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Datasheet for the decision of 20 January 2015

Case Number: T 2000/09 - 3.5.02

Application Number: 02256491.8

Publication Number: 1401090

IPC: H02M5/10, H02J7/00

Language of the proceedings: EN

Title of invention:
Polarity inversion circuit for pulsating DC power supply

Applicant:
Yang, Tai-Her

Relevant legal provisions:
RPBA Art. 12
EPC Art. 54, 84
EPC R. 43

Keyword:
Late-filed request - request could have been filed in first instance proceedings (yes) main request
Claims - clarity - auxiliary request (no) - essential features
Novelty - auxiliary request (no)

Decisions cited:
T 1472/08

Catchword:

Beschwerdekammern
Boards of Appeal
Chambres de recours

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Case Number: T 2000/09 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 20 January 2015

Appellant: (Applicant)	Yang, Tai-Her No. 59 Chung Hsing 8 Street Si-Hu Town Dzan-Hwa (TW)
Representative:	Wright, Howard Hugh Burnby Withers & Rogers LLP 4 More London Riverside London SE1 2AU (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 6 May 2009 refusing European patent application No. 02256491.8 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Ruggiu
Members:	G. Flyng
	P. Mühlens

Summary of Facts and Submissions

I. Contested decision

The applicant's appeal concerns the examining division's decision to refuse European patent application 02 256 491.8.

In the contested decision the examining division referred to the following prior art documents:

D1: Kazimierczuk M K et al: "Class D voltage-switching inverter with tapped resonant inductor", IEE Proceedings B, ELECTRICAL POWER APPLICATIONS, IEE, Stevenage, GB, vol. 140, no. 3, Part B, May 1993, pages 177 to 185, XP000304271

D2: Fujii M et al: "Resonant DC/DC converter with class D inverter and class E synchronous rectifier using thinned-out method", Telecommunications Enegry Conference, INTELEC '95, The Hague, NL, 29 October to 1 November 1995, IEEE, 1995, pages 496 to 501, XP010161282 ISBN: 0-7803-2750-0

D3: EP-A-1 026 769 (Nokia Mobile Phones Ltd) 9 August 2000

D4: US-B1-6 278 260 (Yang Tai-Her) 21 August 2001

D5: US-A-4 691 158 (Ashikaga Tadashi et al) 1 September 1987

The examining division found that claims 1 to 6 filed in electronic form on 18 March 2009 did not meet the requirements of Article 84 EPC in that the matter for which protection was sought was not clearly defined.

Furthermore, the examining division found that claim 1 was not supported by the description as required by Article 84 EPC and did not contain all the technical features essential to the definition of the invention

(Article 84 EPC in combination with Rules 43(1) and (3) EPC).

Independently of the above the examining division held that claims 1 to 6 offended the provision of Article 123(2) EPC, because their subject-matter went beyond the content of the application as originally filed.

In a section entitled "Additional comments" the examining division expressed the view that even if claim 1 were duly formulated and delimited to clearly define the topologies of the circuits depicted in figures 1 and 2, its subject matter would nevertheless be deprived of novelty from any well-known converter of the flyback type or of the class-D type (Article 54(1) and (2) EPC).

II. **Basis of the appeal**

In the letter dated 14 September 2009 setting out the grounds of appeal the appellant requested that:

- the decision under appeal be "reversed" (i.e. set aside); and
- a patent be granted on the basis of:
  the main request:
    Description as originally filed;
    Claims 1 to 4 filed therewith;
    Drawings as originally filed,
  or otherwise the first (and only) auxiliary request:
    Description as originally filed;
    Claims 1 to 5 filed therewith;
    Drawings as originally filed.

Oral proceedings were requested if the board was minded to maintain the decision of the examining division (i.e. reject the appeal).

Independent claim 1 of the main request reads as follows:

"1. A circuit for the generation of electric power induced to bear opposite polarity in a pulsating D.C. power supply (PPS101), whereby electric power of opposite polarity is generated the moment the D.C. pulsating power that is being delivered is suspended, by means of a transformer (T101), and the power of opposite polarity thus generated is fed to a load (LD101); the polarity correlation between a primary winding (WP) and a secondary winding (WS) of said transformer (T101) is such that a reduction or cutoff of the causal D.C. power will bring about power of the opposite polarity on the load side."

Independent claim 1 of the auxiliary request reads as follows:

"1. A circuit for generating power in a D.C. pulsating power supply, the circuit comprising:

a source of pulsating D.C. power (PPS101);

a load (LD101); and

a transformer (T101) having a primary winding (WP) and a secondary winding (WS), characterised in that:

the primary winding (WP) and the secondary winding (WS) are each connected between the source of pulsating D.C. power (PPS101) and the load (LD101), wherein the primary winding (WP) is connected in series between a first end (+) of the source of pulsating D.C. power (PPS101) and a first end (a) of the load (LD101); a first end (x) of the secondary winding (WS) is

connected with a point connecting the first end (a) of the load (LD101) and a first end (u) of the primary winding (WP); a second end (y) of the secondary winding (WS) and a second end (-) of the source of pulsating D.C. power being *[sic]* (PPS101) are connected together to a second end (b) of the load (LD101); the first end (+) of the source of pulsating DC power (PPS101) is connected with a second end (v) of the primary winding (WP); and

the secondary winding (WS) is arranged to discharge in opposite polarity to the load (LD 101) when the pulsating power is suspended."

III. **Oral Proceedings**

With a communication dated 29 September 2014 the Board summoned the appellant to oral proceedings to take place on 20 January 2015 and made observations on the appeal in an annex to the summons.

In a fax dated and received on 15 January 2015 the Board was informed that the appellant would not be attending the oral proceedings.

The oral proceedings took place as scheduled on 20 January 2015. As announced, the appellant was not represented. The Board considered the case and pronounced the present decision.

Reasons for the Decision

1. Main request

1.1 The appellant has acknowledged that claim 1 of the main request is broader than claim 1 as filed before the first instance on 18 March 2009, but has asked for the board's view on the allowability of this claim.

1.2 With claim 1 of the main request the appellant has dropped the many features that were added during the course of the first instance procedure and has returned to a much broader claim, based on claim 1 as originally filed, with the induction device specified as a transformer and with an additional feature concerning the polarity of the transformer windings, taken from claim 2 as originally filed.

The Board has discretion over whether or not to admit requests which could have been presented to the first instance, but were not (see Article 12(4) RPBA). The boards have held that the purpose of examination appeal proceedings could not be to completely reopen the examination proceedings by admitting claims defining features more broadly if those claims could already have been presented in those proceedings and the broader definitions were not apt to overcome objections raised in the contested decision or by the board (see T1472/08 and Case Law of the Boards of Appeal IV.E. 4.3.3 b)).

1.3 In the present case the appellant has not presented any arguments explaining how claim 1 of the main request might overcome either the objections that were raised in the contested decision, or those that the examining division raised in the first communication pursuant to Article 96(2), dated 31 August 2006. The Board considers that the amendments to claim 1 do not overcome those objections and hence it is appropriate

to use the discretion available under Article 12(4) RPBA to not admit the main request.

2. Auxiliary request

2.1 According to the appellant, claim 1 of the auxiliary request has been amended with respect to the claims filed on 18 March 2009 in order to describe the circuit shown in figure 1.

2.2 The Board notes that the reference numerals +, -, a, b, x, y, u, v used in claim 1 of the auxiliary request do not appear in the figures and were not mentioned in the description and claims as filed, which the claims inconsistent with the description and figures.

2.3 Furthermore, the Board notes that the feature:

> "a first end (x) of the secondary winding (WS) is connected with a point connecting the first end (a) of the load (LD101) and a first end (u) of the primary winding (WP)"

is consistent only with figure 1, not with any of the remaining figures 2 to 6, which show a different circuit arrangement. Given that the arrangements in figures 2 to 6 are described as being embodiments of the invention, there is an inconsistency between the description and claims which creates a lack of clarity in the sense of Article 84 EPC.

2.4 According to claim 1:

> "the primary winding (WP) is connected in series between a first end (+) of the source of pulsating D.C. power (PPS101) and a first end (a) of the load (LD101)"; and

"the first end (+) of the source of pulsating DC power (PPS101) is connected with a second end (v) of the primary winding (WP)".

The Board considers that this wording is not consistent with the possibility of there being a blocking diode CR101 connected in series between the first end (+) of the source of pulsating D.C. power (PPS101) and the second end (v) of the primary winding (WP) as shown in figure 1 and as mentioned in dependent claim 3. Hence, dependent claim 3 contradicts the wording of claim 1, causing a lack of clarity, Article 84 EPC.

2.5 Furthermore, according to claim 1:

"a second end (y) of the secondary winding (WS) and a second end (-) of the source of pulsating D.C. power [~~being~~] (PPS101) are connected together to a second end (b) of the load (LD101)".

The Board considers that this wording is not consistent with there (possibly) being a resistor (R101) connected in series between the second end (y) of the secondary winding (WS) and the connected-together second end (-) of the source of pulsating D.C. power and second end (b) of the load (LD101) as depicted in figure 1 and as mentioned in dependent claim 2. Hence, dependent claim 2 contradicts the wording of claim 1, causing a lack of clarity, Article 84 EPC.

2.6 In the contested decision (see Reasons, section 1.5) the Examining Division held that the blocking diode was essential to the performance of the invention. The appellant argues that the blocking diode is presented as an optional feature. Whilst this may be true (see column 3, lines 4 to 9 of the application as published, EP 1 401 090 A1), the Board considers that in the

absence of such a blocking diode, energy stored in the transformer would be free to discharge from the primary winding back into the supply, rather than being discharged from the secondary winding into the load. This would not meet the purpose of the invention of allowing the secondary winding to discharge in opposite polarity to the load when the pulsating power is suspended. Hence the Board shares the examining division's view that the blocking diode is an essential feature and that independent claim 1 does not meet the requirement following from Article 84 EPC taken in combination with Rules 43(1) and (3) EPC that any independent claim must contain all the technical features essential to the definition of the invention.

2.7 Novelty and Inventive Step

2.7.1 In the contested decision (Reasons, paragraph 1.4), the examining division stated that the description and figures showed either an autotransformer or a simple inductor.

2.7.2 In the Board's understanding, an autotransformer is a transformer that has a single winding (as opposed to two or more electrically isolated windings) with two terminal ends and one or more terminals at intermediate tap points (see the paragraph under the heading "Operation" in the printout from Wikipedia annexed to the summons to oral proceedings).

The transformer T101 of figure 1 may not be drawn in a way that immediately looks like an autotransformer, but the Board is of the view that a person skilled in electrical engineering would realise that, without changing the electrical circuit, the transformer can be redrawn, as shown below. This arrangement is

immediately recognisable as an autotransformer (cf. the figure in the Wikipedia entry). Note, the reference numerals +, -, a, b, x, y, u, v in the redrawn figure correspond to those used in claim 1 of the auxiliary request.

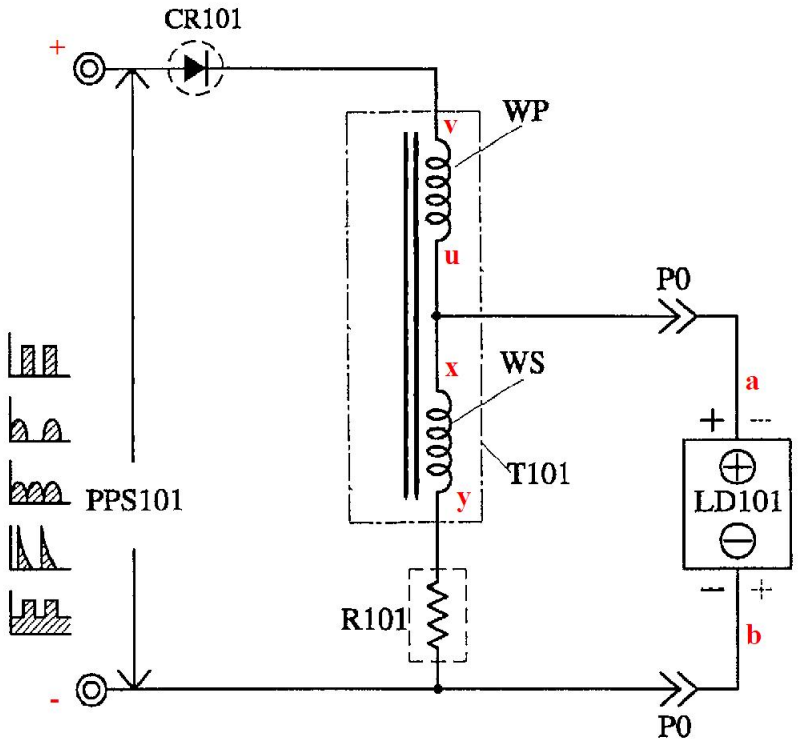

Figure 1 redrawn

2.8 Considering the prior art, document D1 discloses a class D voltage-switching inverter whose resonant circuit consists of a resonant capacitor in series with a tapped inductor (see Abstract). As explained in section 2 "Principle of operation":

> "A circuit of the CLL inverter [6] shown in Fig. 1 is composed of two bidirectional two-quadrant switches S1 and S2 and a resonant circuit C-L_1-L_2. The resonant capacitor C is connected in series with the tapped inductor L_1-L_2."

In the Board's view the source V_1 and the MOSFET switches are a source of pulsating DC power in the sense of claim 1 of the auxiliary request. Furthermore, the tapped inductor L_1-L_2 as shown in figure 1 of D1 is an autotransformer with two windings that correspond to the primary and secondary windings of claim 1. Also, these windings are connected between the source of pulsating DC power and the load R_L in the manner specified in claim 1.

In the section of the contested decision entitled "Additional comments" the examining division expressed the view that in a flyback converter, a magnetising current is induced in the primary during the on-time and when the power source is cut-off (off-time), power of opposite polarity is generated in the secondary and delivered to the load (flyback phase). The Board considers that this is how the circuit of figure 1 of document D1 would operate, with energy being stored in the inductor L2 during the on-time of the MOSFET switch S1 and being discharged at opposite polarity to the load during the off-time of the MOSFET switch S1.

For these reasons the Board concludes that document D1 discloses all of the features of claim 1 of the auxiliary request. Hence, the auxiliary request is not allowable because the subject-matter of claim 1 lacks novelty, Article 54 EPC.

3. Given that the main request has not been admitted and the auxiliary request is not allowable, the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann M. Ruggiu

Decision electronically authenticated