5. Alternatively, Applicant could provide an explanation of where each and every claimed component is found in the figures as filed.

Specification

6. **The specification is objected to as directed solely to an inoperable device.** Specifically, the present invention appears to be derived from the discredited "dry LENR" process embodied by Andrea Rossi's "e-Cat" device. As discussed below, claims directed to this mode of fusion have been rife with fraud and fail to measure up to even cursory examination under the generally accepted laws of physics. Rossi's e-Cat device is a purported nuclear fusion reactor which exposes nickel powder to hydrogen gas at modest pressure (around 2 bar) and temperature (between 150-500°C).[1] According to Rossi, the nickel nuclei absorb protons from the hydrogen gas and undergo β decay to form various isotopes of copper. Rossi does not propose a theory of operation for the device, but simply reviewing the products and the reactants would cause one of ordinary skill to doubt the operability of the system.

7. First, there is the issue of nickel. Nickel-62, one of the reactant isotopes, has the highest nuclear binding energy of any known isotope.[2] In laymen's terms, this means that nickel-62 is the most stable and non-reactive nucleus in the known universe. However, the other common isotopes of nickel (^{58}Ni, ^{60}Ni, ^{61}Ni and ^{64}Ni) share similar binding energies. This relative stability explains why the metal accumulates in stars - even under the most extreme fusion conditions imaginable, nickel will not react with other elements. However, for the sake of argument, we will assume that an unknown mechanism is causing nickel to react with hydrogen.

8. If nickel were to react with hydrogen, it would do so according to the following mechanisms:[3]

$$^{58}Ni + {}^{1}H \rightarrow {}^{59}Cu*$$
$$^{60}Ni + {}^{1}H \rightarrow {}^{61}Cu*$$

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[1] *See* Application. 12/736,193 (US 2011/0005506 A1). Note, the Abstract in this reference states a temperature range of 150-5000°C. This would appear to be a typographical error since the steel containment would melt at 1510°C. Examiner notes that this error is not repeated in elsewhere in the specification or the claims.

[2] *See* Fewell, "The Atomic Nuclide With the Highest Mean Binding Energy," http://adsabs.harvard.edu/abs/1995AmJPh..63..653F (last visited 17 December 2015).

[3] *See* Thieberger, "The Physics of why the e-Cat's Cold Fusion Claims Collapse," pp. 7-8.

$$^{61}Ni + {}^{1}H \rightarrow {}^{62}Cu*$$
$$^{62}Ni + {}^{1}H \rightarrow {}^{63}Cu*$$
$$^{64}Ni + {}^{1}H \rightarrow {}^{65}Cu*$$

Where the star (*) signifies that copper is unstable and will undergo β-decay back to a nickel isotope of corresponding mass. This mechanism obviously fails because it does not produce the claimed reaction products.

9. One could create copper from nickel with neutrons, but then it is not clear where the present invention (nor the e-Cat) would obtain such a source. However, for the sake of argument, we assume that the unknown mechanism *also* has a ready supply of neutrons. If this is the case, then we can convert ^{62}Ni and ^{64}Ni into ^{63}Cu and ^{65}Cu respectively under the following reactions:[4]

$$^{62}Ni + {}^{1}n \rightarrow {}^{63}Ni* \rightarrow {}^{63}Cu + \beta^{-} + \gamma + \upsilon_{e}^{-}$$
$$^{64}Ni + {}^{1}n \rightarrow {}^{65}Ni* \rightarrow {}^{65}Cu + \beta^{-} + \gamma + \upsilon_{e}^{-}$$

If one were to build a machine to leverage these reactions, one would expect the proportion of the products to equal the proportion of the reactants. Thus, the ratio of nickel-62 to nickel-64 should equal the ratio of copper-63 to copper-65. However, this is not the case.[5]

10. Moreover, there is no physical or chemical impetus that would cause hydrogen gas (or deuterium gas) to undergo electrolysis in Rossi's device or in the device as described in the specification. Electrolysis of water is a well-known process that uses electricity, i.e. electrons, to break the bonds between the elements of water, thereby producing elemental hydrogen gas and elemental oxygen gas. The process works because the atomic constituents of water have very different electronegativities. In laymen's terms, electronegativity is a measure of an element's desire or need for electrons. An element with a high electronegativity—like oxygen—has a strong affinity for electrons, making it likely to attract electrons. Conversely, an element with a low electronegativity-–like hydrogen—is likely to give up its electrons. The electrolysis process takes advantage of these inherent physical tendencies of atoms.

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[4] *Id.* at 10.
[5] *See* Aleklett, "Rossi energy catalyst - a big hoax or new physics?" Aleklett's Energy Mix, pp. 2-3. https://aleklett.wordpress.com/2011/04/11/rossi-energy-catalyst-a-big-hoax-or-new-physics/ (last accessed 18 December 2015).

Because oxygen attracts electrons and hydrogen tends to donate electrons, a portion of the molecules in water naturally dissociate into H^+ cations[6] and O^{2-} anions. That is each atom of hydrogen in a water molecule donates its electron to the oxygen atom, making the hydrogen atoms positively charged, and the oxygen atom negatively charged. In an electrolysis apparatus, the electrons at the negatively-charged cathode react with the positively charged H^+ cations to produce hydrogen gas. At the same time, oxidation of water occurs at the positively-charged anode oxidize water to form elemental oxygen, hydrogen cations, and electrons, thereby completing the circuit.

11. Electrolysis of elemental hydrogen, therefore, is a myth. It cannot occur because there is no electronegativity difference in the molecule to drive the oxidation/reduction reactions. That is, neither hydrogen atom in a hydrogen molecule, H_2, has more affinity for electrons than the other. There is no natural dissociation of hydrogen gas into H^+ cations. Without this dissociation, there can be no protons to react with the nickel in Rossi's device. The provision of an electric current to the device, i.e. adding electrons, would have no effect because to produce protons, electrons must be *removed* from hydrogen molecules.

12. Putting aside the theoretical considerations, there is the additional matter of verifiability. To date, there exists no independent, peer-reviewed evaluation of the e-Cat device. Nor has there been a credible attempt at explaining the purported nickel phenomenon. Additionally, attempts to independently verify the Rossi device appear to have been met with resistance.[7]

13. A person of ordinary skill in the art would have cause to doubt the operability of the claimed invention for three reasons. First, the inventors make the incredible claim of exothermic fusion of hydrogen in a laboratory environment. For the reasons discussed above, the known and existing laws of nature do not support this reaction. Next, the proponents have only been able to produce an ash that reflects the standard isotopic distribution of copper, not the distribution of copper that would occur if nickel were actually undergoing the fusion process. Finally, the absolute dearth independent confirmation and

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[6] A hydrogen cation, H+ is a hydrogen atom without its electron. Because the hydrogen atom contains no neutrons, the cation is simply a proton.

[7] *See* "Can Andrea Rossi's Infinite-Energy Black Box Power the World - Or Just Scam It?" Popular Science http://www.popsci.com/science/article/2012-10/andrea-rossis-black-box (last accessed 18 December 2015).

the carefully crafted "demonstrations" would cause a person of ordinary skill in the art to doubt the operability of the device as claimed.

14. **The specification is objected to under 35 U.S.C. 112(a) as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention, i.e. failing to provide an enabling disclosure.** The specification contains references throughout to excess heat and low energy nuclear reactions. This scenario is consistent with what has become known in the art as *"cold fusion."* There is no reputable evidence of the record that this type of fusion has been achieved (See Seife "Sun in a Bottle" 2008, Chapters 6, 9, and 10; Close "Too Hot to Handle" 1991; DOE "Report of the Review of Low Energy Nuclear Reactions" 2004). These references provide documentary evidence that *there are no operative cold fusion systems that actually produce excess heat or any other nuclear reaction product.* The disclosure is thus insufficient and non-enabling as to exactly what is necessary to present a reproducible, sustainable excess heat and as to what would cause such reactions to take place in Applicant's system. As explained above, there is no proven scientific explanation for why fusion would take place in a device like that which is described in the specification. The specification as filed does not provide a scientific explanation nor does it provide any scientific evidence that would lead one of ordinary skill in the art to believe that the disclosed invention is indeed capable of energy production via low energy nuclear reactions.

15. Examiner has presented evidence (above) showing that in such cold fusion systems, the claims of excess heat (as well as of other nuclear reaction products), are not reproducible or even obtainable. It consequently must follow that the claims of excess heat or nuclear reactions are not reproducible of even obtainable with Applicant's invention. While Applicant may have set forth theoretical concepts, it is well known in the cold fusion field that theory and reality have a habit of not coinciding. Applicant presents no evidence to suggest success where others have failed, i.e. achieving an operative cold fusion system. Therefore, Applicant has not shown progress beyond the point of an unproven theory or concept that still requires an undue amount of experimentation to enable the artisan to make and use the inventive system for its indicated purpose. This view is also considered supported by the failure to set forth a full example of the specific parameters of an operative embodiment. One cannot rely on the skill in the art for the

selection of the proper quantitative values to present an operative cold fusion system, since those in the art do not know what would be these values. See *Bank v. Rauland Corp.*, 64 U.S.P.Q. 93 and *In re Corneil et al.*, 145 U.S.P.Q. 697.

16. Therefore, Examiner (for the reasons set forth above) has set forth a reasonable and sufficient basis for challenging the adequacy of the disclosure. The statute requires the applicant itself to inform, not to direct others to find out for themselves. See *In re Gardner et al.*, 166 U.S.P.Q. 138 and *In re Scarborough*, 182 U.S.P.Q. 298. The disclosure must enable a person skilled in the art to practice the invention without having to design structure not shown to be readily available in the art; *In re Hirsch*, 131 U.S.P.Q. 198.

17. Rejection of "cold fusion" claims on the grounds of lack of enablement (35 U.S.C. §112) and operability/utility (35 U.S.C. §101) have been upheld by the Board and affirmed by the Court See *In re Dash*, No. 04-1145, 2004 WL 2829039 (Fed. Cir. Dec. 10, 2004) and *In re Swartz*, 232 F.3d 862, 56 USPQ2d 1703, (Fed. Cir. 2000). The Court construed the Dash claims to require the production of excess heat energy and to be directed to a method of achieving "cold fusion". The Court stated, "[g]iven the scientific community's considerable doubt regarding the utility of "cold fusion" processes, we hold that the examiner established a prima facie case of lack of utility and enablement." In Swartz, the Board held that the applicant had "produced no persuasive objective evidence, in our view, that overcomes the examiner's position." The Court affirmed the Board's decision that the "claimed process had not been established and that [the] application did not satisfy the enablement requirement."

18. The examiner has the initial burden of challenging an asserted utility. Only after the examiner has provided evidence showing that one of ordinary skill in the art would reasonably doubt the asserted utility does the burden shift to the applicant to provide rebuttal evidence sufficient to convince one of ordinary skill in the art of the invention's asserted utility. *In re Swartz*, 232 F.3d 862, 56 USPQ2d 1703, (Fed. Cir. 2000)

Claim Rejections - 35 USC § 112

19. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

20. **Claims 1-22 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention**. The reasons the inventions as disclosed are not enabling are the same reasons set forth above in paragraphs 14-18. Given the lack of evidence that any cold fusion device is capable of producing fusion reaction combined with the lack of evidence in the instant application that the claimed device is capable of producing fusion reactions, Examiner posits the instant application does not enable one skilled in the art to make the claimed invention. Not only is there no evidence to suggest the claimed invention accomplishes its stated goal of low energy nuclear reactions, it is not even clear what the claimed invention includes that would make it capable of its goal. Based on the evidence regarding the below factors (*In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988)), the specification at the time the application was filed, would not have taught one skilled in the art how to make the full scope of the claimed invention without undue experimentation.

- The claims are overly broad because they include an abundance of alternately usable species. Therefore, one of ordinary skill in the art would be unable to select which combination of components (if any) would produce the desired result.
- The nature of the invention, the state of the prior art, the level of skill in the art, and the predictability of the art would require disclosure of a specific device, its operating

parameters, as well as scientific evidence of its success to enable one skilled in the art to make the claimed invention, because no such device had achieved low energy nuclear reactions at the time of filing. Therefore, one of ordinary skill in the art would need a specific blueprint along with experimental results so that the invention could be exactly reproduced and its results verified.

- The amount of direction provided by the inventor—the disclosure of a multitude of alternately usable components—would not have enabled one of ordinary skill in the art at the time of the invention to make the claimed invention. Because of the abundance of possible combinations of components disclosed in the instant specification (and claims), one of ordinary skill in the art has no clear blueprint to follow in an attempt to reproduce the disclosed invention.
- The absence of working examples indicates one of ordinary skill in the art would not have been enabled to make the claimed invention and use it to produce the desired results. That is, one of ordinary skill in the art at the time of the invention would not have been able to reproduce both the construction and the operation of the claimed device, given the breadth of possibilities disclosed and the lack of parameters that would guide one of ordinary skill in the art's selection of specific components.
- Based on the content of the disclosure—which provides no clear blueprint for the construction of the claimed device as well as no evidence of its successful operation—one of ordinary skill in the art would have had to conduct undue experimentation to make the claimed invention. Such experimentation would have involved construction of a plethora of devices by selecting each one of the disclosed components in turn, operating the device, and hoping to produce low energy nuclear reactions. Since there is no disclosed evidence of successful operation of the claimed invention, one of ordinary skill in the art has no standard with which to compare any results obtained from testing the ample selection of devices disclosed. Accordingly, one of ordinary skill in the art would have to seek independent verification of any results obtained from testing the disclosed

invention. This process essentially involves an entire R&D cycle, eliminating only the conception phase, and would almost certainly take at least a decade to complete. The process is likely to require several decades, given the lack of a solid, scientific theory on which to base experimental design (see paragraphs 6-13 above). That is, without an understanding of the scientific principles at work in the claimed device, one of ordinary skill in the art would be unable to rely on a body of established scientific work to guide his reconstruction of the claimed invention.

21. The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

22. **Claims 1-22 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.**

23. The claims are vague, indefinite, and incomplete for lack of support for the intended use—low energy nuclear reactions--discussed above (see paragraphs 6-13). Thus, the metes and bounds of the claims cannot be determined.

24. In the following discussion, Examiner sets forth themes that render the metes and bounds of the claims indefinite. In conjunction with each theme, at least one *example* of specific claim language is provided to illustrate the theme. Therefore, Applicant should not consider the following list of claim language to be a comprehensive list of indefinite claim limitations.

25. Claims 1-22 include limitations directed to sometimes vast lists of alternatively usable species of components (MPEP 2173.05(h)). There are three reasons these limitations render the claims indefinite:

1) the sheer number of possible combinations listed in the nested groups is so expansive that the metes and bounds of the claimed invention is unclear;

2) the use of the terminology "at least one of" followed by a listing of elements only adds to the vast number of possible combinations encompassed by the claims; and

3) many of the claimed groups include elements whose common properties are unclear.

26. If one were to choose one component from each list of alternatively useable species, some of the claims cover hundreds of different devices. In claim 1, one must choose an electronic control circuit *or* subsystem as well as choose an electrical or electronical coupling between the electronic control component and a header. Setting aside that the alternative terms do not appear to be mutually exclusive, which adds additional uncertainty to the claim as addressed below, claim 1 appears to include 4 different devices. The devices are: 1) one with an electronic control circuit electrically coupled to the header, 2) one with an electronic control circuit electronically coupled to the header, 3) one with an electronic control subsystem electrically coupled to the header, and 4) one with an electronic control subsystem electronically coupled to the header. Accordingly, some of the dependent claims encompass dozens to hundreds of different devices:

- Claim 2 includes 24 devices.
- Claim 4 includes 20 devices.
- Claim 5 includes 8 devices.
- Claim 6 includes 162 devices.
- Claim 7 includes 216 devices.
- Claim 12 includes 86 devices.
- Claim 14 includes 8 devices.
- Claim 15 includes 8 devices.
- Claim 16 includes 12 devices.
- Claim 18 includes 144 devices.
- Claim 19 includes 56 devices.
- Claim 20 includes 88 devices.
- Claim 22 includes 360 devices.

27. However, the above analysis does not accurately convey the number of devices encompassed by the claims, because Applicant often uses the terminology “comprises at least one of.” Therefore, one does not only have to select one component from a claimed list; he can select one, two, or even all components in the list! Applying this methodology to claim 4 (which is one of the only claims whose groups can be easily understood), there are 5 alternative options in the claim. Therefore, claim 4 contains not just 5 options, but 5! ((factorial) options, which is equivalent to 120. When combined with the 4 options available in claim 1, claim 4 recites 480 different combinations of components.

28. Not only do the claims encompass an incomprehensible number of species when the simplistic analysis above is applied, the claiming of alternative lists within alternative lists adds an even further layer of complexity that renders the claims indefinite. Consider claim 22: reading just the first 6 lines of the claim, it is impossible to understand which components belong in which list. For example, the limitation "record at least one sensory output as sampled data" appears to belong in the list associated with the configuration of the electrolysis apparatus controller subsystem, but its indentation places it in the list associated with the components of the gaseous electrolysis apparatus itself. This uncertainty continues for 6 pages, rendering the claim unintelligible. While claim 22 is an extreme example, claims 7, 12, 18 and 20 are also unintelligible for the same reason.

29. Even when one ignores the ample number of devices encompassed by the claims, the lists of alternatively usable components themselves are often perplexing. Members of an alternative group must possess a common property. While, for example, the list of cooled header options in claim 6 appears to comply with this provision, the functional limitations in claim 16 (for example) do not. Consider claim 18, which appears to describe a heat exchanger comprising one of: a plurality of spray nozzles, a controlled release of a predetermined amount of coolant, a controlled release of a calculated amount of coolant, a relatively low boiler volume, a flash boiler enabling a weight of coolant to be minimized for a mobile or transportable application, and a coolant. What structural or functional relationship exists between the members of this list? There is no structural relationship because only one list member—spray nozzles—is a structural limitation. While the list members seem to maybe be broadly related to a cooling function, there is no definite functional relationship because it is unclear how the three separate members related

to a boiler are related to this function. The claims are replete with lists whose members do not have a defined structural or functional relationship. Accordingly, the metes and bounds of the claims are unclear.

30. Furthermore, Applicant's terminology adds to the uncertainty of the claim scope. For example, claim 1 recites "an electronic control circuit or subsystem" that is "electrically or electronically" coupled to a header. What structural difference is there between a circuit and a subsystem? How is an electrical coupling different from an electronic coupling? Applicant's use of these terms in the alternative suggests that there must be some difference between the terms because if there were no difference, there would be no need to claim two alternatives. See also claim 5, which recites (alternatively) a cooled header and a cooling apparatus. There appears to be no clear difference between the two limitations that would necessitate claiming them in the alternative. The claims are replete with such limitations.

31. Moreover, the claims are replete with functional limitations that have no clear metes and bounds. For example, claim 2 recites a gasket and an electrical connection or coupling (an alternative limitation that itself is indefinite as discussed in the previous paragraph) that are configured to enable opening and closing of the apparatus or enable replacement of parts. First of all, it is unclear whether both the gasket and the nebulous electrical connection or coupling are required to contribute to the claimed functionality. Secondly, the structural relationship required between the gasket and/or the connection or coupling that would enable opening and closing of the apparatus or replacement of parts is unclear. Ignoring the fact that neither claim 1 nor claim 2 introduce a structure, such as a casing, that would need to be opened or closed, it is unclear how a gasket and/or electrical connection or coupling could contribute to opening or closing the claimed apparatus. Furthermore, while one of ordinary skill in the art could envision how an electrical connection or coupling would be used in an operation to replace parts, it is unclear how the electrical connection or coupling of the claim could be configured to enable this operation. The use of functional language in a claim may fail "to provide a clear-cut indication of the scope of the subject matter embraced by the claim" and thus be indefinite. *In re Swinehart*, 439 F.2d 210, 213 (CCPA 1971). For example, when claims merely recite a description of a problem to be solved or a function or result achieved by the invention, the boundaries of the claim scope may be unclear. *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1255, 85 USPQ2d 1654, 1663 (Fed. Cir. 2008) (noting that the Supreme

Court explained that a vice of functional claiming occurs "when the inventor is painstaking when he recites what has already been seen, and then uses conveniently functional language at the exact point of novelty") (quoting General Elec. Co. v. Wabash Appliance Corp., 304 U.S. 364, 371 (1938)); see also United Carbon Co. v. Binney & Smith Co., 317 U.S. 228, 234 (1942) (holding indefinite claims that recited substantially pure carbon black "in the form of commercially uniform, comparatively small, rounded smooth aggregates having a spongy or porous exterior"). Further, without reciting the particular structure, materials or steps that accomplish the function or achieve the result, all means or methods of resolving the problem may be encompassed by the claim. *Ariad Pharmaceuticals., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1353, 94 USPQ2d 1161, 1173 (Fed. Cir. 2010) (en banc). Further examples of indefinite functional language include:

- “optimally built so that a pressure side of each said feedthrough can be oriented towards and inside of the reaction chamber” (claim 4)
- “wherein at least one insulator is configured to at least one of: electrically isolate; minimize the volume where gas could reside; or provide mechanical support” (claim 8)
- “a robust, thick” ceramic insulator (claim 8)
- “can be of a shape to provide for high packing density an enable consistent cathode industrial production” (claim 12)
- “a heater in conjunction with said heat exchanger, produces [sic] a thermal gradient across a cathode and a wall of the reaction chamber” (claim 13)
- “sufficient number of said spray nozzles” (claim 18)
- “a controlled release of a predetermined amount of coolant; a controlled release of a calculated amount of coolant” (claim 18)
- “sufficiently high steam pressure for at least one application” (claim 19)
- “wherein the gas handling system comprises minimal volumes or amounts of pas external to the reaction chamber where heat is produced, enabling relatively accurate flow control and supporting safety concerns" (claim 20)

- “wherein the gas manifolds of the gas handling system comprise tanks or containers whose known volume enables small quantities of gas to be determined by calculating pressure, temperature, and volume before gas is transferred into or out of the reaction chamber" (claim 20)
- “a container configured to temporarily store the reactant gas and periodically permit extraction from the container” (claim 20)
- "configured to manage material output with a separator valve that facilitates estimation of quantities of reaction gas being processed" (claim 20)
- “wherein said gas handling system comprises at least one of: …supports mobile operation; or supports transportable operation" (claim 20)
- “subsystem that facilitates estimation of quantities of reaction gas processed (claim 22)
- “wherein said ECC controls a heat exchanger cooling valve to accomplish reaction chamber cooling at startup in order to facilitate the process startup" (claim 22; this limitation carries no patentable weight as it recited the intended use of the ECC and the valve)

32. The following terms are relative terms which renders the claim indefinite. The terms are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

- “sufficiently low temperature” (claim 6)
- “a robust, thick” ceramic insulator (claim 8)
- “tight Gaussian distribution" (claim 12)
- “the average temperature” (claim 18)
- “relatively low volume boiler” (claim 18)

33. Other claim limitations that raise questions as to the scope of the claims include:

- “said feedthrough” in claim 6 has insufficient antecedent basis

- "a stabilizer provides mechanical stability or a protector protects said antenna" in claim 7 is unclear because the claim does not define whether the function of the structure has patentable weight
- "the electrical connections or couplings" in claim 8 has insufficient antecedent basis
- "co-disposed within the reaction chamber" in claim 11 is unclear because it does not define what two components are both disposed within the reaction chamber
- "a coaxial" in claim 11 does not describe what two things share an axis
- "a consolidated metal power comprising at least one of a modular design, or an encased unit" in claim 12 is unintelligible because the terms consolidated and modular seem to be mutually exclusive and it is neither clear what is encased within the unit nor what the encasement is
- "cathode material that can be" in claim 12 because it implies the cathode also can be some other material or have some other property not recited in the claim
- "co-axial heat exchanger" in claim 14 does not define another component sharing an axis
- "co-disposed" in claim 14 does not define what other structure is disposed around the reaction chamber along with the heat exchanger
- "the average temperature" in claim 18 lacks antecedent basis
- "a rugged gas handling system; a compact gas handling system" (claim 20) does not clearly define what structure is encompassed by the adjectives rugged and compact

35. Any claim not specifically addressed above is rejected under 35 U.S.C. §112 because it depends on a rejected claim.

36. Taking account into account the clarity issues associated with the claims, it is not even clear that Applicant knows what the metes and bounds of the claims are, so we cannot expect one of ordinary skill in the art to be able to determine them. The claims seem designed to overwhelm the reader rather than to define the scope of the invention.

Claim Rejections - 35 USC § 101

37. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

38. **Claims 1-22 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility**. The reasons the invention as disclosed is inoperative are the same as the reasons set forth in paragraphs 6-13. There is no reputable evidence of record to indicate the invention has been reduced to the point of providing in current available form, an operative cold fusion system. This invention is not considered as meeting the requirements of 35 U.S.C. 101 as being "useful."

39. The applicant at best has set forth what may be considered a concept or an object of scientific research. However, it has been held that such does not present a utility within the meaning of 35 U.S.C. 101. See *Brenner v. Manson*, 148 U.S.P.Q. 689.

40. Additionally, it is well established that whereas here, the utility of the claimed invention is based upon allegations that border on the incredible or allegations that would not be readily accepted by a substantial portion of the scientific community, sufficient substantiating evidence of operability must be submitted by applicant. Note *In re Houghton*, 167 U.S.P.Q. 687 (CCPA 1970); *In re Ferens*, 163 U.S.P.Q. 609 (CCPA 1969); *Puharich v. Brenner*, 162 U.S.P.Q. 136 (CA DC 1969); *In re Pottier*, 152 U.S.P.Q. 407 (CCPA 1967); *In re Ruskin*, 148 U.S. P.Q. 221 (CCPA 1966); *In re Citron*, 139 U.S.P.Q. 516 (CCPA 1963); and *In re Novak*, 134 U.S.P.Q. 335 (CCPA 1962).

41. Claims 1-22 are also rejected under 35 U.S.C. 112(a) or pre-AIA 35 U.S.C. 112, first paragraph. Specifically, because the claimed invention is not supported by either a well-established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Claim Rejections - 35 USC § 103

42. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

43. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

44. This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

45. **Claim 1 is rejected under 35 U.S.C. 103 as being unpatentable over Davis et al., US Patent 6,248,221 in view of McGraw and Davis, "Critical Factors in Transitioning to Fuel Cell to Cold Fusion Technology," IECEC-98-1271, 1998.**

46. Regarding claim 1, Davis discloses a gaseous electrolysis apparatus (100; Figure 1) comprising: a cathode (104) disposed within a reaction chamber (118); a heat exchanger in proximity to the reaction chamber, said heat exchanger configured to remove heat from a surface of the reaction chamber (column 7, lines 51-65; see also the arrows labeled water and steam in Figure 1); a gas handling system mechanically coupled to the reaction chamber (column 7 lines 66 through column 8, line 5; hydrogen gas

is admitted to the device at 120 from a gas handling system that includes a hydrogen supply (inherent) and electronically-controlled gas valves (column 8, line 26)) and an electronic control circuit (200) mechanically coupled to said gas handling system (column 8, lines 23-31; the ECC controls gas valves). Davis does not explicitly disclose a gas header including at least one electrical connector or coupling and the ECC electronically coupled to said header. McGraw teaches a header (Figure 3; (the "gas mixing chamber" includes a header--a conduit into which other conduits feed--because the hydrogen, deuterium and carrier gas supplies feed into it) including at least one electrical connector (the header contains a temperature sensor which must include an electrical connector). Because Davis discloses the ECC is connected to electrically couples to temperature sensors (column 8, lines 23-26), the ECC of Davis would be electrically connected to the header of McGraw in the combination. One of ordinary skill in the art at the time of the invention would have found it obvious to combine the gas header of McGraw in the device of Davis for the predictable purpose of providing a structure into which multiple gases could flow and mix before entering the reaction chamber.

47. **Alternatively, Claim 1 is rejected under 35 U.S.C. 103 as being unpatentable over McGraw and Davis, "Critical Factors in Transitioning to Fuel Cell to Cold Fusion Technology," IECEC-98-1271, 1998 in view of Davis et al., US Patent 6,248,221.**

48. Regarding claim 1, McGraw discloses a gaseous electrolysis apparatus (Figure 3), comprising: a header (the "gas mixing chamber" includes a header--a conduit into which other conduits feed--because the hydrogen, deuterium and carrier gas supplies feed into it); a cathode (see Figure 1), a reaction chamber ("reactor"), a heat exchanger in proximity to the reaction chamber ("cooling tank"), the reaction chamber coupled to said header (via a conduit, a valve, and two pressure sensors), said heat exchanger configured to remove heat from a surface of the reaction chamber (the cooling tank surrounds the reactor, so it would inherently remove heat via contact with the surface); a gas handling system mechanically coupled to the reaction chamber (the hydrogen, deuterium and carrier gas supplies along with their regulators and valves are mechanically coupled via conduits and the gas mixing chamber to the reaction chamber); and an electronic control circuit or subsystem ("electronic control circuit") mechanically coupled

to said gas handling system (the ECC is connected to the reactor, which is in turn connected to the gas handling system at the gas mixing chamber).

49. Further regarding claim 1, McGraw does not explicitly disclose the header including at least one electrical connector or coupling, but the header includes a temperature sensor which must include an electrical connector to power it. Alternatively, one of ordinary skill in the art would have found it obvious to include an electrical connector for the predictable purpose of providing power to the temperature sensor. McGraw further does not explicitly disclose the gas handling system electrically or electronically coupled to said header; however, both the gas handling system and the header include valves that provide for communication therebetween. One of ordinary skill in the art would therefore have found it obvious to use electrically-actuated valves that would provide an electronic coupling between the two components. This modification would have been motivated by a desire to provide easy to control actuation of flow between the two components. Such an obvious modification would also require an electrical connection between the electronic control circuit and the header to provide for user-controlled valve actuation.

50. Finally regarding claim 1, McGraw does not disclose the cathode disposed within the reaction chamber. Davis teaches a similar device (see Figure 1) comprising a cathode (104) disposed within a protective jacket (118). Accordingly, one of ordinary skill in the art at the time of the invention would have found it obvious to dispose the cathode of McGraw within the reaction chamber for the predictable purpose of ensuring that malfunctions associated with the cathode do not affect areas outside the reaction chamber (column 14, lines 38-41). Furthermore, such an arrangement would prevent maintenance cathode maintenance by untrained persons (column 14, lines 41-42).

51. Due to the numerous clarity issues with the claims (see above in paragraphs 21-33) and the great deal of speculation required by the examiner when interpreting the claims, no art rejections are being presented in this action from dependent claims 2-22. See MPEP 2173.06(II). As stated in *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962), a rejection under 35 U.S.C. §103 should not be based on considerable speculation about the meaning of terms employed in a claim or assumptions that must be made as to the scope of the claims.

Information Disclosure Statement

52. The information disclosure statement filed 07/31/15 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; *each non-patent literature publication* or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. No copies of the cited NPL documents (other than the McGraw and Davis reference submitted on 02/17/16) can be found in the file. A copy of EP0568118 B1 was provided, but the list of citations includes EP0568118 A2. A copy of WO 2007096120 A3 was provided, but the list of citations includes 2007096120 A2. A copy of WO 2007130156 A3 was provided, but the list of citations includes 2007096120 A2.

Conclusion

53 Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHARON M. DAVIS whose telephone number is (571)272-6882. The examiner can normally be reached on Monday through Thursday, 8:00am - 6:00pm EST.

54. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

55. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. M. D./
Examiner, Art Unit 3646

/JACK W KEITH/
Supervisory Patent Examiner, Art Unit 3646