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D E C I S I O N
of 12 November 1997

Case Number: T 0250/94 - 3.4.1

Application Number: 87903537.6

Publication Number: 0248913

IPC: A61N 1/32

Language of the proceedings: EN

Title of invention:
Compact low-frequency therapeutic device

Applicant:
HISAMITSU PHARMACEUTICAL CO. INC.

Opponent:

-

Headword:

-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"
"Claimed solution not obviously derivable from the prior art,
in particular forming no operation of a prior art circuit,
which a skilled person would seriously contemplate"

Decisions cited:
T 0170/84, T 0176/84

Catchword:

-



Case Number: T 0250/94 - 3.4.1

DECISION
of the Technical Board of Appeal 3.4.1
of 12 November 1997

Appellant: HISAMITSU PHARMACEUTICAL CO. INC.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office dated 3 November 1993
refusing European patent application
No. 87 903 537.6 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: H. J. Reich
Members: G. Assi
A. C. G. Lindqvist

Summary of Facts and Submissions

- I. European patent application No. 87 903 537.6 (publication No. 0 248 913) having priorities dated 4 December 1985 and 11 November 1986, was refused by a decision of the Examining Division dated 3 November 1993.
- II. The reason given for the refusal was that the subject-matter of claim 1 filed with letter dated 3 June 1993 did not satisfy the requirements of Articles 52(1) and 56 EPC having regard to documents:

D2: EP-A-0 138 347 and

D4: JP-U-53-145 393, together with an English translation thereof.

The Examining Division took the following view:
Document D4 anticipates all electrotechnical features of claim 1 concerning the means for producing the low frequency pulses at the outputting means. The remaining mechanical features of claim 1 concerning the electrodes, the skin adhesive electrically conductive layer and the sheet-like member are disclosed in document D2. Since documents D2 and D4 both concern an electrical therapy, apparatuses with a similar oscillator-pulse generator, it is obvious for a skilled person to supplement the gap of information in document D4 by the teaching of document D2. The applicant's interpretation of the working principle of document D4, leading to the fact that the circuit shown in Figure 3 of D4 delivers pulses at its output (4) at a frequency equal to that of the oscillator section (10), would be ruled out by lines 10 to 11 of claim 1 in the English translation of document D4. This passage would clearly indicate that the **output current amplitude** of the oscillator is controllable in order to

determine the frequency of the pulses at the outputting means. Moreover, "trickle charging", i.e. rectifying the output of an oscillator and accumulating the charges of a rectified pulse train, is a usual method for obtaining a large energy pulse from a source of limited power, an everyday example being provided by the flash unit of commercial cameras.

- III. The appellant lodged an appeal and paid the fee on 27 December 1993. The grounds were filed on 11 March 1994, maintaining the refused version of claims.
- IV. During the appeal proceedings, on 3 March 1994, the present European patent application has been transferred from "Kabushiki Kaisya Advance" to "Hisamitsu Pharmaceutical Co., Inc."
- V. In an annex to a summons to oral proceedings the Board relied additionally on document

D1: US-A-4 210 150,

cited also by the Examining Division and informed the appellant of its provisional view, that a conversion of the circuit of Figure 3 of document D4 into a step up transformer may appear obvious in view of the therapy apparatus disclosed in document D1. Preparing oral proceedings, the appellant presented its comments on the Board's preliminary view in a letter dated 8 October 1997.

- VI. Oral proceedings were held on 12 November 1997, at the end of which the appellant requested that the decision under appeal be set aside and a patent be granted on the basis of a new claim 1 with minor linguistic clarification and a new introduction of the description, wherein the presentation of the background art included the information indicated in Rule 29(1)(a)

EPC, claim 1 being a one-part claim, see also T 170/84 OJ EPO 1986, 400. Thus, it was requested that a patent be granted on the basis of the following documents:

Claims: 1 to 10, handed over on 12 November 1997;

Description: pages 1, 3 and 4, filed with letter dated 27 March 1992,
pages 2, 2a and 2b with insertion pages 1 and 2 handed over on 12 November 1997,
pages 5 to 34 according to EP-A-0 248 913,

Drawings: sheet 1/17 to 17/17 according to EP-A-0 248 913.

VII. Claim 1 handed over on 12 November 1997 reads as follows:

"1. An apparatus for therapy of a body by means of a cenesthetic low frequency stimulation, comprising:

a small-sized, small current capacity, power source (1);

a boosted pulse generating means (2) having a high-frequency oscillating circuit (21) and a boosting circuit (22) for generating a train of a plurality of high frequency boosted pulses upon receipt of electrical energy from the power source;

an electrical energy accumulating means (3) operatively connected to said boosted pulse generating means, for accumulating electrical energy of the train of a plurality of high frequency boosted pulses generated from the boosted pulse generating means, the electrical energy accumulating means being arranged (3) to accumulate the electrical energy from the boosted pulse generating means (2) to accumulate the electrical energy at least to a predetermined stimulation level sufficient for therapy of a body to be electrically stimulated;

• • • a low frequency pulse outputting means (4) operatively connected to the electrical energy accumulating means, for outputting electrical energy accumulated in the accumulating means as low frequency pulses, the low frequency pulse outputting means (4) being arranged to output the low frequency pulses with a charge being the sum of the charges of the accumulated plurality of high frequency pulses, and each having an amplitude corresponding to the electrical energy accumulated in the electrical energy accumulating means and is operable periodically and alternately together with the electrical energy accumulating means to cause the electrical energy accumulating means to discharge the accumulated energy thereof when the accumulated energy exceeds a predetermined level;

and a pair of electrodes (K,F) arranged to transmit the low frequency pulses from the low frequency pulse outputting means;

wherein:

the pair of electrodes (K,F) are provided on a sheet like member and are applied to the body and transmit the low frequency pulses from the low frequency pulse outputting means to the body via a skin-adhesive electrically conductive layer; and the power source (1), boosted pulse generating means (2), electrical energy accumulating means (3) and low frequency pulse outputting means (4) are supported by the sheet-like member (K,F)."

Claims 2 to 10 are dependent on claim 1.

VIII. In support of this request the appellant argued essentially as follows:

- (a) The present invention is concerned with providing a light-weight apparatus for cenesthetic low frequency stimulation. In this apparatus a train of a plurality of relatively low energy, high-frequency pulses is generated and accumulated. Once the summoned energy permits the desired effect, a pulse is output. The output to the electrodes does not correspond to a single pulse from the oscillator, but to a plurality of high frequency pulses from the oscillator.

- (b) In the device disclosed in document D1 the boosted voltage of the pulses from the oscillator undergoes full-wave rectification, is then regulated by resistors 44 and 43 forming a voltage divider to charge a capacitor 55. Capacitor 55 acts as a regulating means, not as an electrical energy accumulating means. Without any consideration of the state of the charges in capacitor 55, pulse rate establishing multivibrator 65 outputs a pulse which turns Darlington-connected switching elements on or off. A combination of the teachings of documents D1 and D4 would not result in the present invention, which seeks to provide an arrangement in which as much energy as possible is converted from the power source to the stimulation pulse. Voltage divider 43, 44 decreases the current flow to the capacitor, reducing the amplitude of the output pulse to values which are insufficient to provide satisfactory stimulation. Moreover, capacitor 58 at the output stage cuts the DC component of the pulse applied to the human body and unduly reduces the stimulation provided.

- (c) The device disclosed in Figure 3 of document D4 discloses an arrangement in which the frequency of the oscillator section 10 is the same as the frequency of the pulses in the discharge section 11. Variable resistor VR_1 regulates the pulse rate (see claim 2 of the translation) of the output from the oscillator section 10 to transformer T_1 . The outputs of transformer T_1 are connected to opposite ends of the capacitor C_2 . Since there is no resistor connected in series with capacitor C_2 , the terminal voltage of capacitor C_2 rises with substantially the same timing as the output of the oscillation section 10. Thyristor S detects the rectified-voltage value of capacitor C_2 and is turned on, when that voltage exceeds a predetermined value. Thus, the thyristor is tuned on once for each output pulse from the transformer T_1 . Capacitor C_2 determines the proportion of the energy of each boosted pulse which is to be passed as an output pulse. There is no suggestion in document D4 of accumulating in capacitor C_2 a train of pulses outputted by oscillator section 10. As follows in particular from original claim 1 of document D4, oscillator section 10 is disclosed to generate "low frequency waves", not high-frequency pulses as claimed. Even if the device of document D4 - as the Examining Division proposes - were operated at a high frequency, this would result only in a more rapid opening of thyristor S at each output pulse from transformer T_1 .
- (d) Hence, the appealed decision is based on a misinterpretation of document D4. In document D4, as correctly interpreted, there is no accumulating means for accumulating high frequency pulses to generate low frequency pulses. Such an accumulation means is not shown in documents D1 or D2 either.

- IX. At the conclusion of the oral proceedings, the decision was announced that the decision of the Examining Division is set aside and that the case is remitted to the first instance with the order to grant a patent on the basis of the requested documents as set out in paragraph VI above.

Reasons for the Decision

1. The appeal is admissible.
2. The subject-matter of claim 1 comprises the characteristics of original claim 1 and features disclosed in original Figures 1 to 4 with the corresponding description, in particular page 2, lines 23 to 25 and page 1, lines 32 to 34. The amendments of the description are in line with Rule 27(1)(b), (c) EPC. There is therefore no objection under Article 123(2) EPC to the current set of documents.
3. *Novelty*
 - 3.1 Document D4 being the closest prior art document with regard to the electrotechnical features of claim 1 discloses in the wording of this claim:

"An apparatus for therapy of a body by means of a...low frequency stimulation (see document D4, the translation, page 2, line 3) comprising, a...power source (D4, B in Figure 3); a boosted pulse generating means (10 in Figure 3) having a...oscillating circuit (R_1 , C_1 , VR_1) and a boosting circuit (Q , L_1 , T_1 , L_3) for generating...boosted pulses upon receipt of electrical energy from the power source; an electrical energy accumulating means (C_2 in Figure 3) operatively

connected to said boosted pulse generating means, for accumulating electrical energy of... (a single boosted pulse)... generated from the boosted pulse generating means, the electrical energy accumulating means being arranged to accumulate the electrical energy from the boosted pulse generating means to accumulate the electrical energy at least to a predetermined stimulation level sufficient for therapy of a body to be electrically stimulated (D4, translation page 2, lines 5 to 9); a low frequency pulse outputting means (R_2 , VR_2 , S , L_4 , L_5 in Figure 3) operatively connected to the electrical energy accumulating means (C_2) for outputting electrical energy accumulated in the accumulating means as low frequency pulses, the low frequency pulse outputting means being arranged to output pulses... each having an amplitude corresponding to the electrical energy accumulated in the electrical energy accumulating means and is operable (via S) periodically and alternately together with the electrical energy accumulating means to cause the electrical energy accumulating means to discharge (through thyristor S) the accumulated energy thereof when the accumulated energy exceeds a predetermined level (to be set via VR_2); and a pair of electrodes (4) arranged to transmit the low frequency pulses from the low frequency outputting means..."

3.2 Document D4 is silent about the form and fixation of the electrodes as claimed in remaining wording of claim 1. Of decisive relevance are the following differences of claim 1 over the closest prior art disclosed in document D4:

- (a) The boosted pulse generating means having a "**high-frequency**" oscillating circuit. The text of the translation of document D4, page 2, line 4 indicates explicitly that the known oscillating circuit generates "low-frequency waves", and

(b) the low frequency pulse outputting means being arranged to output the low frequency pulses "with a charge being the sum of the charges of the accumulated plurality of high frequency pulses".

3.3 The Examining Division cannot be followed in its view in the appealed decision page 4, last 6 lines and page 5, line 1, that the translation of D4, page 2, lines 10 and 11 clearly indicates that the output current **amplitude** of the D4 oscillator is controllable to determine the frequency of the output pulses. The corresponding text of the translation of D4 reads:

"...the period of said pulses ("said" being the pulses at the output transformer) can be adjusted by increasing or decreasing the **alternating current output** of said oscillation section..."

In the Board's view the term "alternating current output" represents a generic expression which does not disclose one of the three parameters, i.e. pulse amplitude, pulse length or pulse frequency determining all three quantitatively the amount of charges of the "output" of the known oscillation section. A skilled person derives from the translation of D4, page 2, lines 16 to 21 that the period of the output pulses can be adjusted by varying the base bias of a transistor (Q) in a self-excited oscillation circuit. In the absence of any particular data specifying the properties of the circuit elements involved, such a statement in the Board's view gives a hint to a skilled person to conclude that the frequency of the oscillation circuit and thereby the frequency at which the transistor Q opens for allowing a current flow through transformer T_1 , is changed, rather than to interpret the above text to mean that the interior resistance of the transistor Q (and thereby the amplitude of the current through T_1) is modified.

Moreover, a skilled person would not seriously contemplate the latter interpretation for the following reasons: The translation of document D4, page 2 lines 12 to 14 and 24 to 28 teaches to set the amplitude of the output pulse by varying the gate voltage of the thyristor S which opens the current flow from capacitor C_2 to winding L_4 of the output transformer, i.e. by varying the maximum voltage appearing at capacitor C_2 . In the event that the period of the output pulses would be controlled by the amplitude of the pulses from the oscillation section, this would lead to the fact that any change of the output pulse amplitude at VR_2 would encounter a subsequent readjustment of the output pulse frequency, at VR_1 . In view of such disadvantage, a skilled person would exclude this interpretation as a technical reality and derive from document D4, that the oscillating section and the discharge section operate at the same frequency, allowing to control frequency (at VR_1) and amplitude (at VR_2) independently from each other.

- 3.4 All other documents cited in the European Search Report or during the proceedings before the Examining Division are less relevant. In this context, however, the Board regards it useful to state that the following features of claim 1 are known from document D2 in the same special technical field as the invention:

"...the pair of electrodes (see D2, 51, 52 in Figure 16) are provided on a sheet-like member (59) and are applied to the body and transmit...to the body via a skin-adhesive electrically conductive layer (52, 53, page 18, lines 33 to 35 and page 19, lines 2 to 4) and...(the whole device is)...supported by the sheet like members (page 18, lines 31 and 32, page 19, lines 23 to 29)."

3.5 Hence, none of the cited documents discloses features (a) and (b) defined in paragraph 3.2 above.

3.6 Thus, in the Board's judgement the subject-matter of claim 1 is novel in the sense of Article 54 EPC.

4. *Inventive step*

4.1 Starting from the closest prior art according to document D4, the objective problem underlying the present invention is to provide a small-sized low frequency curing apparatus capable of supplying long-time and stable cenesthetic electrical stimulation to an organism irrespective of the amount of energy of a small-sized power supply; see the original description page 2, lines 23 to 32.

4.2 The above problem is solved by making the oscillating circuit operate at "high frequency" and by outputting low frequency pulses" with a charge being the sum of the charges of the accumulated plurality of high frequency pulses".

4.3 None of the documents cited in the proceedings discloses a device generating an output pulse with a charge resulting from summing the respective charges of a plurality of individual pulses. Having regard to document D1, the appellant is followed in its view set out in paragraph VIII-(b) above. Hence, in the Board's judgement, it is not obvious to a skilled person to provide satisfying cenesthetic stimulation pulses from small-sized power supply by making use of the charge-summing principle set out in paragraphs 4.2 and 3.2 above.

4.4 Though the Examining Division is followed in its view that the charge-summing principle is known to be used for flash-lights in optical cameras, the Board takes the view that optical cameras represent no neighbouring technical field, where a person skilled in the therapy by cenesthetic stimulation would look for help in order to provide satisfying long-time and stable stimulation; see also T 176/84 OJ EPO 1986, 50.

4.5 For the reasons set out above in paragraphs 4.1 to 4.4, the subject-matter of claim 1 is considered to involve an inventive step in the sense of Article 56 EPC.

4. Thus, claim 1 is allowable under Article 52(1) EPC. Dependent claims 2 to 10 concern particular embodiments of the device claimed in claim 1 and are, therefore, likewise allowable.

Order

For these reasons it is decided that:

1. The decision of the Examining Division is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of the requested documents (see paragraph VI above).

The Registrar:

The Chairman:

M. Beer

H. J. Reich