

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SHOICHI OKAMURA, KEIICH FUJII, SUSUMU ADACHI,
SHINYA HIRASAWA, TOSHINORI YOSHIMUTA, KOICHI TANABE,
SHIGEYA ASAII and AKIHIRO NISHIMURA

Appeal 2008-4662
Application 10/887,920
Technology Center 2800

Decided: December 15, 2008

Before CHARLES F. WARREN, TERRY J. OWENS, and
THOMAS A. WALTZ, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

The Appellants appeal from a rejection of claims 1-18, which are all of the pending claims. We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

The Invention

The Appellants claim a radiographic apparatus and method. Claim 1 is illustrative:

1. A radiographic apparatus having radiation emitting means for emitting radiation toward an object under examination, radiation detecting means for detecting radiation transmitted through the object under examination, and signal sampling means for taking radiation detection signals from the radiation detecting means at predetermined sampling time intervals, to obtain a live image and a mask image based on the radiation detection signals outputted from the radiation detecting means at the predetermined sampling time intervals as radiation is emitted to the object under examination, the live image and the mask image being subjected to a subtraction process to obtain a subtraction image, said apparatus comprising:

time lag removing means for removing lag-behind parts from the radiation detection signals by recursive computation, on an assumption that a lag-behind part included in each of said radiation detection signals taken at the predetermined sampling time intervals is due to an impulse response formed of one exponential function or a plurality of exponential functions with different attenuation time constants;

wherein, in order to pick up the live image and the mask image continually, the radiation detection signals relating to the live image and radiation detection signals relating to the mask image are continually detected at the sampling time intervals, the lag-behind parts being removed from the radiation detection signals by said time lag removing means to obtain corrected radiation detection signals for forming the live image and the mask image, and obtaining the subtraction image.

The References

Stein	4,444,196	Apr. 24, 1984
Kruger	4,577,222	Mar. 18, 1986
Hsieh (Hsieh '123)	5,249,123	Sep. 28, 1993
Hsieh (Hsieh '593)	5,907,593	May 25, 1999
Hsieh (Hsieh '920)	6,373,920 B1	Apr. 16, 2002

The Rejections

The claims stand rejected as follows: claims 16-18 under 35 U.S.C. § 112, first paragraph, enablement requirement; claims 1-3, 5, 6, 8-13 and 15 under 35 U.S.C. § 103 over Hsieh '920 in view of Hsieh '123; claims 4 and 14 under 35 U.S.C. § 103 over Hsieh '920 in view of

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Hsieh ‘123 and either Stein or Kruger; and claim 7 under 35 U.S.C. § 103 over Hsieh ‘920 in view of Hsieh ‘123 and Hsieh ‘593.

ISSUES

The issues are whether the Appellants have shown reversible error in the Examiner’s determination that the Appellants’ original disclosure fails to provide enabling support for the claimed invention, and whether the applied references would have led one of ordinary skill in the art to combine their disclosures so as to arrive at the claimed invention.

PRINCIPLES OF LAW (PL)

Obviousness

1. For a *prima facie* case of obviousness to be established there must be “an apparent reason to combine the known elements in the fashion claimed.” *KSR Int’l. Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740-41 (2007).
2. “[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *KSR*, 127 S. Ct. at 1740.

35 U.S.C. § 112, first paragraph, enablement requirement

3. A specification complies with the 35 U.S.C. § 112, first paragraph, enablement requirement if it allows those of ordinary skill in the art to make and use the claimed invention without undue experimentation.

See In re Wright, 999 F.2d 1557, 1561 (Fed. Cir. 1993); *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.*, 750 F.2d 1569, 1576 (Fed. Cir. 1984). As stated by the court in *Wright*, 999 F.2d at 1561-62:

Nothing more than objective enablement is required, and therefore it is irrelevant whether this teaching is provided

through broad terminology or illustrative examples. [Citation omitted.]

When rejecting a claim under the enablement requirement of section 112, the PTO bears an initial burden of setting forth a reasonable explanation as to why it believes that the scope of protection provided by that claim is not adequately enabled by the description of the invention provided in the specification of the application; this includes, of course, providing sufficient reasons for doubting any assertions in the specification as to the scope of enablement. If the PTO meets this burden, the burden then shifts to the applicant to provide suitable proofs indicating that the specification is indeed enabling. [Citation omitted.]

4. Regarding enablement, a predecessor of our appellate reviewing court stated in *In re Marzocchi*, 439 F.2d 220, 223-24 (CCPA 1971):

[A] specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as in compliance with the enabling requirement of the first paragraph of § 112 unless there is reason to doubt the objective truth of the statements contained therein which must be relied on for

. . . .

. . . it is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. Otherwise, there would be no need for the applicant to go to the trouble and expense of supporting his presumptively accurate disclosure.

Claim construction

5. During patent prosecution, claims are to be given their broadest reasonable interpretation consistent with the specification, as the claim language would have been read by one of ordinary skill in the art in view of the specification. *See In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989); *In re Sneed*, 710 F.2d 1544, 1548 (Fed. Cir. 1983); *In re Herz*, 537 F.2d 549, 551 (CCPA 1976); *In re Okuzawa*, 537 F.2d 545, 548, (CCPA 1976); *In re Kroekel*, 504 F.2d 1143, 1146 (CCPA 1974); *In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971).
6. It is proper to use the specification to interpret what the Appellants mean by a word or phrase in the claim. *See In re Morris*, 127 F.3d 1048, 1053-56 (Fed. Cir. 1997).

Argument

7. Arguments of counsel cannot take the place of evidence. *See In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984); *In re Payne*, 606 F.2d 303, 315 (CCPA 1979); *In re Greenfield*, 571 F.2d 1185, 1189 (CCPA 1978); *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974).
8. An argument directed toward a limitation which is not in the claim is improper. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982).

FINDINGS OF FACT (FF)

1. Hsieh '920 discloses a computed tomography (CT) system wherein difference projection data are collected by subtracting, for each view, a first subset of projection data from a second subset of projection data (col. 1, ll. 43-45).
2. Hsieh '920's first subset of projection data is obtained when no contrast medium is present in a patient or shortly after the contrast medium is injected into the patient, i.e., before the contrast medium is

- sufficiently absorbed by the patient to impact collected data (col. 2, ll. 36-40).
3. Hsieh ‘920’s second subset of projection data is obtained after the contrast medium is absorbed by the patient (col. 2, ll. 40-44).
 4. In Hsieh ‘920’s difference projection data set the human related structures are removed while data for vessels and tissues that have absorbed the contrast medium remain (col. 4, ll. 54-57).
 5. Hsieh ‘123 teaches that X-ray detectors (14) comprise a scintillator and a solid state photodiode, and that X-rays striking the scintillator produce light photons which are absorbed by the photodiode, thereby creating an electric current (col. 1, ll. 60-63).
 6. Hsieh ‘123 teaches that the light is not emitted by the scintillators instantaneously and that the light emission does not terminate immediately when the X-ray beam is shut off but, instead, in each case the light emission follows a multi-exponential curve (col. 1, ll. 63-68).
 7. The time dependence of the emitted light, Hsieh ‘123 teaches, can be modeled accurately as a sum of several exponential terms with different decay constants (col. 1, l. 68 – col. 2, l. 2).
 8. Hsieh ‘123 teaches that because the detector array is rotating rapidly about the patient, the exponential response blurs together detector readings for successive views producing an image artifact known as “afterglow” (col. 2, ll. 3-6).
 9. Hsieh ‘123’s afterglow degrades the azimuthal component of the image resolution which produces shading and arc shaped artifacts in the reconstructed image and causes the imaged object to appear enlarged and lacking of sharp, distinct edges (col. 2, ll. 6-9, 30-32).

- 10.Hsieh ‘123 alters the X-ray attenuation measurements from each detector to remove the effects produced by the non-ideal radiation response of the detector (col. 3, ll. 7-10).
- 11.Hsieh ‘123 models the exponentially decaying impulse response as a sum of a plurality of components with different time constants (col. 2, ll. 43-46).
- 12.Hsieh ‘123’s most prompt time constant component is the time in which the detector output falls to 1/e of its initial value after being stimulated by an impulse of X-rays, and the remaining time constant components are “afterglow” (col. 2, ll. 46-52; col. 4, ll. 57-68).
- 13.The time constants for one type of Hsieh ‘123’s CT detectors is characterized by four time constants, 1, 6, 40 and about 300 milliseconds (col. 6, ll. 35-37).
- 14.In an exemplified embodiment a Hsieh ‘123 detector sample is acquired 300 milliseconds after the X-ray beam is extinguished (col. 6, ll. 61-64).

ANALYSIS

We reverse the rejection under 35 U.S.C. § 112, first paragraph, enablement requirement, and affirm the rejections under 35 U.S.C. § 103.

*Rejection under 35 U.S.C. § 112,
first paragraph, enablement requirement, of claims 16-18*

Claim 16 requires that a mask image and a live image “are picked up by switching between a focus voltage and a defocus voltage to be applied to radiation emitting means that emits radiation toward the object under examination.” Claims 17 and 18 depend from claim 16.

The Appellants’ Specification discloses (Spec. 28:15-23):

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The defocus voltage is applied to the X-ray tube, after the contrast medium is given to the patient, to pick up an image free from high frequency components. Next, the focus voltage is applied to the X-ray tube to pick up an image with high frequency components remaining therein. Lag-behind parts are removed from X-ray detection signals for the former image free from high frequency components, and the resulting image may be used as a mask image.

The Examiner argues that “the specification fails to describe the method of focusing/defocusing the voltage applied to the radiation emitting means in such a way as to enable one skilled in the art to which it pertains, or with which it is most connected, to make and/or use the invention” (Ans. 5). The Specification, the Examiner argues, fails “to explain what a focusing/defocusing voltage is and/or how it affects or modifies the x-ray beam” (Ans. 15).

The Examiner has not provided the required evidence or reasoning which shows that one of ordinary skill in the art would not have known what a focusing/defocusing voltage is, how it affects or modifies the X-ray beam, and how to use the focus and defocus voltages as required by the Appellants’ claim 16 (PL 3, 4). The Examiner’s mere assertion to that effect is not sufficient for establishing a *prima facie* case of lack of enablement.

Accordingly, we reverse the rejection under 35 U.S.C. § 112, first paragraph, enablement requirement.

*Rejection of claims 1-3, 5, 6, 8-13 and 15 under 35 U.S.C. § 103
over Hsieh ‘920 in view of Hsieh ‘123*

The Appellants argue claims 1 and 11 together, and do not separately argue any other claim (Br. 9-12). We therefore limit our discussion to the Appellants’ arguments regarding claims 1 and 11. Claims 2, 3, 5, 6 and 8-10 stand or fall with claim 1 from which they depend, and claims 12, 13 and 15

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stand or fall with claim 11 from which they depend. *See*
37 C.F.R. § 41.37(c)(1)(vii) (2007).

The Appellants argue that the Appellants' lag is completely different from Hsieh '123's afterglow (Br. 9, 11). Hsieh '123's afterglow, the Appellants argue, ceases in a very short time of about 0.01 ms and is not a problem in the Appellants' invention wherein the minimum photographing interval is about 1/30 second (Br. 10-11).¹

The Appellants do not provide evidentiary support for that argument. Hence, the argument is unpersuasive. Mere attorney argument cannot take the place of evidence (PL 7). Moreover, the argument is inconsistent with Hsieh '123's disclosure of time constants between 1 and 300 ms and Hsieh '123's indication that effects are still significant after 300 ms (FF 13-14).

The Appellants argue that "the 'lag' addressed by the present invention refers to a phenomenon that, as also recited in claim 1, all electric charges converted from radiation are not read, but part of the charges remain unread" (Br. 11).

The Appellants' claims 1 and 11 do not require the unread charges argued by the Appellants (PL 8). Moreover, the argument is not supported by the Appellants' Specification, which discloses that lag-behind parts create after-images (Spec. 2:17-19; 7:11 – 8:2; PL 5, 6). Those after-images appear to be the same as Hsieh '123's afterglow.

The Appellants argue that "[t]he detector of the present invention is an FPD [flat panel X-ray detector] for X-ray fluoroscopy" (Br. 11).

¹ The Appellants' Specification exemplifies a 1/30 second sampling time interval (Spec. 20:16; 24:13-14), but does not state that 1/30 second is the minimum sampling time interval.

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That argument is not well taken because the Appellants are arguing a limitation that is not in claims 1 and 11 (PL 8).

The Appellants argue that “[t]he algorithm of the present invention can never be derived from Hsieh et al.” (Br. 12).

That argument is not convincing because the Appellants’ claims 1 and 11 do not require any particular algorithm (PL 8).

For the above reasons we are not persuaded of reversible error in the rejection under 35 U.S.C. § 103 of claims 1-3, 5, 6, 8-13 and 15 (PL 1, 2).

Rejections under 35 U.S.C. § 103 of claims 4 and 14 over Hsieh ‘920 in view of Hsieh ‘123 and either Stein or Kruger, and claim 7 over Hsieh ‘920 in view of Hsieh ‘123 and Hsieh ‘593

Regarding the rejection of claims 4, 7 and 14, the Appellants rely upon the same arguments set forth with respect to claims 1 and 11 (Br. 12-13).

Those arguments are not persuasive for the reasons given above regarding the rejection of claims 1 and 11.

CONCLUSIONS OF LAW

The rejection of claims 16-18 under 35 U.S.C. § 112, first paragraph, enablement requirement, is reversed. The rejections of claims 1-3, 5, 6, 8-13 and 15 under 35 U.S.C. § 103 over Hsieh ‘920 in view of Hsieh ‘123, claims 4 and 14 under 35 U.S.C. § 103 over Hsieh ‘920 in view of Hsieh ‘123 and either Stein or Kruger, and claim 7 under 35 U.S.C. § 103 over Hsieh ‘920 in view of Hsieh ‘123 and Hsieh ‘593 are affirmed.

DECISION/ORDER

It is ordered that the Examiner’s decision is affirmed-in-part.

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

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AFFIRMED-IN-PART

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