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Datasheet for the decision of 19 September 2022

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Application Number: 09718363.6

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Title of invention:
PHOTO-EPILATION DEVICE

Patent Proprietor:
Koninklijke Philips N.V.

Opponents:
Cyden Limited
The Procter & Gamble Company
Babyliss Faco SRL

Relevant legal provisions:
EPC Art. 54, 56, 83

Keyword:
Sufficiency of disclosure - (yes)
Novelty - (yes)
Inventive step - (yes)

Decisions cited:
T 0261/15, T 0875/16

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Case Number: T 2250/18 - 3.2.02

D E C I S I O N
of Technical Board of Appeal 3.2.02
of 19 September 2022

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted on 23 July 2018 concerning maintenance of the European Patent No. 2262439 in amended form.**

Composition of the Board:

Chairman M. Alvazzi Delfrate
Members: S. Dennler
C. Schmidt

Summary of Facts and Submissions

I. Each of the three opponents filed an appeal against the decision of the Opposition Division concerning the maintenance of the contested patent in amended form on the basis of auxiliary request I.

II. In its decision, the Opposition Division held, *inter alia*, that the invention was sufficiently disclosed and that the subject-matter of claim 1 of auxiliary request I was novel and involved an inventive step, especially in view of the following documents:

P2: WO 99/34867 A1
P3: US 7,044,959 B2
P4: US 2004/0230260 A1
P6: US 2004/0167499 A1
P8: US 2003/0069567 A1
P16: US 2007/0239144 A1
P20: J. H. Lee *et al.*, *Photoepilation Results of Axillary Hair in Dark-Skinned Patients by Intense Pulsed Light: Comparison between Different Wavelengths and Pulse Widths*, Dermatologic Surgery, 32, 2006, 239-45

III. Oral proceedings before the Board were held on 19 September 2022.

IV. The three appellants (opponents) requested that the decision under appeal be set aside and that the patent be revoked.

V. The respondent (patent proprietor) requested that the appeals be dismissed.

VI. Claim 1 of auxiliary request I ("claim 1") is identical to claim 1 of the patent as granted and reads as follows (feature numbering introduced by the Board):

a1 *"A photo-epilation device (1), comprising:*
a2 *a hand-held housing (10) with*
a3 *at least one light output window opening (11);*
a4 *broadband intense pulsed light-generating means (20) accommodated in the housing for generating high-intensity light in a broad spectral range suitable for effecting photo-epilation;*
a5 *a control device (70) for driving the light-generating means (20);*
a6 *a user-operated pulse trigger; wherein*
b1 *the control device is adapted to control the light-generating means so as*
b2 *to switch on the light-generating means in brief pulses having a pulse duration in the range from 1.1 ms to 1.9 ms, preferably about 1.8 ms; and wherein*
b3 *the control device is adapted to control the light-generating means such that the fluence on skin level is in the range from 2 to 7 J/cm^2 per pulse;*
characterized in that
c1 *the control device is responsive to the user-operated pulse trigger*
to control the light-generating means so as
c2 *to generate one single pulse."*

VII. The **appellants' arguments** relevant for this decision can be summarised as follows.

Sufficiency of disclosure

Paragraph [0063] of P16 disclosed, in the context of a photo-epilation device, that using light pulses having a pulse duration of 1.8 ms with a fluence of 4 J/cm^2 produced "very poor" results, hence that this combination of parameters did not work. As this combination was covered by claim 1, this demonstrated that the invention of the patent could not be carried out over the whole scope of the claims. It resulted that the invention was not sufficiently disclosed.

Furthermore, in its written submission dated 15 September 2022, appellant 1 referred to Table 2 of P3 and decision T 875/16. The following points on insufficiency of disclosure were further developed by the appellants at the oral proceedings before the Board.

The patent did not clearly disclose what the technical effect underlying the claimed invention was and how this effect was achieved.

A low fluence setting alone could not allow for effective photo-epilation while keeping heat production and pain at low levels, as alleged in the patent specification where fluence was systematically presented as the only relevant parameter (paragraphs [0010] and [0038]). Only during the examination phase had the claimed feature related to the generation of a single pulse been added as a characterising feature of claim 1 and the pulse duration range originally disclosed been limited to the narrower range claimed. This showed that these features were actually irrelevant to the alleged invention for which protection had been originally sought.

Moreover, the description contained no explanation as to the choice of the fluence and pulse duration ranges defined in claim 1. Nor had any supporting clinical results been submitted. The original broader pulse duration range, of which the claimed range was a limitation, had been further claimed in another patent, which was based on a divisional application and concerned a similar device. This supported the view that these ranges were purely arbitrary. This view was further confirmed by Table 2 of P3, which disclosed that photo-epilation was actually achieved over much broader fluence and pulse duration ranges than those defined in claim 1.

In addition, claim 1 did not specify the nature of the light-generating means and its spectral range and did not limit the photo-epilation allegedly achieved to certain skin types. However, these parameters were strongly linked. It was therefore not plausible that photo-epilation was achieved over the whole combination of parameter ranges defined in claim 1, especially in the absence of any supporting clinical results. Reference was made to the principles elaborated in T 875/16, especially in points 21 to 40 of the Reasons, which also applied in the current case.

Therefore, also for these reasons the invention of the patent was not sufficiently disclosed.

Novelty

The subject-matter of claim 1 lacked novelty in view of each of P2, P6, P8 and P16.

(a) Novelty in view of P2

P2 disclosed a photo-epilation device which used light pulses with a duration of 1 to 75 ms and a fluence of 1.5 to 5 J/cm^2 (last paragraph of page 8).

These ranges substantially overlapped with those defined in features b2 and b3. The upper bound of the fluence range, 5 J/cm^2, was within the claimed range of 2-7 J/cm^2. The lower bound of the claimed pulse duration range, 1.1 ms, could not be closer to the lower bound of the range of P2, 1 ms, since the contested patent defined the pulse durations to one significant decimal place only. Moreover, a 10% difference was not a significant gap. Therefore, the two-dimensional range defined by the combination of features b2 and b3 was not far removed from the limits of the broader two-dimensional range disclosed in P2. Also, this combination was not associated with a particular technical effect but was a mere alternative and did not represent another invention. Consequently, features b2 and b3 were not novel over P2.

(b) Novelty in view of P6

P6 disclosed in paragraph [0182] that temporary hair regrowth inhibition had been found clinically for pulse durations between 0.3 and 3 ms and fluences as low as 4-5 J/cm^2. These ranges were novelty-destroying for those defined in features b2 and b3.

The person skilled in the art would have understood, for example from paragraph [0167], that the disclosure in paragraph [0182] also related to the device described in the rest of P6. This device comprised all the other features of claim 1, in particular a user-operated pulse trigger (trigger buttons 430; Figure 6).

As a consequence, P6 disclosed the whole subject-matter of claim 1.

(c) Novelty in view of P8

P8 disclosed in paragraph [0085] a pulse duration range of 1-10 ms and a fluence range of 6-20 J/cm^2. These ranges anticipated those defined in features b2 and b3.

It was true that the fluence range of 6-20 J/cm^2 was disclosed for a bandwidth of 500 to 650 nm. However, this bandwidth was obtained by filtering the light emitted by a broadband flash lamp. The wording of claim 1 did not exclude that the broadband light emitted by the light-generating means could also be filtered before being applied to the skin. A filter was even defined in claim 9 of auxiliary request I, which was dependent on claim 1. Alternatively, a bandwidth of 500 to 650 nm could also be regarded as broad.

(d) Novelty in view of P16

Features b2 and b3 were not novel over the combination of fluence and pulse duration disclosed in paragraph [0063] of P16. Moreover, P16 implicitly disclosed features c1 and c2.

P16 failed to mention or suggest multiple pulse emission. Paragraph [0015] indicated that light was applied to the skin "in a short pulse". Like in claim 1 of the contested patent, the other references in P16 to "pulses" and "flashes" in the plural form merely reflected that the photo-epilation device had to be able to generate many pulses over its operational lifetime. This was also why the term "periodically" was used in paragraph [0050]. Moreover, the fluence

disclosed in paragraph [0063] was implicitly the fluence of a single pulse applied to the skin.

In addition, the electronic circuit shown in Figure 5A was, by design, able to generate only one single pulse upon the closing of the SCR switch 46. This kind of switch could not be manually operated. Rather, some user-operated pulse trigger was necessarily implicitly present in the photo-epilation device to enable a user to activate the SCR switch, at least indirectly. The lack of disclosure of any control circuitry to activate the SCR switch periodically indicated that a single pulse was produced when the pulse trigger was activated by a user.

In a further line of argument, the appellants argued that the wording of features c1 and c2 did not exclude that light pulses could be periodically generated if each of these pulses were regarded individually as "one single pulse". Thus, under this interpretation, P16 disclosed both features c1 and c2, even if the electronic circuits generated light pulses periodically upon activation of a user-operated pulse trigger, for example an on/off button.

Inventive step

The subject-matter of claim did not involve an inventive step in view of the epilation devices disclosed in P2, P4, P6 or P16, or in view of the common general knowledge reflected in paragraph [0182] of P6, each regarded as the starting point.

(a) Starting from P2

If the fluence and pulse duration ranges defined by features b2 and b3 were to be found novel over those disclosed in P2, these ranges would, in any event, not be inventive.

Concerning fluence, the range of 1.5-5 J/cm^2 disclosed in P2 was almost entirely contained within the fluence range of feature b3. Thus, it was extremely likely that the person skilled in the art would choose to work within the claimed fluence range when putting the teaching of P2 into practice.

Moreover, the respondent, on which the burden of proof lay, had not credibly demonstrated any technical effect associated with the claimed fluence range. The latter indeed included a fluence of 7 J/cm^2, which was higher than the fluences disclosed in P2. Hence, there could be no technical effect related to a reduction of the heat generated by the claimed device.

Concerning pulse duration, the range 1.1-1.9 ms defined by feature b2 was an arbitrary specimen of the range 1-75 ms disclosed in P2 and thus could not support an inventive step either. The respondent, on which the burden of proof lay, had not credibly demonstrated any technical effect associated with this sub-range either:

- Table 2 of P3 indicated that the follicle heating effect was largely insensitive to pulse duration for a given fluence across several orders of magnitude. Thus, it was not credible that the range 1.1-1.9 ms had any special effect.

- According to P20 (leftmost column of page 244), the thermal relaxation time of epidermal melanosomes was between 1 and 2 ms. It was not

credible that a distinction between 1 and 1.1 ms, i.e. of merely 10%, enabled significantly more heat to dissipate from the epidermal layer to significantly reduce pain levels. The claimed ranges could therefore not have any technical effect in terms of reducing pain.

- The maximum power output on the skin, calculated for maximum fluence and shortest pulse duration, was higher for the claimed device (6.36 kW/cm^2) than for the device of P2 (5 kW/cm^2). This indicated that the claimed ranges could not have any effect in terms of increased safety either.

In the absence of any technical effect achieved by the distinguishing features of claim 1, these features could not support the presence of inventive step over P2.

Furthermore, the combination with P3 or P6 would also have prompted the person skilled in the art toward the claimed ranges.

Table 2 of P3 demonstrated that the fluence required for photo-epilation was virtually constant from 0.1 to 10 ms. The person skilled in the art would have thus understood that any pulse duration between these limits could be expected to produce the same effect. The range 1.1-1.9 ms was therefore a merely arbitrary, non-inventive selection of this broader range.

Since the duration pulse and fluence ranges disclosed in P2 were broad, the person skilled in the art seeking to put the teaching of P2 in practice would have been motivated to select particular values for pulse duration and fluence, at least for the purpose of

performing trial design experiments. To this end, it would have been obvious for them to consider the clinical results described in paragraph [0182] of P6 because clinical studies were a valuable and reliable source of data in the medical field. Based on these results, an obvious choice would have been to take the average values of the duration pulses and fluences disclosed, i.e. 1.65 ms and 4.5 J/cm^2. As a result, the person skilled in the art starting from P2 would have arrived at a combination within the claimed ranges defined by features b2 and b3 without inventive step.

(b) Starting from P4

P4 disclosed a photo-epilation device which generated periodic light pulses. The subject-matter of claim 1 differed from this device only on account of feature c2.

In a first line of argument, this feature had no technical effect and did not solve the technical problem put forward by the respondent. Indeed, applying one light pulse only to a given skin area could not increase the safety of the photo-epilation treatment because the user was not prevented from applying several light pulses to the same skin area. In fact, given the low pulse repetition rate of 0.5 to 3 seconds (paragraph [0017]), the same effect could be achieved with the device of P4 by moving it over the skin between two successive pulses. Moreover, P4 further disclosed a skin sensor which stopped the generation of pulses when it detected that the device had been pulled away from the skin (paragraph [0036]). Hence, it was also possible for the user to apply one single light pulse to a given skin area by pulling the device away immediately after a pulse had been generated.

Consequently, feature c2 could not lend inventive step to the subject-matter of claim 1 over P4.

In a further line of argument, feature c2 could be regarded as allowing a user to generate the light pulses manually and not periodically as disclosed in P4. In the same way that the mere automation of a process was not considered inventive in line with established case law, the reverse operation consisting in replacing automatic operation by manual operation should not be regarded as inventive either.

(c) Starting from the main disclosure of P6

If the ranges 0.3-3 ms and 4-5 J/cm^2 disclosed for clinical results in paragraph [0182] were to be found not to apply to the photo-epilation device disclosed in the rest of P6, the subject-matter of claim 1 would differ from that known device only on account of features b2 and b3.

Prompted by the teaching of paragraph [0182] that this combination led to temporary hair regrowth inhibition, it would have been obvious for the person skilled in the art to use this combination instead of the other light pulse parameters described in the main disclosure of P6 to solve the technical problem of reducing the efficacy of the skin treatment to achieve temporary rather than permanent hair removal.

A fluence of 4-5 J/cm^2 was within the claimed range 2-7 J/cm^2. The claimed range 1.1-1.9 ms was an arbitrary selection, without any technical effect, from the range 0.3-3 ms. Consequently, pursuing the reasoning above, the person skilled in the art proceeding from the main disclosure of P6 would have

arrived at the features b2 and b3 without inventive step.

(d) Starting from the common general knowledge as reflected by paragraph [0182] of P6

The clinical results described in paragraph [0182] of P6 could be regarded as reflecting the common general knowledge and as such could be considered on their own, i.e. isolated from the rest of P6, to be an appropriate starting point for assessing inventive step of claim 1. Following the same reasoning as argued above for P2 as the starting point, an obvious choice for the person skilled in the art seeking to develop a photo-epilation device on the basis of these clinical results would have been to take the average values of the duration pulses and fluences disclosed in paragraph [0182], i.e. 1.65 ms and 4.5 J/cm^2.

Since the photo-epilation device used to obtain the clinical results was unspecified, the person skilled in the art would have consulted P2 to find details on how to construct a photo-epilation device, while keeping the average values of fluence and pulse duration suggested by the clinical results. This would have led the person skilled in the art to the subject-matter of claim 1 without inventive step.

(e) Starting from P16

The fact that the results obtained with the fluence and pulse duration ranges disclosed in paragraph [0063] of P16 were reported as being "very poor" would not have dissuaded the person skilled in the art starting from this document from using these parameters. Indeed, the statement "very poor" was made in the context of

permanent hair removal. If these parameters were less effective for permanent hair removal, this conversely meant that they were more effective for temporary hair removal. Since the contested patent also addressed temporary hair removal, it was therefore justified to take this example of P16 as a starting point to assess inventive step.

Hence, if the Board were to conclude that features c1 and c2 were not disclosed in P16, these features would be the only features distinguishing claim 1 over this document. They would, in any event, not lend inventive step to the subject-matter of claim 1.

In view of the common general knowledge, it would have been obvious to the person skilled in the art to include a user-operable pulse trigger for causing the photo-epilation device of P16 to emit one single pulse when it was required. This kind of pulse trigger was well known in the art. Examples were disclosed, for example, in P6 (paragraph [0079]) and P2 (page 8, line 30) in the form of a button or switch.

Therefore, the person skilled in the art starting from P16 would have arrived at the subject-matter of claim 1 without inventive step.

VIII. The **respondent's arguments** relevant for this decision can be summarised as follows.

Sufficiency of disclosure

The example disclosed in paragraph [0063] of P16 only suggested that permanent hair removal might not be possible using the parameters mentioned in this paragraph. However, in the context of the contested

patent (see paragraph [0001]), photo-epilation was not limited to permanent hair removal but also covered temporary hair removal. Thus, the example of P16 did not cast any doubt on the fact that photo-epilation was possible over the complete fluence and pulse duration ranges defined in claim 1.

The further points raised by the appellants about sufficiency of disclosure were also without merit. The appellants, which bore the burden of proving a potential insufficiency of disclosure, had not substantiated any serious doubts in this respect.

Novelty

The subject-matter of claim 1 was novel in view of each of P2, P6, P8 and P16, at least for the following reasons.

(a) Novelty in view of P2

The ranges defined by features b2 and b3 were novel over those disclosed in P2. The principles applicable for assessing novelty were those related to the selection from two lists.

(b) Novelty in view of P6

P6 did not directly and unambiguously disclose that the clinical results mentioned in paragraph [0182] had been obtained with the device described in the rest of P6. Rather, they could well have been obtained with another device, the configuration of which was not further described. Therefore, even if the ranges disclosed for the clinical results were assumed to be novelty-destroying for the ranges defined in claim 1, the

remaining features of claim 1 would still not be directly and unambiguously disclosed in P6 in combination with these ranges.

(c) Novelty in view of P8

The fluence on skin between 6 and 20 J/cm^2 mentioned in paragraph [0085] of P8 was disclosed only for a narrow spectral bandwidth of 500 to 650 nm, which was not a broadband spectrum as required by claim 1. For a broadband, unfiltered light, the fluence was in the range 30-100 J/cm^2, i.e. considerably higher than required by feature b3. Thus, P8 failed to disclose at least feature b3.

(d) Novelty in view of P16

Features c1 and c2 clearly required that one single pulse, and only one, should be generated upon each activation of the user-operated pulse trigger. However, these features were not directly and unambiguously disclosed in P16, which was ambiguous on this aspect.

Inventive step

None of the inventive-step objections raised by the appellants were convincing, at least for the following reasons.

(a) Starting from P2

The subject-matter of claim 1 differed from the device of P2 on account of features b2 and b3.

As explained in the contested patent, the ranges defined by features b2 and b3 enabled achieving photo-

epilation, i.e. epilation based on the application of light only. As a result, the additional features necessitated by the thermal epilation mechanism on which the epilation device of P2 was primarily based could be dispensed with. Accordingly, the ranges defined by features b2 and b3 solved the objective technical problem of simplifying the construction of the epilation device.

While light pulses could also be emitted by the device of P2, P2 explicitly taught that their energy had to be insufficient to destroy the hairs. Thus, without hindsight, the person skilled in the art would not have implemented the claimed ranges in the device of P2, against the teaching of P2, to destroy hair via photo-epilation only.

In any event, the combination of P2 with P3 or P6 would not have prompted the person skilled in the art toward the claimed ranges either.

P3 related to an epilation treatment in which neither the hair follicle nor the hair shaft were destroyed. Therefore, it could not be concluded that the fluences and pulse durations specified in Table 2 led to hair and/or follicle damage as sought in P2.

The person skilled in the art considering P6 would not have used the parameters mentioned for the clinical results of paragraph [0182] but rather those consistently recommended in the rest of the document. P6 taught to use pulse durations of at least 3 ms, i.e. much higher than the range defined in feature b2.

(b) Starting from P4

The subject-matter of claim 1 differed from the photo-epilation device of P4 at least on account of features c1 and c2.

These features solved the technical problem of enabling a safer and more reliable photo-epilation treatment having sufficient efficacy, in particular for home treatment.

P4 stressed, for example in paragraph [0020], that multiple light pulses had to be applied to the same treatment area in contrast to other "single pulse treatments". Thus, P4 taught away from the invention of the patent. It was irrelevant that by misusing the device of P4, one single light pulse could be applied to a given skin area.

Therefore, the person skilled in the art would not have considered implementing features c1 and c2 in the device of P4.

(c) Starting from the main disclosure of P6

Following the same reasoning as argued above for the inventive-step objection based on the combination of P2 with P6, the person skilled in the art proceeding from P6 would not have used the parameter ranges disclosed in paragraph [0182]. They instead would have merely followed the explicit, systematic teaching in the rest of P6 that large pulse durations of at least 3 to 10 ms were preferable. This would have led the person skilled in the art away from the claimed range of 1.1-1.9 ms defined by feature b2.

(d) Starting from the common general knowledge as reflected by paragraph [0182] of P6

The person skilled in the art would not have considered the clinical results disclosed in paragraph [0182] of P6 in isolation from the rest of this document. Rather, the person skilled in the art reading P6 as a whole would have simply followed the teaching disclosed in the rest of P6, which taught away from the range of feature b2 as argued above for the inventive-step objection starting from the main disclosure of P6.

(e) Starting from P16

Without hindsight, the person skilled in the art starting from P16 would not have used the light pulse parameters disclosed in paragraph [0063] because of the explicit statement that these parameters led to "very poor" results. Rather, they would have followed the consistent teaching of P16 to use durations of less than about 0.5 ms, i.e. much shorter than those defined by feature b2. Hence, the person skilled in the art would not have arrived at the subject-matter of claim 1.

Reasons for the Decision

1. The subject-matter of the contested patent

The contested patent relates to a photo-epilation device. As explained in paragraphs [0001] and [0002], photo-epilation consists in damaging or destroying hair and hair follicles by applying light on the skin, typically in form of intense pulses. Melanin contained in the hair and the follicles selectively absorbs light, heats up and eventually vaporises. The resulting hair removal can be temporary or permanent.

Due to their high light energy density, or fluence, professional systems are typically bulky, heavy and expensive, and may lead to skin damage or high levels of pain if they are not used with care. This is why they are generally not suitable for the consumer market (paragraphs [0005] and [0006]).

By contrast, the patent aims at providing a photo-epilation device which can be comfortably and safely used by consumers at home, without the need for well-trained professionals to operate the device. For this purpose, the patent entails operating at a comparatively low fluence which is still effective to achieve photo-epilation. This keeps heat generation low and thus ultimately allows for a smaller size of the device (paragraphs [0007]-[0010], [0038]).

The claimed photo-epilation device includes a broadband intense pulsed light-generating means for generating high-intensity light in a broad spectral range suitable for effecting photo-epilation and a control device adapted to control the light-generating means to switch it on in brief pulses having a pulse duration in the range from 1.1 to 1.9 ms, and such that the fluence on skin level is in the range from 2 to 7 J/cm^2 per pulse. Moreover, the control device is responsive to a user-operated pulse trigger for controlling the light-generating means to generate one single pulse.

2. Sufficiency of disclosure

2.1.1 In *inter partes* proceedings, the burden of proof for sufficiency of disclosure initially lies with the opponent, which must establish, on the balance of probabilities, that a person skilled in the art reading

the patent, using common general knowledge, would be unable to carry out the invention.

In the current case, the appellants' objections of insufficiency of disclosure do not convince the Board.

2.1.2 While a low fluence is indeed presented in the patent as the feature which primarily allows keeping heat generation low and thus also the pain caused to the patient low, this effect is not defined in the claims. It is therefore irrelevant for sufficiency of disclosure whether this effect is actually achieved, in contrast to the appellants' view. This question might only become relevant when assessing inventive step for the formulation of the technical problem to be solved (see, in this respect, G 1/03, point 2.5.2 of the Reasons). Rather, it must be determined whether the person skilled in the art could, on the basis of the disclosure of the patent as a whole and using common general knowledge, reproduce without undue burden a photo-epilation device as claimed over the whole scope of the claims.

2.1.3 Contrary to the appellants' argument, fluence is not the only parameter which defines the photo-epilation device provided by the patent. As explained in the description, the low fluence must be "still effective" (paragraph [0010]). For this purpose, claim 1 stipulates, in addition to a fluence in the range of 2-7 J/cm^2 (i.e. lower than in the typical professional systems described in paragraph [0003]), a short pulse duration in the range of 1.1-1.9 ms, with paragraph [0030] specifying how the pulse duration is to be measured. Even in the absence of any clinical results submitted by the respondent, the Board does not see any reason to doubt that the claimed ranges enable, in

combination with the further requirement of claim 1 that the emitted light must have a suitable broad spectral range (as is the case, for example, for xenon flash lamps as disclosed in paragraph [0014]), achieving temporary or permanent photo-epilation as asserted in the patent, at least for certain skin types.

The reference to paragraph [0063] of P16, which the appellants alleged disclosed a non-working combination of parameters, is not persuasive. Firstly, the expression "very poor" in that paragraph does not mean that no damage was caused to the hair follicles but merely that better results, i.e. greater damage, were obtained with a shorter pulse as described in the preceding paragraph. Secondly, this statement has to be understood in the context of P16, i.e. in the context of permanent hair removal (paragraphs [0001], [0062]). This context is different from the context of the contested patent, which relates not only to permanent but also temporary photo-epilation (paragraph [0001]) that does not require permanent destruction of the hair follicles. Hence, contrary to the appellants' view, the statement of paragraph [0063] of P16 does not demonstrate any insufficiency of disclosure of the invention in the contested patent, as also concluded by the Opposition Division (point 4.3 of the decision under appeal).

The Board acknowledges that a given combination of fluence and pulse duration in the ranges defined in claim 1 may not necessarily be effective for all skin types, as objected to by the appellants. However, the contested patent teaches, both in paragraphs [0033]-[0035] and [0049] of the description and in claims 4-5, how to select an appropriate fluence within the claimed

range depending on the user's skin type (see also in paragraph [0010] the indication "still effective [...] dependent on the skin type").

2.1.4 Moreover, contrary to the appellants' submission, it is irrelevant that the pulse duration range has been narrowed compared to the broader range originally disclosed for the contested patent but not for a divisional application directed to a similar photo-epilation device. It is also irrelevant that Table 2 of P3 might suggest that photo-epilation could actually be achieved over much broader ranges of fluence and pulse duration. All these aspects relate to novelty and inventive step and have no bearing on sufficiency of disclosure. They are merely linked to the fact that an applicant may have to restrict its original claims to overcome objections of lack of novelty or lack of inventive step potentially raised during examination of the application or in the course of subsequent opposition proceedings.

2.1.5 The reference to decision T 875/16 is not convincing either. The pulse duration range claimed in the patent at stake in that decision extended from 1 to 30 ms, which was considered disproportionately large in view of the consequences it presented for the fluence involved, especially given that that patent failed to give any definition of the pulse duration (point 31 of the Reasons). The situation in the current case differs significantly, with a clearly defined and much narrower claimed pulse duration range of 1.1-1.9 ms.

2.1.6 From the above considerations, the Board therefore concludes that, contrary to the appellants' view, the invention as defined in claim 1 of the contested patent is disclosed in a manner sufficiently clear and

complete to be carried out by the person skilled in the art.

3. Novelty

The appellants submitted that the subject-matter of claim 1 lacked novelty over each of P2, P6, P8 and P16. None of these objections convinces the Board.

3.1 Novelty over P2

3.1.1 According to the appellants, the ranges 1.1-1.9 ms and 2-7 J/cm^2 defined by features b2 and b3 are not novel in view of the ranges 1-75 ms and 1.5-5 J/cm^2 disclosed in the last paragraph of page 8 of P2. The Board disagrees.

3.1.2 When assessing the novelty of a numerical range selected from or overlapping with another range known from the prior art, the following criteria must be met for the range to be novel (see *Case Law of the Boards of Appeal of the EPO*, 10th edn. 2022, I.C.6.3.1 and I.C.6.3.2):

(a) The range should be narrow.

(b) The range should be sufficiently far removed from the known range illustrated by means of examples.

These two criteria compare the invention as claimed to the disclosure of the prior art, as is required for the examination of novelty. This Board takes the view, also taken in the majority of recent case law (see e.g. T 261/15, point 2.2.2 of the Reasons), that whether the selected or overlapping area provides an arbitrary specimen from the prior art or another invention - an

aspect on which the parties also relied in their submissions - is in fact a question of inventive step rather than novelty.

Moreover, since the fluence on skin level and the pulse duration jointly influence the way the hairs and hair follicles are damaged or destroyed by the light pulse, their ranges are not to be considered in isolation but in combination when assessing the prior art.

3.1.3 While the ranges defined by features b2 and b3 indeed overlap to varying degrees with the ranges of P2, considering them in combination as discussed above results in a narrow range of overlap with the light pulse characteristics disclosed in P2, especially due to the claimed pulse duration range 1.1-1.9 ms, which is considerably narrower than the corresponding range 1-75 ms of P2. Criterion (a) is thus met.

Furthermore, the combination of 1 ms and 5 J/cm^2 from which the claimed combination of ranges was alleged to be insufficiently far removed is not directly and unambiguously disclosed in P2. Even though each is explicitly disclosed in P2, the end-values of the known ranges cannot be combined with each other arbitrarily to suit the case being made. Moreover, in the absence of further teaching in this direction, the person skilled in the art would not seriously contemplate working in the region of the end-values of the prior-art ranges (see T 261/15, fourth paragraph of point 2.3.2 of the Reasons). For this reason, it is irrelevant whether, as argued by the appellants, the claimed end-value of 1.1 ms should be considered close to the limit of 1 ms disclosed in P2. Even if this assumption were adopted, the claimed combination would

still be far removed from the combination of ranges disclosed in E2 since the combination of 1 ms and 5 J/cm^2 is not disclosed in E2 as discussed above. Thus, criterion (b) is met as well.

At least for these reasons, the Board concludes that P2 fails to anticipate features b2 and b3. The subject-matter of claim 1 is therefore novel over P2.

3.2 Novelty over P6

The ranges 0.3-3 ms and 4-5 J/cm^2 mentioned in paragraph [0182] of P6, which the appellants considered novelty-destroying, are disclosed in the context of clinical results ("found clinically"). As put forward by the respondent, P6 does not directly and unambiguously disclose that these clinical results were obtained with the device described in the rest of the document. The clinical results could well have been obtained with another device, the configuration of which is not disclosed in P6.

This view is reinforced by the fact that for the preferred device, P6 systematically discloses pulse durations above 3-10 ms or even higher (paragraphs [0176], [0185]), i.e. much higher than those specified in paragraph [0182]. Pulse durations below 10 ms are even explicitly qualified as "not desired" in P6 (paragraph [0200]).

Therefore, even if the ranges in paragraph [0182] were assumed to anticipate those of features b2 and b3, P6 would still not directly and unambiguously disclose the remaining features of claim 1 in combination with these ranges. The subject-matter of claim 1 is therefore novel over P6.

3.3 Novelty over P8

As argued by the respondent, the fluence range 6-20 J/cm^2 mentioned in paragraph [0085] of P8, which the appellants argued was novelty-destroying for the range defined in feature b3, was disclosed only for a filtered light having a bandwidth of 500 to 650 nm.

Claim 1 requires that the pulses emitted by the photo-epilation device and applied to the user's skin should have a "broad spectral range". Paragraphs [0016] and [0017] of the patent describe that the portion of the light spectrum useful for the invention ranges from about 575 nm to about 1200 nm. The filter defined in claim 9, to which the appellants referred, only stops ultraviolet light, i.e. short wavelengths below about 575 nm. Contrary to the appellants' submission, the spectral band 500-650 nm cannot therefore be considered broad.

For the unfiltered light emitted by the "typical flashlamp" mentioned in paragraph [0085], P8 discloses that the fluence is in the range 30-100 J/cm^2, i.e. well above the range specified in feature b3.

Furthermore, the Board notes that the combination disclosed in paragraph [0085] in fact relates to devices for skin treatment (see the first sentence of paragraph [0089]), which P8 distinguishes from hair removal. For the embodiment related to epilation (see the part of the description starting with paragraph [0171]), P8 instead discloses a pulse duration of 50 ms (paragraph [0181]) and fluence values in the range of 10-100 J/cm^2 (paragraph [0191]), i.e. both well above the claimed ranges specified in features b2 and b3.

Thus, the subject-matter of claim 1 is novel over P8.

3.4 Novelty over P16

As put forward by the respondent, features c1 and c2 require that "one single pulse", i.e. one and only one, should be generated upon each activation of the user-operated switch. This interpretation is supported, for example, by paragraph [0037], which explains that the user has to operate the pulse trigger "when he is ready to apply the next single light pulse". This excludes the appellants' interpretation that claim 1 also covers the generation of periodic light pulses. The appellants' line of argument based on this interpretation therefore fails for this reason alone.

The appellants' other line of argument does not convince the Board either.

It is true, as put forward by the appellants, that P16 discloses applying light to the skin "in a short pulse" (paragraph [0015]). The light pulses produced by the device indeed appear to be designed to damage the hair follicles in one single application only (paragraphs [0036]-[0040]). This is also supported by the fact that the discussion of the experimental results presented in paragraphs [0062] and [0063] mentions only fluence and pulse duration, without specifying any total duration of exposition of the skin to pulsed light or cumulative fluence.

However, the Board shares the respondent's view that this way of treating the skin by application of single pulses does not necessarily require the provision of a trigger and a control device according to features c1

and c2. This could equally be achieved if the device, once activated by the user, were configured to periodically generate light pulses, with the user moving the device along the skin to apply the pulses sequentially on different areas of the skin.

The reference to "pulses" and "flashes" in the plural form in the description (paragraphs [0018], [0054], claims 1 and 6) as well as the use of the term "periodically" in paragraph [0050] could support both interpretations. As put forward by the appellants, these words may simply reflect the fact that the device must generate more than one flash when used over its operational lifetime.

The electronic circuit shown in Figure 5A does not shed any light on this question. It is true, as also conceded by the respondent, that by design this electronic circuit produces only one single light pulse upon the closing of the switch 46. While it is highly likely that some user-operable trigger is provided in the device to command the generation of the light flashes, P16 is, however, silent on how the switch 46 is actuated, especially whether this switch is directly operable by a user. Nor does P16 contain any details about the control circuit required for generating a gate signal to control the switch when this switch is implemented as a SCR switch (paragraph [0051]). For example, such a control circuit could equally involve a push-button (in which case actuation of the push-button by the user would result in the generation of one single light pulse, thus anticipating features c1 and c2) or a wave signal generator to close the switch at regular time intervals (in which case multiple light pulses would be automatically generated by the device).

It follows that, contrary to the appellants' argument, P16 does not directly and unambiguously disclose features c1 and c2. The subject-matter of claim 1 is therefore novel over P16.

4. Inventive step

The appellants raised several inventive-step objections against claim 1. None of them convinces the Board.

4.1 Starting from P2

4.1.1 It follows from point 3.1 above that the subject-matter of claim 1 differs from the hair removal device disclosed in P2 at least on account of features b2 and b3.

As argued by the respondent, the device disclosed in P2 is based primarily on thermal epilation: heat is first transferred to the hairs from the hot air heated by the flash lamp and then conducted along the hair shafts down to the follicles (page 2, lines 1-6). Light pulses as in the contested patent may also play a role, albeit only a secondary one (page 2, lines 13-16 and 32-33).

Thermal epilation requires special components to facilitate heat transfer and conduction to the hair follicles (such as a heated sealed cavity, a suction pump, a comb for lifting the hairs from the skin and bringing them closer to the lamp; see page 3, lines 8-33) as well as to avoid epidermal burns (such as an air pump to dissipate heated air and cool the cavity; page 10, lines 7-10).

By contrast, as explained in the contested patent, the combination of ranges defined by features b2 and b3

enables hair to be removed by photo-epilation only. The appellants' submissions that these ranges do not have any technical effect fail to consider this point and are therefore not convincing.

If photo-epilation is the sole mechanism used to remove hair, the additional special components required for thermal epilation in P2 can be dispensed with. The Board thus concurs with the respondent that the objective technical problem to be solved starting from P2 may therefore be formulated as simplifying the construction of the device of P2.

4.1.2 Without hindsight, the person skilled in the art proceeding from P2 alone would not have selected light pulse parameters such that photo-epilation is the sole mechanism for hair removal, notably because this would have been against the explicit teaching of P2 that the light pulse must have an energy insufficient to destroy the hairs (page 2, lines 32-33).

4.1.3 Contrary to the appellants' assertions, neither would the combination with P3 or P6 have prompted the person skilled in the art toward the ranges of features b2 and b3.

In strong contrast to the device of P2, the treatment disclosed in P3, albeit qualified as "photo-epilation" (header of Table 2), must explicitly not destroy or damage the hair follicles and the hair shafts (column 6, lines 47-49 and 64-65). Therefore, the person skilled in the art starting from P2 would not have consulted P3 to solve the technical problem above. Moreover, even if they did, for the same reason, they would not have drawn from the fluence and pulse duration ranges indicated in Table 2 the conclusion

that any pulse duration between 0.1 and 10 ms, for a fluence in the range 1.5-5 J/cm^2 disclosed in P2, would equally result in damaging or destroying hair, as alleged by the appellants.

Concerning P6, the person skilled in the art considering this document would have considered the disclosure about clinical results in paragraph [0182] merely to be an isolated teaching not related to the invention of P6 (see point 3.2 above). Consequently, they would not have used the ranges disclosed in this paragraph. They would have instead followed the explicit, systematic teaching in the rest of P6 that large pulse durations of at least 3 to 10 ms are preferable. This would have led the person skilled in the art away from the claimed range of 1.1-1.9 ms defined by feature b2.

4.1.4 Hence, the person skilled in the art would not have implemented the ranges defined in features b2 and b3 in the device of P2 in an obvious manner. The subject-matter of claim 1 therefore involves an inventive step starting from P2.

4.2 Starting from P4

4.2.1 It is common ground that the photo-epilation device of P4 is configured to emit, once activated by the user, periodic light pulses at a certain repetition rate (see, for example, paragraphs [0020] and [0022]).

The subject-matter of claim 1 thus differs from this device on account of feature c2, namely that only one single pulse is generated upon actuation by a user of a pulse trigger.

4.2.2 The appellants submitted that this distinguishing feature had no technical effect because one single pulse at a time could also be applied onto the skin using the photo-epilation device of P4, either by moving the device after each emitted light pulse, which was possible given the low pulse repetition rate of 0.5 to 3 seconds (paragraph [0017]), or by using the skin sensor disclosed in paragraph [0036], which started the generation of light pulses upon detection of skin contact and stopped it when the device had been pulled away. As a consequence, feature c2, having no technical effect, could not support the presence of an inventive step.

This argument is not convincing. As argued by the respondent, feature c2 enables the user to generate one pulse, and only one, in response to the operation of the pulse trigger by the user. Compared with the automatic generation of periodic pulses in P4, this feature minimises the risk that more than one light pulse is applied inadvertently to the same area of skin, for example, if the user forgets to move the device along the skin or moves it too slowly. Accordingly, this reduces the risk of over-treatment and unnecessary heating of the skin and the device and allows for a safer and more reliable use of the device.

4.2.3 P4 underlines in paragraph [0020] the advantages of "delivering multiple low power pulses on a treatment area over a relatively long period of time", not only in terms of "economy and reduction in system complexity" but also a "less painful treatment" compared to "single pulse treatments".

Implementing feature c2 in the device of P4 would have been contrary to this explicit teaching. Hence,

contrary to the appellants' submission, the person skilled in the art proceeding from P4 would not have arrived at the subject-matter of claim 1 without inventive step.

4.3 Starting from the main disclosure of P6

It follows from point 3.2 above that the subject-matter of claim 1 differs from the device disclosed in P6 on account of features b2 and b3.

Contrary to the appellants' argument, the person skilled in the art starting from P6 would not, without hindsight, have deviated from the explicit and consistent teaching in this document that recommends using pulse durations "above 3-10 ms" or even higher (paragraphs [0176], [0185]), i.e. much higher than the pulse durations defined by feature b2. As a result, the person skilled in the art proceeding from P6 would not have arrived at the subject-matter of claim 1 without inventive step.

4.4 Starting from the common general knowledge as reflected by paragraph [0182] of P6

Contrary to the appellants' assertion, the person skilled in the art would not have isolated the disclosure of paragraph [0182] on the clinical results from the rest of the document. The appellants' objection based on this premise therefore fails at least for this reason.

The person skilled in the art would have instead considered the disclosure of P6 as a whole. However, as discussed in point 4.3, this would not have led the

person skilled in the art to the subject-matter of claim 1 in an obvious way.

4.5 Starting from P16

Contrary to the appellants' argument, the person skilled in the art starting from P16 would not have used the light pulse parameters disclosed in paragraph [0063], which are explicitly described as leading to "very poor" results. Rather, the person skilled in the art would have considered the preferred, much shorter pulse durations recommended in P16 to obtain better results.

It is irrelevant that the "very poor" results relate to permanent epilation, with which P16 is generally concerned, whereas claim 1 also implicitly covers temporary epilation. The person skilled in the art starting from P16 would not, without the benefit of hindsight or a prompt towards this in P16, have deliberately deviated from the teaching of P16 as a whole and selected pulse characteristics that are explicitly described in this document as being detrimental.

Therefore, a combination of P16 as the starting point with another document that teaches features c1 and c2, as submitted by the appellants, would not have led the person skilled in the art to a photo-epilation device according to claim 1 in an obvious manner.

5. Conclusion

Given the above considerations, none of the appellants' objections prejudices the maintenance of the contested

patent in the form found allowable by the Opposition Division.

Order

For these reasons it is decided that:

The appeals are dismissed.

The Registrar: The Chairman:

A. Chavinier-Tomsic M. Alvazzi Delfrate

Decision electronically authenticated