

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DEXCOWIN GLOBAL, INC.
Petitioner

v.

ARIBEX, INC.
Patent Owner

Case IPR: IPR2016-_____

PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 7,496,178
UNDER 35 U.S.C. § 311

Mail Stop "PATENT BOARD"
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

TABLE OF CONTENTS

	<u>Page</u>
I. STATEMENT OF RELIEF REQUESTED (37 C.F.R. § 42.22(A))	1
II. GROUNDS FOR STANDING (37 C.F.R. § 42.0104 (a)).....	1
III. BACKGROUND OF THE ‘178 PATENT AND CLAIM CONSTRUCTION ISSUES PRESENTED	2
A. Background of the ‘178 patent.....	2
B. Claim Term Construction.....	5
IV. GROUNDS FOR CHALLENGING CLAIMS 1-5, 14-15, 17, 19, 21 AND 23 OF THE ‘178 PATENT	7
A. Claim 1 is Anticipated By JP ‘098	10
B. Claim 4 is Anticipated By JP ‘098.....	14
C. Claim 19 is Anticipated By JP ‘098	15
D. Claim 21 is Anticipated By JP ‘098.....	16
A. Claims 2, 3 and 14 Would Have Been Obvious From the Teachings of JP ‘098 in view of Skillicorn ‘771	19
B. Claims 2, 3 and 14 Would Have Been Obvious From the Teachings of JP ‘098 In View of the Teachings of United States Patent 4,485,433 to Topich	25
C. Claims 2, 3 and 14 Would Have Been Obvious From the Teachings of JP ‘098 In View of the Publication “Using the Cockroft-Walton Voltage Multiplier Design in Handheld Devices” by Spencer et al dated October 2001 (the “INEEL Article”).....	26
V. MANDATORY NOTICES (37 C.F.R. § 42.8(A)(1)).....	39
VI. CONCLUSION.....	40

I. STATEMENT OF RELIEF REQUESTED (37 C.F.R. § 42.22(A))

Dexcowin Global, Inc., (hereinafter “Petitioner” or “Dexco”) petitions for institution of *inter partes* review (“IPR”) of U.S. Patent 7,496,178 to D. Clark Turner (“the ‘178 patent” or “Turner ‘178”), and cancellation of claims 1-5, 14-15, 17, 19, 21 and 23 of the ‘178 patent. Thus, this Petition requests cancellation of 14 claims of the ‘178 patent. A copy of the ‘178 patent is submitted as Dexco Exhibit 1001¹ (“Dexco 1001” or “Exh. 1001”). A copy of the United States Patent and Trademark Office (“PTO”) file history (“FH”) of the ‘178 patent is submitted as Dexco 1002.

According to the PTO Abstract of Title records the ‘178 patent is owned in its entirety by Aribex, Inc., by assignment from its inventor executed November 22, 2005, recorded December 12, 2005, as found at Reel 17348, Frame 831.

The Petition asserts six Grounds of Invalidity under pre-AIA 35 U.S.C. § § 112, ¶ 2; 102(a), (b); and 103 (“Grounds”).

II. GROUNDS FOR STANDING (37 C.F.R. § 42.0104 (a))

Petitioner Dexco and the undersigned certify that the ‘178 patent is available for review, having an effective filing date of at least February 18, 2005, i.e., a “first to invent” patent; and that Petitioner is not estopped from requesting an IPR

¹ For convenience, Dexco Exhibits may be referred to alternatively in the formats of Dexco Exhibit 1XXX; Dexco 1XXX; or Exh. 1XXX.

challenging claims 1-5, 14-15, 17, 19, 21 and 23 on the grounds as set forth hereinafter.

III. BACKGROUND OF THE '178 PATENT AND CLAIM

CONSTRUCTION ISSUES PRESENTED

A. Background of the '178 patent.

The '178 patent issued from application 10/529,805, (“the ‘805 application”) based on international application PCT/US2005/005712, filed February 18, 2005, and claims priority based on provisional application 60/546,575, filed February 20, 2004 (“the ‘575 application”). The '178 patent is directed to and claims certain portable X-ray devices, systems using portable X-ray devices, a method for making a portable X-ray device, a method for analysis using a portable X-ray device, a method for dental imaging using a portable X-ray device and a handheld X-ray device. A general description of how X-ray devices work is provided in an article entitled “How X-rays Work”, and marked as Exh. 1017.

While the '178 patent broadly states that portable X-ray devices are especially useful “. . . in field work, remote operations, and mobile operations such [*sic*, as] nursing homes, home healthcare, teaching classrooms,” the '178 patent emphasizes that the “. . . portability feature can be particularly useful in multi-suite medical and dental offices where a single x-ray device can be used in multiple

offices instead of single using an x-ray device in each office.” Exhibit 1001, the ‘178 patent, Abstract.

Figures 1 and 2 of the ‘178 patent, reproduced below, illustrate the main structures of the X-ray device.

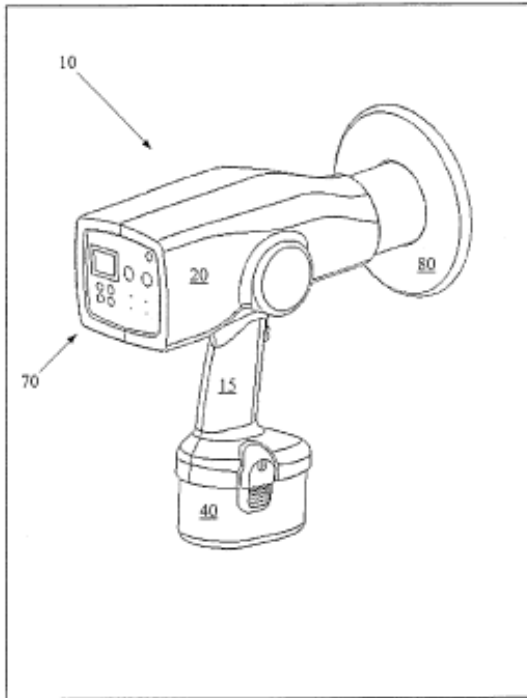


FIGURE 1

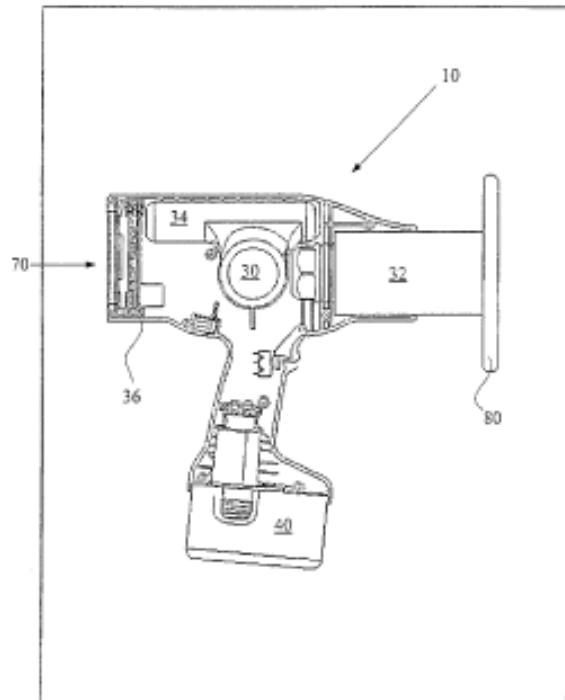


FIGURE 2

The patented X-ray device 10 has a housing 20 that contains the internal components, including x-ray tube 30, power source 40, means for sensing the x-rays, such as film, CCD sensors, or imaging plates (not shown), controller 70, radiation shielding 80 and handle 15. Figure 2 additionally shows x-ray collimator 32, power supply 34 and power management boards 36.

As explained in the specification:

The power system of the x-ray device comprises a power source 40, power supply 34 and conversion means. The power source 40 used in the x-ray device of the invention can be any known in the art that can supply the desired amount of power, yet fit within the space limitations of the x-ray device. [Emphasis added]

Exh. 1001, '178 patent, at C3, LL34-39. The '178 patent describes “conversion means” as structure that converts the power source voltage into a voltage that can be used by a conventional X-ray tube, as follows:

The power source 40 is electrically connected to the conversion means using any connection means known in the art, including those described in the publications above. The conversion means converts the initial voltage supplied by the power source 40 to a converted voltage that is provided to the power supply 34. The conversion means generally converts the 14.4V (or similar voltage) provided by the power source 40 to a voltage ranging from about 80 to about 200V. Any conversion means known in the art that operates in this manner can be used in the invention, including power management boards 36. [Emphasis added]

Id. at [3:65-4:9]. The specification further describes how the conversion means functions:

The conversion means is electrically connected to the power supply 34. The power supply 34 steps up the converted voltage (i.e., the 100V) provided by the conversion means to a voltage that can be used by the x-ray tube 30. . . . Generally, the power provided by the

power supply 34 to the x-ray tube 30 can range from about 20 to about 150kV. Typically, this power provided by the power supply can range from about 40kV to about 100kV.

Id. at [4: 10-20].

B. Claim Term Construction

Petitioner proposes that four terms in the challenged must be construed as having special meaning regarding the '178 patent and that all of the remaining claim terms be given their ordinary meaning. Under 37 C.F.R. §42.100 “[a] claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent in which it appears.” *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1275 (Fed. Cir. 2015).

All of the four terms first appear in claim 1: (1) “portable x-ray device”; (2) “integrated”; (3) “high voltage”; and, (4) “internal power source”. Petitioner’s proposed constructions are detailed in the Declarations of Professor David M Hamby, Ph.D. (“Hamby Decl.”) and Mark I. Montrose (“Montrose Decl.”). Their declarations are submitted as Dexco Exhibits 1003 and 1006, respectively. Petitioner’s proposed constructions are set forth, in summary form, in Claim Chart 1, below. See, Hamby Decl., Exh. 1003, ¶¶ 12-25; Montrose Decl., Exh. 1006, ¶¶ 7-18.

Claim Chart 1 – Claim Interpretation

Claim No.	Claim Term	Construction
Claim 1 (a)	A <u>portable x-ray device</u> , comprising:	The term “portable x-ray device” means a device that contains an x-ray tube (Exh. 1001 at C1, LL24-25) and that can be handheld, temporarily fixed to a given location, such as a tripod-mount operation, mounted on any other semi-stable apparatus, such as an articulating arm or C-arm as commonly used in radiology applications or can be transported by hand carrying it from one location to a second location without support by any mechanical apparatus.” <i>Id.</i> , at [3: -11].
(b)	a housing with	
(c)	a first portion that contains and x-ray source that is powered by	
(d)	an <u>integrated</u> power system that provides	The term “integrated” means “internal. <i>Id.</i> at [1: 51-53].
(e)	a continuous, <u>high voltage</u> DC power and	The term “high voltage” means “a voltage that can be used by an x-ray tube to generate x-rays.” <i>Id.</i> at [4: 10-21].
(f)	the housing also contains an <u>internal power source</u> ; and	The term “internal power source” means independent of any external fixed power source, such as utility-supplied AC voltage commonly available in the home or office. <i>Id.</i> at [1: 49-51] (not external); [3: 11-17].
(g)	wherein the x-ray device has a high current load sufficient for radiographic imaging.	

**IV. GROUNDS FOR CHALLENGING CLAIMS 1-5, 14-15, 17, 19, 21 AND
23 OF THE '178 PATENT**

GROUND 1:

CHALLENGE TO GROUP 1 CLAIM 3

FOR THE REASON THAT CLAIM 3

FAILS TO COMPLY WITH DEFINITENESS REQUIREMENT

OF PRE-AIA 35 U.S.C. §112, ¶¶ 1 and 2

Claim 3 fails to comply with pre-AIA 35 U.S.C. § 112, ¶¶ 1, 2 as lacking support, and as indefinite for several reasons, as discussed below.

Claims 1 and 3 recite:

1. A portable x-ray device, comprising:
a housing with a first portion that contains an x-ray source
55 that is powered by an integrated power system that pro-
vides a continuous, high voltage DC power and the
housing also contains an internal power source; and
wherein the x-ray device has a high current load sufficient for
radiographic imaging.

3. The device of claim 1, wherein each power supply pro-
vides a power ranging from about 20 to about 50 kV.

First, as is readily apparent, claim 3 depends from claim 1 and claims that “each power supply provides . . . “. However, claim 1 has no recitation of any “power supply” or a plurality of power supplies. Claim 3 lacks antecedent basis for the term “each power supply”. In order for claim 3 to make sense to a person

of ordinary skill in the field of '178 patent, claim 1 would have to require at least two power supplies. *See* Hamby, Exh. 1003, ¶ 28; *See* Montrose, Exh. 1006, ¶ 21. Claim 1 does not require at least two power supplies, and does not even require a single power supply.

Second, claim 3 recites a “power” ranging from about “20 to about 50kV”. A person of ordinary skill in the field of '178 patent would understand that the reference to “power” in claim 3 is a reference to electrical energy. Exh. 1003 at ¶ 29; Exh. 1006 at ¶ 22. However, “power” in the context of electrical energy is measured in term of “Watts”; not voltage. *Id.* Thus, because claim 3 uses the term “power” in a sense that is contrary to the way in which electrical power is expressed in the field of electrical engineering by those skilled in the art, and because there is no definition in the '178 patent specification for the meaning of “power”, claim 3 is indefinite.

Third, claim 3 also recites that the “power” ranges from “about 20 to about 50 kV”. By the literal reading of this claim, it appears that the power ranges from 20 V (essentially the battery source voltage level) to 50kV (extremely high voltage level). Assuming it is known what is meant by the term “power” for this claim, which should have been in units associated with “voltage” and not “power, or watts”, as discussed above, there is simply no description in the '178 patent specification that (i) there was an ability of the '178 patented X-ray device to

provide such a wide range of power, and in real-world engineering design it is difficult for any energy source to provide such a large operating range in a miniaturized cost effective manner; (ii) power in the lower end of this range does not have the capability to power any X-ray source described in the '178 patent because X-ray sources require voltage in the thousands of volts range, which is electrically impossible with a low battery voltage power source; and, (iii) such low end range power is, by IEEE dictionary definition, any voltage level less than 1000V, and therefore the lower end of this voltage range cannot be considered as “high voltage DC power”. Exh. 1003 at ¶ 30; Exh. 1006 at ¶ 23. Thus, claim 3, as written, does not have support in the specification of the '178 patent, as required by 35 U.S.C. §112, ¶ 1. An X-ray tube simply cannot operate off of 20 VDC or any voltage less than 1000V. *Id.*

For all the above reasons, claim 3 should be cancelled for failure to comply with the requirement of pre-AIA 35 U.S.C. § 112, ¶¶ 1, 2.

GROUND 2:

**CHALLENGE TO GROUP 2 CLAIMS 1, 4, 19 AND 21
FOR THE REASON THAT CLAIMS 1, 4, 19 AND 21
ARE ANTICIPATED UNDER PRE-AIA 35 U.S.C. §102(a), (b)
BY JAPANESE PATENT PUBLICATION 58-145098**

Claims 1, 4, 19 and 21 are anticipated under pre-AIA 35 U.S.C. § 102(a), (b) by Japanese Patent Publication 58-145098 (“JP ‘098”), published August 29, 1983. A copy of JP’098 is submitted as Dexco 1010 and a certified English translation, with the translator’s certificate of translation is submitted as Dexco 1011.

A. Claim 1 is Anticipated By JP ‘098

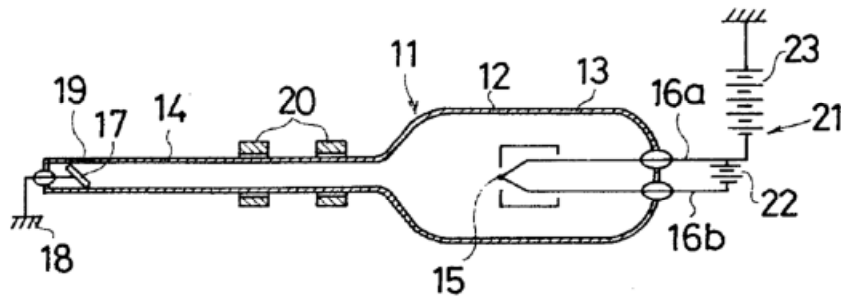
Claim 1 recites a portable x-ray device, as follows:

1. A portable x-ray device, comprising:
a housing with a first portion that contains an x-ray source
55 that is powered by an integrated power system that provides a continuous, high voltage DC power and the housing also contains an internal power source; and wherein the x-ray device has a high current load sufficient for radiographic imaging.

Exh. 1001, at [8: 53-59]. JP ‘098 is entitled “A Portable X-ray Generating Apparatus” and its “DETAILED DESCRIPTION OF THE INVENTION” provides that “[t]he invention relates to a portable X-ray generating apparatus which can, for example, be suitably used for medical treatment, etc.”

Exh. 1011, at [0001]². JP '098 describes that conventionally, when X-ray photography of the root of a tooth is carried out during dental medical treatment, for example, X-ray film is generally placed in the oral cavity and photography of a transmission image is carried out by external-ray irradiation.” *Id.* at [0002]. JP '098 continues to explain that it provides “a small, easy-to-handle portable X-ray generating apparatus which can be safely used as an apparatus for such medical treatment.” *Id.* at [0002]-[0004]. With reference to its Figure 2, reproduced below, the X-ray tube is shown and described as follows:

[FIG. 2]



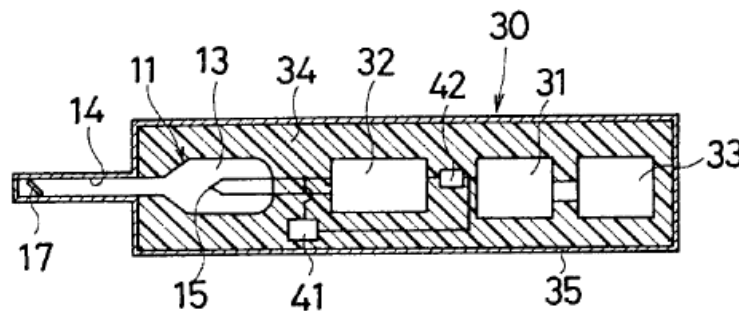
Bulb 11 has a filament 15 for generating electron beams and is connected to lead wires 16a, 16b for supplying a high DC voltage of approximately 60kV. Target 17 is made from metals such as tungsten, copper, and platinum and converts electron beams into X-rays. Circuit 22 heats filament 15 and circuit 23 provides high voltage to the filament 15 to accelerate electron beams from the filament 15 to the

² The notation [00xx] refers to the number of the paragraph in the English translation of the JP '098 specification. Thus, [0001] refers to the first paragraph under the topic heading “DETAILED DESCRIPTION OF THE INVENTION”.

target 17. The tube 11 applies approximately 60kV as a high voltage and circulates a filament current of approximately 1 mA. Exh. 1011, at [0006], [0007] and [0010].

With reference to its Figure 4 embodiment, reproduced below, JP '098 describes and illustrates a portable X-ray device 30 as follows:

[FIG. 4]



The portable X-ray generating apparatus 30 uses X-ray tube bulb 11 and includes a rechargeable battery 31, and high voltage generating circuit 32. The “energy supply source, battery 31, itself is of a low voltage and therefore [is] converted to AC by an oscillation circuit in high voltage generating circuit 32, with the voltage thereof increased by a transformer and used as a high voltage power source.” Exh. 1011, at [0011]. The housing 35 has a first portion [the left side as shown in Figure 4] that contains X-ray tube 11. Thus, the X-ray tube 11 is powered by an internal, power system that includes high voltage circuit 32 and rechargeable battery 31, which together provide a high voltage, continuous DC power to the

tube 11. The battery 31 is an internal power source. The apparatus 30 also includes a “switch 41 for heating filament 15” and “switch 42 for applying a high voltage to filament 15”. Switch 42 “can selectively perform . . . operations for operating only for a continuously necessary time for continuous irradiation.” Exh. 1011 at [0013]. During operation “X-rays are output from target 17, allowing a transmission image of the root of the tooth, etc. [,] in dental medical treatment to be easily observed or photographed. Thus, the JP ‘098 apparatus provides an X-ray output such that images of dental roots can be easily observed, and it has a current load sufficient for radiographic imaging. Claim Chart 2, below, summarizes and correlates the elements and limitations of claim 1 to the corresponding Figures and written description of JP ‘098. *See also* Exh. 1003, ¶ 40; Exh. 1006, ¶¶ 25-34.

Claim Chart 2 - ‘178 Claim 1 Compared to JP ‘098 (Exh. 1011)

Claim No.	Claim Term	JP ‘098
Claim 1 (a)	A portable x-ray device, comprising:	Figs. 2, 4; ¶¶ [0001] - [0002]; [0004]- [0015].
(b)	a housing with	Fig. 4; case 35, ¶ [0011]
(c)	a first portion that contains and x-ray source that is powered by	Figs. 2, 4, X-ray bulb/tube 11 in left portion of Fig. 4 embodiment; ¶¶ [0006]-[0007]; [0011]
(d)	an integrated power system that provides	Fig. 2, ¶¶ [0006]- [0007]; Fig. 4, ¶¶

		[0011]-[0013]
(e)	a continuous, high voltage DC power and	Fig. 2, ¶¶ [0006]-[0007]; Fig. 4, ¶¶ [0011]-[0013]
(f)	the housing also contains an internal power source; and	Fig. 4, chargeable reversible battery 31, ¶ [0011]
(g)	wherein the x-ray device has a high current load sufficient for radiographic imaging.	¶¶ [0001], [0004], [0013], [0015]

Thus, for all of the above reasons claim 1 is anticipated by JP’098.

B. Claim 4 is Anticipated By JP ‘098

Claim 4 recites a portable X-ray device, as follows:

4. The device of claim 1, wherein the portable device is handheld.

Claim 4 depends from claim 1. Claim 4 contains all of the elements and limitations of claim 1, all of which are expressly found in JP ‘098, as discussed above. Claim 4 additionally requires the device to be “handheld”. JP ‘098 is a portable X-ray generating apparatus, which is small, easy-to-handle and portable. The large part 13 of the tube has a diameter of approximately 20-30 mm, and the small diameter part of the tube has a diameter of about 6 mm, all of which implies that the device inherently is capable of being held in a user’s hand, thus, is handheld. *See*, Exh. 1011 at [0006] and Fig. 2; *see also* Exh. 1003, ¶¶ 41-45; *see also* Exh. 1006, ¶ 34.

Thus, for all of the above reasons claim 4 is anticipated by JP ‘098.

C. Claim 19 is Anticipated By JP '098

Claim 19 recites a portable x-ray device, as follows:

19. A method for analysis, comprising:
providing a material to be analyzed;
providing a handheld x-ray device with a high current load,
the device having a housing that contains an x-ray source
that is powered by an integrated power system that pro-
vides a continuous, high voltage DC power and the
housing also contains an internal power source; and
actuating the x-ray source so that an x-ray impinges on the
material.

While claim 19 recites a method for analysis, the specific language of the claim requires providing a material to be analyzed and providing an X-ray device having the features of the X-ray device of claim 1. Claim 19 then also requires actuating the X-ray source, which a person of ordinary skill in the art would understand as simply a way of stating the normal intended use of the X-ray device of claim 1. *See* Exh. 1003 at ¶ 47. For the reasons stated below, claim 19 is directed simply to a use of the claim 1 device, that the claim 1 device corresponds literally to the device shown in the JP '098 reference, and that the normal intended use of the JP '098 portable X-ray device, i.e., radiographing the teeth of dental patients, would exemplify the method of analysis of claim 19.

First, JP '098 describes conventional dental radiography at Exh. 1011, [0002] (dental medical treatment with photography of a transmission image of a

tooth); and at [0015] (transmission image of the root of a tooth) as an example of a method for analysis. Second, as set forth in detail in Section A. above, the device of JP '098 has a housing 35 that contains X-ray source tube 13 that is powered by an integrated power system including a rechargeable battery 31, high voltage generating circuit 32, filament heating switch 41, filament high voltage switch 42. During use the device provides for continuous irradiation. Exh. 1011, at [0013]. Third, when the switches 41, 42 of the X-ray device of JP '098 are operated, X-rays are produced and impinge on the tooth, thus “allowing a transmission of the root of the tooth . . . to be easily observed or photographed.” Exh. 1011, at [0015]. *See also* Exh. 1003 at ¶¶ 46-51; *see also* Exh. 1006, ¶ 34.

Thus, for all of the above reasons claim 19 is anticipated by JP '098.

D. Claim 21 is Anticipated By JP '098

Claim 21 recites a portable x-ray device, as follows:

21. A method for dental imaging, comprising:
providing a tooth of a patient to be analyzed;
providing a portable x-ray device with a high current load for radiographic imaging, the device having a housing that contains an x-ray source that is powered by an integrated power system that provides a continuous, high voltage DC power and the housing also contains an internal power source; and
actuating the x-ray source so that x-rays impinge on that tooth.

While claim 21 recites a method for dental imaging, the specific language of the claim requires providing a tooth of a patient to be analyzed and providing a portable X-ray device having the features of the X-ray device of claim 1. Claim 21 then also requires actuating the X-ray source, which a person of ordinary skill in the art would understand as simply a way of stating the normal intended use of the X-ray device of claim 1. Exh. 1003, ¶ 54. Thus, claim 21 is directed to a use of the claim 1 X-ray device. The elements and limitations of claim 1 correspond literally to the device shown in the JP '098 reference, and the normal intended use of the JP 098 X-ray device, i.e., X-ray radiographing the teeth of dental patients, literally corresponds to the method of dental imaging of claim 21. *See*, Exh. 1011, at Figures 2 and 4, and the Detailed Description, at [0001] - [0007]; [0013]; *see also* Exh. 1003, ¶¶ 52-55; *see also* Exh. 1006, ¶34.

Thus, for the above reasons claim 21 is anticipated by JP '098.

///

///

///

///

///

///

///

GROUND 3:

**CHALLENGE TO GROUP 3 CLAIMS 2, 3 AND 14
FOR THE REASON THAT CLAIMS 2, 3 AND 14
ARE UNPATENTABLE UNDER PRE-AIA 35 U.S.C. §103
AS HAVING BEEN OBVIOUS FROM THE TEACHINGS OF
JP ‘098 IN VIEW OF THE TEACHINGS OF
U. S. PATENT 5,077,771 TO SKILLICORN ET AL., U.S. PATENT NO.
4,485,433 TO TOPICH, AND/OR THE INEEL ARTICLE**

Claims 2, 3 and 14 are challenged under pre-AIA 35 U.S.C. § 103(a) as obvious from the teachings of JP ‘098 in view of United States Patent 5,077,771 to Skillicorn et al (“Skillicorn ‘771” or “the ‘771 patent” or “Skillicorn”), United States Patent 4,485,433 to Topich, entitled “Integrated Circuit Dual Polarity High Voltage Multiplier for Extended Operating Temperature Range (“the ‘433 patent” or “Topich ‘433) and/or an Article entitled: “Using the Cockroft-Walton Voltage Multiplier Design in Handheld Devices,” published in October 2001 by the Idaho National Engineering and Environmental Laboratory (“the INEEL Article”). A copy of Skillicorn ‘771 is submitted as Dexco 1012. A copy of Topich ‘433 is submitted as Exh. 1015. A copy of the INEEL Article is submitted as Exh. 1016.

A. Claims 2, 3 and 14 Would Have Been Obvious From the Teachings of JP '098 in view of Skillicorn '771

Claim 2 recites a portable X-ray device, as follows:

2. The device of claim 1, wherein the integrated power system comprises a plurality of low voltage power supplies.

Claim 3 recites a portable X-ray device, as follows:

3. The device of claim 1, wherein each power supply provides a power ranging from about 20 to about 50 kV.

Claim 14 recites a system for X-ray analysis as follows:

14. A system for x-ray analysis, the system containing a portable x-ray device with a housing containing an x-ray source that is powered by an integrated power system that provides a continuous, high voltage DC power and which includes a plurality of power supplies with each power supply providing a power ranging from about 20 kV to about 50 kV and the integrated power system provides a high current load sufficient for radiographic imaging, wherein the housing also contains an internal power source.

Claims 2 and 3 depend from claim 1. Claims 2 and 3 include all of the elements and limitations of claim 1, all of which are literally found in JP '098, as discussed above. Claim 2 also recites that the integrated power system includes “a plurality of low voltage power supplies”. Claim 3 recites that “each power supply provides a power ranging from about 20 to about 50kV.”

The structures in the '178 patent that provide power to the X-ray tube are described as follows:

. . . [t]he power supplied by each individual power supply depends on the number of individual power supplies used, the maximum power available from the power source, and the heat-dissipating capability of the x-ray tube. Generally, the power supplied by each individual power supply is the total power needed to operate the x-ray tube divided by the number of individual power supplies. For example, the power provided by each individual power supply (when there are 2) can range from about 20kV to about 50kV.

Exh. 1001, at [4:32-40].

Skillicorn '771 describes a miniaturized, modular, light weight hand held X-ray source that includes a hand holdable ruggedized high impact housing 12, having handles 11, 13. The power source for the Skillicorn X-ray device is a low voltage, high current source such as a 38 volt storage battery. The Skillicorn X-ray source includes a two-part, well known Cockcroft-Walton capacitor-diode voltage multiplier stack assembly 100. The stack assembly 100 comprises two rows of

cylindrical high voltage ceramic capacitors 104A and 104B as shown in Figure 4, reproduced below:

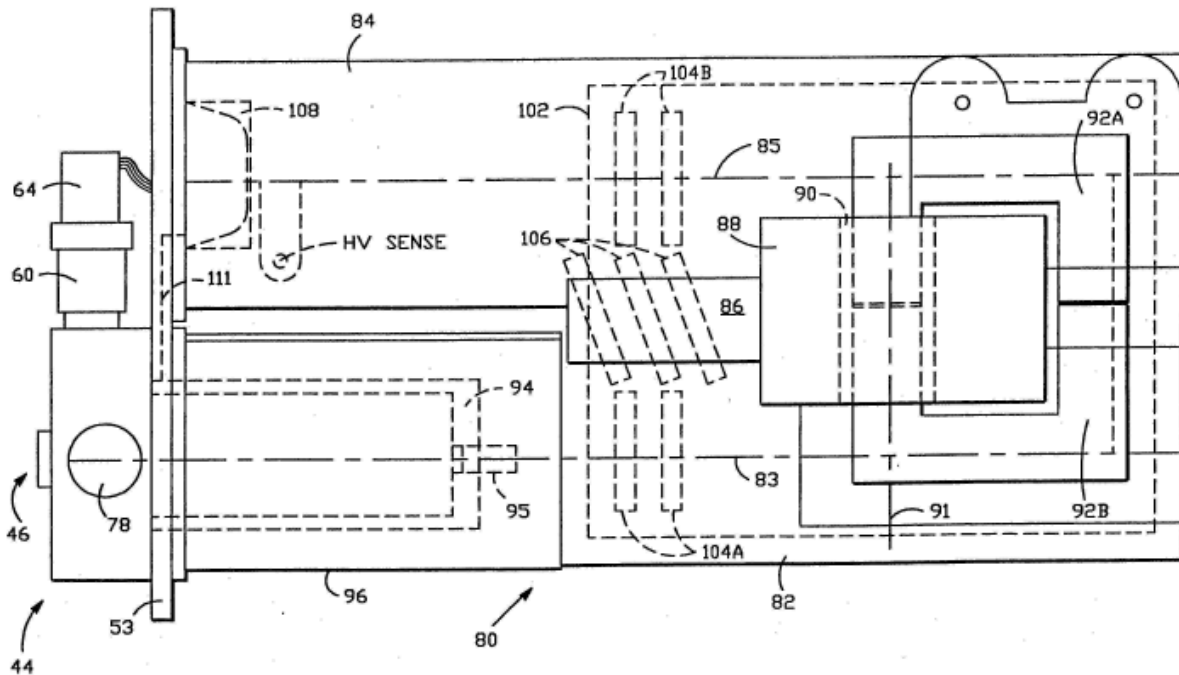


FIG. -4

The '771 patent specification informs that “[t]he voltage multiplier stack contains a sufficient number of voltage multiplier stages so as to provide the desired maximum high voltage of 70 kilovolts.” Exh. 1012, at [8:58-60]. The '771 patent also provides for setting the kilovolt output thereof between, e.g. 50kV, 60kV and 70kV. *See id.* at [9:45-48]. Thus, based on the '178 patent's description and teaching for determining the power supplied by each power supply in a portable, hand held X-ray device, each of the two Skillicorn power supplies provides voltages in the range of 25kV – 35kV, for a total output voltage range of

50V-70kV. Thus, it is certain that Skillicorn teaches the use of plural power supplies in a portable X-ray device, as recited in claim 2. It is also certain that the voltage output for each of the two Skillicorn power supplies is within the range of output voltages described in the '178 patent and as recited in claim 14. *See also* Exh. 1003, ¶¶ 57-59 and Exh. 1006, ¶¶ 47-49.

With respect to claim 3, first, Dexco relies on its Ground 1 challenge to claim 3 made under pre-AIA 35 U.S.C. 112, ¶¶ 1, 2, as indefinite and lacking antecedent basis for “each power supply,” and lacking support in the specification. Claim 1 does not recite any “power supply”, or any plurality of power supplies. Second, assuming, *arguendo* that claim 3 is either amended to include, or is construed to provide antecedent basis for “a plurality of low voltage power supplies”, it is emphasized that claim 3 lacks support in the specification. Third, aside from § 112 considerations, Skillicorn teaches plural power supplies, as explained in regard to claim 2. *See* Exh. 1006, ¶¶ 48-49.

It would have been obvious to have used a dual power supply such as taught by Skillicorn in the JP '098 X-ray device because the use of such conventional, dual power supplies would have provided predictable results, would have been consistent with the then-conventional understanding by persons of ordinary skill in this field, and would have resulted in a portable X-ray device that generated less

heat loss than a corresponding, single power supply that provided the same voltage increases, that is, voltage increases to a voltage in the range of 50kV to 70kV.

Also, use of the Skillicorn '771 dual power supply in the JP '098 portable X-ray device would have been a simple substitution of one known element in a prior art X-ray device for another known element in another prior art device to obtain predictable results in the field of portable X-ray devices, and which is alluded to in the '178 patent specification as follows: “any conversion means known in the art that operates in this manner can be used in the invention, including the power management boards 36”. Exh. 1001, at [4:7-9].

Moreover, use of a conventional, dual power supply would have provided predictable results and would have been consistent with then-conventional understanding by persons of ordinary skill in this field, providing a combined voltage increase to a voltage level in the range of 50kV to 70kV, which is shown in Figure 9 of '178 as admitted “Prior Art”, copied below. *See* Exh. 1003, ¶¶ 57-59 and Exh. 1006, ¶¶ 50-53.

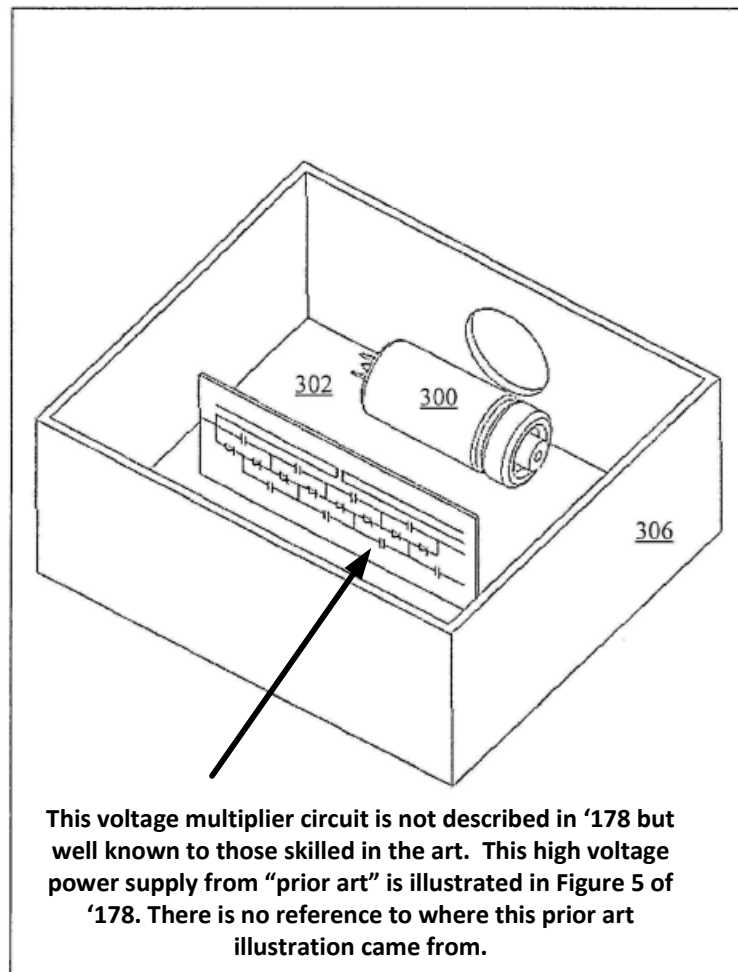


FIGURE 9
(PRIOR ART)

For all of the above reasons, claims 2, 3 and 14 would have been obvious at the time of invention of the '178 patent priority date, and should be cancelled.

B. Claims 2, 3 and 14 Would Have Been Obvious From the Teachings of JP '098 In View of the Teachings of United States Patent 4,485,433 to Topich

Topich '433 teaches an on-chip, dual polarity, high voltage multiplier and, more particularly, to a voltage multiplier having an extended operating temperature. Exh. 1015 at [3:57-60]. This reference shows that a dual power supply, such as described and claimed in the '178 patent was well known to those skilled in this field, at least by February 20, 2004.

Use of the Topich '433 dual power supply in the JP '098 portable X-ray device would have been a simple substitution of one known element in a prior art X-ray device for another known element in another prior art device to obtain predictable results in the field of portable X-ray devices, and which is alluded to in the '178 patent specification as follows: “any conversion means known in the art that operates in this manner can be used in the invention, including the power management boards 36”. Exh. 1001, at [4:7-9]; *see also* Exh. 1006, at ¶54.

Thus, claims 2, 3 and 14 of the '178 patent would have been obvious from the teachings of JP '098, as discussed above, in view of the dual power supply teachings of Topich '433.

///

///

C. Claims 2, 3 and 14 Would Have Been Obvious From the Teachings of JP ‘098 In View of the Publication “Using the Cockroft-Walton Voltage Multiplier Design in Handheld Devices” by Spencer et al dated October 2001 (the “INEEL Article”)

The INEEL Article discloses a variation of the basic Cockroft-Walton (C-W) Voltage Multiplier circuit design that may be used to generate “multiple voltages” at sufficient currents to drive the dynodes of a photomultiplier tube. *See* Exh. 1016, “Abstract”. The INEEL Article shows that a dual power supply, such as described and claimed in the ’178 patent was well known to those skilled in this field, at least by February 20, 2004. Use of the dual power supply as described in the INEEL Article in the JP ‘098 portable X-ray device would have been a simple substitution of one known element in a prior art X-ray device for another known element in another prior art device to obtain predicable results in the field of portable X-ray devices. *See* Exh. 1006, at ¶ 55.

Thus, claims 2, 3, and 14 of the ‘178 would have been obvious from the teachings of JP ‘098, as discussed above, in view of the dual power supply teachings of the INEEL Article.

///

///

GROUND 4:

**CHALLENGE TO GROUP 4 CLAIMS 15 AND 17
FOR THE REASON THAT CLAIMS 15 AND 17
ARE UNPATENTABLE UNDER PRE-AIA 35 U.S.C. §103
AS HAVING BEEN OBVIOUS FROM THE TEACHING OF JP ‘098
IN VIEW OF THE TEACHING OF U. S. PATENT 5,077,771
TO SKILLICORN ET AL
AND FURTHER IN VIEW OF U. S. PATENT 5,442,677
TO GOLDEN ET AL**

Claims 15 and 17 are challenged under pre-AIA 35 U.S.C. § 103(a) obvious from the teachings of JP ‘098 in view of United States Patent 5,077,771 to Skillicorn et al (“Skillicorn ‘771” or “the ‘771 patent” or “Skillicorn”) further in view of United States Patent 5,442,677 to Golden et al (“the ‘677 patent” or “Golden” or “Golden ‘677”). A copy of Golden ‘677 is submitted as Dexco 1013.

Claim 15 recites a system for X-ray analysis as follows:

15. The system of claim **14**, wherein x-ray ray source is contained in a first portion of the housing and the internal power source is contained in a second portion that is removably attached to the first portion so that when the second portion is removed from the first portion, no power is generated for the x-ray source.

Claim 15 depends from claim 14, includes all of the elements and limitations of claim independent claim 14, as discussed above. Claim 15 adds the limitations that one portion of the housing contains the X-ray source and a second portion that contains the power source and is removably attached to the first portion so that when the second portion is remove, no power is generated for the X-ray source.

Claim 17 is an independent claim, and recites a method for making a portable X-ray device as follows:

17. A method for making a portable x-ray device with a high current load, the method comprising:
providing an x-ray source in a first portion of a housing;
providing an integrated power system that provides a continuous, high voltage DC power in the first portion of the housing and connecting it to the x-ray source;
providing an internal power source in a removable, second portion of the housing; and
connecting the second portion to the first portion.

Golden '677 describes a light weight battery powered X-ray source capable of producing high intensity X-ray emissions with low power consumption. As shown below in Figures 1 and 3, Golden has a housing 10, referred to in Golden as "a small lightweight battery-powered x-ray emission source 10 having as integrated but separable components." *See*, Exh. 1013 at [4:4-8].

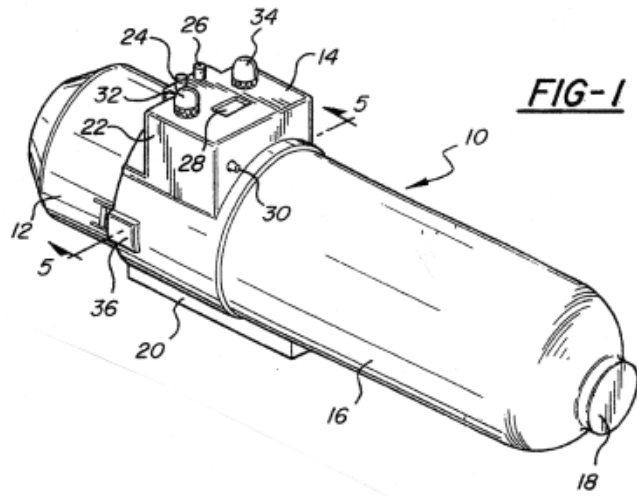


FIG-1

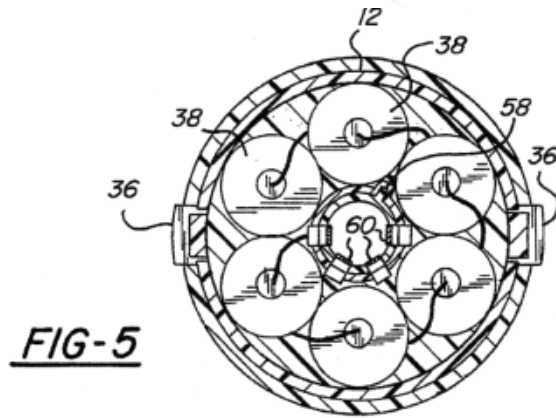


FIG-5

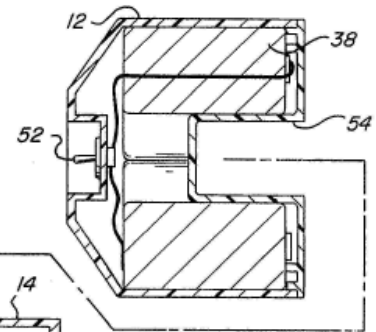
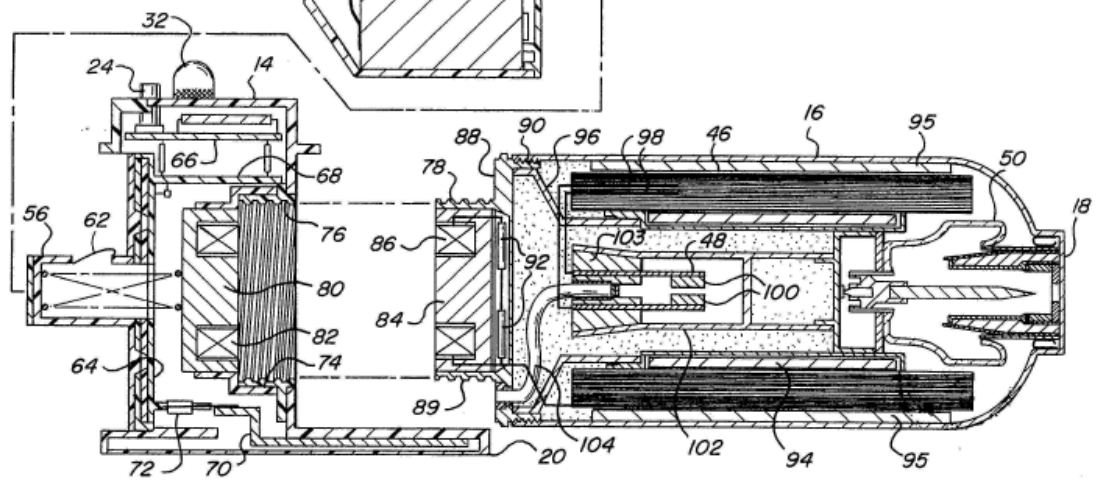


FIG-3



The X-ray source is in the portion of the housing referred to as “high voltage canister module 16”, and the internal power source is located in battery module 12, which is removably attached to the combined interface module 14 and canister module 16.

The battery module 12 is coupled to the interface module by a female socket 54 that receives a male mounting peg 56 shown in Figure 5 above. A key/keyway structure 58 ensures proper alignment of the spring terminals 60 and 62 carried by the battery module 14 and the male peg 56. The spring contacts complete the electrical circuitry. *See*, Exh. 1013, at Figures 1, 3, and 5³; and [4:4-10; 5:45-63]; *See*, Exh. 1006 at ¶ 60.

In regard to the Golden modular construction, it is readily apparent that having a battery module such as 12 be removable through use of, for example, sliding spring terminals. *See*, Exh. 1006 at ¶ 61. Sliding spring terminals provide for the capability of the battery pack to be quickly and easily removed for recharging the batteries, or alternatively in periods of high use by simply removing a spent battery pack and replacing it with a second fully charged unit. *Id.* Golden provides additional reasons why he uses a modular construction in which each of

³ Figure 3 shows the elements in Figures 1 and 5 integrated into one complete assembly.

the portions of the housing may be removably attached or separated, and why the modular structures will have differing degrees of ease or difficulty in separating one module from another. *Id.* As explained in Golden '677:

The large diameter flange portion 90 of the molded plastic structural fitting 88 is threaded to receive in mechanical engagement therewith the aluminum canister 16 of the canister module, the threaded coupling 88, 90 being bonded for relative permanence such that the threaded coupling 76, 78 is operative with lesser turning torque than the coupling 88, 90, *i.e.*, while it is desirable to be able to disassemble the entire canister unit 16 from the interface unit 14 via threaded coupling 76, 78 during normal field operations of the source 10, it is not desirable or expected that the threaded coupling 88, 90 will be decoupled in the field. Rather, it is the intent of this structure that the entire canister module 16 be viewed as a non-serviceable block for replacement purposes in the field. Canister modules 16 may, of course, be rebuilt and/or serviced by the manufacturer.

Exh. 1013, Figure 3, [5:64-6:11].

With respect to claim 15 of the '178 patent, modifying the X-ray device of the JP '098 publication to substitute its rechargeable battery with a rechargeable battery pack, such as described in Golden '677, would have been a simple

substitution of one known element (a removably attached rechargeable battery module in a second portion of the housing) for another (a non-removably contained rechargeable battery in a second portion of the housing). *See* Exh. 1006, at ¶ 62. Also, the ‘178 patent specification essentially invites such a substitution by its statement that “[t]he power source 40 used in the x-ray device of the present invention can be any known in the art that can supply the desired amount of power, yet fit within the space limitations of the x-ray device.” *See* Exh. 1001, at [3:36-39]; *see also* Exh. 1006, at ¶ 62-63; *see also* Exh. 1003, at ¶ 67. It would have been obvious to substitute the rechargeable battery of the JP ‘098 X-ray device, as modified by the teachings of Skillicorn, with a removably attachable battery pack as taught by Golden ‘677. *Id.*

With respect to claim 17 of the ‘178 patent, while it is a method claim, it recites the same structural elements and limitations as does claim 1, and in addition, requires that the X-ray device include the X-ray source and high voltage DC power system in a first portion of a housing, and an internal power source in a second portion of the housing. Claim 17 also requires connecting the first portion to the second portion in some manner that is not specifically detailed in the ‘178 patent.

The JP ‘098 reference includes those elements and limitations common to claims 1 and 17 of the ‘178 patent as discussed above. Furthermore, Golden ‘677,

teaches a portable X-ray device and method that includes providing the X-ray source and high voltage DC power system in a first portion of a housing, providing an internal power source in a second portion of the housing and connecting the first portion to the second portion, as discussed above in regard to claim 15. In other words, modifying the JP '098 X-ray device to include a modular housing in which the rechargeable battery source is in a removable, second portion of the housing would have been either a simple substitution of one known element for another to obtain predictable results, or would have been simply combining prior art elements according to known methods to yield predicable results. *See* Exh. 1006, at ¶¶ 64-66; *see also* Exh. 1003, at ¶¶ 66, 68-70.

Thus, it would have been obvious to have modified the X-ray device described in JP '098 with the teachings of Skillicorn '177 and Golden '677 to have yielded the X-ray device of claim 15; and it would have been obvious to have modified the X-ray device described in JP '098 with the teachings of Golden '677 to have yielded the X-ray device of claim 17. Exh. 1003, at ¶ 71.

For all of the above reasons, claims 15 and 17 would have been obvious at the time of invention of the '178 patent, based on its priority date, and should be cancelled.

///

///

GROUND 5:

**CHALLENGE TO GROUP 5, CLAIM 5
FOR THE REASON THAT CLAIM 5 IS UNPATENTABLE
UNDER PRE-AIA 35 U.S.C. §103
AS HAVING BEEN OBVIOUS FROM THE TEACHINGS
OF JP '098 IN VIEW OF THE TEACHINGS
OF U. S. PATENT 6,282,260 TO GRODZINS**

Claim 5 is challenged under pre-AIA 35 U.S.C. § 103(a) obvious from the teachings of JP '098 in view of United States Patent 6,282,260 (“the ‘260 patent” or “Grodzins ‘260” or “Grodzins”). A copy of Grodzins is submitted as Dexco 1014.

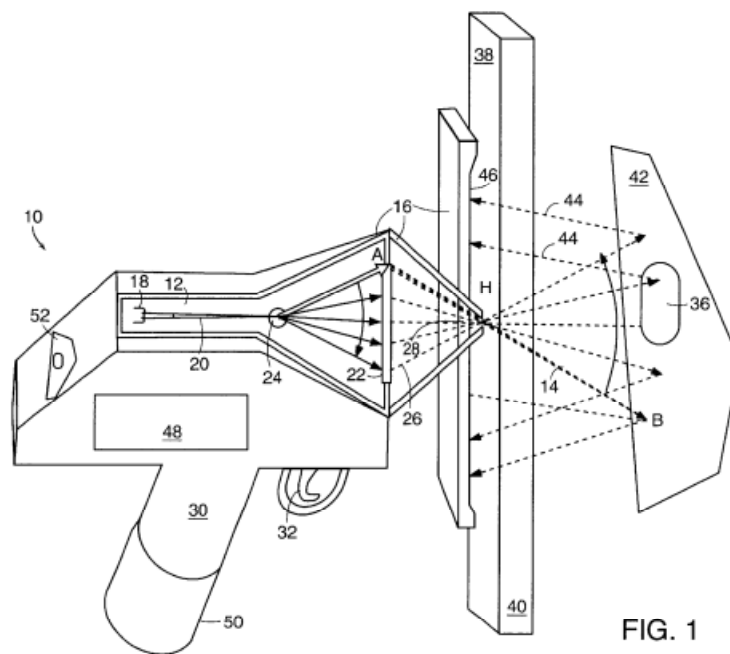
Claim 5 recites a portable X-ray device as follows:

5. The device of claim 1, further comprising a display for a radiographic image that is integrated into the housing.

Claim 5 depends from claim 1, includes all of the elements and limitations of claim 1, all of which are literally found in JP '098. Claim 5 also requires the portable X-ray device to include a “display for a radiographic image that is integrated into the housing”. Regarding the term “display”, the '178 patent specification states that “[t]he X-ray device may also contain means for displaying the X-rays detected by the detecting means. Any display means that displays the detected X-rays in a

manner that can be understood by the operator of the device can be used for the invention.” Exh. 1001 at [6: 15-19].

Grodzins ‘260 describes and illustrates a hand-held X-ray device that includes a display 52 that is integrated into the housing, as shown below in Figure 1.



Grodzins explains the image and image display features of his portable X-ray device as follows:

The term “image” refers to a mapping of raw or processed detector signals to positions in the plane, and .

. . . may be displayed visually on a display 52 such as a video monitor.

Exh. 1014, at Fig. 1; [3:24-37; especially 33-37].

Combining the teachings of Grodzins '260 with the teachings of JP '098 would have been an obvious method of having an image display incorporated in the housing of a portable X-ray device for several reasons. *See* Exh. 1003, ¶ 78. First, Grodzins already had such an X-ray device. *See* Fig. 1 above. Second, Grodzins' display was positioned and functioned just as recited in claim 5 and therefore was an example of a display means that the '178 patent specification said "can be used for the invention". Third, having an image display on the housing of the portable device itself was simply an application of a known technique [integrated image display of Grodzins] to a known device that was ready for improvement [the X-ray device of JP'098] and the resulting X-ray device's image display capability was predictable. Fourth, the combination of Grodzins' image display integrated into the JP '098 portable X-ray device housing would have yielded the predictable result that the thus-modified portable X-ray device would have had a housing with an integrated image display that provided the operator of the device with the capability to understand the detected X-rays. *See* Exh. 1003, ¶ 78.

For all of the above reasons, claim 5 would have been obvious at the time of invention of the '178 patent priority date, and should be cancelled.

GROUND 6:

**CHALLENGE TO GROUP 6, CLAIM 23
FOR THE REASON THAT CLAIM 23
IS UNPATENTABLE UNDER PRE-AIA 35 U.S.C. §103
AS HAVING BEEN OBVIOUS FROM THE TEACHINGS
OF JP '098 IN VIEW OF THE TEACHINGS
OF SKILLICORN '771
AND FURTHER IN VIEW
OF U. S. PATENT 5,442,677 TO GOLDEN ET AL
AND GRODZINS '260**

Claim 23 is challenged under pre-AIA 35 U.S.C. § 103(a) obvious from the teachings of JP '098 in view of Skillicorn '771 further in view of Golden '677 and Grodzins '260.

Claim 23 recites a handheld X-ray device as follows:

23. A handheld x-ray device, comprising:
a housing having a first portion that contains an x-ray source that is powered by an integrated power system that provides a continuous, high voltage DC power and which includes a plurality of power supplies with each power supply providing a power ranging from about 20 kV to about 50 kV and the power system provides a current sufficient for radiographic imaging;
the housing also having a second portion that contains an internal power source and the second portion is removably attached to the first portion so that when the second portion is removed from the first portion, no power is generated for the x-ray source; and
a display integrated into the first portion of the housing to display a radiographic image.

Claim recites all of the features that are also found in claims 1 [basic features]; 14 [dual power supplies]; 15 [removable housing portion]; and 5 [image display integrated into the housing].

It would have been obvious to have combined the dual power supplies, removable housing portion and image display integrated into the housing with the basic structures of the hand held X-ray device of JP '098. *See* Exh. 1003, ¶¶ 81-82. Each of these combinations and the reasons why such combinations would have been obvious are discussed above, and apply equally to claim 23. Thus, claim 23 of the '178 patent would have been obvious from the teachings of JP '098 in view of Skillicorn '771, further in view of Golden '677 and Grodzins '260.

V. MANDATORY NOTICES (37 C.F.R. § 42.8(A)(1))

A. The Real Party-In-Interest (37 C.F.R. § 42.8(b)(1)):

Dexcowin Global, Inc. (“Petitioner”).

B. Notice of Related Matters (37 C.F.R. § 42.8(b)(2)):

Petitioner is concurrently-filing a petition for *inter partes* review on a related patent, U.S. Patent No. 7,224,769 (“the ‘769 patent”). The ‘769 patent claims priority from the same provisional patent application as the ‘178 patent (*i.e.*, App. No. 60/546,575, filed on February 20, 2004).

C. Designation of Lead and Back-Up Counsel and Service Information (37 C.F.R. § 42.8(b)(3) and 42.8(b)(4)):

Lead Counsel	Back-Up Counsel
Jon E. Hokanson (Reg. No. 30,069) Lewis Brisbois Bisgaard & Smith LLP 633 W. 5 th St., Suite 4000 Los Angeles, CA 90071 Jon.Hokanson@lewisbrisbois.com Tel. No.: 213-250-1800 Fax. No.: 213-250-7900	Josephine A. Brosas (Reg. No. 66,679) Lewis Brisbois Bisgaard & Smith LLP 633 W. 5 th St., Suite 4000 Los Angeles, CA 90071 Josephine.Brosas@lewisbrisbois.com Tel. No.: 213-250-1800 Fax. No.: 213-250-7900

///

///

VI. CONCLUSION

For all of the reasons stated above, *inter partes* review should be authorized and Petitioner Dexco requests an Order to that effect.

Submitted concurrently herewith are a Power of Attorney, an Exhibit List, and copies of the references per § 42.10(b), § 42.63(e), and §42.6(d). The required fee is paid, and the Office is authorized to charge fee deficiencies and credit overpayments to Deposit Account No. 50-3725.

LEWIS BRISBOIS BISGAARD & SMITH LLP

Dated: January 6, 2016

By: /Jon Hokanson/
Jon E. Hokanson
Reg. No. 30,069

LEWIS BRISBOIS BISGAARD & SMITH LLP

633 W. 5th St., Suite 4000

Los Angeles, California 90071

Tel. 213-250-1800

Fax. 213-250-7900

CERTIFICATE OF SERVICE

I certify that on the 6th day of January 2016, a copy of the PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 7,496,178 UNDER 35 U.S.C. § 311, has been served in its entirety by United States Postal Service Express Mail® on the following:

Michael A. Fisher Michael.Fisher@kavokerrgroup.com Chief Intellectual Property Counsel 11727 Fruehauf Drive Charlotte, NC 28273

Dated: January 6, 2016

LEWIS BRISBOIS BISGAARD & SMITH LLP
By: /Jon Hokanson/
Jon E. Hokanson
Reg. No. 30,069

LEWIS BRISBOIS BISGAARD & SMITH LLP
633 West 5th Street, Suite 4000
Los Angeles, California 90071
(213) 250-1800