

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 36

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte EMERY S. ROSE

Appeal No. 1995-5010
Application 08/116,261¹

ON BRIEF

Before THOMAS, JERRY SMITH and LALL, Administrative Patent Judges.

LALL, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of Claims 1 to 4, 6 and 12, all

¹ Application for patent filed August 9, 1993. According to appellant, the application is a continuation of Application 07/832,534, filed February 7, 1992, now abandoned.

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the pending claims in the case.

The invention concerns an apparatus comprised of an ultrasonic surgical handpiece driven by a piezoelectric crystal transducer having a frequency control loop and an automatic gain control loop. The latter has a limiter connected to its output so a maximum error signal output of the automatic gain control may be operator adjusted and limited to achieve tissue selectivity. A low value resistor in series and an inductor in parallel to the output of the voltage source amplifier, which drives the transducer, provide added stability of the operation of the transducer. The invention is further illustrated by the following claim.

Claim 1 is selected as representative of the invention and is reproduced below:

1. An electrical apparatus and an ultrasonic piezoelectric crystal transducer in a surgical handpiece for the fragmentation and aspiration of tissue the ultrasonic piezoelectric crystal transducer driven by the apparatus, which apparatus comprises:

a voltage controlled oscillator in series with an amplifier and a first electronic control loop connected from a feedback piezoelectric crystal through a phase comparator and a loop filter to the voltage controlled oscillator, which feedback crystal is mechanically coupled to an ultrasonic

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piezoelectric crystal transducer in a surgical handpiece and the feedback piezoelectric crystal provides a feedback signal which is a function of the actual frequency of vibration of the ultrasonic piezoelectric crystal transducer in a surgical handpiece and which phase comparator compares the phase of the feedback signal of the feedback piezoelectric crystal and of a driving signal and provides a control signal which maintains the driving signal at the resonant frequency of the ultrasonic piezoelectric crystal transducer in a surgical handpiece, wherein said amplifier is a sinusoidally oscillating voltage source amplifier, the sinusoidally oscillating voltage source amplifier in parallel with a tuning inductor and having an output which is connected to the ultrasonic piezoelectric crystal transducer in a surgical handpiece and to provide the driving signal, includes a second control loop comprising:

a means for sensing the amplitude of vibration of the ultrasonic piezoelectric crystal transducer in a surgical handpiece and providing an amplitude signal in proportion thereto, means for comparing the amplitude signal with a command signal adjustable by an operator and generating an error signal in proportion to the difference between the amplitude signal and the command signal, the error signal of the second control loop changing the amplitude of vibration to a desired level with the second control loop as an automatic gain control loop, the amplitude signal in proportion with the command signal under varying loads and in which the automatic gain control loop including a limiter so the maximum error signal output of the loop may be adjusted and limited by an operator to achieve tissue selectivity, and

a switching unit connected to provide a feedback command signal as input to the second control loop, the switching unit connects to limit selectivity with the operator amplitude set point or a low reference point according to second output signal.

The Examiner relies on the following references:

Takahashi et al. (Takahashi)	4,888,514	Dec. 19, 1989
Sakurai	4,965,532	Oct. 23, 1990

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Wilson	5,113,116	May 12, 1992 (filed Oct. 5, 1989)
Ams et al. (Ams)	5,116,343	May 26, 1992 (filed Aug. 28, 1990)

Claims 1 to 4, 6 and 12 stand rejected 35 U.S.C. § 103 over various combinations of Takahashi, Sakurai, Wilson and Ams.

Rather than repeat the arguments of Appellant or the Examiner, we make reference to the brief and the answers² for the respective details thereof.

OPINION

We have considered the rejections advanced by the Examiner and the supporting arguments. We have, likewise, reviewed the Appellant's arguments set forth in the brief.

It is our view that the rejection under 35 U.S.C. § 103 over Takahashi, Wilson and Ams is reversed with respect to

² A supplemental answer [paper no. 34] was written in response to the Remand [paper no. 33] from the Board of Patent Appeals and Interferences. There was no reply brief.

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claims 1 through 4 and 6, but affirmed with respect to claim 12 over Takahashi and Sakurai. Accordingly, we affirm in part.

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of presenting a prima facie case of obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). A prima facie case of obviousness is established by presenting evidence that the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed combination or other modification. See In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Furthermore, the conclusion that the claimed subject matter is prima facie obvious must be supported by evidence, as shown by some objective teaching in the prior art or by knowledge generally available to one of ordinary skill in the art that would have led that individual to combine the relevant teachings of the references to arrive at the claimed invention. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Rejections based on § 103 must rest on a factual basis with these facts being

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interpreted without hindsight reconstruction of the invention from the prior art. The Examiner may not, because of doubt that the invention is patentable, resort to speculation, unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis for the rejection. See In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968). Our reviewing court has repeatedly cautioned against employing hindsight by using the Appellant's disclosure as a blueprint to reconstruct the claimed invention from the isolated teachings of the prior art. See, e.g., Grain Processing Corp. v. American Maize-Products Co., 840 F.2d 902, 907, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988). On the other hand, we are also guided by the precedence of our reviewing court that the limitations from the disclosure are not to be imported into the claims. In re Lundberg, 244 F.2d 543, 113 USPQ 530 (CCPA 1957); In re Queener, 796 F.2d 461, 230 USPQ 438 (Fed. Cir. 1986).

With this as background, we analyze the prior art applied by the Examiner in the rejection of the claims on appeal.

Rejection of claims 1 to 4 and 6 under 35 U.S.C. § 103

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These claims are rejected as being obvious over Takahashi, Wilson and Ams. We treat the independent claim 1 first. With respect to this claim, the Examiner states:

Takahashi thus lacks an additional limiter (connected to the output of comparing means 56), and a loop filter, and explicit showing of a tuning inductor in parallel with a voltage source amplifier within driving circuitry 22. However, the first two elements are very common in the art and would have been obvious in order to provide smoothness and stability to the feedback signals. Likewise, to combine the Wilson teaching of employing a parallel inductor so as to counter the capacitance of the piezoelectric transducer 1 or 2 would have been obvious from Wilson's disclosure on utilizing a parallel tuning inductor in conjunction with "the most common situation of driving from a constant voltage source" (...) and would have been motivated by Takahashi's expositions on the transducer equivalent circuit (Figure. 10(b)) [final rejection, pages 4 to 5].

We note that the Examiner recognizes that Takahashi does not show the claimed limiter but alleges that it would have been obvious to incorporate such along with a smoothing filter in Takahashi. No evidence, based on either a prior art reference or technological reasoning, is presented to support

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this view. Appellant argues, and we agree, that there is no reason in Takahashi to consider such a limiter and further how this limiter would operate in Takahashi's transducer is not explained by the Examiner [brief, pages 4, 7 and 8]. The Federal Circuit states that "[the] mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fitch, 972 F.2d 1260, 1266 n.4, 23 USPQ2d 1780, 1783-84 n.4 (Fed. Cir. 1992), citing In re Gordon, 773 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). "Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor." Para-Ordnance Mfg. v. SGS Importers Int'l, 73 F.3d 1087, 37 USPQ 2d at 1239 (Fed. Circuit. 1995), citing W. L. Gore & Assocs., v. Garlock, Inc., 721 F.2d at 1551, 1553, 220 USPQ at 311, 312-13 (Fed. Cir. 1983). Furthermore, the Examiner contends that Wilson's teachings would have made it obvious to incorporate an inductor in Takahashi to meet the limitation: "the sinusoidally oscillating voltage source amplifier in parallel with a tuning inductor" (claim 1, lines 21 to 22). The

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Examiner has not identified a sinusoidally oscillating voltage source amplifier and even though Wilson teaches the concept of tuning inductors for transducer driving circuits, it is not seen how an inductor can be placed in Takahashi's transducer circuit to meet the above limitation. The closest the Examiner comes to dealing with this issue is that "[t]he tuning inductor 6 of Wilson certainly works for both types of waves, since a square wave comprises a fundamental (sinusoidal) component along with (sinusoidal) harmonics (Wilson: column 6, line 55 et seq.) " [supplemental answer, page 3]. Appellant argues, and we agree, that Wilson's quoted passage does not teach the claimed sinusoidally oscillating voltage source amplifier in combination with a parallel tuning inductor resonance [brief, pages 6 to 8]. Furthermore, Ams does not cure the deficiency of Takahashi and Wilson discussed above. For these reasons, we do not sustain the obviousness rejection of claim 1 and its dependent claims 2 to 4 and 6 over Takahashi, Wilson and Ams.

Rejection of claim 12 under 35 U.S.C. § 103

Claim 12³ is rejected as being obvious over Takahashi and Sakurai'532. The Examiner states:

Takahashi et al. lacks a limiter component distinct from and in series with the amplitude detector 51a. However, such a feature is well known, as seen in Figure 9 (element 69) of Sakurai, and would have been obvious in order to provide smoothness and stability to the feedback signals. Furthermore, to incorporate the Takahashi et al. circuitry into an ultrasonic surgical hand piece would have been obvious because the inherent advantages are applicable to piezoelectric transducers in general [final rejection, page 4].

Appellant first argues that the Examiner has combined non-analogous references of Takahashi and Sakurai to reject claim 12 [brief, page 13]. However, we believe that the ultrasonic motor of Takahashi is of the same type as disclosed by Appellant, and Sakurai discloses a control circuit for an ultrasonic motor. Therefore, we disagree with Appellant's conclusory statement that Takahashi and Sakurai are from non-

³ We note that claim 12 is not clear. For example, the clause "a second control loop" (claim 12, line 9) is not defined. We take it to mean that it refers to the "automatic gain control loop" mentioned in lines 5 and 6 of claim 12. Also, the clause "second output signal" (claim 12, line 11) is undefined. We interpret it to mean any kind of output. Our discussion is based on this interpretation of the claim.

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analogous art. Next, Appellant further argues a lack of an express teaching or suggestion in either Takahashi or Sakurai to combine the two references [brief, page 13]. This argument is misplaced. We note that while there must be some teaching, reason, suggestion, or motivation to combine existing elements to produce the claimed device, it is not necessary that the cited references or prior art specifically suggest making the combination (see B.F. Goodrich Co. v. Aircraft Braking Systems Corp., 72 F.3d 1577, 1583, 37 USPQ2d 1314, 1319 (Fed. Cir. 1996) and In re Nilssen, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988)) as Appellant would apparently have us believe. Rather, the test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. See In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991) and In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). Moreover, in evaluating such references it is proper to take into account not only the specific teachings of the references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. In re Preda, 401 F.2d 825, 826, 159 USPQ 342,

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344 (CCPA 1968). We agree with the Examiner that, to the extent claimed, the "frequency control loop" (claim 12, line 3) and the "automatic gain control loop" (claim 12, line 3) are shown by circuit 50 and 51a of Takahashi in figure 5 as controlling the speed of the ultrasonic motor 23. The reference voltage at element 55 in Takahashi can be switched from one setting to another to achieve a desired speed (column 7, lines 23 to 25 and column 8, lines 57 to 60]. This meets the limitation: "a switching unit ... to second output" (claim 12, lines 8 to 11). We further agree with the Examiner that to broadly add a limiter, such as element 69 of Sakurai, to the output of the feedback control loop 51a of Takahashi would have been obvious because the purpose of such a limiter in Takahashi would have been the same as in Sakurai as well as in Appellant's device, i.e., to limit the amplitude of the feedback signal below an undesirable speed limit in Sakurai to avoid damage to the ultrasonic motor, or to match a particular tissue selectivity in Appellant's device. Therefore, we sustain the obviousness rejection of claim 12 over Takahashi and Sakurai.

In conclusion, the decision of Examiner rejecting Claims

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1 to 4, 6 and 12 under 35 U.S.C. § 103 is affirmed in part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

JAMES D. THOMAS)	
Administrative Patent Judge)	
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JERRY SMITH)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
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