

EXHIBIT 1002

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESTO, INC., a/k/a TESTO NORTH AMERICA, AND TESTO SE & CO. KGaA

Petitioner

v.

PARKER INTANGIBLES LLC

Patent Owner

IPR2023-00685

U.S. Patent No. 10,281,183

DECLARATION OF JAMES PARKER

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I. INTRODUCTION

1. I, James Parker, submit this declaration to state my opinions on the matter described below.

2. I have been retained by Petitioner TESTO, INC., a/k/a TESTO NORTH AMERICA, AND TESTO SE & CO. KGaA (“Petitioner”), as an independent expert in this proceeding before the United States Patent and Trademark Office (USPTO). Although I am being compensated at my usual and customary rate of \$325.00 per hour, no part of my compensation depends on the outcome of this proceeding, and I have no other interest in this proceeding. I am not related or affiliated with Patent Owner, Parker-Hannifin Corporation, or Christian D. Parker.

3. I understand that this proceeding involves U.S. Patent No. 10,281,183 (the “’183 Patent” (Ex. 1001)), and I have been asked to provide my opinions as to the patentability of the claims of the ’183 Patent. I understand that the application for the ’183 Patent was U.S. Application No. 14/913,834 (the “’834 Application”), which was a U.S. national stage application of international application PCT/US2015/011900, filed January 19, 2015. I also understand that PCT/US2015/011900 claimed the benefit of U.S. Provisional Application No. 61/929,363, which was filed on January 20, 2014.

4. I have been advised that the '183 Patent claims may or may not be entitled to the benefit of U.S. Provisional Application No. 61/929,363, and if they are not then the effective filing date would not be the filing date of U.S. Provisional Application No. 61/929,363. Likewise, the '183 Patent claims may or may not be entitled to the benefit of PCT/US2015/011900 filing date. Nonetheless, I have been instructed to assume that the effective filing date is January 20, 2014 for purposes of forming my opinions in this matter.

5. I have been asked to consider the validity of certain claims of the '183 Patent based on certain prior art references. I have also been asked to consider the state of the art and prior art available as of January 20, 2014. Based on the prior art discussed in this declaration, it is my opinion that claims 1 and 12, the "Challenged Claims," of the '183 patent are unpatentable for the reasons provided below.

II. QUALIFICATIONS AND BACKGROUND

6. I believe that I am well qualified to serve as a technical expert in this matter based upon my educational and work experience, and specifically, wireless sensors, systems, and devices. My *curriculum vitae* ("CV") is submitted as Exhibit 1003.

7. I earned a diploma in Electronic Engineering Technology from the Radio College of Canada, now the RCC Institute of Technology, a Division of Yorkville University, in Toronto, Ontario, Canada in 1982.

8. I was an Engineering Technologist with Thermetic Controls Limited in 1983, a Technical Sales Representative at Har-Tech Electronics Ltd. in 1984, and Vice President of Engineering at Swinemaster Inc. from 1984 to 1985.

9. I was the Head of Engineering at Digital Security Controls (DSC) Limited starting in 1985. Tyco Security Products (TYCO) then acquired DSC. I was then Vice President of Engineering at TYCO until December 2003.

10. I was the co-founder and President of EE-Systems Group Inc. (EE-SGI) Canada (R&D) from 2004–2014. I was responsible for new product development.

11. I am currently a consultant at Parker Security Consulting Inc. (PARSEC), which I founded to provide technical consulting and expert witness services in electronics research and development, new product development, electronic security systems and sensors, and other areas.

12. While at EE-SGI, I developed several new technologies such as ePIR for motion detection, eLEDing for high efficiency LED illumination and eFAR for significant false alarm reduction.

13. While at DSC/Tyco, I was the principal architect and driving force behind most of DSC's major commercial product successes. These include the industry benchmark setting "Power" and "Maxsys" families, and the PC1550, which is one of the most prolific alarm control panels in the world with an installed base in the millions.

14. I developed the KEYBUS and COMBUS protocols for interconnecting components. These protocols have a proven track record and have been widely imitated and copied. I also developed DSC's wireless protocols for both 924 Mhz DSSS (Direct Sequence Spread Spectrum) and 433.92 Mhz tight narrow band.

15. I conceived and drove the development of over twelve mixed mode ASIC's (Application Specific Integrated Circuits). Mixed mode ASIC's combine analog and digital circuitry on a single chip. They offer superior capabilities and performance to "off the shelf" solutions while dramatically reducing cost and improving product reliability.

III. MATERIALS CONSIDERED

16. In forming my opinions, I reviewed the following documents:

Exhibit	Description
Ex. 1001	U.S. Patent No. 10,281,183 to Parker et al. (the '183 Patent)
Ex. 1004	Prosecution History of U.S. Patent No. 10,281,183
Ex. 1005	"Wireless Full System Analysis in Real Time" brochure for "Fieldpiece HG3" (The Fieldpiece Brochure)
Ex. 1006	CN 101339078 (CN '078)
Ex. 1007	English Translation of CN 101339078
Ex. 1008	U.S. Patent No. 6,779,919 (Staniforth)

Ex. 1009	CN 102435332 (CN '332)
Ex. 1010	English Translation of CN 102435332
Ex. 1011	EP 2 309 212 (Peirs)
Ex. 1012	“HVAC Guide System Analyzer Field Manual Model HG3” (The Fieldpiece Manual)
Ex. 1013	U.S. Pre-Grant Publication No. 2013/0245965 (Kane)

IV. LEGAL STANDARDS

17. In forming my opinions and considering the subject matter of the '183 patent and its claims in light of the prior art, I am relying on certain legal principles that counsel for the Petitioner in this case explained to me. My understanding of these concepts is summarized below.

18. I understand that the claims of a patent define the invention.

19. I understand that an unpatentability analysis is a two step process. First, the claims of the patent are construed to determine their meaning and scope. Second, the content of the prior art is compared to the construed claims.

20. I understand that a patent claim is only patentable over “prior art” when it is new and non-obvious in light of the prior art. That is, the invention as defined

in the claims of the patent must not be anticipated by or rendered obvious by the prior art.

A. Claim Construction

21. I have been advised that the USPTO interprets claim terms in *inter-partes* review proceedings under the same claim construction standards used in the United States federal courts, and that under these standards, the meaning of claim terms is considered from the viewpoint of one of ordinary skill in the art at the time of the invention.

22. I have been further advised that claim terms are generally given their plain and ordinary meaning in light of the specification and prosecution history pertaining to the patent. I understand, however, that claim terms are not generally limited to specific embodiments described in the specification.

23. I understand that in addition to the claims, specification, and prosecution history, other evidence may be considered to ascertain the meaning of claim terms, including textbooks, encyclopedias, articles, and dictionaries, although this evidence is secondary to the claims, specification, and prosecution history.

B. Anticipation Under 35 U.S.C. § 102

24. I have been advised that 35 U.S.C. § 102 lists the standard for when a patent claim is anticipated and is, thus, unpatentable as follows:

(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or

(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

25. I have been advised that this means that a patent claim is unpatentable under 35 U.S.C. § 102 if its subject matter was patented or described in a printed publication before the effective filing date of the claimed invention, and this grounds for unpatentability is referred to as “anticipation.” I have also been advised that a patent claim is anticipated, or lacks novelty, if a single prior art reference discloses every element of the claim.

26. I have been advised that a reference may inherently disclose an element of an invention if the element is necessarily present in the technology disclosed even though it may not have been explicitly stated in the reference.

C. Obviousness Under 35 U.S.C. § 103

27. I have been advised that that 35 U.S.C. § 103 lists the statutory standard for obviousness, and states:

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, 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.

28. I understand that obviousness can be established over one prior art reference or a combination of references that teach the invention.

29. I understand that a patent claim is unpatentable as obvious if the claimed invention would have been obvious to a person of ordinary skill in the art at the time the claimed invention was made. This, I have been advised, means that even if all of the elements of the claim cannot be found in a single prior art reference such that the single prior art reference would anticipate the claim, a person of ordinary skill in the art who knew about the prior art would have come up with the claimed invention. I understand that in an obviousness determination, the person of ordinary skill in the art is presumed to have knowledge of all material prior art. I also understand that whether a claim is obvious is based upon the determination of several factual issues.

30. I have been advised that obviousness is a determination of law based on underlying determination of fact.

31. I understand that this underlying determination of fact includes determining (i) the scope and content of the prior art; (ii) differences between the prior art and the claims at issue; and (iii) the level of ordinary skill in the pertinent art. With these determinations, I have been advised, the obviousness or non-obviousness of the subject matter is determined – whether one prior art reference or a combination of references teach the claimed invention. I have also been advised, that secondary considerations of non-obviousness must be determined.

32. I understand that one must determine what differences, if any, existed between the claimed invention and the prior art.

33. I understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, one may consider whether a reason has been identified that would have prompted a person of ordinary skill in the art to combine the elements or concepts from the prior art in the same way as in the claimed invention. There is no single way to define the line between true inventiveness on the one hand (which is patentable) and the application of common sense and ordinary skill to solve a problem on the other hand

(which is not patentable). For example, market forces or other design incentives may be what produced a change, rather than true inventiveness.

34. I understand that there is no rigid rule that a reference or combination of references must contain a “teaching, suggestion, or motivation” to combine references. But I also understand that the “teaching, suggestion, or motivation” test can be a useful guide in establishing a rationale for combining elements of the prior art. I have been told that this test poses the question as to whether there is an express or implied teaching, suggestion, or motivation to combine prior art elements in a way that realizes the claimed invention, and that it seeks to counter impermissible hindsight analysis.

35. I understand that one may consider, for example, whether (1) the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness; (2) there is some teaching or suggestion in the prior art to make the modification or combination of elements claimed in the patent; (3) the claimed innovation applies a known technique that had been used to improve a similar device or method in a similar way; (4) the claimed invention would have been obvious to try, meaning that the claimed innovation was one of a relatively small number of possible approaches to the problem with a reasonable expectation of success by those skilled in the art; (5) the invention merely substituted one known element for another known element in order

to obtain predictable results; (6) the invention merely applies a known technique to a known device, method, or product to yield predictable results; or (7) known work in the field may have prompted variations of use of the same inventions in the same or different fields due to market forces or design incentives that would have been predictable to a person of ordinary skill in the art.

36. I understand that any assertion of secondary considerations of non-obviousness must be accompanied by a nexus between the merits of the invention and the evidence offered.

37. I have been advised that the motivation to combine teachings in prior art references may be found explicitly or implicitly in market forces; design incentives; the interrelated teachings of multiple patents; any need or problem known in the field of endeavor at the time of invention and addressed by the patent; and the background knowledge, creativity, and common sense of the person of ordinary skill in the art.

38. I understand that an analogous reference that is (1) from the same field of endeavor as the claimed invention (even if it addresses a different problem); or (2) reasonably pertinent to the problem faced by the inventor (even if it is not in the same field of endeavor as the claimed invention) may be used to establish claims are obvious.

V. The '183 Patent

A. Overview of the '183 Patent

39. The '183 Patent relates to a sensor system for refrigeration units: “The present invention is directed to enhanced sensor systems for refrigeration units for monitoring and collecting system conditions, such as superheat and subcooling.” Ex. 1001, 1:12–14. Refrigeration units are equipment that are broadly used in “heating, ventilation, air conditioning and refrigeration (HVACR) systems.” *Id.*, 1:18–21.

40. The '183 Patent describes certain sensor systems that existed prior to the effective filing date in the “BACKGROUND OF THE INVENTION,” and states “FIG. 1 depicts a conventional gauge set used for monitoring and collecting system conditions of a refrigerant unit such as pressure, which may then be used to calculate system parameters such as superheat and subcooling.” Ex. 1001, 1:23–27. The prior art sensors for a refrigerant unit included two pressure sensors: “There is a set of analog pressure gauges 14, typically a high side pressure gauge . . . and a low side pressure gauge . . .” (*Id.*, 1:32–35), and two temperature sensors: “FIGS. 2 and 3 (FIG. 3 being a more close-up view) depict the installation of the conventional gauge set 10 and temperature sensors 16 within an air conditioning unit 18.” *Id.*, 1:48–50,

underline added. A technician would use the temperature and pressure readings from these sensors to then “manually calculate superheat and supercooling.” *Id.*, 1:50–52.

41. The '183 Patent points out problems in the prior art pressure gauges, which would have a “length of the hoses to the analog or digital gauges at the manifold to display pressure.” Ex. 1001, 1:57–59. The problems included the following. The refrigerant in conventional gauge hoses had to be collected and reclaimed, rather than released to the environment. *Id.*, 1:61–63. Refrigerant trapped in the hoses required reservation of one set of hoses for only those HVAC systems using the same one type of refrigerant. *Id.*, 1:65–2: 17. This deficiency required a technician to carry multiple sets of gauges – one for each type of refrigerant that might be encountered. *Id.* Otherwise, cross-contamination would lead to gauge set damage and reduced HVACR system performance. *Id.* The lengthy hoses were bulky and inconvenient to transport, weighty and difficult to manage — especially on ladders and roofs. *Id.* 2:18–30. Also, conventional gauge sets required a technician to stand next to the gauges to read them, or a first technician to stand next to and read a gauge, and a second technician in radio communication with the first and receiving reports from the first via radio. *Id.*, 2:24–30. Finally, the “close distance requirements of conventional analog gauge sets” provided another deficiency in the prior art. *Id.*

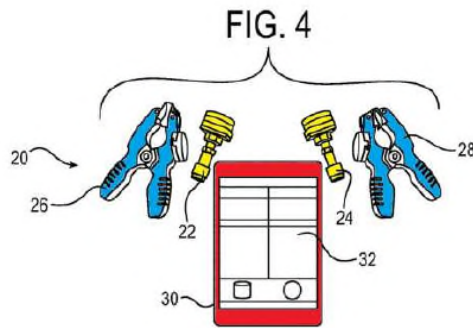
42. The '183 Patent describes the solution to these problems in the art: wireless communication from sensors to a remote device that can calculate system conditions:

The described invention is a hoseless system of individual hose-free sensors that are installed on a refrigeration or air conditioning system. Sensor information may be transmitted wirelessly to a remote device, such as a portable electronic device (e.g., tablet computer, laptop computer, smartphone, or the like). The portable electronic device may have installed a software or program application that receives the sensor information and calculates automatically system conditions, such as for example superheat and subcooling.

Ex. 1001, 2:36–45, underline emphasis added.

43. In comparison to the conventional systems described in the “BACKGROUND OF THE INVENTION” section, all that is added by the '183 Patent claims is “hoseless” or “wireless” communication between sensors and a portable electronic device.

44. At FIG. 4, the '183 Patent illustrates “an exemplary hoseless sensor system for use in sensing parameters and determining system conditions” (Ex. 1001, 3:55–57) and a color-coded copy of FIG. 4 follows.



Ex. 1001, FIG. 4

45. FIG. 4 of the '183 Patent includes two temperature sensors 26, 28 (Blue), two pressure sensors 22, 24 (Yellow), and a portable electronic device 30 (Red). Ex. 1001, 4:56–5:10.

46. The '183 Patent refers to both the temperature sensors and both the pressure sensors as “hoseless” sensors, and states that they “transmit pressure and temperature data to the portable electronic device preferably by a wireless communication.” Ex. 1001, 4:56–61;6:6–8.

47. According to the '183 Patent, the portable electronic device “may calculate system conditions based on sensor parameters measured by the plurality of hoseless sensors.” Ex. 1001, 4:67–5:2.

B. Person Having Ordinary Skill in the Art

48. I was advised that patentability must be analyzed from the perspective of “one of ordinary skill in the art,” or “person of ordinary skill in the art” (a “POSITA”), in the same field as the '183 patent at the time of the invention. I was also advised that several factors are considered in assessing the level of a POSITA,

including (1) the types of problems encountered in the art; (2) the prior art solutions to those problems; (3) the rapidity with which innovations are made; (4) the sophistication of the technology; and (5) the education level of active workers in the field.

49. In my opinion, one of ordinary skill in the art, that is, a person of ordinary skill in the art (POSITA), of the '183 Patent would have (A) a bachelor's or equivalent degree in electrical or electronic engineering, industrial engineering, or mechanical engineering, or (B) at least a two (2) year associate's degree in electrical or electronic engineering, industrial engineering, or mechanical engineering, or an equivalent field, and two (2) years of practical experience in an industry relating to HVAC service and repair.

50. Although my training and experience surpassed the above definition of a POSITA at the effective filing date of the '183 patent, January 20, 2014, my analysis was from the perspective of a POSITA as of January 20, 2014.

51. I am also familiar with the knowledge of the POSITA as of January 20, 2014. I am able to opine on how POSITA would have understood the disclosure and claims of the '183 Patent, the disclosures of the prior art, the motivation to combine the prior art, and what combinations would have been obvious to a POSITA prior to the priority date of the '183 Patent, January 20, 2014.

VI. CLAIM CONSTRUCTION AND OVERVIEW OF GROUNDS

52. I understand that the United States Patent and Trademark Office interprets claim terms in an *inter partes* review proceeding under the same claim construction standard that is used in a United States federal court. I understand that under this standard, the meaning of claim terms is considered from the viewpoint of one of ordinary skill in the art at the time of the alleged invention.

53. I have been informed that claim terms are generally given their ordinary and customary meaning as understood by one of ordinary skill in the art in light of the specification and the prosecution history pertaining to the patent. I understand that in addition to the claims, specification, and prosecution history, other evidence may be considered to ascertain the meaning of claim terms, including textbooks, encyclopedias, articles, and dictionaries, although this other evidence is often less significant and less reliable than the claims, specification, and prosecution history.

54. I have been asked to assume that the claim terms have their plain and ordinary meaning to a POSITA in light of the specification and the prosecution history at the time of the invention. I expect to respond in the event that the Patent Owner proposes or the Board adopts a different construction. As of this point in the proceedings, I am not aware of anything in the prosecution history of the '183 Patent that would change my opinions in this declaration.

55. Grounds of Unpatentability

Grounds of Unpatentability	
1	The Fieldpiece Brochure renders claims 1 and 12 unpatentable.
2	The Fieldpiece Brochure in combination with CN '078 renders claims 1 and 12 unpatentable.
3	The Fieldpiece Brochure in combination with CN '078 and Staniforth renders claims 1 and 12 unpatentable.
4	The Fieldpiece Brochure in combination with CN '332 renders claims 1 and 12 unpatentable.
5	The Fieldpiece Brochure in combination with of CN '332 and Staniforth renders claims 1 and 12 unpatentable.
6	The Fieldpiece Brochure in combination with Peirs renders claims 1 and 12 unpatentable.
7	The Fieldpiece Brochure in combination with Peirs and Staniforth renders claims 1 and 12 unpatentable.
8	The Fieldpiece Manual renders claims 1 and 12 unpatentable.
9	The Fieldpiece Manual in combination with CN '078 and Staniforth renders claims 1 and 12 unpatentable.

Grounds of Unpatentability	
10	Kane anticipates claims 1 and 12.
11	Kane in combination with Staniforth renders claims 1 and 12 unpatentable
12	Kane in combination with Staniforth and CN '078 renders claims 1 and 12 unpatentable.

VII. GROUND 1: THE FIELDPIECE BROCHURE RENDERS CLAIMS 1 AND 12 UNPATENTABLE

A. Independent Claim 1

1. Claim 1, [Preamble] “A sensor system for a refrigerant unit comprising:”

56. The Fieldpiece Brochure discloses a sensor system for a refrigerant unit in at least with its “Full A/C Diagnostic Kit.” Ex. 1005, Pg. 4. The text describing this sensor system states “Full A/C Diagnostic Kit — THE most accurate way to do a full system diagnosis, the HG3K18AC uses all wireless measurements to get real-time data for the CheckMe!® Test. Includes nine ET2W wireless transmitters and nine accessory heads.” *Id.* It is my opinion that The Fieldpiece Brochure disclose a “sensor system for a refrigerant unit,” as recited in claim 1 of the '183 Patent.

2. ***Claim 1, [1] “a plurality of sensors for sensing system parameters of the refrigerant unit; and”***

57. An image of the Full A/C Diagnostic Kit is reproduced below from Exhibit 1005:



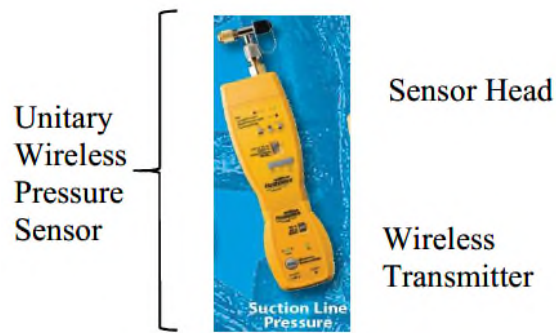
Ex. 1005, Pg. 4 – Full A/C Diagnostics Kit

58. The Fieldpiece Brochure explains that a “ET2W wireless transmitter” and “any” accessory head are combined into a single unit to provide a wireless sensor:

Simply slide any Fieldpiece Accessory Head onto the ET2W wireless transmitter to make any head a wireless measuring device.

Ex. 1005, Pg. 3.

59. The result of combining a pressures sensor head with the wireless transmitters is pictured at Pg. 1 of The Fieldpiece Brochure as a unitary, wireless pressure sensor combining a pressure sensor head with a ET2W wireless transmitter:



Ex. 1005, Pg. 1

60. In view of the above disclosure of a wireless pressure sensor in The Fieldpiece Brochure, a POSITA would understand that all of the nine ET2W wireless transmitters and nine accessory heads of the Full A/C Diagnostic Kit are respectively combined into a plurality of wireless sensors.

61. It is my opinion that The Fieldpiece Brochure discloses [1] “a plurality of sensors for sensing system parameters of the refrigerant unit,” as recited in claim 1 of the ’183 Patent.

3. ***Claim 1, [2] “a portable electronic device configured to receive the system parameters from the plurality of sensors and to calculate system conditions for the refrigerant based on the system parameters;”***

62. The Fieldpiece Brochure discloses the “WIRELESS HG3 System Analyzer,” that “walks you through step-by-step through critical HVAC tests. With wireless capability, all your measurements are taken in real-time, so you can diagnose a system more accurately.” Ex. 1005, Pg. 2. An image from Pg. 2 of The

Fieldpiece Brochure, Ex. 1005, is copied below, with annotations, to illustrate the WIRELESS HG3 System Analyzer.



Ex. 1005, Pg. 2

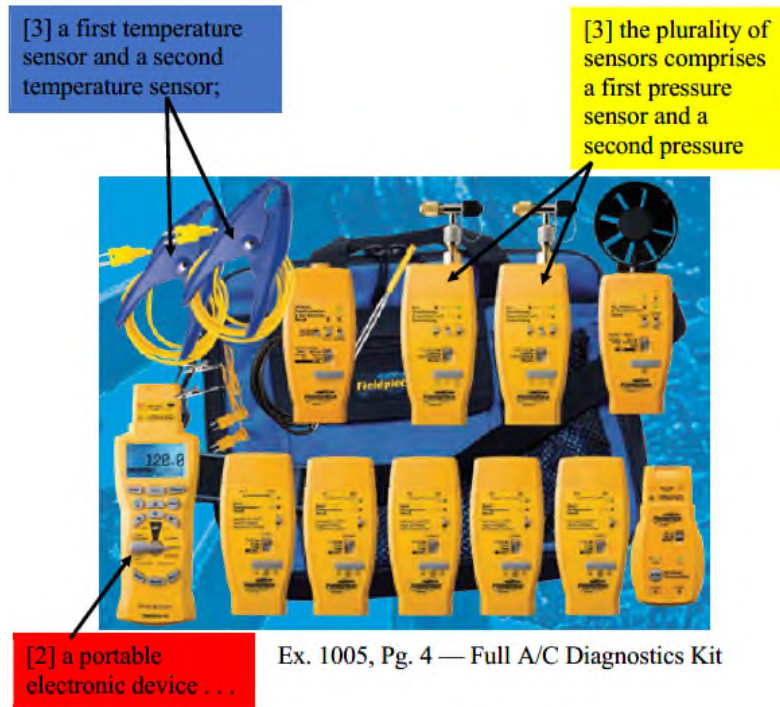
63. As illustrated in the "INPUT FORM," the WIRELESS HG3 System Analyzer "receives the system parameters from the plurality of sensors"; that is, from at least two of the plurality of sensors in, for example, the Full A/C Diagnostics Kit. See Ex. 1005, Pg. 4. Also, as illustrated in the OUTPUT FORM, the WIRELESS HG3 System Analyzer is configured to "calculate system conditions for the refrigerant based on the system parameters."

64. The '183 Patent establishes that a POSITA knew prior to January 20, 2014 that superheat and subcooling are calculated results related to conditions for the refrigerant (Ex. 1001, 1:42–55), which is as illustrated in The Fieldpiece Brochure, and copied above.

65. It is my opinion that The Fieldpiece Brochure discloses [2] “a portable electronic device configured to receive the system parameters from the plurality of sensors and to calculate system conditions for the refrigerant based on the system parameters,” as recited in claim 1 of the '183 Patent.

4. Claim 1, [3] “wherein: the plurality of sensors comprises a first pressure sensor and a second pressure sensor, and a first temperature sensor and a second temperature sensor;”

66. An image of the Full A/C Diagnostics Kit from The Fieldpiece Brochure is reproduced below, with annotations, showing the Full A/C Diagnostics Kit with two temperature sensors (Blue) and two pressure sensors (Yellow):

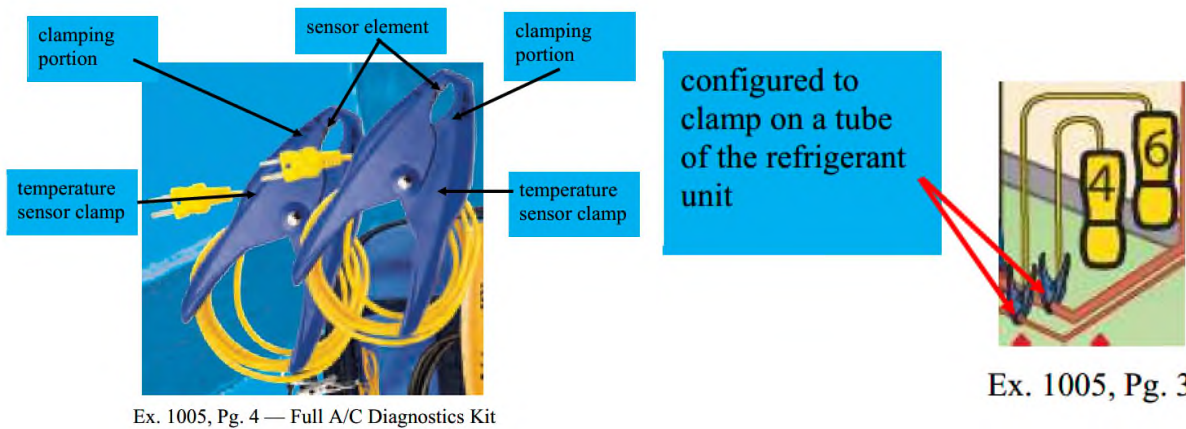


Ex. 1005, Pg. 4 — Full A/C Diagnostics Kit

67. It is my opinion that The Fieldpiece Brochure discloses [3] “the plurality of sensors comprises a first pressure sensor and a second pressure sensor, and a first temperature sensor and a second temperature sensor,” as recited in claim 1 of the ’183 Patent.

5. ***Claim 1, [4] “the first and second temperature sensors each comprises a temperature sensor clamp having a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube;”***

68. An image from The Fieldpiece Brochure showing the Full A/C Diagnostics Kit alongside an image of the temperature sensor claims clamped on a tube of the refrigerant unit is copied below with annotations:

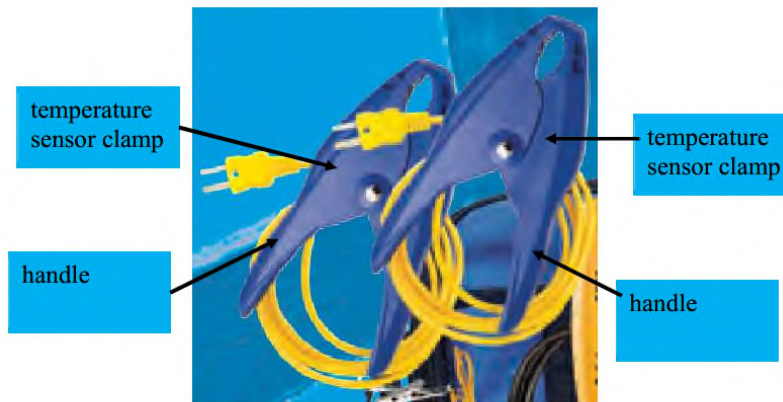


69. As shown above, each temperature sensor clamp in the Full A/C Diagnostics Kit includes a clamping portion configured to clamp on a tube of the refrigerant unit, and a sensor element in the clamping portion.

70. In my opinion, The Fieldpiece Brochure discloses [4] “the first and second temperature sensors each comprises a temperature sensor clamp having a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube,” as recited in claim 1 of the ’183 Patent.

6. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

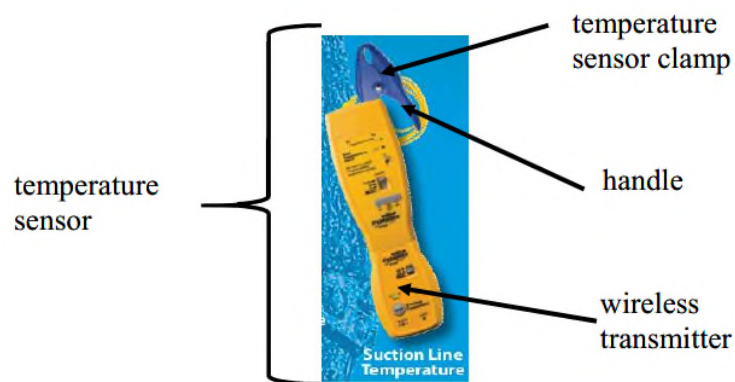
71. The same image of Full A/C Diagnostics Kit is copied below with different annotations to highlight that each clamp includes a handle:



Ex. 1005, Pg. 4 — Full A/C Diagnostics Kit

72. It is my opinion that each of the above illustrated temperature sensor clamps necessarily include integrated electronics; *i.e.*, a thermocouple, to convert sensed temperature to signal carried by the cable, and deliver them to the wireless transmitter.

73. Further, see the below copied photograph of an isolated, wireless temperature sensor from The Fieldpiece Brochure. It is my opinion the temperature sensor clamp necessarily includes integrated electronics that carry the sensed temperature data to the wireless transmitter:



Ex. 1005, Pg. 1

74. The Fieldpiece Brochure teaches “Wireless Signal from 100’ Away,” “12 Wireless Measurements at the Same Time,” and obtaining a “complete live system snapshot.” Ex. 1005, Pg. 3. Any assembly of sensors disclosed in The Fieldpiece Brochure including 12 sensors to take “12 Wireless Measurements at the Same Time” would be bulky and difficult to work with in practice. A POSITA would have been motivated to move a wireless transmitter into the handle of each temperature sensor to reduce the number of components a technician would have to carry, and minimize bulkiness of the Kit, while still being able to obtain “Wireless Signal from 100’ Away” from each temperature sensor.

75. It is my opinion that a POSITA would have understood prior to January 20, 2014 that wireless technology capable of being received 100 feet away was commonplace and could have been incorporated in the temperature sensor clamps successfully. For example, Bluetooth 4.0 was easily capable of reaching beyond 100 feet (up to 300 feet as per the standard in place at the time). Bluetooth technology was also sufficiently miniaturized prior to January 20, 2014 as to be in popular use in a myriad of small electronic devices, including smartphones, wireless headphones and hands free headsets such as those types that fit on or over the ear.

76. Still further, as noted above, The Fieldpiece Brochure teaches that one can “simply slide any Fieldpiece Accessory Head onto” a wireless transmitter. It is my opinion that, based on The Fieldpiece Brochure, a POSITA would have gone

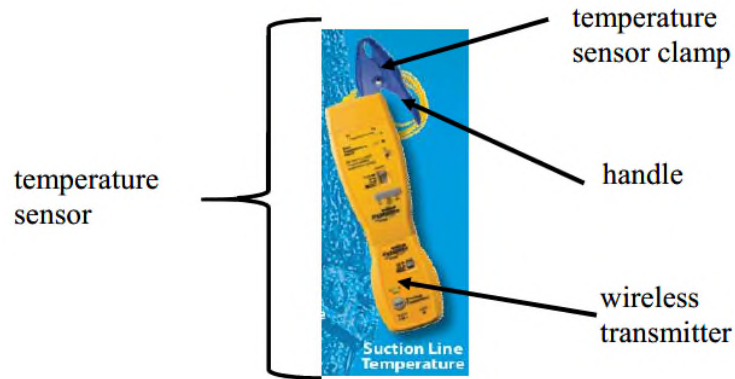
further and placed suitably configured wireless transmitters into the temperature sensor handles, and in electrical connection with the sensor elements.

77. It is my opinion that The Fieldpiece Brochure teaches [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 1.

7. ***Claim 1, [6] “there are no external physical connections among the plurality of sensors and the portable electronic device.”***

78. The “Full A/C Diagnostics Kit ... Includes nine ET2W wireless transmitters and nine accessory heads.” Ex. 1005, Pg. 4. A POSITA would have understood that every one of the nine accessory heads can be modified by attachment to its own wireless transmitter. It is my opinion that, a POSITA would have readily assembled components that were only wirelessly connected based on The Fieldpiece Brochure.

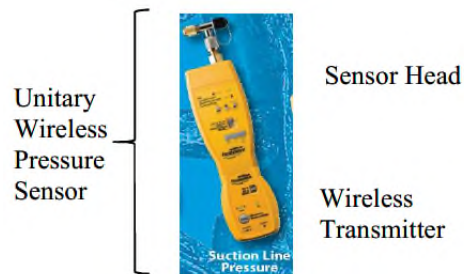
79. An image of a temperature sensor from The Fieldpiece Brochure is reproduced below:



Ex. 1005, Pg. 1

80. As shown, there is no external physical connection leading away from the temperature sensor, and two such temperature sensors are included in the Full A/C Diagnostics Kit. Ex. 1005, Pg. 4.

81. Further, as disclosed, each pressure sensor in The Fieldpiece Brochure is an integrated, unitary wireless sensor. See, for example, Ex. 1005, Pgs. 1 and 4, and the below copied image from Ex. 1005, Pg. 1:



Ex. 1005, Pg. 1

82. Further, the WIRELESS HG3 System Analyzer, the portable electronic device, receives data from each sensor wirelessly. *Id.*, Pg. 3. Accordingly, it is

further my opinion on that the WIRELESS HG3 System Analyzer has no external physical connection.

83. It is also my opinion that there are no physical connections between any of the wireless sensors taught or disclosed in The Fieldpiece Brochure and the WIRELESS HG3 System Analyzer.

84. It is my opinion that The Fieldpiece Brochure discloses [6] “there are no external physical connections among the plurality of sensors and the portable electronic device,” as recited in claim 1 of the ’183 Patent.

8. *Claim 1 Summary and Conclusion*

85. Based on the foregoing analysis, it is my opinion that a POSITA would appreciate that The Fieldpiece Brochure teaches incorporation of wireless technology in HVACR sensors configured to transmit data to a remote, portable electronic device used for analysis of HVACR systems. A POSITA would recognize that The Fieldpiece Brochure temperature sensor could be improved by placing wireless technology and integrated electronics in the temperature sensor clamp handles of The Fieldpiece Brochure in order to enhance usability of the assembled sensor system components. A POSITA would have found it obvious to make such a modification and would have predicted success of this combination.

86. A POSITA would have been motivated to combine HVACR sensors and wireless technology in order to reduce the bulk, number, and arrangement of

components required in the field. Instead of two temperature sensor clamps, and their respective tethered headpiece-wireless transmitter units of The Fieldpiece Brochure, the modification would result in two wireless temperature sensor clamps requiring less bulk and weight, and being more convenient to simply clamp in place and remove at will. A POSTIA would also have been motivated to make the combination of wireless sensors and a wireless remote computer in order to eliminate distance constraints imposed by cables or hoses connecting sensors to each other, or to the remote computer collecting sensed data. A POSITA would have understood that without such distance constraints, a greater number of sensors could be deployed at remote locations, while facilitating rapid and efficient data collection from every sensor at the same time, and without the need for a technician to physically approach, read, and record data from each sensor. A POSTIA would also have known based on the state of the art at the time that wireless communication was predictably effective, and would have expected success at the combination of wireless technology in HVACR sensors and remote computers.

87. Accordingly, it is my opinion that The Fieldpiece Brochure renders claim 1 obvious.

B. Independent Claim 12

1. ***Claim 12, [Preamble] “A temperature sensor clamp for sensing temperature in a refrigerant unit, the temperature sensor clamp comprising:”***

88. The Full A/C Diagnostic Kit temperature sensors in The Fieldpiece Brochure includes temperature sensor clamps for sensing temperature in a refrigerant unit. See Ex. 1005, Pgs. 2–4. It is my opinion that The Fieldpiece Brochure discloses this preamble.

2. ***Claim 12, [1] “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube, and”***

89. See the discussion of claim 1, element [4] at Section VII.A.5, which is incorporated by reference as if fully set forth here. For at least the same reasons, it is my opinion that The Fieldpiece Brochure discloses [1] “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube,” as recited in claim 12 of the '183 Patent.

3. ***Claim 12, [2] “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;”***

90. See the discussion of claim 1, element [5] at Section VII.A.6, which is incorporated by reference as if fully set forth here. For at least the same reasons, it

is my opinion that The Fieldpiece Brochure discloses “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 12 of the ’183 Patent.

4. Claim 12, [3] “wherein the temperature sensor clamp has no external physical electrical or fluidic connections.”

91. See the discussion of claim 1, element [6] at Section VII.A.7, which is incorporated by reference as if fully set forth here. For at least the same reasons, it is my opinion that The Fieldpiece Brochure teaches “wherein the temperature sensor clamp has no external physical electrical or fluidic connections,” as recited in claim 12 of the ’183 Patent.

5. Claim 12 Summary and Conclusion

92. For at least the same reasons as set forth in Section VII.A.8, which is incorporated by reference as if fully set forth here, it is my opinion that The Fieldpiece Brochure renders claim 12 obvious.

VIII. GROUND 2: THE FIELDPIECE BROCHURE IN COMBINATION WITH CN ’078 RENDERS CLAIMS 1 AND 12 UNPATENTABLE

93. CN ’078 is directed to a device comprising a temperature sensor that wirelessly transmits temperature data to a computer, which then analyzes the temperature data. Ex. 1007, Abstract. The wireless temperature sensor can be a temperature sensor clamp. Ex. 1006, FIG. 5.

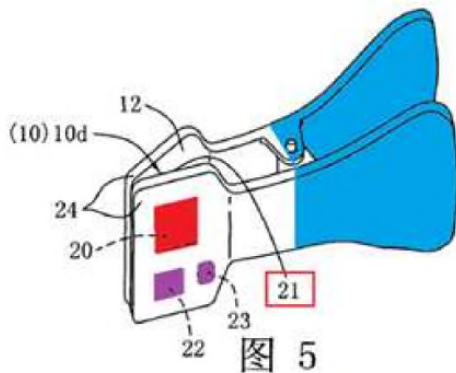
94. In my opinion, The Fieldpiece Brochure is analogous art to and in the same field as the '183 Patent since both relate to sensor systems that remotely transmit temperature and pressure data for refrigeration units. See Ex. 1005, Pg. and Ex. 1001, 1:12–14. It is also my opinion that CN '078 is analogous art to The Fieldpiece Brochure and the '183 Patent, since it is reasonably pertinent to a problem described in the '183 Patent, for example, “an improved sensor system for refrigeration units for monitoring and collecting system conditions,” and the proposed solution of “wireless” transmission of sensor data to a remote device. Ex. 1001, 2:34–40. CN '078 provides “The temperature sensing device can be fixed on the poultry body ... and transmit the sensed temperature to a computer device by transmitting a wireless signal with a wireless transmitter” Ex. 1007, p. 5, 1st paragraph.

A. Independent Claim 1

95. Sections VII.A.1–5 set forth my opinion that The Fieldpiece Brochure discloses the preamble and elements [1], [2], [3], and [4] of claim 1, and are incorporated by reference and the same analysis applies here. Section VII.A.6 sets forth my opinion that The Fieldpiece Brochure discloses “each temperature sensor clamp further comprises a handle,” as recited in element [5] of claim 1, and is incorporated by reference and the same analysis applied here.

1. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

96. Below is a color-coded comparison of the temperature sensor clamp of CN '078 at FIG. 5 to the temperatures sensor clamp of the '183 Patent at FIGS. 9B and 10:



Ex. 1006, FIG. 5

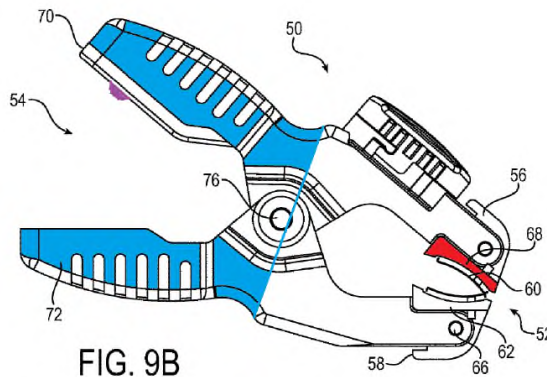


FIG. 9B

Ex. 1001, FIG. 9B

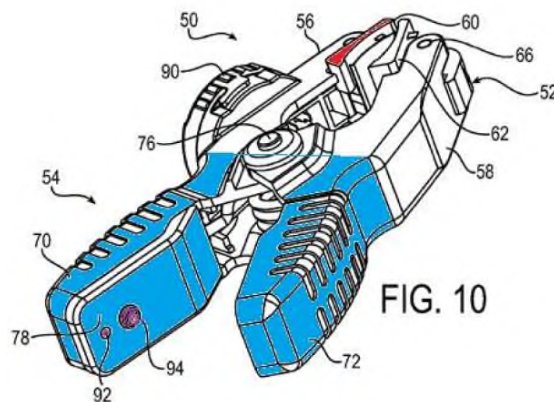


FIG. 10

Ex. 1001, FIG. 10

97. With reference to the annotated FIGS. 9B and 10 of the '183 Patent, above, the '183 Patent describes integrated electronics (Purple). Ex. 1001, 9:55–61.

Further, the integrated electronics are described in “electrical connection” to the sensor 68 (Red). *Id.* The 183 Patent also states that the “integrated electronics may include . . . wireless interface pair button.” *Id.*

98. CN '078 discloses a temperature sensing device having integrated electronics including a “wireless transmitter 22” (Purple) and an “alarm 23” (Purple) Ex. 1007, Pg. 6.

99. The CN '078 device also comprises a clamp: “a clamping portion 24, as shown in Fig. 5, [that] directly clamps and is fixed on” the item being monitored. Ex. 1007, Pg. 6 and Ex. 1006, FIG. 5, copied above.

100. The device of CN '078 also comprises a “handle.” See Ex. 1006, FIG. 5, as reproduced above.

101. CN '078 also discloses temperature sensor 20 (Red) having a sensing surface 21. Ex. 1007, Pg. 6. See CN '078 FIG. 5 reproduced above. Further, “a temperature sensor 20 starts sensing and converts the measured sensed values into electrical signals, the electrical signals are transmitted through a wireless transmitter 22 to a wireless receiver 31, the wireless receiver 31 transmits the electrical signals received to a computer device 30, and the computer device 30 analyzes and determines the electrical signals received.” Ex. 1007, Pg. 5. In my opinion, a POSITA would have understood that the “wireless transmitter 22” would be

considered an integrated electronic component of the clamp, and is in electrical connection with the sensor element.

102. Claim 1 recites that the integrated electronics are incorporated into the “handle.” However, it is my opinion that moving the integrated electronics a little closer or a little farther away from the sensor element in the same clamp arm part, as illustrated in CN ’078, has no effect on function and is an obvious design choice a POSITA would have readily adopted.

103. It is my opinion that The Fieldpiece Brochure in combination with CN ’078 teach [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 1 of the ’183 Patent.

2. Claim 1, [6] “there are no external physical connections among the plurality of sensors and the portable electronic device.”

104. Section VII.A.7 further sets for my opinion that The Fieldpiece Brochure discloses two wireless pressure sensors and the WIRELESS HG3 System Analyzer (“portable electronic device”) in the Full A/C Diagnostic Kit with “no external physical connections,” as recited by claim 1, element [6], and the discussion therein is incorporated by reference and the same analysis is applied here.

105. To the extent that the “first and second temperature sensors” of element [6] are interpreted to be only “first and second temperature sensor clamps,” modification of The Fieldpiece Brochure sensor clamps as taught by CN ’078 would result in “no external physical electrical connections that extend from the first and second temperature sensors.”

3. *Claim 1 Summary and Conclusion*

106. Based on the foregoing analysis, it is my opinion that a POSITA would appreciate that The Fieldpiece Brochure teaches incorporation of wireless technology in HVACR sensors configured to transmit data to a remote, portable electronic device used for analysis of HVACR systems. A POSITA would recognize that The Fieldpiece Brochure temperature sensor could be improved by placing wireless technology and integrated electronics in the temperature sensor clamp handle of The Fieldpiece Brochure in order to enhance usability of the assembled sensor system components, and based on this understanding, a POSITA would have been motivated to combined The Fieldpiece Brochure and CN ’078 to arrive at improved, wireless temperature clamps. Further, the POSITA would have expected success at the combination since both The Fieldpiece Brochure and CN ’078 teach success at incorporation of wireless technology in the elements of a sensor system.

107. A POSITA would have been motivated to combine the HVACR sensors of The Fieldpiece Brochure with the wireless temperature sensor clamp of CN ’078

in order to reduce the bulk, number, and arrangement of components required in the field. Instead of two temperature sensor clamps, and their respective tethered headpiece-wireless transmitter units of The Fieldpiece Brochure, the modification with the integrated electronics, including a wireless transmitter, from CN '078 would result in two wireless temperature sensor clamps requiring less bulk and weight, and being more convenient to simply clamp in place and remove at will. A POSTIA would also have been motivated to make the combination in order to eliminate distance constraints imposed by cables or hoses connecting sensors to each other, or to the remote computer collecting sensed data. A POSITA would have understood that without such distance constraints, a greater number of sensors could be deployed at remote locations, while facilitating rapid and efficient data collection from every sensor at the same time, and without the need for a technician to physically approach, read, and record data from each sensor. A POSTIA would also have known based on the state of the art at the time, as demonstrated by The Fieldpiece Brochure and CN '078, that wireless communication was predictably effective, and would have expected success at the combination of wireless technology in HVACR sensors and remote computers.

108. It is my opinion that The Fieldpiece Brochure in combination with CN '078 renders claim 1 obvious.

B. Independent claim 12

1. ***Claim 12, [Preamble] “A temperature sensor clamp for sensing temperature in a refrigerant unit, the temperature sensor clamp comprising:”***

109. The Full A/C Diagnostic Kit temperature sensors in The Fieldpiece Brochure includes temperature sensor clamps for sensing temperature in a refrigerant unit. See Ex. 1005, Pgs. 2–4. It is my opinion that The Fieldpiece Brochure discloses this preamble.

2. ***Claim 12, [1] “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube, and”***

110. The discussion of claim 1, element [4] at Section VII.A.5 is incorporated by reference and the same analysis is applied here. For at least the same reasons, it is my opinion that The Fieldpiece Brochure discloses [1] “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube,” as recited in claim 12 of the '183 Patent.

3. ***Claim 12, [2] “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;”***

111. The discussions of claim 1, element [5] at Sections VII.A.6 and VIII.A.1 are incorporated by reference as if fully set forth here. For at least the same

reasons, it is my opinion that The Fieldpiece Brochure in combination with CN '078 teaches “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 12 of the '183 Patent.

4. Claim 12, [3] “wherein the temperature sensor clamp has no external physical electrical or fluidic connections.”

112. The discussions of claim 1, element [6] at Sections VII.A.7 and VIIIA.2 are incorporated by reference as if fully set forth here. For at least the same reasons, it is my opinion that The Fieldpiece Brochure in combination with CN '078 teaches “wherein the temperature sensor clamp has no external physical electrical or fluidic connections,” as recited in claim 12 of the '183 Patent.

5. Claim 12 Summary and Conclusion

113. The Summary of Section VIII.A.3 is incorporated by reference and the same analysis is applied here. It is my opinion that The Fieldpiece Brochure in combination with CN '078 renders claim 12 obvious.

IX. GROUND 3: THE FIELDPIECE BROCHURE IN COMBINATION WITH CN '078 AND STANIFORTH RENDERS CLAIMS 1 AND 12 UNPATENTABLE

114. Staniforth relates to “a probe for measuring the surface temperature of a pipe which comprises an active clamp assembly and a passive clamp assembly.” Ex. 1008, 1:43–45. The probe includes a “clamp temperature sensor assembly . . . in

the upper jaw and an electronics module is carried in the lower handle. The electronics module is in communication with the clamp temperature sensor assembly and has a display panel.” *Id.*, 1:50–55. The probe further has electronics incorporated in its handle that connect a thermistor to a display panel, and the display has integrated control buttons. *Id.*, 4:30–49.

115. CN ‘078 is directed to a device comprising a temperature sensor that wirelessly transmits temperature data to a computer, which then analyzes the temperature data. Ex. 1007, Abstract. The wireless temperature sensor can be a temperature sensor clamp. Ex. 1006, FIG. 5.

116. In my opinion, The Fieldpiece Brochure is analogous to and is in the same field of endeavor as the ’183 Patent since both relate to sensor systems for refrigeration units. See Ex. 1005, Pg. and Ex. 1001, 1:12–14. It is also my opinion that CN ’078 is analogous art to The Fieldpiece Brochure and the ’183 Patent, since it is reasonably pertinent to a problem described in the ’183 Patent, for example, “an improved sensor system for refrigeration units for monitoring and collecting system conditions,” and the proposed solution of “wireless” transmission of sensor data to a remote device. Ex. 1001, 2:34–41. Still further, it is my opinion that Staniforth is analogous since it is reasonably pertinent to the problem of providing improved sensor systems, in particular, improved temperature sensor clamps as it provides “[a]

probe for measuring a surface temperature of a pipe [that] includes an active clamp assembly and a passive clamp assembly ...” Ex. 1008, Abstract.

117. Based on the foregoing, it is my opinion that a POSITA would have consulted and combined The Fieldpiece Brochure, CN '078, and Staniforth when considering “an improved sensor system for refrigeration units for monitoring and collecting system conditions,” as all of these references relate to sensors used to collect temperature data.

A. Independent Claim 1

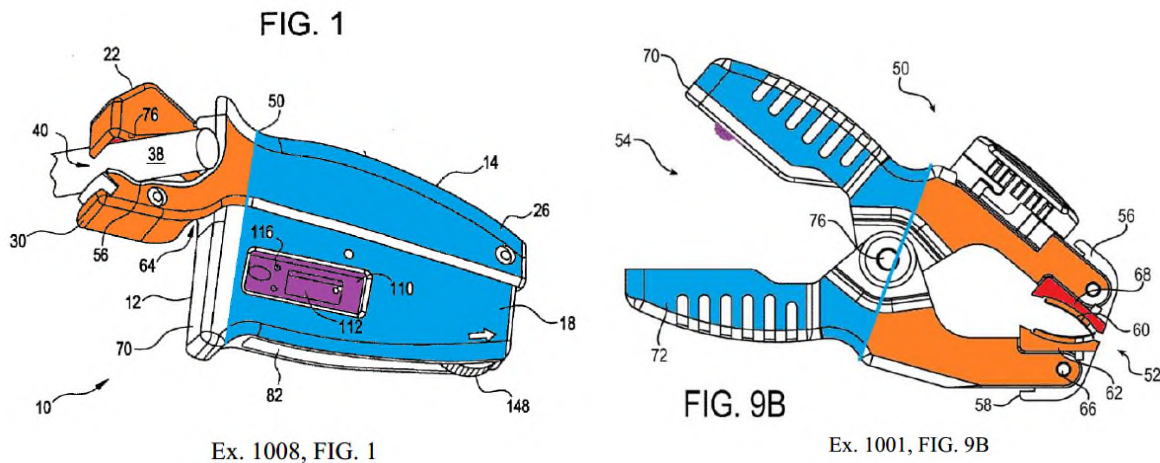
118. The Fieldpiece Brochure and CN '078 disclose claim 1 **[preamble]** and elements **[1]**, **[2]**, **[3]**, **[4]**, and **[6]** as discussed in Sections VIII.A. (with reference to Sections VII.A.1, 2, 3, 4, 5, and 7) and VIII.A.1, 2, and 3, all of which are incorporated by reference and the same analysis is applied here to claim 1. As shown in those Sections, The Fieldpiece Brochure discloses claim 1 **[preamble]** and elements **[1]**, **[2]**, **[3]**, **[4]**, and **[6]**.

119. To the extent that it is suggested The Fieldpiece Brochure does not disclose claim 1, elements **[5]** and **[6]**, CN '078 discloses those elements, as outlined in Sections VIII.A.1. and 3, which are incorporated by reference with the same analysis applied here to claim 1.

120. To the extent that it is suggested that either The Fieldpiece Brochure or CN '078 does not disclose element [5], Staniforth, an analogous patent reference, discloses this element.

1. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

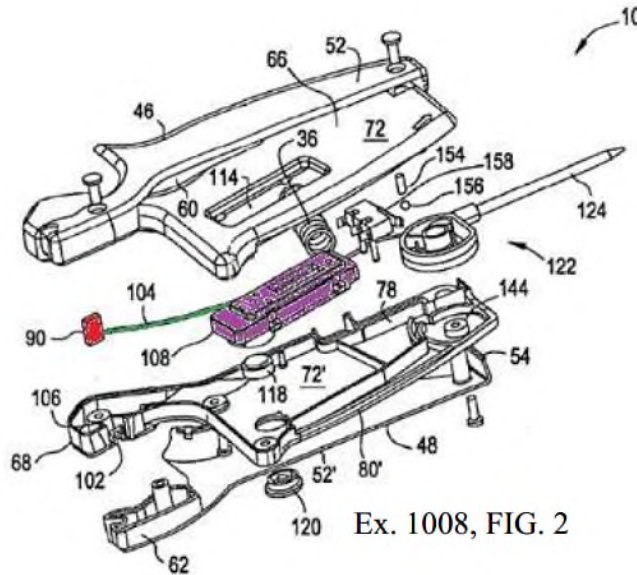
121. FIG. 1 of Staniforth as compared to FIG. 9B of the '183 Patent are annotated and reproduced below for reference:



122. Staniforth discloses upper and lower jaws 22, 30 (Orange) that clamp a pipe 38. Ex. 1008, 3:15–17. This is the same configuration shown in the '183 Patent at FIG. 9B.

123. A temperature sensor assembly 90 (Red) is “in recess 102 in the clamping surface 76 of the upper jaw 22, with the signal-carrying conductor 104

[green] extending through opening 106 in clamping surface 76.” See Ex. 1008, 4:8–11, and FIGS. 1 (above) and 2 (below):



124. The clamping surface 76 (Red) is just visible in FIG. 1 and shows the location of the temperature sensor assembly 90 in the assembled temperature probe.

125. Staniforth also discloses upper handle 26 and lower handle 18 (Blue), and an electronics module 108, that is “integrated electronics” (Purple) within lower handle 18 and within display panel 110. Ex. 1008, 3:5–24. The electronics module includes display panel 110, LCD display 112, and control buttons 116. *Id.*, 4:30–49.

126. Further, the temperature sensor assembly 90 is connected via signal-carrying conductor 104 (Green) with the electronics module 108 (Purple) within lower handle 18. Ex. 1008, 4:30–34.

127. It is my opinion that the further combination of Staniforth with The Fieldpiece Brochure and CN '078 teaches moving integrated electronics to the handle of the temperature sensor taught by the combination of The Fieldpiece Brochure and CN '078.

2. *Claim 1 Summary and Conclusion*

128. A POSITA would have combined The Fieldpiece Brochure and CN '078 and would have predicted success at the combination for the reasons set forth in the Claim 1 Summary and Conclusion over The Fieldpiece Brochure and CN '078 in Section VIII.A.3, which is incorporated and applied here. Further, a POSITA would have been motivated to apply the modifications of Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

129. Moreover, A POSITA would have been further motivated to modify the temperature sensor clamps taught by The Fieldpiece Brochure and CN '078 under the teachings of Staniforth with integrated electronics, including control buttons, in the handle for enhanced usability as well as a reduced number of parts.

130. In my opinion, The Fieldpiece Brochure in combination with CN '078 and Staniforth renders claim 1 obvious.

B. Independent Claim 12

131. The discussions at Sections VII.A.4.–7. and VIII.B.1.–3. are incorporated by reference and the same analysis applies here. As set forth above for Ground 2, at Sections VIII.B.1.–3, The Fieldpiece Brochure in combination with CN '078 teaches the preamble and elements [1]–[3] of claim 12.

132. To the extent that it is suggested that either The Fieldpiece Brochure or CN '078 does not disclose element [2], Staniforth discloses this element.

1. Claim 12, [2] "a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;"

133. The discussions of claim 1, element [5] at Sections VII.A.6, VIII.A.1, and IX.A.1 are incorporated by reference as if fully set forth here, the latter showing that Staniforth discloses “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 12.

2. Claim 12 Summary and Conclusion

134. A POSITA would have combined The Fieldpiece Brochure and CN '078 and would have predicted success at the combination for the reasons set forth

in the Claim 12 Summary and Conclusion over The Fieldpiece Brochure and CN '078 in Section VIII.B.3, which is incorporated and applied here. Further, a POSITA would have been motivated to apply the modifications of Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

135. Moreover, A POSITA would have been further motivated to modify the temperature sensor clamps taught by The Fieldpiece Brochure and CN '078 under the teachings of Staniforth with integrated electronics, including control buttons, in the handle for enhanced usability as well as a reduced number of parts.

136. It is my opinion that the combination of Fieldpiece in combination with CN '078 and Staniforth renders claim 12 obvious.

X. GROUND 4: THE FIELDPIECE BROCHURE IN COMBINATION WITH CN '332 RENDERS CLAIMS 1 AND 12 UNPATENTABLE

137. CN '332 is directed to “pipe temperature measurement device,” with a temperature transducer. . . .” Ex. 1010, ¶[0009]. The temperature transducer includes a temperature-sensing probe in a clamping portion of the device, and the temperature transducer is connected to a data processing device that “may be a digital display

and may also have a wireless transmission function.” *Id.*, ¶¶[0009]-[0010]. In comparison to Ground 2, CN ’332 replaces CN ’078. Like ’CN ’078, CN ’332 is an analogous prior art reference disclosing a wireless temperature sensor clamp.

138. In my opinion, The Fieldpiece Brochure is analogous to the ’183 Patent since it is in the same field of endeavor as the ’183 Patent; both relate to sensor systems for refrigeration units. See Ex. 1005, Pg. and Ex. 1001, 1:12–14. It is also my opinion that CN ’332 is analogous art to The Fieldpiece Brochure and the ’183 Patent, since it is reasonably pertinent to a problem described in the ’183 Patent, for example, “an improved sensor system for refrigeration units for monitoring and collecting system conditions,” and the proposed solution of “wireless” transmission of sensor data to a remote device. Ex. 1001, 2:34–41. In particular, CN ’332 discloses a wireless temperature sensor Ex. 1010, ¶[0009]-[0010]. For these reasons, it is my opinion that a POSITA would have consulted and combined The Fieldpiece Brochure and CN ’332 when considering “an improved sensor system for refrigeration units for monitoring and collecting system conditions.”

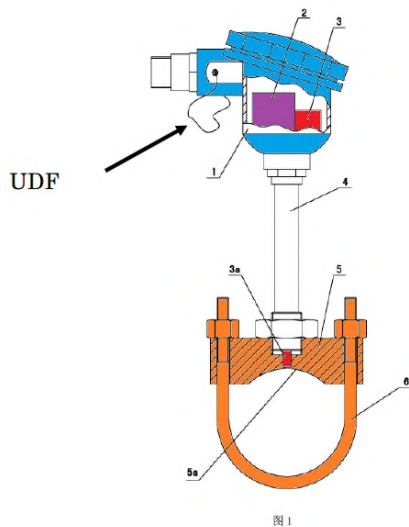
A. Independent Claim 1

139. Sections VII.A.1–5 set forth my opinion that The Fieldpiece Brochure discloses the preamble and elements [1], [2], [3], and [4] of claim 1, and are incorporated by reference and the same analysis applies here. Section VII.A.6 sets forth my opinion that The Fieldpiece Brochure discloses “each temperature sensor

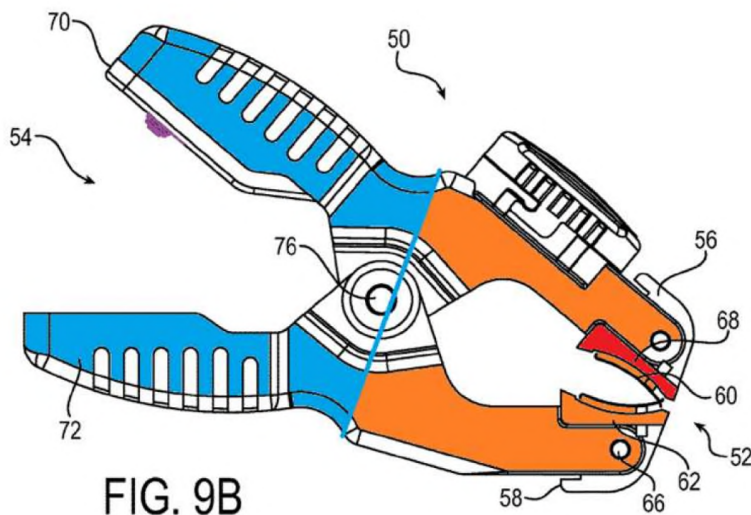
clamp further comprises a handle,” as recited in element [5] of claim 1, and is incorporated by reference and the same analysis applied here.

1. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

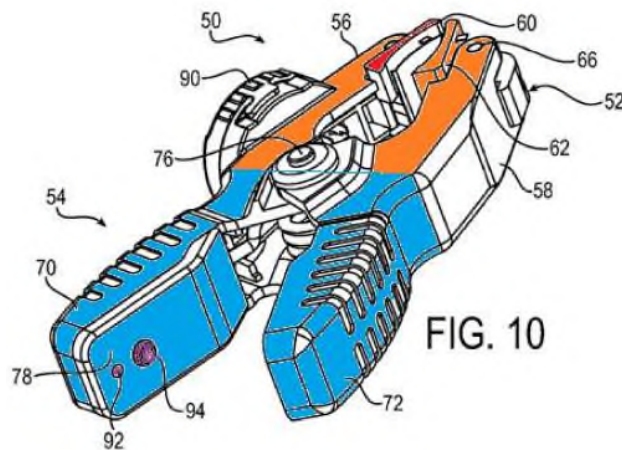
140. CN '332 discloses Example 1 of a pipe temperature measurement device; *i.e.*, a temperature sensor. Ex. 1010, ¶[0009] and Ex. 1010, FIG. 1. An annotated version of CN '332 FIG. 1 is reproduced below in comparison to the '183 Patent FIGS. 9B and 10:



Ex 1009, FIG. 1



Ex. 1001, FIG. 9B



Ex. 1001, FIG. 10

141. Compared to the '183 Patent, FIGS. 9B and 10, the CN '332 temperature clamp has the same features but a different shape: The temperature sensor has a clamp 6 (Orange), and heat conduction base 5 (Orange), having cylindrical surface 5a, linked to the clamp 6. Ex. 1010, ¶[0009]. These elements are configured to clamp around a pipe. *Id.*, ¶[0012].

142. Above support pole 4, shell 1 (Blue) contains temperature transducer 3 (Red) and temperature data processing device 2 (Purple), which are connected to each other. Ex. 1010, ¶[0009]. In my opinion, the temperature transducer 3 and the temperature data processing device 2 are “integrated electronics.”

143. In my opinion, A POSITA considering improvements to The Fieldpiece Brochure temperature sensor clamps would have learned from CN '332 to incorporate the integrated electronics in electrical connection with a temperature sensor. The POSITA would have been motivated to incorporate The Fieldpiece

Brochure temperature sensor clamps to place the CN '332 temperature processing device, including wireless transmitter, in The Fieldpiece Brochure handle and in electrical connection with the sensor element.

144. Still referring to the annotated CN '332 FIG. 1 above, it is my opinion that a POSITA would have recognized that upper shell 1 of the temperature sensor clamp in CN '332 (Blue) may be grasped as a handle when installing the clamping portion about a pipe. To the extent that it is argued that the “shell” of CN '332 is not a handle, The Fieldpiece Brochure also discloses temperature sensor clamps having a handle, and it is my opinion that a POSITA would have incorporated the CN '332 integrated electronics in The Fieldpiece Brochure disclosed temperature sensor clamp handles. Further “temperature data processing device [2] in the example may be a digital display and may also have a wireless transmission function.” Ex. 1010, ¶[0010].

145. The CN '332 temperature sensor also includes a temperature-sensing probe 3a (Red). Ex. 1010, ¶[0009]. The temperature-sensing probe 3a “obtains the temperature of the outer surface of the pipe.” *Id.*, ¶[0012].

146. CN '332 discloses that the temperature-sensing probe 3a (Red) is connected, via its integration as part of temperature transducer 3, to the temperature data processing device 2 (Purple), which may include a digital display and a wireless transmission function.”

147. It is my opinion that Fieldpiece Brochure in combination with CN '332 teaches element [5].

2. Claim 1, [6] “there are no external physical connections among the plurality of sensors and the portable electronic device.”

148. CN '332 discloses that the “temperature data processing device [2] in the example may be a digital display and may also have a wireless transmission function.” Ex. 1010, ¶[0010].

149. Section VII.A.7., which is incorporated by reference and the same analysis is applied here, shows that the Fieldpiece Brochure discloses to pressure sensors of the “plurality of sensors” that have “no external physical connections” and that the portable electronic device as “no external physical connections.”

150. Also as set forth in Ground 1, Section VII.A.7., it is my opinion that The Fieldpiece Brochure discloses temperature sensors having “no external physical connections.” To the extent that the temperature sensors of the “plurality of sensors” in element [6] are interpreted to be “temperature sensor clamps,” modification of the two temperature sensor clamps of The Fieldpiece Brochure as taught by CN '332 would include wireless function in the handle of each temperature sensor clamp. In my opinion, the combination of The Fieldpiece Brochure with CN '332 teaches temperature sensor clamps having “no external physical connections.”

151. FIG. 1 of CN '332 includes an undescribed feature, indicated by “UDF,” as shown above.

152. The UDF appears to be illustrated tethering one side of the shell 1 to the other. It is my opinion that the UDF is not an external physical connection since it appears to be anchored at both ends to shell 1. It is, however, unclear what the purpose of the UDF is.

153. To the extent that the UDF is suggested to be an “external physical connection,” the embodiment of Example 2, FIG. 2, includes an integrated solar means and is, thus, clearly self-sustaining without external physical connections.

154. According to CN '332, the FIG. 2 embodiment includes all of the following features of the FIG.1 embodiment: “the structure of the supporting pole 4, heat conduction base 5, clamp 6, and temperature-sensing probe in the temperature transducer disposed in the heat conduction base 5 is the same as that in Example 1.” Ex. 1010, [0011]. FIG. 2 adds a “solar wireless temperature testing device 7.” Ex. 1010, [0011].

155. For either device FIG. 1 or FIG. 2 “the temperature measurement device is fixed on the pipe, the temperature-sensing probe 3a obtains the temperature of the outer surface of the pipe, the temperature transducer obtains temperature data of the outer surface of the pipe, and the actual temperature value of liquid and gas in the

pipe is accurately obtained after the temperature data processing device 2 acquires, compensates, and processes the temperature data.” Ex. 1010, [0012].

156. In my opinion, each of the CN ’332 FIG. 2 embodiment features apply equally to element [6], in the same manner explained above for the CN ’332 FIG. 1 embodiment.

157. It is my opinion that The Fieldpiece Brochure in combination with CN ’332 teaches element [6].

3. *Claim 1 Summary and Conclusion*

158. Based on the foregoing analysis, it is my opinion that a POSITA would appreciate that The Fieldpiece Brochure teaches incorporation of wireless technology in HVACR sensors configured to transmit data to a remote, portable electronic device used for analysis of HVACR systems. A POSITA would recognize that The Fieldpiece Brochure temperature sensor could be improved by placing wireless technology and integrated electronics in the temperature sensor clamp handle of The Fieldpiece Brochure in order to enhance usability of the assembled sensor system components, and based on this understanding, a POSITA would have been motivated to combine The Fieldpiece Brochure and CN ’332 to arrive at improved, wireless temperature clamps. Further, the POSITA would have expected success at the combination since both The Fieldpiece Brochure and CN ’332 teach success at incorporation of wireless technology in sensors.

159. A POSITA would have been motivated to combine the HVACR sensors of The Fieldpiece Brochure with the wireless temperature sensor clamp of CN '332 in order to reduce the bulk, number, and arrangement of components required in the field. Instead of two temperature sensor clamps, and their respective tethered headpiece-wireless transmitter units of The Fieldpiece Brochure, the modification with the integrated electronics, including a wireless transmitter, from CN '332 would result in two wireless temperature sensor clamps with electronics integrated into the handles requiring less bulk and weight, and being more convenient to simply clamp in place and remove at will. A POSTIA would also have been motivated to make the combination in order to eliminate distance constraints imposed by cables or hoses connecting sensors to each other, or to the remote computer collecting sensed data. A POSITA would have understood that without such distance constraints, a greater number of sensors could be deployed at remote locations, while facilitating rapid and efficient data collection from every sensor at the same time, and without the need for a technician to physically approach, read, and record data from each sensor. A POSTIA would also have known based on the state of the art at the time, as demonstrated by The Fieldpiece Brochure and CN '332, that wireless communication was predictably effective, and would have expected success at the combination of wireless technology in HVACR sensors and remote computers.

160. It is my opinion that The Fieldpiece Brochure in combination with CN '332 renders claim 1 obvious.

B. Independent Claim 12

1. ***Claim 12, [Preamble] “A temperature sensor clamp for sensing temperature in a refrigerant unit, the temperature sensor clamp comprising:”***

161. The Full A/C Diagnostic Kit temperature sensors in The Fieldpiece Brochure includes temperature sensor clamps for sensing temperature in a refrigerant unit. See Ex. 1005, Pgs. 2–4. It is my opinion that The Fieldpiece Brochure discloses this preamble.

2. ***[1] “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube, and”***

162. The discussion of claim 1, element [4] at Section VII.A.5 is incorporated by reference and the same analysis is applied here. For at least the same reasons, it is my opinion that The Fieldpiece Brochure discloses [1] “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube,” as recited in claim 12 of the '183 Patent.

3. [2] “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;”

163. The discussions of claim 1, element [5] at Sections VII.A.6 and X.A.1 are incorporated by reference as if fully set forth here. For at least the same reasons, it is my opinion that The Fieldpiece Brochure in combination with CN '332 teaches “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 12 of the '183 Patent.

4. [3] “wherein the temperature sensor clamp has no external physical electrical or fluidic connections.”

164. The discussions of claim 1, element [6] at Sections VII.A.7 and X.A.2 are incorporated by reference as if fully set forth here. For at least the same reasons, it is my opinion that The Fieldpiece Brochure in combination with CN '332 teaches “wherein the temperature sensor clamp has no external physical electrical or fluidic connections,” as recited in claim 12 of the '183 Patent.

5. Claim 12 Summary and Conclusion

165. The Summary of Section X.A.3 is incorporated by reference and the same analysis is applied here. It is my opinion that The Fieldpiece Brochure in combination with CN '332 renders claim 12 obvious.

XI. GROUND 5: THE FIELDPIECE BROCHURE IN COMBINATION WITH CN '332 AND STANIFORTH RENDERS CLAIMS 1 AND 12 UNPATENTABLE

166. Section X, which is incorporated by reference and is applied here, shows that a POSITA would have looked to The Fieldpiece Brochure and CN '332 for improvements in sensor systems for refrigerant units.

167. Staniforth relates to “a probe for measuring the surface temperature of a pipe which comprises an active clamp assembly and a passive clamp assembly.” Ex. 1008, 1:43-45. The probe includes a “clamp temperature sensor assembly . . . in the upper jaw and an electronics module is carried in the lower handle. The electronics module is in communication with the clamp temperature sensor assembly and has a display panel.” *Id.*, 1:50-55. The probe further has a display panel that has control buttons. *Id.*, 4:30-49. It is my opinion that Staniforth is also analogous prior art to the '183 Patent and Fieldpiece Brochure since it is reasonably pertinent to the problem providing improved sensor systems, in particular, improved temperature sensor clamps. In particular, Staniforth discloses a means to connect a sensor via integrated electronics in the handle, which could be readily accessed by a technician and would enhance the workability of a temperature sensor clamp in an HVACR sensor system.

168. Based on the foregoing, it is my opinion that a POSITA would have consulted and combined teachings from The Fieldpiece Brochure, CN '332, and

Staniforth when considering the need identified in the '183 Patent: “an improved sensor system for refrigeration units for monitoring and collecting system conditions.” Ex. 1001, 2:34-36.

A. Independent Claim 1

169. Over the combination of The Fieldpiece Brochure and CN '332, the claim language of the **[preamble]** and elements **[1]**, **[2]**, **[3]**, **[4]**, and **[6]** are discussed in Sections X.A. (with reference to Sections VII.A.1.–5. and 7.) and X.A.2., all of which are incorporated by reference and the same analysis is applied here to claim 1. Section X.A.1. also demonstrates CN '332 teaches element **[5]**, and is incorporated by reference and the same analysis is applied here.

170. To the extent that it is suggested that CN '332 did not teach a “handle” and locating “integrated electronics” in the handle, Staniforth discloses **[5]** “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and,” as recited in claim 1.

1. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

171. The discussion of Staniforth in Sections IX, IX.A., and IX.A.1. is incorporated by reference and the same analysis is applied here to claim 1, but to the

combination of The Fieldpiece Brochure and CN '332. Staniforth discloses integrated electronics incorporated into the handle of a temperature sensor clamp and in electrical connection with a sensor element. Ex. 1008, 4:30–49.

172. The Fieldpiece Brochure in combination with CN '332 and Staniforth teach element [5].

2. *Claim 1 Summary and Conclusion*

173. A POSITA would have combined The Fieldpiece Brochure and CN '332 and would have predicted success at the combination for the reasons set forth in the Claim 1 Summary and Conclusion over The Fieldpiece Brochure and CN '332 in Section X.A.3, which is incorporated and the same analysis is applied here. Further, a POSITA would have been motivated to apply the modifications of Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

174. Moreover, A POSITA would have been further motivated to modify the temperature sensor clamps taught by The Fieldpiece Brochure and CN '332 under the teachings of Staniforth with integrated electronics, including control buttons, in the handle for enhanced usability as well as a reduced number of parts.

175. It is my opinion that The Fieldpiece Brochure in combination with CN '332 and Staniforth renders claim 1 obvious.

B. Independent Claim 12

176. The claim language for the claim 12 **[preamble]** and elements **[1]**, **[2]**, and **[3]** are discussed in Sections VII.B.1, 2, 3, and 4 and X.B.1, 2, 3, and 4, all of which are incorporated by reference and the same analysis is applied here to claim 12.

177. To the extent that it is suggested that either The Fieldpiece Brochure or CN '078 does not disclose element **[2]**, Staniforth discloses this element.

1. ***[2] a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;***

178. The discussions of claim 1, element **[5]** at Sections VII.A.6, X.A.1, and XI.A.1 are incorporated by reference as if fully set forth here, the latter showing that Staniforth discloses “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 12.

2. Claim 12 Summary and Conclusion

179. A POSITA would have combined The Fieldpiece Brochure and CN '332 and would have predicted success at the combination for the reasons set forth in the Claim 12 Summary and Conclusion over The Fieldpiece Brochure and CN

'332 in Section X.B.5, which is incorporated and the same analysis is applied here. Further, a POSITA would have been motivated to apply the modifications of Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

180. Moreover, A POSITA would have been further motivated to modify the temperature sensor clamps taught by The Fieldpiece Brochure and CN '332 under the teachings of Staniforth with integrated electronics, including control buttons, in the handle for enhanced usability as well as a reduced number of parts.

181. In my opinion, The Fieldpiece Brochure in combination with CN '332 and Staniforth renders claim 12 obvious.

XII. GROUND 6: THE FIELDPIECE BROCHURE IN COMBINATION WITH PEIRS RENDERS CLAIMS 1 AND 12 UNPATENTABLE

182. The '183 Patent describes a need in the art for an “improved sensor system for refrigeration units for monitoring and collecting system conditions such as superheat and subcooling,” and proposes a “hoseless” system with sensors that transmit sensor information wirelessly to a portable electronic device. Ex. 1001, 2:34-41.

183. Peirs relates to “relates to improved monitoring equipment for heat pump or refrigerating systems.” Ex. 1011, [0001]. Peirs describes “heat pumps and refrigerating systems” as including “refrigerators, freezers, coolers, air conditioners, etc.” *Id.*, [0002]. As such, it is my opinion that Peirs is in the same field of endeavor as the ’183 Patent, namely “enhanced sensor systems for refrigeration units for monitoring and collecting system conditions, such as superheat and subcooling.” Ex. 1001, 1:12-14.

184. For the same reasons as set for the Section VII., The Fieldpiece Brochure is also in the same field of endeavor as the ’183 Patent, and it is my opinion that a POSITA would have consulted and combined The Fieldpiece Brochure and Peirs when considering the need identified in the ’183 Patent: “improved sensor system for refrigeration units for monitoring and collecting system conditions such as superheat and subcooling.” Ex. 1001, 2:34-36.

A. Independent Claim 1

185. The claim language of the **[preamble]** and elements **[1]**, **[2]**, **[3]**, **[4]**, and **[6]** are discussed in Sections VII.A.1, 2, 3, 4, 5, and 7, which are incorporated by reference and the same analysis is applied here to claim 1. As shown in those Sections, The Fieldpiece Brochure discloses the preamble and elements **[1]**, **[2]**, **[3]**, **[4]**, and **[6]**. Also, The Fieldpiece Brochure discloses element **[5]** in combination with the whole temperature sensor disclosed therein. Still further, as discussed in

Section VII.A.6., The Fieldpiece Brochure, the two temperature sensors of the Full A/C Diagnostic Kit necessarily include a “sensor element” in the clamping portion, and “integrated electronics . . . in electrical connection with the sensor element.”

186. To the extent that it is asserted that The Fieldpiece Brochure does not disclose elements [5], and [6], Peirs, a patent publication in the same field, teaches those claim elements.

1. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

187. Peirs discloses two wirelessly communicating pressure sensors in an HVAC/R system. Ex. 1011, Abstract, ¶¶[0037] and [0038], and FIG. 1. Peirs also explicitly discloses two wirelessly communicating temperature sensors. Ex. 1011, Abstract, ¶¶[0037] and [0038], and FIG. 1. The below reproduced and annotated FIG. 1 from Peirs is compared to the '183 Patent FIG. 4, which is “an exemplary hoseless sensor system: in the '183 Patent (Ex. 1001, 3:55–57):

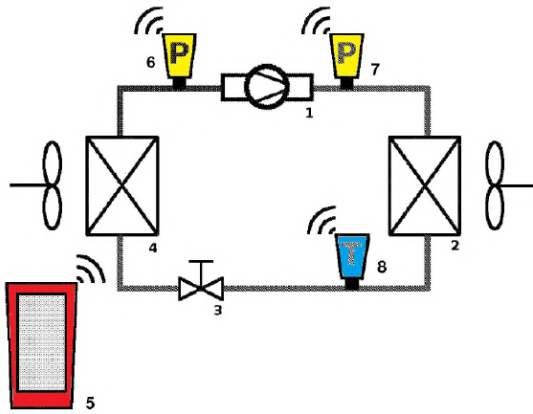
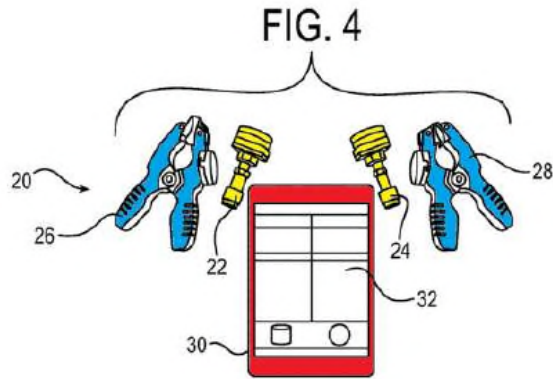


FIG 1

Ex. 1011, FIG. 1



Ex. 1001, FIG. 4

188. Each figure above shows a portable electronic device (Red). Each figure shows two pressure sensors (Yellow). Each figure shows a wireless temperature sensor (Blue). There is no difference between these two figures but for artistic rendering and the absence of one wireless temperature sensor in Peirs FIG. 1 versus the '183 Patent FIG. 4. That difference is accounted for in the specification of Peirs, as Peirs states “two wireless temperature sensors.” Ex. 1011, ¶[0039].

189. It is my opinion that having “two wireless temperature sensors,” as taught by Peirs (¶[0039]), would have led a POSITA to replace the cables in the handle and leading away from each temperature sensing clamp of the Full A/C Diagnostic Kit with wireless transceivers located in the handle of each clamp. This would have realized the “two wireless temperature sensors” of Peirs, but in the clamping configuration of The Fieldpiece Brochure — each having a handle and integrated electronics to establish the wireless communication.

190. It is my opinion that a POSITA would have connected the sensing element in both of the temperature sensor clamps of the Full A/C Diagnostic Kit temperature sensors to the “integrated transmitting unit” in the wireless temperature sensors taught by Peirs. See Ex. 1011 at ¶[0039] and [0040].

191. The Fieldpiece Brochure in combination with Peirs teaches element [5].

2. Claim 1, [6] “there are no external physical connections among the plurality of sensors and the portable electronic device.”

192. Peirs also discloses receiving unit 5 that is a “handheld console able to communicate with at least 10 sensors,” lacks external physical connections, and is not physically connected to any of the sensors. Ex. 1011, FIG. 1 and ¶¶[0038] and [0042]. Receiving unit also runs calculations and displays data. *Id.*, ¶[0042].

193. Simply put, the addition of wireless communication between sensors and a portable electronic device was released to the public and published by The Fieldpiece Brochure at least three years prior to the '183 Patent. Further, minor, trivial, design rearrangements of the temperature sensors of The Fieldpiece Brochure to meet every element of claim 1 would have been obvious modifications in light of Peirs.

194. To the extent that the “first and second temperature sensors” of the “plurality of sensors” in element [6] are interpreted to be only “first and second temperature sensor clamps,” it is my opinion that modification of The Fieldpiece

Brochure sensor clamps as taught by Peirs would result in a wireless temperature sensor clamp having “no external physical electrical connections.”

195. The discussion of claim 1 in Ground 1, Section VII.A.7, which is incorporated by reference and the same analysis is applied here to claim 1, shows that The Fieldpiece Brochure discloses unitary wireless pressure sensors having “no external physical connections.”

196. Further, none of the wireless temperature sensors, the wireless pressures sensors, or the portable electronic devices taught by The Fieldpiece Brochure in combination with Peirs include external physical connections between one another.

197. The Fieldpiece Brochure in combination with Peirs teaches element [6].

3. *Claim 1 Summary and Conclusions*

198. Based on the foregoing analysis, it is my opinion that a POSITA would appreciate that The Fieldpiece Brochure teaches incorporation of wireless technology in HVACR sensors configured to transmit data to a remote, portable electronic device used for analysis of HVACR systems. Based on the disclosure in Peirs of wireless temperature sensors and a wireless receiving unit, a POSITA would recognize that The Fieldpiece Brochure temperature sensor could be improved by placing wireless technology, including the “integrated transmitting unit” in the wireless temperature sensors taught by Peirs (Ex. 1011 at [0039] and [0040]), in the

temperature sensor clamp handles of The Fieldpiece Brochure in order to enhance usability of the assembled sensor system components. A POSITA would have been motivated to combined The Fieldpiece Brochure and Peirs to arrive at improved, wireless temperature clamps. Further, the POSITA would have expected success at the combination since both The Fieldpiece Brochure and Peirs teach success at incorporation of wireless technology in the elements of a sensor system.

199. A POSITA would have been motivated to combine the HVACR sensors of The Fieldpiece Brochure with the wireless temperature sensors of Peirs in order to reduce the bulk, number, and arrangement of components required in the field. Instead of two temperature sensor clamps, and their respective tethered headpiece-wireless transmitter units of The Fieldpiece Brochure, the modification with the integrated electronics, including the "integrated transmitting unit" in the wireless temperature sensors taught by Peirs (Ex. 1011 at [0039] and [0040]) would result in two wireless temperature sensor clamps requiring less bulk and weight, and being more convenient to simply clamp in place and remove at will. A POSTIA would also have been motivated to make the combination in order to eliminate distance constraints imposed by cables or hoses connecting sensors to each other, or to the remote computer collecting sensed data. A POSITA would have understood that without such distance constraints, a greater number of sensors could be deployed at remote locations, while facilitating rapid and efficient data collection from every

sensor at the same time, and without the need for a technician to physically approach, read, and record data from each sensor. A POSTIA would also have known based on the state of the art at the time, as demonstrated by The Fieldpiece Brochure and Peirs, that wireless communication was predictably effective, and would have expected success at the combination of wireless technology in HVACR sensors and remote computers.

200. It is my opinion that The Fieldpiece Brochure in combination with Peirs renders claim 1 obvious.

B. Independent Claim 12

201. The claim language of the **[preamble]** and elements [1], [2], and [3], are discussed in Sections VII.B.1, 2, 3, and 4, which are incorporated by reference and the same analysis is applied here. As shown in those Sections, The Fieldpiece Brochure discloses the preamble and element [1], and teaches elements [2] and [3].

202. To the extent that it is asserted that The Fieldpiece Brochure does not teach elements [2] and [3], Peirs teaches those claim elements.

1. ***[2] a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;***

203. See the discussion in Section XII.A.1., which is incorporated by reference and the same analysis is applied here. It is my opinion that Piers teaches

modification of a Fieldpiece temperature sensor clamp such that The Fieldpiece Brochure in combination with Peirs teaches element [2].

2. [3] wherein the temperature sensor clamp has no external physical electrical or fluidic connections.

204. It is my opinion that the wireless temperature sensor clamp taught by The Fieldpiece Brochure and Peirs would have no external physical or fluidic connections, and that The Fieldpiece Brochure in combination with Peirs teaches element [3].

3. Claim 12 Summary and Conclusion

205. Based on the foregoing analysis, it is my opinion that a POSITA would appreciate that The Fieldpiece Brochure teaches incorporation of wireless technology in HVACR sensors for use in HVACR sensor systems. A POSITA would recognize that The Fieldpiece Brochure temperature sensor could be improved by placing wireless technology, including the “integrated transmitting unit” in the wireless temperature sensors taught by Peirs (Ex. 1011 at [0039] and [0040]), in the temperature sensor clamp handles of The Fieldpiece Brochure in order to enhance usability of the assembled sensor system components. A POSITA would have been motivated to combine teachings of wireless sensors in Peirs with The Fieldpiece Brochure temperature sensor clamps for these reasons, would have found it obvious to make such a modification, and would have predicted success at the combination.

206. A POSITA would have been motivated to combine HVACR sensors and wireless technology in order to reduce the bulk, number, and arrangement of components required in the field. Instead of a temperature sensor clamps, and its tethered headpiece-wireless transmitter unit of The Fieldpiece Brochure, the modification with the integrated electronics, including the “integrated transmitting unit” in the wireless temperature sensors taught by Peirs (Ex. 1011 at [0039] and [0040]), would result in a wireless temperature sensor clamp requiring less bulk and weight, and being more convenient to simply clamp in place and remove at will. A POSTIA would also have known based on the state of the art at the time that wireless communication was predictably effective, as shown by both The Fieldpiece Brochure and Peirs, and would have expected success at the combination of wireless technology in sensors.

207. It is my opinion that The Fieldpiece Brochure in combination with Peirs renders claim 12 obvious.

XIII. GROUND 7: THE FIELDPIECE BROCHURE IN COMBINATION WITH PEIRS AND STANIFORTH RENDERS CLAIMS 1 AND 12 UNPATENTABLE

208. Section XII, which is incorporated by reference and is applied here, shows that a POSITA would have consulted and combined The Fieldpiece Brochure and Piers.

209. Staniforth relates to “a probe for measuring the surface temperature of a pipe which comprises an active clamp assembly and a passive clamp assembly.” Ex. 1008, 1:43-45. The probe includes a “clamp temperature sensor assembly . . . in the upper jaw and an electronics module is carried in the lower handle. The electronics module is in communication with the clamp temperature sensor assembly and has a display panel.” *Id.*, 1:50-55. The probe further has a display panel that has control buttons. It is my opinion that Staniforth is reasonably pertinent to the problem providing improved sensor systems, in particular, improved temperature sensor clamps.

210. It is my opinion that a POSITA would have consulted and combined The Fieldpiece Brochure, Peirs, and Staniforth when considering the need identified in the '183 Patent: “an improved sensor system for refrigeration units for monitoring and collecting system conditions.” Ex. 1001, 2:34-36.

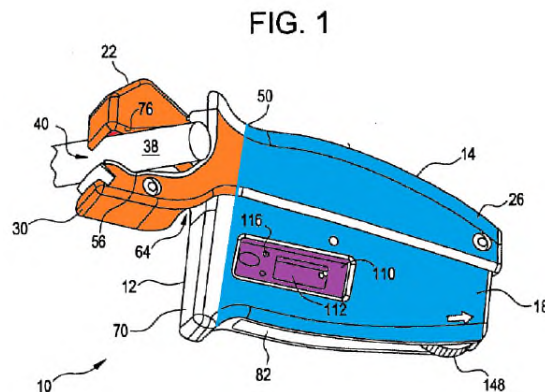
A. Independent Claim 1

211. Over the combination of The Fieldpiece Brochure and Piers, the claim language of the **[preamble]** and elements **[1]**, **[2]**, **[3]**, **[4]**, and **[6]** are discussed in Sections XII.A. (with reference to Sections VII.A.1, 2, 3, 4, 5, and 7) and XII.A.1. and 2., all of which are incorporated by reference and the same analysis is applied here.

212. To the extent that it is suggested that The Fieldpiece Brochure in combination with Peirs does not teach element [4], [5], and [6], Staniforth, discloses or teaches these elements.

1. ***[4] the first and second temperature sensors each comprises a temperature sensor clamp having a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube;***

213. As outlined in Section IX.A.1, which is incorporated by reference and the same analysis applies here, Staniforth discloses a temperature sensor clamp, and an annotated FIG. 1 from Staniforth is copied below to show features of the clamp.



214. Also as outlined in Section IX.A.1, which is incorporated by reference and the same analysis applies here, Staniforth discloses upper and lower jaws 22, 30 (Orange) that clamp a pipe 38. Ex. 1010, 3:15–17. Also, a temperature sensor assembly 90 is located on the clamping surface 76 of the upper jaw 22.

215. In combination with the two wireless temperature sensors of Peirs, Staniforth teaches [4] “the first and second temperature sensors each comprises a temperature sensor clamp having a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube,” as recited in claim 1.

2. ***[5] each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and***

216. Also, as outlined in Section IX.A.1, which is incorporated by reference and the same analysis applies here, Staniforth discloses “integrated electronics” and a “handle.” In the same Section IX.A.1, it is shown that Staniforth discloses integrated electronics, including control buttons, incorporated in the handle and in electrical connection with a sensor element.

217. In combination with the two wireless temperature sensors of Peirs, Staniforth teaches [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 12.

3. [6] there are no external physical connections among the plurality of sensors and the portable electronic device.

218. It is my opinion that the two wireless temperature sensor clamps taught by the combination of Staniforth and Peirs would have “no external physical connections.”

219. The discussion at Section VII.A.8., which is incorporated by reference and the same analysis is applied here, shows that The Fieldpiece Brochure discloses two wireless pressure sensors with “no external connections.”

220. The discussions at Sections VII.A.8. and XII.A.2, which are incorporated by reference and the same analysis is applied here, show that both The Fieldpiece Brochure and Peirs disclose a wireless portable electronic device that has “no external physical connections.” Further, none of the wireless temperature sensors, wireless pressure sensors, or the wireless portable electronic device taught by the combination of The Fieldpiece Brochure and Peirs include physical connections between one another.

221. The Fieldpiece Brochure in combination with Peirs and Staniforth teaches element [6].

4. Claim 1 Summary and Conclusion

222. A POSITA would have combined The Fieldpiece Brochure and Peirs and would have predicted success at the combination for the reasons set forth in the

Claim 1 Summary and Conclusion over The Fieldpiece Brochure and Peirs in Section XII.A.3, which is incorporated and applied here. Further, a POSITA would have been motivated to apply the modifications of Peirs and Staniforth to provide a temperature sensor clamp having integrated electronics incorporated in the handle, including the integrated transmitting unit of Peirs and control buttons from Staniforth, in electrical connection with a sensor element. Further, the POSITA would have expected success at the combination since Peirs teaches successful use of wireless technology in sensors, and Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

223. It is my opinion that The Fieldpiece Brochure in combination with Peirs and Staniforth render claim 1 obvious.

B. Independent Claim 12

224. The claim language for the **[preamble]** and elements [1] and [3] are discussed in Sections VII.B.1., 2., and 4. and XII.B.2., which are incorporated by reference and the same analysis is applied here.

1. ***[2] a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;***

225. The discussion in Section VIII.A.2, which is incorporated by reference and the same analysis is applied here, show that Peirs in view Staniforth teach [2] “a handle and integrated electronics, and the integrated electronics are incorporated into

the handle and in electrical connection with the sensor element,” as recited in claim 12.

2. *Claim 12 Summary and Conclusion*

226. A POSITA would have combined The Fieldpiece Brochure and Peirs and would have predicted success at the combination for the reasons set forth in the Claim 12 Summary and Conclusion over The Fieldpiece Brochure and Peirs in Section XII.B.3, which is incorporated and applied here. Further, a POSITA would have been motivated to apply the modifications of Peirs and Staniforth to provide a temperature sensor clamp having integrated electronics incorporated in the handle, including the integrated transmitting unit of Peirs and control buttons from Staniforth, in electrical connection with a sensor element. Further, the POSITA would have expected success at the combination since Peirs teaches successful use of wireless technology in sensors, and Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

227. In my opinion, The Fieldpiece Brochure in combination with Peirs and Staniforth renders claim 12 obvious.

XIV. GROUND 8: The Fieldpiece Manual Renders Claims 1 and 12 Unpatentable.

228. The Fieldpiece Manual is from the same field of endeavor as the '183 Patent, namely sensor systems for HVACR. For example, the Fieldpiece Manual

relates to an “HVAC Guide® System Analyzer” and wireless sensors that transmit data to it for, among other purposes, testing “Superheat” and “Subcooling” in an HVAC system. Ex. 1012, Pg. 2. Further, both the Fieldpiece Manual and the ’183 Patent are directed to solving problems similar to the problems addressed by the ’183 Patent, namely, a “need in the art for an improved sensor system for refrigeration units for monitoring and collecting system conditions such as superheat and subcooling.” Ex. 1001, 2:34–36.

A. Independent Claim 1

1. Claim 1, [Preamble] A sensor system for a refrigerant unit

229. The Fieldpiece Manual discloses a sensor system for a refrigerant unit. Ex. 1012, Pgs. 12–13.

2. Claim 1, [1] a plurality of sensors for sensing system parameters of the refrigerant unit.

230. The Fieldpiece Manual discloses recording 13 system parameters “at the same time,” and, thus, discloses at least 13 sensors: “Attach any Fieldpiece Accessory Head to the ET2W or EH4W to view or log measurements on your HG3 in real-time. The HG3 has the capability to wirelessly and simultaneously read up to 12 signals. A 13th accessory head can be attached directly to the HG3 and gives you the ability to record 13 parameters at the same time.” Ex. 1012, Pg. 12.

231. Further, the Fieldpiece Manual discloses “Set up the Fieldpiece Accessory Heads at multiple locations on the system with the wireless transmitters. . . .” Ex. 1012, Pg. 2.

232. It is my opinion that The Fieldpiece Manual, thus, discloses [1] “a plurality of sensors for sensing system parameters of the refrigerant unit,” as recited in claim 1.

3. Claim 1, [2] a portable electronic device configured to receive the system parameters from the plurality of sensors and to calculate system conditions for the refrigerant based on the system parameters;

233. The Fieldpiece Manual discloses the “HVAC GUIDE System Analyzer,” also referred to as the “New HG3 model” or “HG3.” Ex. 1012, Pgs. 2, 4, and 5.

234. The HG3 calculates system conditions based on the received system parameters. See, for example, Ex. 1012 at Pgs. 12–15, 22–33. The system conditions calculated include superheat and subcool. *Id.*, Pgs. 22–33.

235. For these reasons, The Fieldpiece Manual discloses “a portable electronic device configured to receive the system parameters from the plurality of sensors and to calculate system conditions for the refrigerant based on the system parameters,” as recited in claim 1.

4. Claim 1, [3] the plurality of sensors comprises a first pressure sensor and a second pressure sensor, and a first temperature sensor and a second temperature sensor

236. As set for the above, Fieldpiece Manual discloses that the HG3 can receive 13 system parameters, 12 of them wirelessly, at the same time.

237. The Fieldpiece Manual also discloses detecting suction line temperature and pressure with a first temperature sensor and a first pressure sensor for obtaining the system parameters for superheat analysis. Ex. 1012, Pg. 23.

238. The Fieldpiece Manual also discloses detecting liquid line temperature and pressure with a second temperature sensor and a second pressure sensor for obtaining the system parameters for subcooling analysis. Ex. 1012, Pg. 29.

239. The Fieldpiece Manual also suggests that use of the disclosed system makes the job “easier, faster and better.”

240. It is my opinion that the combined The Fieldpiece Manual teachings (1) faster results, (2) receiving 12 wirelessly transmitted system parameters, (3) a first and second temperature sensor, and (4) a first and second pressure sensor would have suggested to a POSITA [3] “the plurality of sensors comprises a first pressure sensor and a second pressure sensor, and a first temperature sensor and a second temperature sensor,” as recited in claim 1.

5. ***Claim 1, [4] the first and second temperature sensors each comprises a temperature sensor clamp having a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube;***

241. At “Accessory Head Descriptions,” The Fieldpiece Manual discloses “ATH4: Temperature with thermocouples (includes wet bulb and dry bulb thermocouples). Accepts any K-Type thermocouples. Ex. 1012, Pg. 72.

242. In the next section, “K-Type Thermocouples,” The Fieldpiece Manual discloses “ATC1: Pipe Clamp thermocouple” and “ATC1R: Pipe clamp thermocouples.” Ex. 1012, Pg. 73.

243. The Fieldpiece Manual also illustrates temperature sensor clamps having a clamping portion:



Ex. 1012, Pgs. 15, 23, 29

244. As shown above, The Fieldpiece Manual discloses temperature sensor clamps having “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about

the tube.” The “sensor element to measure temperature about the tube” may not be explicitly written, but it is necessarily present in each clamping portion.

245. It is my opinion that the Fieldpiece Manual discloses element [4].

6. ***[5] each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and***

246. Each of the temperature sensor clamps illustrated Fieldpiece Manual, as copied above, also has a handle and it is my opinion that they necessarily include integrated electronics in order to transmit sensed temperature data.

247. It is my opinion that the portion of the temperature sensor clamps engaging either the refrigerant line (suction line or liquid line, above) necessarily includes a sensor element to measure temperature about the tube illustrated.

248. It is further my opinion that the integrated electronics are necessarily connected to the integrated electronics in the handle in order to transmit temperature data.

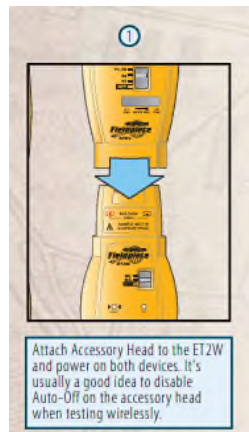
249. It is my opinion that the Fieldpiece Manual teaches element [5].

7. ***[6] there are no external physical connections among the plurality of sensors and the portable electronic device.***

250. The Fieldpiece Manual teaches the option of “Wirelessly Using a Fieldpiece Transmitter” and that for this option “Measurements are taken by the Accessory head and sent wirelessly to the HG3. The HG3 can receive up to 12

wireless signals at one time. See Wireless Testing Section (Pages 12-13).” Ex. 1012, Pg. 10.

251. The “Wireless Testing” section of the Fieldpiece Manual repeats the suggestion to “simultaneously read up to 12 signals” wirelessly, and details combining an accessory head to “ET2W” to make a wireless sensor. See Ex. 1012, Pg. 12:



252. As shown, the combination of accessory head and wireless transmitter creates an integrated, unitary wireless sensor.

253. With a selection of 12, simultaneous signals, The Fieldpiece Manual suggests combining 12 accessory heads with 12 ET2W.

254. Further, the teaching to perform tests “fast” suggests modifying the superheat and subcool arrangements illustrated therein (Ex. 1012, Pgs. 23 and 29) to assemble a kit to attach two wireless temperature sensors (one on the suction line

and one on the liquid line), and two wireless pressure sensors (one at the suction line and one at the liquid line).

255. It is my opinion that as taught and suggested, none of the wireless temperature sensors, the wireless pressure sensors, or the HG3 would have an external physical connection, nor would there be any physical connection between one another.

256. It is my opinion that the Fieldpiece Manual teaches element [6].

8. *Claim 1 Summary and Conclusion*

257. Based on the foregoing analysis, it is my opinion that a POSITA would appreciate that the Fieldpiece Manual teaches incorporation of wireless technology in HVACR sensors configured to transmit data to a remote, portable electronic device used for analysis of HVACR systems. A POSITA would recognize that the Fieldpiece Manual temperature sensors could be improved by placing wireless technology and integrated electronics in the temperature sensor clamp handles of the Fieldpiece Manual in order to enhance usability of the assembled sensor system components. A POSITA would have found it obvious to make such a modification and would have predicted success at the combination.

258. A POSITA would have been motivated to combine HVACR sensors and wireless technology in order to reduce the bulk, number, and arrangement of components required in the field. Instead of two temperature sensor clamps, and their

respective tethered headpiece-wireless transmitter units of Fieldpiece Manual, the modification would result in two wireless temperature sensor clamps requiring less bulk and weight, and being more convenient to simply clamp in place and remove at will. A POSTIA would also have been motivated to make the combination of wireless sensors and a wireless remote computer in order to eliminate distance constraints imposed by cables or hoses connecting sensors to each other, or to the remote computer collecting sensed data. A POSITA would have understood that without such distance constraints, a greater number of sensors could be deployed at remote locations, while facilitating rapid and efficient data collection from every sensor at the same time, and without the need for a technician to physically approach, read, and record data from each sensor. A POSTIA would also have known based on the state of the art at the time that wireless communication was predictably effective, and would have expected success at the combination of wireless technology in HVACR sensors and remote computers.

259. It is my opinion that the Fieldpiece Manual renders claim 1 obvious

B. Independent Claim 12

1. ***[Preamble] A temperature sensor clamp for sensing temperature in a refrigerant unit, the temperature sensor clamp comprising:***

260. The Fieldpiece Manual discloses a temperature clamp. Ex. 1013, Pg.

23. The Fieldpiece Manual discloses this preamble.

2. ***[1] a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube, and***

261. The discussion of claim 1, element **[4]** in Section XIV.A.5. is incorporated by reference and the same analysis is applied here. It is my opinion that the Fieldpiece Manual discloses claim 12, element **[1]** for at least the same reasons.

3. ***[2] a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;***

262. The discussion of claim 1, element **[5]** in Section XIV.A.6. is incorporated by reference and the same analysis is applied here. It is my opinion that the Fieldpiece Manual discloses element **[5]** for at least the same reasons.

4. ***[3] wherein the temperature sensor clamp has no external physical electrical or fluidic connections.***

263. The discussion of claim 1, element **[6]** in Section XIV.A.7 is incorporated by reference and the same analysis is applied here. For at least the same reasons as set forth with respect to element **[6]** of claim 1, the Fieldpiece Manual teaches claim 12, element **[3]**.

5. Claim 12 Summary and Conclusion

264. Based on the foregoing analysis, it is my opinion that a POSITA would appreciate that the Fieldpiece Manual teaches incorporation of wireless technology in HVACR sensors for use in HVACR sensor systems. A POSITA would recognize

that the Fieldpiece Manual temperature sensor could be improved by placing wireless technology in the temperature sensor clamp handle of the Fieldpiece Manual in order to enhance usability of the assembled sensor system components. A POSITA would have found it obvious to make such a modification and would have predicted success at the combination.

265. A POSITA would have been motivated to combine HVACR sensors and wireless technology in order to reduce the bulk, number, and arrangement of components required in the field. Instead of a temperature sensor clamps, and its tethered headpiece-wireless transmitter unit, the modification would result in a wireless temperature sensor clamp requiring less bulk and weight, and being more convenient to simply clamp in place and remove at will. A POSTIA would also have known based on the state of the art at the time that wireless communication was predictably effective, and would have expected success at the combination of wireless technology in temperature sensor clamps.

266. It is my opinion that the Fieldpiece Manual renders claim 12 obvious.

XV. GROUND 9: THE FIELDPIECE MANUAL IN COMBINATION WITH CN '078 AND STANFORTH RENDERS CLAIMS 1 AND 12 UNPATENTABLE.

267. Staniforth relates to “a probe for measuring the surface temperature of a pipe which comprises an active clamp assembly and a passive clamp assembly.” Ex. 1008, 1:43–45. The probe includes a “clamp temperature sensor assembly . . . in

the upper jaw and an electronics module is carried in the lower handle. The electronics module is in communication with the clamp temperature sensor assembly and has a display panel.” *Id.*, 1:50–55. The probe further has electronics incorporated in its handle that connect a thermistor to a display panel, and the display has integrated control buttons. *Id.*, 4:30–49.

268. CN ‘078 is directed to a device comprising a temperature sensor that wirelessly transmits temperature data to a computer, which then analyzes the temperature data. Ex. 1007, Abstract. The wireless temperature sensor can be a temperature sensor clamp. Ex. 1006, FIG. 5.

269. In my opinion, the Fieldpiece Manual is analogous to and is in the same field of endeavor as the ’183 Patent since both relate to sensor systems for HVACR. For example, the Fieldpiece Manual relates to an “HVAC Guide® System Analyzer” and wireless sensors that transmit data to it for, among other purposes, testing “Superheat” and “Subcooling” in an HVAC system. Ex. 1012, Pg. 2. Further, both the Fieldpiece Manual and the ’183 Patent are directed to solving problems similar to the problems addressed by the ’183 Patent, namely, a “need in the art for an improved sensor system for refrigeration units for monitoring and collecting system conditions such as superheat and subcooling.” Ex. 1001, 2:34–36.

270. It is also my opinion that CN ’078 is analogous art to the Fieldpiece Manual and the ’183 Patent, since it is reasonably pertinent to a problem described

in the '183 Patent, for example, “an improved sensor system for refrigeration units for monitoring and collecting system conditions,” and the proposed solution of “wireless” transmission of sensor data to a remote device. Ex. 1001, 2:34–41. Still further, it is my opinion that Staniforth is analogous since it is reasonably pertinent to the problem of providing improved sensor systems, in particular, improved temperature sensor clamps as it provides “[a] probe for measuring a surface temperature of a pipe [that] includes an active clamp assembly and a passive clamp assembly ...” Ex. 1010, Abstract.

271. Based on the foregoing, it is my opinion that a POSITA would have consulted and combined Fieldpiece Manual, CN '078, and Staniforth when considering “an improved sensor system for refrigeration units for monitoring and collecting system conditions,” as all of these references relate to sensors used to collect temperature data.

A. Independent Claim 1

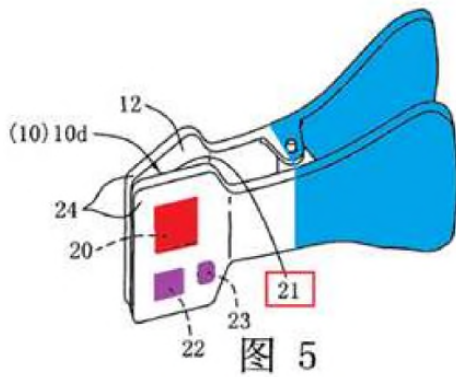
272. The Fieldpiece Manual and discloses claim 1 **[preamble]** and elements **[1], [2], [3], [4], and [6]** as discussed in Sections XIV.A. (with reference to Sections XIV.A.1, 2, 3, 4, 5, and 7) and the same analysis applies here.

273. To the extent that it is suggested the Fieldpiece Manual does not disclose claim 1, elements **[5]** and **[6]**, CN '078 discloses those elements.

274. Section XIV.A.6 sets forth my opinion that Fieldpiece Manual discloses “each temperature sensor clamp further comprises a handle,” as recited in element [5] of claim 1, and is incorporated by reference and the same analysis applied here.

1. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

275. Below is a color-coded comparison of the temperature sensor clamp of CN '078 at FIG. 5 to the temperatures sensor clamp of the '183 Patent at FIGS. 9B and 10:



Ex. 1006, FIG. 5

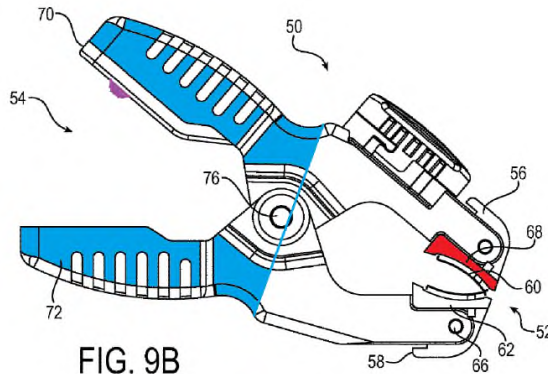


FIG. 9B

Ex. 1001, FIG. 9B

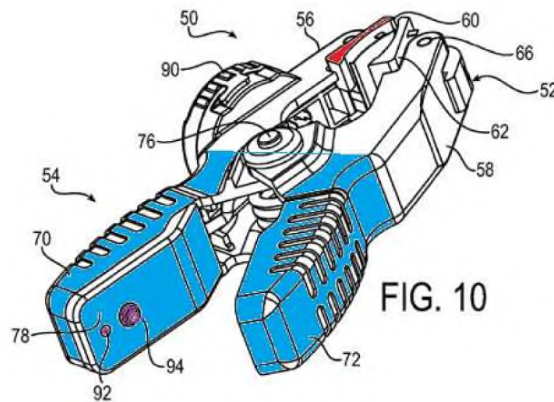


FIG. 10

Ex. 1001, FIG. 10

276. With reference to the annotated FIGS. 9B and 10 of the '183 Patent, above, the '183 Patent describes integrated electronics (Purple). Ex. 1001, 9:55–61. Further, the integrated electronics are described in “electrical connection” to the sensor 68 (Red). *Id.* The 183 Patent also states that the “integrated electronics may include . . . wireless interface pair button.” *Id.*

277. CN '078 discloses a temperature sensing device having integrated electronics including a “wireless transmitter 22” (Purple) and an “alarm 23” (Purple) Ex. 1007, Pg. 6.

278. The CN '078 device also comprises a clamp: “a clamping portion 24, as shown in Fig. 5, [that] directly clamps and is fixed on” the item being monitored. Ex. 1007, Pg. 6 and Ex. 1006, FIG. 5, copied above.

279. The device of CN '078 also comprises a “handle.” See Ex. 1006, FIG. 5, as reproduced above.

280. CN '078 also discloses temperature sensor 20 (Red) having a sensing surface 21. Ex. 1007, Pg. 6. See the CN '078 FIG. 5 reproduced above. Further, “a temperature sensor 20 starts sensing and converts the measured sensed values into electrical signals, the electrical signals are transmitted through a wireless transmitter 22 to a wireless receiver 31, the wireless receiver 31 transmits the electrical signals received to a computer device 30, and the computer device 30 analyzes and determines the electrical signals received.” Ex. 1007, Pg. 5. In my opinion, a POSITA would have understood that the “wireless transmitter 22” would be considered an integrated electronic component of the clamp, and is in electrical connection with the sensor element.

281. Claim 1 recites that the integrated electronics are incorporated into the “handle.” However, it is my opinion that moving the integrated electronics a little closer or a little farther away from the sensor element in the same clamp arm part, as illustrated in CN '078, has no effect on function and is an obvious design choice a POSITA would have readily adopted.

282. It is my opinion that the Fieldpiece Manual in combination with CN '078 teach [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 1 of the '183 Patent.

2. ***Claim 1, [6] “there are no external physical connections among the plurality of sensors and the portable electronic device.”***

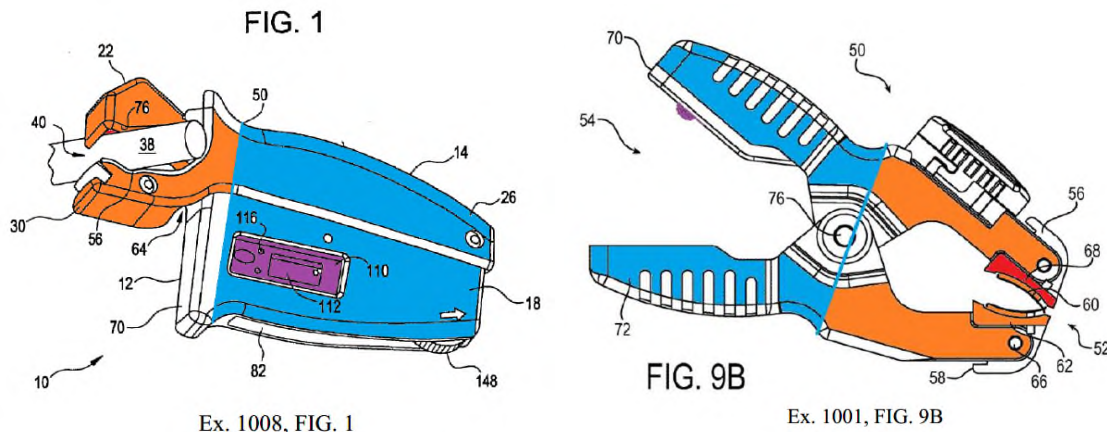
283. Section XIV.A.7 further sets for my opinion that the Fieldpiece Manual teaches the option of “Wirelessly Using a Fieldpiece Transmitter” and that for this option “Measurements are taken by the Accessory head and sent wirelessly to the HG3. The HG3 can receive up to 12 wireless signals at one time. See Wireless Testing Section (Pages 12-13).” Ex. 1012, Pg. 10. This discloses “no external physical connections,” as recited by claim 1, element [6], and the discussion therein is incorporated by reference and the same analysis is applied here.

284. To the extent that the “first and second temperature sensors” of element [6] are interpreted to be only “first and second temperature sensor clamps,” modification of The Fieldpiece Manual sensor clamps as taught by CN '078 would result in “no external physical electrical connections that extend from the first and second temperature sensors.”

285. To the extent that it is suggested that either the Fieldpiece Manual or CN '078 does not disclose element [5], Staniforth, an analogous patent reference, discloses this element.

3. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

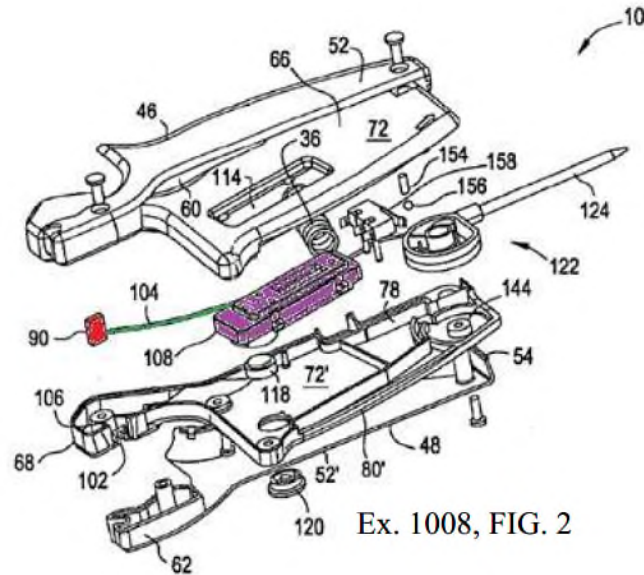
286. FIG. 1 of Staniforth as compared to FIG. 9B of the '183 Patent are annotated and reproduced below for reference:



287. Staniforth discloses upper and lower jaws 22, 30 (Orange) that clamp a pipe 38. Ex. 1008, 3:15–17. This is the same configuration shown in the '183 Patent at FIG. 9B.

288. A temperature sensor assembly 90 (Red) is “in recess 102 in the clamping surface 76 of the upper jaw 22, with the signal-carrying conductor 104

[green] extending through opening 106 in clamping surface 76.” See Ex. 1008, 4:8–11, and FIGS. 1 (above) and 2 (below):



289. The clamping surface 76 (Red) is just visible in FIG. 1 and shows the location of the temperature sensor assembly 90 in the assembled temperature probe.

290. Staniforth also discloses upper handle 26 and lower handle18 (Blue), and an electronics module 108, that is “integrated electronics” (Purple) within lower handle 18 and within display panel 110. Ex. 1008, 3:5–24. The electronics module includes display panel 110, LCD display 112, and control buttons 116. *Id.*, 4:30–49.

291. Further, the temperature sensor assembly 90 is connected via signal-carrying conductor 104 (Green) with the electronics module 108 (Purple) within lower handle 18. Ex. 1008, 4:30–34.

292. It is my opinion that the further combination of Staniforth with the Fieldpiece Manual and CN '078 specifically discloses moving integrated electronics to the handle of the temperature sensor taught by the combination of The Fieldpiece Manual and CN '078.

2. *Claim 1 Summary and Conclusion*

293. A POSITA would have combined Fieldpiece Manual and CN '078 and would have predicted success at the combination for the reasons set forth in the Claim 1 Summary and Conclusion over The Fieldpiece Manual and CN '078 in Section VIII.A.3, which is incorporated and applied here. Further, a POSITA would have been motivated to apply the modifications of Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

294. Moreover, A POSITA would have been further motivated to modify the temperature sensor clamps taught by Fieldpiece Manual and CN '078 under the teachings of Staniforth with integrated electronics, including control buttons, in the handle for enhanced usability as well as a reduced number of parts.

295. In my opinion, the Fieldpiece Manual in combination with CN '078 and Staniforth renders claim 1 obvious.

B. Independent Claim 12

296. The discussions at Sections XIV.A.4.–7. and XIV.B.1.–3. are incorporated by reference and the same analysis applies here. As set forth above for Ground 8, at Sections VIII.B.1.–3, the Fieldpiece Manual teaches the preamble and elements [1]–[3] of claim 12.

297. To the extent that it is suggested that the Fieldpiece Manual does not disclose element [2], CN'078 discloses this element.

1. Claim 12, [2] "*a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;*"

298. The discussion of claim 1, element [5] at Section XV.A.1. is incorporated by reference as if fully set forth here which shows that CN'078 discloses “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 12.

299. To the extent that it is suggested that either The Fieldpiece Manual or CN '078 does not disclose element [2], Staniforth discloses this element.

1. Claim 12, [2] "a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;"

300. The discussions of claim 1, element [5] at Sections VII.A.6, VIII.A.1, and IX.A.1 are incorporated by reference as if fully set forth here, the latter showing that Staniforth discloses “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element,” as recited in claim 12.

2. Claim 12 Summary and Conclusion

301. A POSITA would have combined Fieldpiece Manual and CN '078 and would have predicted success at the combination for the reasons set forth in the Claim 12 Summary and Conclusion over The Fieldpiece Manual and CN '078 in Section VIII.B.3, which is incorporated and applied here. Further, a POSITA would have been motivated to apply the modifications of Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

302. Moreover, A POSITA would have been further motivated to modify the temperature sensor clamps taught by Fieldpiece Manual and CN '078 under the teachings of Staniforth with integrated electronics, including control buttons, in the handle for enhanced usability as well as a reduced number of parts.

303. It is my opinion that the combination of the Fieldpiece Manual in combination with CN '078 and Staniforth renders claim 12 obvious.

XVI. GROUND 10: KANE ANTICIPATES CLAIMS 1 AND 12

304. Kane relates to “servicing and testing equipment used in the heating, ventilating, air conditioning, and refrigeration (HVAC/R) field and, more particularly to handheld test and measurement devices useful for HVAC/R technicians for the performance of their vocation.” Ex. 1013, [0002].

305. In my opinion, Kane is analogous to the '183 Patent as it is in the same field of endeavor as the '183 Patent; both relate to sensor systems for refrigeration units. See Ex. 1013, [0002] and Ex. 1001, 1:12-14

306. Kane discloses wireless pressure and temperature sensors transmitting data wirelessly to a portable electronic device at least with respect to FIGS. 4 and 9. See, for example, Ex. 1013; ¶¶[0043]–[0043] and [0063]–[0067].

A. Independent Claim 1

1. Claim 1, [Preamble] “A sensor system for a refrigerant unit comprising:”

307. Kane discloses “servicing and testing equipment used in the heating, ventilating, air conditioning, and refrigeration (HVAC/R) field.” Ex. 1013, ¶[0002]. Kane discloses this preamble.

2. Claim 1, [1] “a plurality of sensors for sensing system parameters of the refrigerant unit; and”

308. Kane discloses pressure sensors 416 and 426, and temperature sensors 418 and 428. Ex. 1013, [0042] and [0043]. These sensors may be in “The AC/R kit,” and are for sensing system parameters of the AC/R *Id.*

309. It is my opinion that Kane discloses element [1].

3. Claim 1 [2] “a portable electronic device configured to receive the system parameters from the plurality of sensors and to calculate system conditions for the refrigerant based on the system parameters; wherein”

310. Kane discloses “main unit 120,” which is “a handheld central or main field test and measurement instrument [and] comprises: a handheld-sized instrument with means for receiving a plurality of (ex. 1 through n) inputs 122 via wireless communications with sensor” Ex. 1013, ¶[0023]. The “the main unit 120 also provides the user/technician with real-time display of the (computed/calculated/estimated) output values (such as, for example, superheat,

subcool, combustion efficiency, etc.).” In some embodiment, the main unit functions are split between a handheld data interface unit 702 and user interface 708. Ex. 1013, ¶¶[0057], [0064]–[0066].

311. Kane discloses that “main unit” 120 “handheld.” Ex. 1013, ¶[0023]. A handheld device is a “portable,” and main unit 120 is an electronic device. Ex. 1013, ¶[0055]. The user interface 708, in combination with a handheld data interface unit 702, functions as the main unit 120, and can be a “portable tablet computing device, netbook, or smartphone device.” Ex. 1013, ¶[0058]. These are all portable electronic devices.

312. It is my opinion that Kane discloses element [2].

4. Claim 1, [3] “the plurality of sensors comprises a first pressure sensor and a second pressure sensor, and a first temperature sensor and a second temperature sensor;”

313. As above, regarding element [1], Kane discloses pressure sensors 416 and 426, and temperature sensors 418 and 428. Ex. 1013, [0042] and [0043]. These sensors may be in “The AC/R kit,” and are for sensing system parameters of the AC/R *Id.*

314. It is my opinion that Kane discloses element [3].

5. Claim 1, [4] “the first and second temperature sensors each comprises a temperature sensor clamp having a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube;”

315. Over FIG. 4, Kane discloses the first temperature sensor: “In one embodiment, AC kit 402 includes a . . . temperature sensor 418 for measuring . . . temperature . . . of typical refrigerant lines in HVAC/R systems such as system 100 in FIG. 1.” Ex. 1013, [0042]. Kane also discloses this temperature sensor is “preferably equipped with . . . pipe engaging sensor clamps for quality transducer contact for measuring refrigerant (line) temperature. . . .” *Id.* It is my opinion that a POSITA would have known that a “sensor clamp” includes a handle.

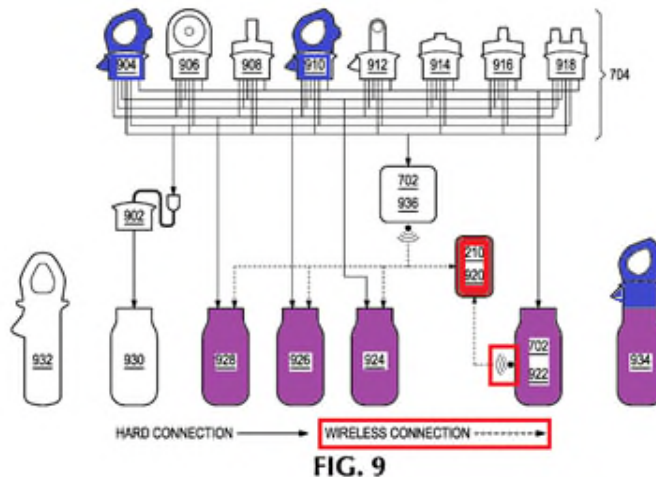
316. Kane then describes kit 404, says it has everything in kit 402, including the first temperature sensor, and “an additional temperature sensor 428 (which may be substantially similar to temperature sensor 418).” Ex. 1013, [0043].

317. Further Kane discloses that both of these temperature sensors can be wireless, and transmit data to the “central/main unit 120” wirelessly: “The AC/R kit 404 may include a combination of wired and wireless sensors, sender units, and transceivers/receivers as described and shown in FIG. 3, to provide a combination of wired and wireless remote sensor test and measurement means using a central/main unit 120.” Ex. 1013, [0043].

318. In my opinion, wireless technology is “integrated electronics.”

319. For the above reasons, the embodiment of FIG. 4 in Kane discloses element [4].

320. Over FIG. 9, Kane discloses many “sensors 704 [that] comprise any one or more attachment heads 904, 906, 908, 910, 912, 914, 916, 918, or another sensor attachment head not shown, each of which preferably interconnects with the sensor interface 702.” Ex. 1013, ¶[0063]. See FIG. 9:



321. The meter 934 has a “clamp-on type head 904.” Ex. 1013, [0065]. Meter 34 is the integral combination of base unit 922 and sensor head 904. *Id.* As illustrated, base unit 922 includes wireless technology; *i.e.*, integrated electronics. Ex. 1013, [0065].

322. Any of the wireless base units 922, 924, 926, 928 may be attached to a sensor attachment head 704, and “sensor kits 704 are as in FIG. 4,” including kit 404, which includes two temperature sensors. Ex. 1013, ¶¶[0042], [0043], [0057], [0063]-[0066].

323. A POSITA would hold the base unit 922, 924, 926, or 928 as a handle.

324. Further “integrated electronics” are necessarily present to convert temperature sensed to data that is wirelessly transmissible.

325. Also through the embodiment of FIG. 9, it is my opinion that Kane also discloses element [4].

6. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

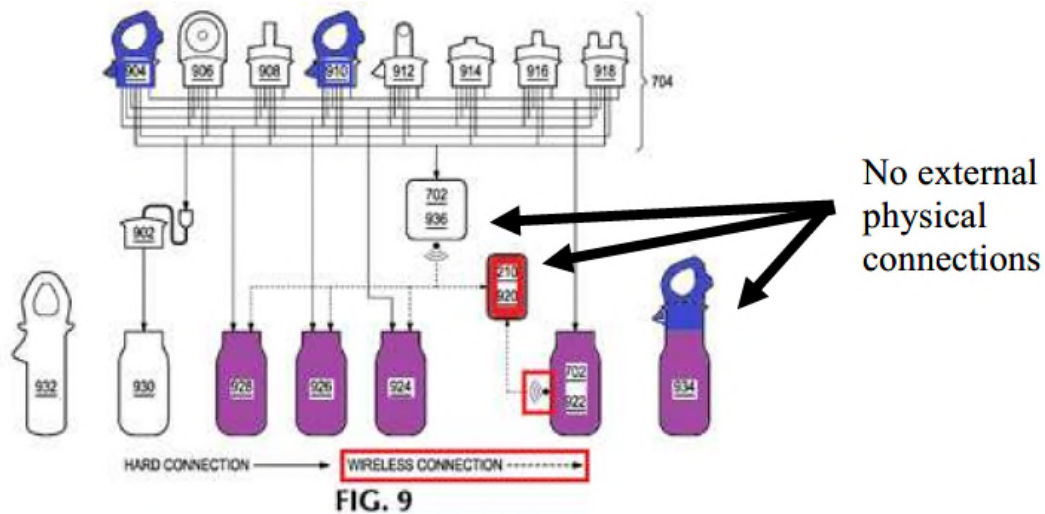
326. The discussion of element [4] in this Ground, immediately above and in this Section, is incorporated by reference and the same analysis is applied. Specifically, the meter 934 has a “clamp-on type head 904”, Ex. 1013, [0065], has a handle (shown above), and “integrated electronics” are necessarily present to convert temperature sensed to data that is wirelessly transmissible. These are in the integrated temperature sensor clamp handle shown above. It is my opinion that Kane discloses element [5].

7. ***Claim 1, [6] “there are no external physical connections among the plurality of sensors and the portable electronic device.”***

327. Kane discloses an option for pressure sensors 416 and 426, and temperature sensors 418 and 428 to be wireless: “The AC/R kit 404 may include a combination of wired and wireless sensors” Ex. 1013, [0042] and [0043]. In

addition, the embodiment of FIG. 9 contemplates these pressure sensors as options for its wireless sensors. *Id.*, [0042], [0043], [0057], [0063]-[0066].

328. Below, the one assembled sensor in FIG. 9 is labeled with “no external physical connections:



329. As noted above, any of the wireless base units 922, 924, 926, 928 may be attached to a sensor attachment head 704, and “sensor kits 704 are as in FIG. 4,” including kit 404, which includes two temperature sensors. Ex. 1013, ¶¶[0042], [0043], [0057], [0063]-[0066]. As such, four wireless units like the assembled unit in FIG. 9 would be created, and would include two wireless pressure sensors and two wireless pressure sensors.

330. Further, main unit 120 receives data wirelessly. Ex. 1013, ¶23.

331. Still further, FIG. 9 illustrates that the wireless sensors communicate wirelessly with “Blue Tooth enabled device 920 (or smartphone 210)” (Red), which

operates as user interface 708. Ex. 1013, ¶¶[0065], [0068]. As noted above, Kane describes the two components user interface 708 and measurement data interface unit 702 as a substitute for main unit 120. *Id.*, [0057]. FIG. 9, as reproduced and annotated above, illustrates device 920 and interface unit 702 as having only wireless connections to sensors.

332. Either through “main unit 120” or “device 920”/interface unit 702, Kane discloses a wireless portable electronic device that has not external physical connections.

333. It is my opinion that Kane discloses element [6].

4. *Claim 1 Summary and Conclusion*

334. Kane discloses every element of claim 1 of the '183 Patent. It is my opinion that Kane anticipates claim 1.

B. Independent Claim 12

1. *Claim 12, [Preamble] “A temperature sensor clamp for sensing temperature in a refrigerant unit, the temperature sensor comprising:”*

335. The discussion of claim 1, element [3] at Section XVI.A.4. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane discloses a temperature sensor clamp for sensing temperature in a refrigerant unit.

2. ***Claim 12, [1] “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube, and”***

336. The discussion at Section XVI.A.5. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane discloses element [1].

3. ***Claim 12, [2] “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;”***

337. The discussion at Sections XVI.A.6. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane discloses element [2].

4. ***Claim 12, [3] “wherein the temperature sensor clamp has no external physical electrical or fluidic connections.”***

338. The discussion at Section XVI.A.7. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane discloses element [3].

5. ***Claim 12 Summary and Conclusion***

339. Kane discloses every element of claim 12 of the '183 Patent. It is my opinion that Kane anticipates claim 12.

**XVII. GROUND 11: KANE IN COMBINATION WITH STANIFORTH
RENDERS CLAIMS 1 AND 12 UNPATENTABLE**

340. Ground 10, Section XVI, and the discussion of Staniforth in Ground 3, Section IX, are incorporated by reference and the same analysis is applied here to

apply the teaching of integrated electronics incorporated in a temperature sensing clamp in Staniforth to Kane.

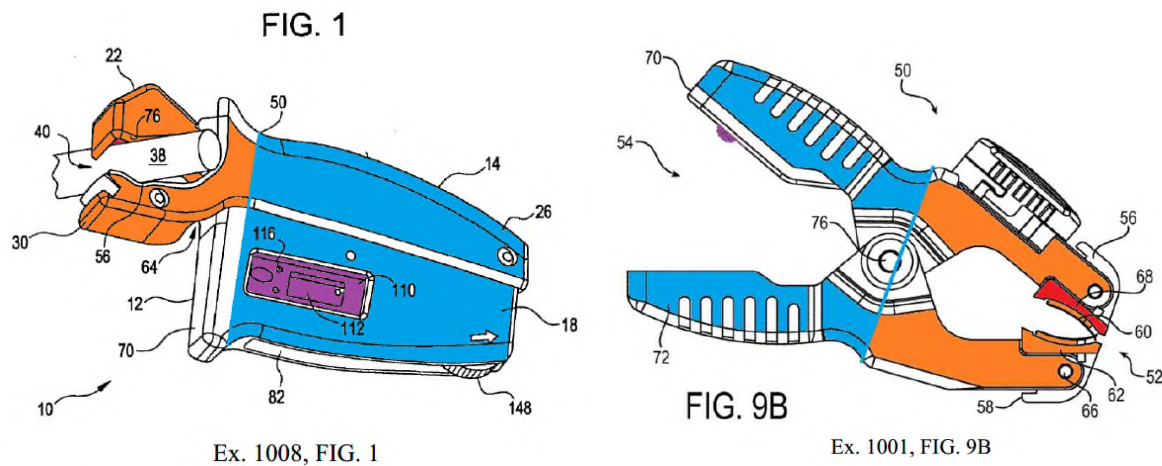
A. Independent Claim 1

341. As shown in those Sections, Kane discloses claim 1 XVI.A.1.-5. And 7. above, Kane discloses claim 1 **[preamble]** and elements **[1], [2], [3], [4], and [6]**.

342. To the extent that it is suggested that Kane does not disclose element **[5]**, Staniforth, an analogous patent reference, discloses this element.

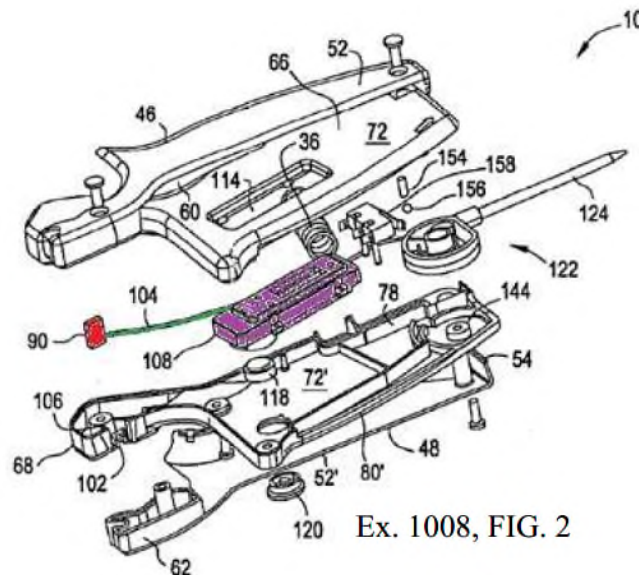
1. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

343. FIG. 1 of Staniforth as compared to FIG. 9B of the '183 Patent are annotated and reproduced below for reference:



344. Staniforth discloses upper and lower jaws 22, 30 (Orange) that clamp a pipe 38. Ex. 1008, 3:15–17. This is the same configuration shown in the '183 Patent at FIG. 9B.

345. A temperature sensor assembly 90 (Red) is “in recess 102 in the clamping surface 76 of the upper jaw 22, with the signal-carrying conductor 104 [green] extending through opening 106 in clamping surface 76.” See Ex. 1008, 4:8–11, and FIGS. 1 (above) and 2 (below):



346. The clamping surface 76 (Red) is just visible in FIG. 1 and shows the location of the temperature sensor assembly 90 in the assembled temperature probe.

347. Staniforth also discloses upper handle 26 and lower handle 18 (Blue), and an electronics module 108, that is “integrated electronics” (Purple) within lower

handle 18 and within display panel 110. Ex. 1008, 3:5–24. The electronics module includes display panel 110, LCD display 112, and control buttons 116. *Id.*, 4:30–49.

348. Further, the temperature sensor assembly 90 is connected via signal-carrying conductor 104 (Green) with the electronics module 108 (Purple) within lower handle 18. Ex. 1008, 4:30–34.

349. It is my opinion that the further combination of Staniforth with Kane teaches moving integrated electronics to the handle of the temperature sensor taught by Kane.

350. A POSITA would have been motivated to combine Kane with Staniforth to specifically provide integrated electronics in the handles of wireless temperature sensors, including control buttons that would enhance the utility and ease of use of the temperature sensors. Kane in combination with Staniforth discloses element [5].

2. *Claim 1 Summary and Conclusion*

351. Based on the foregoing analysis, it is my opinion that a POSITA would appreciate that Kane teaches the incorporation of wireless technology in HVACR sensors configured to transmit data to a remote, portable electronic device used for analysis of HVACR systems. A POSITA would recognize that the Kane temperature sensor could be improved by placing wireless technology and integrated electronics in the temperature sensor clamp handle of Kane in order to enhance usability of the

assembled sensor system components, and based on this understanding, a POSITA would have been motivated to combine Kane and Staniforth to arrive at improved, wireless temperature clamps.

352. Further, a POSITA would have been motivated to apply the modifications of Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

353. Moreover, A POSITA would have been further motivated to modify the temperature sensor clamps taught by Kane under the teachings of Staniforth with integrated electronics, including control buttons, in the handle for enhanced usability as well as a reduced number of parts.

354. In my opinion, Kane and Staniforth renders claim 1 obvious.

B. Independent Claim 12

1. Claim 12, [Preamble] “A temperature sensor clamp for sensing temperature in a refrigerant unit comprising:”

355. The discussion at Section XVI.A.4. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane discloses this preamble.

2. ***Claim 12, [1] “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube, and”***

356. The discussion at Section XVI.A.5. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane discloses element [1]. Alternatively, Kane in combination with Staniforth teaches this element.

3. ***Claim 12, [2] “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;”***

357. The discussion at Section XVI.A.6. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane discloses element [2]. Alternatively, Kane in combination with Staniforth teaches this element as noted at XVII.A.1.

4. ***Claim 12, [3] “wherein the temperature sensor clamp has no external physical electrical or fluidic connections.”***

358. The discussion at Section XVI.A.7. is incorporated by reference and the same analysis is applied here. For at least the same reasons, it is my opinion that Kane discloses element [3].

5. **Claim 12 Summary and Conclusion**

359. A POSITA would have been motivated to combine HVACR sensors and wireless pressure and temperature sensors disclosed by Kane at ¶¶[0042]–[0043]

in order to reduce the bulk and number of components required in the field. A POSTIA would also have been motivated to make the combination of wireless sensors and a wireless remote computer in order to eliminate distance constraints imposed by cables or hoses connecting sensors to each other, or to the remote computer collecting sensed data. A POSITA would have understood that without such distance constraints, a greater number of sensors could be deployed at remote locations, while facilitating rapid and efficient data collection from every sensor at the same time, and without the need for a technician to physically approach, read, and record data from each sensor. A POSTIA would also have known based on the state of the art at the time, as evidenced by Kane, that wireless communication was predictably effective, and would have expected success at the combination of wireless technology in HVACR sensors and remote computers.

360. A POSITA with such an understanding would have been motivated to combine Kane with Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

361. Moreover, A POSITA would have been further motivated to modify the temperature sensor clamps taught by Kane under the teachings of Staniforth with

integrated electronics, including control buttons, in the handle for enhanced usability as well as a reduced number of parts.

362. It is my opinion that the combination of Kane in combination with Staniforth renders claim 12 obvious.

XVIII. GROUND 12: KANE IN COMBINATION WITH STANIFORTH AND CN '078 RENDERS CLAIMS 1 AND 12 UNPATENTABLE

363. Kane relates to “servicing and testing equipment used in the heating, ventilating, air conditioning, and refrigeration (HVAC/R) field and, more particularly to handheld test and measurement devices useful for HVAC/R technicians for the performance of their vocation.” Ex. 1013, [0002].

364. CN '078 is directed to a device comprising a temperature sensor that wirelessly transmits temperature data to a computer, which then analyzes the temperature data. Ex. 1007, Abstract. The wireless temperature sensor can be a temperature sensor clamp. Ex. 1006, FIG. 5.

365. Staniforth relates to “a probe for measuring the surface temperature of a pipe which comprises an active clamp assembly and a passive clamp assembly.” Ex. 1008, 1:43–45. The probe includes a “clamp temperature sensor assembly . . . in the upper jaw and an electronics module is carried in the lower handle. The electronics module is in communication with the clamp temperature sensor assembly and has a display panel.” *Id.*, 1:50–55. The probe further has electronics incorporated

in its handle that connect a thermistor to a display panel, and the display has integrated control buttons. *Id.*, 4:30–49.

366. In my opinion, Kane is analogous to the '183 Patent as it is in the same field of endeavor as the '183 Patent; both relate to sensor systems for refrigeration units. See Ex. 1013, [0002] and Ex. 1001, 1:12-14. It is also my opinion that CN '078 is analogous art to Kane and the '183 Patent, since it is reasonably pertinent to a problem described in the '183 Patent, for example, “an improved sensor system for refrigeration units for monitoring and collecting system conditions,” and the proposed solution of “wireless” transmission of sensor data to a remote device. Ex. 1001, 2:34-41. In particular, CN '078 discloses a wireless temperature sensor clamp. Ex. 1006, FIG. 5. Still further, it is my opinion that Staniforth is analogous since it is reasonably pertinent to the problem of providing improved sensor systems, in particular, improved temperature sensor clamps as it provides “[a] probe for measuring a surface temperature of a pipe [that] includes an active clamp assembly and a passive clamp assembly ...” Ex. 1008, Abstract.

A. Independent Claim 1

1. Claim 1, [Preamble] “A sensor system for a refrigerant unit comprising:”

367. Kane discloses “servicing and testing equipment used in the heating, ventilating, air conditioning, and refrigeration (HVAC/R) field.” Ex. 1013, ¶[0001]. Kane discloses this preamble.

2. Claim 1, [1] “a plurality of sensors for sensing system parameters of the refrigerant unit; and”

368. Kane discloses pressure sensors 416 and 426, and temperature sensors 418 and 428. Ex. 1013, [0042] and [0043]. These sensors may be in “The AC/R kit,” and are for sensing system parameters of the AC/R *Id.*

369. It is my opinion that Kane discloses element [1].

3. Claim 1 [2] “a portable electronic device configured to receive the system parameters from the plurality of sensors and to calculate system conditions for the refrigerant based on the system parameters; wherein”

370. Kane discloses “main unit 120,” which is “a handheld central or main field test and measurement instrument [and] comprises: a handheld-sized instrument with means for receiving a plurality of (ex. 1 through n) inputs 122 via wireless communications with sensor” Ex. 1013, ¶[0023]. The “the main unit 120 also provides the user/technician with real-time display of the (computed/calculated/estimated) output values (such as, for example, superheat,

subcool, combustion efficiency, etc.).” In some embodiment, the main unit functions are split between a handheld data interface unit 702 and user interface 708. Ex. 1013, ¶¶[0057], [0064]–[0066].

371. Kane discloses that “main unit” 120 “handheld.” Ex. 1013, ¶[0023]. A handheld device is a “portable,” and main unit 120 is an electronic device. Ex. 1013, ¶[0055]. The user interface 708, in combination with a handheld data interface unit 702, functions as the main unit 120, and can be a “portable tablet computing device, netbook, or smartphone device.” Ex. 1013, ¶[0058]. These are all portable electronic devices.

372. It is my opinion that Kane discloses element [2].

4. Claim 1, [3] “the plurality of sensors comprises a first pressure sensor and a second pressure sensor, and a first temperature sensor and a second temperature sensor;”

373. As above, regarding element [1], Kane discloses pressure sensors 416 and 426, and temperature sensors 418 and 428. Ex. 1013, [0042] and [0043]. These sensors may be in “The AC/R kit,” and are for sensing system parameters of the AC/R. *Id.*

374. It is my opinion that Kane discloses element [3].

5. ***Claim 1, [4] “the first and second temperature sensors each comprises a temperature sensor clamp having a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube;”***

375. Kane discloses “The . . . temperature sensors . . . 418 [is] preferably equipped with . . . pipe engaging sensor clamps for quality transducer contact for measuring refrigerant (line) temperature.” Ex. 1013, ¶[0042], underline emphasis added. Further, Kane states that both of temperature sensors 418, 428 can have these features. Ex. 1013, ¶[0043].

376. Temperature sensors 418 and 428 are “pipe engaging sensor clamps for quality transducer contact for measuring refrigerant (line) temperature.”

377. A POSITA would have understood that (1) a pipe engaging sensor clamp has a “clamping portion configured to clamp on a tube of the refrigerant unit,” and (2) a quality transducer contact for measuring refrigerant (line) temperature occurs through a “sensor element to measure temperature about the tube.”

378. It is my opinion that Kane discloses element [4].

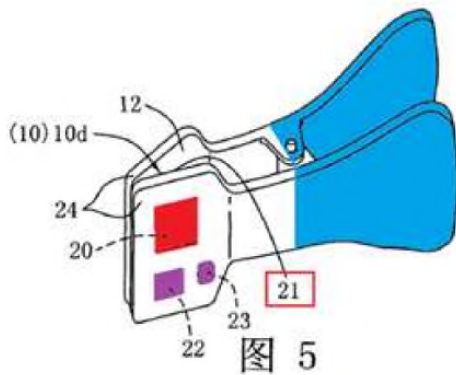
6. ***Claim 1, [5] “each temperature sensor clamp further comprises a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element; and”***

379. The discussion of Staniforth in Ground 11, element [5], Section XVII.A.1 is incorporated by reference and the same analysis is applied here. For the

reasons discussed with respect to Staniforth in Ground 11, element [5], it is my opinion that Staniforth in combination with Kane's clamping temperature sensor, teach element [5].

380. Further, to the extent that it is suggested that either Kane or Staniforth does not disclose element [5], CN '078, an analogous patent reference, discloses this element.

381. Below is a color-coded comparison of the temperature sensor clamp of CN '078 at FIG. 5 to the temperatures sensor clamp of the '183 Patent at FIGS. 9B and 10:



Ex. 1006, FIG. 5

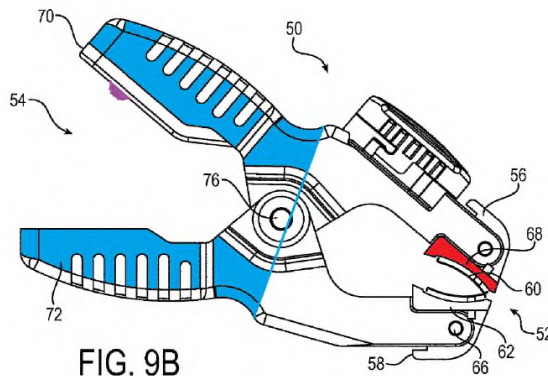


FIG. 9B

Ex. 1001, FIG. 9B

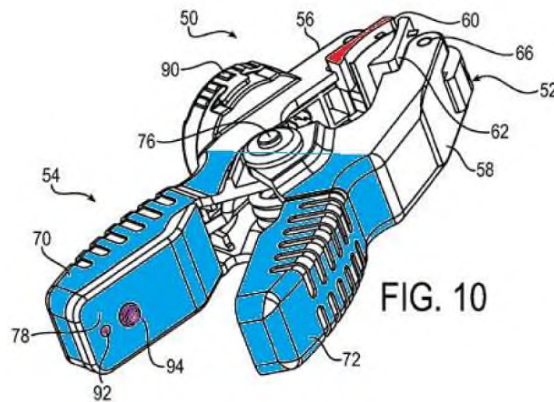


FIG. 10

Ex. 1001, FIG. 10

382. With reference to the annotated FIGS. 9B and 10 of the '183 Patent, above, the '183 Patent describes integrated electronics (Purple). Ex. 1001, 9:55–61. Further, the integrated electronics are described in “electrical connection” to the sensor 68 (Red). *Id.* The 183 Patent also states that the “integrated electronics may include . . . wireless interface pair button.” *Id.*

383. CN '078 discloses a temperature sensing device having integrated electronics including a “wireless transmitter 22” (Purple) and an “alarm 23” (Purple) Ex. 1007, Pg. 6. and a clamp: “a clamping portion 24, as shown in Fig. 5, [that]

directly clamps and is fixed on” the item being monitored. Ex. 1007, Pg. 6 and Ex. 1006, FIG. 5, copied above.

384. The device of CN ‘078 also comprises a “handle.” See Ex. 1006, FIG. 5, as reproduced above.

385. CN ‘078 also discloses temperature sensor 20 (Red) having a sensing surface 21. Ex. 1007, Pg. 6. See CN ‘078 FIG. 5 reproduced above. Further, “a temperature sensor 20 starts sensing and converts the measured sensed values into electrical signals, the electrical signals are transmitted through a wireless transmitter 22 to a wireless receiver 31, the wireless receiver 31 transmits the electrical signals received to a computer device 30, and the computer device 30 analyzes and determines the electrical signals received.” Ex. 1007, Pg. 5. In my opinion, a POSITA would have understood that the “wireless transmitter 22” would be considered an integrated electronic component of the clamp, and is in electrical connection with the sensor element.

386. Claim 1 recites that the integrated electronics are incorporated into the “handle.” However, it is my opinion that moving the integrated electronics a little closer or a little farther away from the sensor element in the same clamp arm part, as illustrated in CN ‘078, has no effect on function and is an obvious design choice a POSITA would have readily adopted, as shown by Staniforth at XVII.A.1 above.

387. It is my opinion that the further combination of Kane with Staniforth and CN '078 specifically teaches moving integrated electronics to the handle of the temperature sensor taught by the combination of Kane and CN '078, and therefore disclose [5].

7. Claim 1, [6] “there are no external physical connections among the plurality of sensors and the portable electronic device.”

388. The discussion above with respect to element [5] in this Ground, element [6] in Ground 2, Section VIII.A.2, with respect to CN '078 are incorporated by reference and the same analysis is applied here.

389. Further, Kane discloses an option for pressure sensors 416 and 426, and temperature sensors 418 and 428 to be wireless: “The AC/R kit 404 may include a combination of wired and wireless sensors, sender units, and transceivers/receivers as described and shown in FIG. 3” Ex. 1013, ¶¶[0042] and [0043].

390. It is my opinion that Kane suggests modification of its temperature and pressures sensors, and that the wireless temperature sensors and wireless pressure sensors taught by the combination of Kane and CN '078 would have no external physical connections that extend therefrom or to the portable electronic device.

391. As outlined above regarding element [2], the “main unit 120” of Kane is a wireless portable electronic device. It is further my opinion that the portable electronic device disclosed in Kane would have no external physical connections,

and would have not physical connections to any of the sensors taught by the combination of Kane and CN '078.

392. It is my opinion that Kane in combination with CN '078 teach element [6].

8. *Claim 1 Summary and Conclusion*

393. A POSITA would have been motivated to combine HVACR sensors and wireless pressure and temperature sensors disclosed by Kane at ¶¶[0042]-[0043] in order to reduce the bulk and number of components required in the field. A POSTIA would also have been motivated to make the combination of wireless sensors and a wireless remote computer in order to eliminate distance constraints imposed by cables or hoses connecting sensors to each other, or to the remote computer collecting sensed data. A POSITA would have understood that without such distance constraints, a greater number of sensors could be deployed at remote locations, while facilitating rapid and efficient data collection from every sensor at the same time, and without the need for a technician to physically approach, read, and record data from each sensor. A POSTIA would also have known based on the state of the art at the time, as evidenced by Kane, that wireless communication was predictably effective, and would have expected success at the combination of wireless technology in HVACR sensors and remote computers.

394. A POSITA with such an understanding would have been motivated to combine Kane with CN '078 to arrive at wireless, clamping temperatures sensors having electronics integrated into the handle, which would require less bulk and weight, and be more convenient to simply clamp in place and remove at will. Further, a POSITA with such an understanding would have been motivated to combine Kane and CN'078 with Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

395. It is my opinion that the combination of Kane in combination with Staniforth and CN '078 renders claim 1 obvious.

B. Independent Claim 12

1. Claim 12, [Preamble] “A temperature sensor clamp for sensing temperature in a refrigerant unit comprising:”

396. The discussion at Section XVII.A.4. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane discloses this preamble.

2. ***Claim 12, [1] “a clamping portion configured to clamp on a tube of the refrigerant unit, the clamping portion including a sensor element to measure temperature about the tube, and”***

397. The discussion at Section XVII.A.5. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane discloses element [1].

3. ***Claim 12, [2] “a handle and integrated electronics, and the integrated electronics are incorporated into the handle and in electrical connection with the sensor element;”***

398. The discussion at Section XVII.A.6. is incorporated by reference and the same analysis is applied here. It is my opinion that Kane in combination with CN’078 and Staniforth disclose element [1].

4. ***Claim 12, [3] “wherein the temperature sensor clamp has no external physical electrical or fluidic connections.”***

399. The discussion at Section XV.A.7. is incorporated by reference and the same analysis is applied here. For at least the same reasons, it is my opinion that Kane discloses element [3].

5. Claim 12 Summary and Conclusion

400. A POSITA would have been motivated to combine HVACR sensors and wireless pressure and temperature sensors disclosed by Kane at ¶¶[0042]–[0043] in order to reduce the bulk and number of components required in the field. A POSTIA would also have been motivated to make the combination of wireless

sensors and a wireless remote computer in order to eliminate distance constraints imposed by cables or hoses connecting sensors to each other, or to the remote computer collecting sensed data. A POSITA would have understood that without such distance constraints, a greater number of sensors could be deployed at remote locations, while facilitating rapid and efficient data collection from every sensor at the same time, and without the need for a technician to physically approach, read, and record data from each sensor. A POSTIA would also have known based on the state of the art at the time, as evidenced by Kane, that wireless communication was predictably effective, and would have expected success at the combination of wireless technology in HVACR sensors and remote computers.

401. A POSITA with such an understanding would have been motivated to combine Kane with CN '078 to arrive at wireless, clamping temperatures sensors with electronics integrated into the handle, which would require less bulk and weight, and be more convenient to simply clamp in place and remove at will. Further, a POSITA with such an understanding would have been motivated to combine Kane and CN'078 with Staniforth to connect the temperature sensor with integrated electronics incorporated in the handle, and to provide control buttons for the temperature sensor clamp. Further, the POSITA would have expected success at the combination since Staniforth teaches successful incorporation of electronics, including control buttons, in the handle of a temperature sensor clamp.

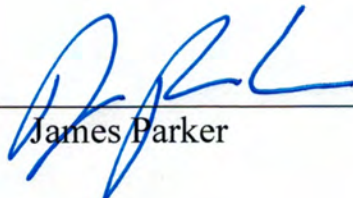
402. It is my opinion that the combination of Kane in combination with CN '078 and Staniforth renders claim 12 obvious.

XIX. CONCLUSION

403. For the reasons set forth above, I believe claims 1 and 12 of the '183 Patent are unpatentable in combination with the prior art. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

404. I declare that all statements made herein of my knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: MARCH 06/2023

By: 
James Parker