by appellant II.

Appellant I wanted to introduce document D12 as means of substantiating this argument. Although document D12 was mentioned on behalf of appellant I in the letter dated 8 November 2013, it was neither filed nor was its admission into the proceedings requested (Article 12(2)(a) RPBA). An admission of this document D12 at this late stage of the proceedings would raise issues which appellant II cannot be reasonably expected to deal with without adjournment of the oral proceedings. In consequence, the board cannot admit document D12 into the proceedings under Article 13(3) RPBA.

8.4 In consequence, the arguments of appellant I concerning a lack of inventive step of the subject-matter of claim 1 according to the ninth auxiliary request based on this unsubstantiated alleged common general knowledge of the skilled person could not be analysed any further.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent on the basis of the following documents:
   - claims 1 to 12 of the ninth auxiliary request filed with letter of 23 January 2013,
   - adapted description pages 3 and 4 filed during the oral proceedings,
   - description pages 2, 5 and 6 of the patent specification,
   - figures 1 to 5 of the patent specification.

The Registrar: The Chairman:

L. Malécot-Grob M. Poock

Decision electronically authenticated