

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Mercedes-Benz USA, LLC

BMW of North America, LLC,

Petitioners,

v.

Michigan Motor Technologies, LLC

Patent Owner.

IPR2023-01031

PETITION FOR *INTER PARTES* REVIEW OF

U.S. PATENT NO. 8,909,482

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LIST OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 8,909,482 to Maso Portabella (“the ’482 patent”)
1002	Prosecution File History of U.S. Patent No. 8,909,482 (“’482 file history”)
1003	Expert Declaration of Glenn R. Bower, Ph.D.
1004	Curriculum Vitae of Glenn R. Bower, Ph.D.
1005	U.S. Patent No. 8,170,886 (“Luff”)
1006	U.S. Patent Publication No. US 2003/0061091 (“Amaratunga”)
1007	U.S. Patent Publication No. US 2003/0028350 (“Seem”)
1008	U.S. Patent Publication No. 2007/0262855 (“Zuta”)
1009	U.S. Patent No. 6,148,656 (“Breton”)
1010	U.S. Provisional Patent Application No. 61/040,466 (“the ’466 provisional”)

I. CLAIM LISTING

A. Claim 1

1[pre]	A device for measuring power consumption and performance with respect to the environment of a power-consuming unit comprising
1[a]	a data introduction module, which receives at least one power consumption value, measured by a measurement apparatus of the power-consuming unit;
1[b]	an input device for inputting waste production data;
1[c]	a display screen; and
1[d]	a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to
1[e]	(a) receive the at least one power consumption value from the data introduction module,
1[f]	(b) receive the waste production data,
1[g]	(c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and
1[h]	(d) operate the display screen to display the calculated ecological parameter,
1[i]	wherein the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value.

B. Claim 2

2	The device of claim 1 further comprising a means for introducing values of waste production.
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C. Claim 4

4	The device of claim 1 further comprising USB input for a serial data bus.
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D. Claim 5

5[a]	The device of claim 1 wherein the at least one power consumption value includes at least two power consumption values selected from the group of:
5[b]	a water flow input from a corresponding first water flow meter;
5[c]	a combustible gas and liquid flow input from a second combustible gas

	and liquid flow meter;
5[d]	an electric power measurement input from a meter or analyser of electric mains; and
5[e]	a waste weight measurement input from a scale for weighting wastes.

E. Claim 6

6[a]	The device of claim 1 wherein the at least one power consumption value includes a fuel flow input from a corresponding flow meter from the motor of an automobile;
6[b]	the waste production data corresponds to one of tire rubber wastes, motor oil wastes, coolant liquid wastes, closed circuit liquid wastes and metal wastes, and
6[c]	the fuel flow input and the waste production data are used to calculate the ecological parameter corresponding to the automobile.

F. Claim 7

7	The device of claim 6 wherein the at least one power consumption value includes an exhaust gas flow input from a corresponding flow meter of exhaust gases of a combustion system of the automobile.
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G. Claim 9

9[pre]	A method of determining an ecological parameter by processor, comprising:
9[a]	receiving a first power consumption value of a power consuming unit,
9[b]	receiving a waste production data value,
9[c]	determining an ecological parameter based on the first power consumption value and the waste production data value, and
9[d]	outputting the determined ecological parameter for display on a display screen.

H. Claim 10

10	The method of claim 9, wherein the first power consumption value corresponds to one of water flow, combustible gas flow, and electric power flow.
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I. Claim 11

11	The method of claim 10, wherein the waste production data corresponds
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	to waste weight.
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J. Claim 12

12	The method of claim 9, wherein the first power consumption value corresponds to one of fuel flow and exhaust gas flow.
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K. Claim 13

13	The method of claim 12, wherein the waste production data corresponds to one of rubber wastes, oil waste, coolant liquid wastes, and metal.
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II. INTRODUCTION

Mercedes-Benz USA, LLC (“MBUSA”) and BMW of North America, LLC (“BMW”) petition for *Inter Partes* Review of claims 1-2, 4-5, 6-7, and 9-13 of U.S. Patent No. 8,909,482 to Portabella et al. (“the ’482 patent”), titled “Device for measuring power consumption and performance with respect to the environment of a power-consuming unit.”

The ’482 patent claims using a general-purpose computer to generate a “parameter” purportedly representing the environmental impact of commonly used resources, *e.g.*, electricity in the home. Notably, the ’482 patent relies on existing measures of resource consumption (“direct consumption”) such as gas or electric meters and waste/residues (“indirect consumption”), such as rubber wastes, oil waste, as inputs to its “parameter” calculation. The ’482 patent does not purport to have invented a new method for gathering or measuring resource consumption or waste. Nor is the ’482 patent’s formula that is used to compute its “parameter” new. Indeed, the formula used to compute the ’482 patent’s “parameter” is merely a measure of deviation between measured consumption/waste and a reference value. Thus, the ’482 patent claims nothing more than measuring consumption or waste values and comparing them to reference values.

There is nothing inventive about this approach. The prior art includes a variety of references that calculate an environmental impact parameter using the same technique. For example, Luff, Zuta, and Breton all disclose meters for

measuring resource consumption, and Luff and Amaratunga both disclose measuring resource consumption and waste production to calculate a parameter representing environmental impact.

Accordingly, Petitioners requests that the challenged claims be held unpatentable.

III. REQUIREMENTS UNDER 37 C.F.R. 42.104

A. Grounds for Standing

Petitioners respectfully requests *inter partes* review (“IPR”) of Claims 1-2, 4-5, 6-7, and 9-13 (“Challenged Claims”) of the ’482 patent (Ex. 1001), which is indicated as assigned to Michigan Motor Technologies LLC (“MMT”). Petitioners certify that the ’482 patent is available for *inter partes* review and Petitioners are not barred or estopped from requesting review of the Challenged Claims on the grounds identified in this Petition.

Precise Relief Requested

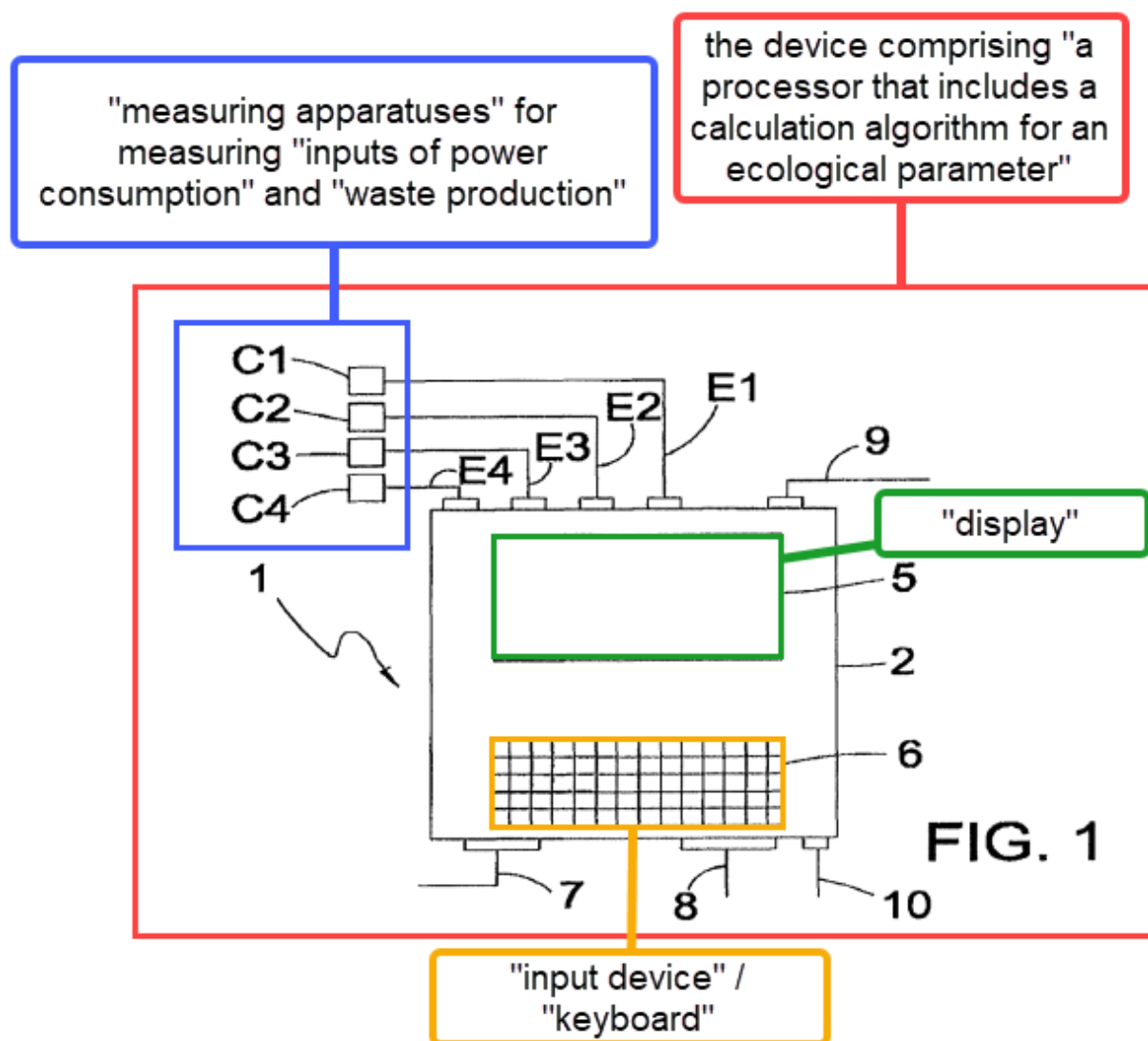
The relief requested is cancellation of the challenged claims, as follows

Ground	’482 Patent Claims	References	Basis
1	1-2, 4-5	Luff, Amaratunga, Seem	§103
2	6	Luff, Amaratunga, Seem, Zuta	§103
3	7	Luff, Amaratunga, Seem, Zuta Breton	§103
4	9-11	Luff, Amaratunga	§103
5	12-13	Luff, Amaratunga, Zuta, Breton	§103

IV. OVERVIEW OF THE '482 PATENT

The '482 patent claims systems and methods for measuring resource consumption of a power consuming unit and calculating an ecological parameter based on that consumption. See Ex. 1001 at Abstract. In particular, the '482 patent claims using a general-purpose computer to generate a “parameter” purportedly representing the environmental impact of commonly used resources, *e.g.*, electricity in the home. See, *e.g.*, *Id.* at cl. 1, . The '482 patent teaches that the inputs used to calculate the claimed “parameter” are standard waste/consumption measurements taken using, *e.g.*, gas or electric meters.

The '482 patent claims recite methods to be performed by a general-purpose computer comprising “a module for introducing data provided with inputs of power consumption values,” “a keyboard for introducing [waste production] data and selecting menus,” a “processor that includes a calculation algorithm for an ecological parameter,” and “a display screen to display the calculated ecological parameter.” *Id.* at 3:26-42. These components are shown, for example, in annotated Figure 1 below:



Id. at FIG. 1 (annotations added).

The '482 patent teaches that its measuring apparatuses may be meters that measure resource consumption, such as water meters, gas meters, or electricity meters, or other similar measuring apparatuses. The '482 patent's power consumption values are measured from a power-consuming unit, such as a vehicle or building. *Id.* at 1:18-29. The '482 patent teaches that it measures power consumption values and waste produced by the power consuming unit, and from

those values uses known statistical formulas to calculate an “ecological parameter” that compares the consumption and waste production to known reference values. *Id.* at Abstract; 3:22-25.

Thus, the ’482 patent claims nothing more than collecting consumption and waste data using known techniques such as gas meters and comparing that data to reference values to establish an “ecological parameter.”

V. PROSECUTION HISTORY

The ’482 patent was issued December 9, 2014, from U.S. Application No. 13/054,355 (“the ’355 application”), which was filed on January 14, 2011. *Ex.* 1001. The ’482 patent claims priority to International Patent Application PCT/IB2009/053135, filed July 20, 2009, which itself claims priority to Spanish Patent Application 2008021529, filed on July 18, 2008. *Id.* at (30). Thus, the ’482 patent’s earliest possible priority date is July 18, 2008.

The examiner issued a single Non-Final Rejection during prosecution of the ’355 application. *Ex.* 1002 at 134-141. Claims 1-8 were allowed as-filed. *Id.* at 135. Independent claims 9 and 16 were rejected as indefinite under 35 U.S.C. § 112. *Id.* at 136. Claims 9-16 were further rejected as directed to non-patentable subject matter under 35 U.S.C. § 101. *Id.* at 137.

The applicant amended claim 9 to recite a processor configured to undertake the recited method steps and addressed typos in the original versions of the claim. *Id.* at 150. The applicant also revised claim 16 into a dependent claim depending

on independent claim 9. *Id.* at 151. After the amendments, the Examiner allowed claims 9-16 without any substantive comment. *Id.* at 155.

VI. THE VOLKSWAGEN IPR

Volkswagen Group of America, Inc. (“VW”) previously filed a petition for *inter partes* review challenging claims 1, 2, and 4-13 of the ’482 patent, on May 12, 2020. See IPR Nos. IPR2020-00894 (“’894 IPR”). The ’894 IPR petition relied on combinations of Luff, Zuta, Breton and Hill & Lewicki, *Statistics: Methods and Applications: A Comprehensive Reference for Science, Industry, and Data Mining*, StatSoft, Inc., 2006 (“Hill”). See ’894 IPR at Paper 2 (Petition). Luff, Zuta, and Breton are relied upon by MBUSA in this Petition. The ’894 IPR petition did not rely on the Amaratunga and Seem references or any combinations including those references relied upon by MBUSA in this Petition. See ’894 IPR at Paper 2 (Petition).

The PTAB denied institution of the ’894 IPR petition on the grounds that the ’894 IPR petition did not persuade the PTAB that Luff taught or suggested “a processor” to “receive the waste production data” limitation recited in claim 1 of the ’482 patent. ’894 IPR, Paper 11 at 12-14.

VII. LEVEL OF ORDINARY SKILL IN THE ART

A POSITA at the time of the alleged invention would have had a B.S. degree in Electrical Engineering or Mechanical Engineering (or equivalent), as well as at least 2-3 years of industry experience, including experience with statistical analysis,

or, alternatively, at least an M.S. degree in Electrical Engineering or Mechanical Engineering and 1-2 years of industry experience, including experience with statistical analysis. Ex. 1003 at ¶¶ 49-50.

VIII. CLAIM CONSTRUCTION

The PTAB construes challenged claims in an IPR “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). Claim terms must be given their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the invention, in light of the specification and the prosecution history of the patent. *Id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-1313 (Fed. Cir. 2005) (en banc); see also 83 Fed. Reg. 51,340 (Oct. 11, 2018).

Petitioners provide the following claim constructions. All claim terms not identified below should receive their plain and ordinary meaning, in the context of the ’482 patent specification, under the *Phillips* standard. Petitioners take no position in this Petition as to whether the claims are indefinite, and no statements herein should be interpreted to mean that the terms are definite.

A. Claim 2: “means for introducing values of waste production”

Under 37 C.F.R. § 42.104(b), an IPR petition must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function of any means-plus-function claim term.

Claim 2 recites “The device of claim 1 further comprising a means for

introducing values of waste production.” Ex. 1001 at cl. 2. This limitation is a means-plus-function term because it recites a function to be performed (“introducing values of waste production”) without reciting the corresponding structure or materials for performing the function. *Lockheed Martin Corp. v. Space Systems/Loral, Inc.*, 324 F.3d 1308, 1318 (Fed. Cir. 2003) (“A means-plus-function limitation recites a function to be performed rather than definite structure or materials for performing that function. Such a limitation must be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.”). The corresponding structure for this limitation is the ’482 patent’s disclosure of a “weight apparatus” (such as a scale or weight sensor)—the ’482 patent discloses that “[t]o introduce values of the waste production one of the inputs E4, digital o[r] analogical, can be used, from a weight apparatus, or they can be introduced manually through a keyboard.” *Id.* at 3:45-47.

Thus, the structure corresponding to the “means for introducing values of waste production” limitation should be construed as a “weight apparatus” (*e.g.*, a scale or weight sensor), a keyboard, or the equivalents of these structures. Ex. 1003 at ¶ 62.

IX. SUMMARY OF PRIOR ART

A. Luff

1. Priority Date

U.S. Patent No. 8,170,886 to Luff, “Systems, methods, and apparatus to

generate an energy consumption index” (Ex. 1005, “Luff”), was filed March 30, 2009 and claims priority to U.S. Provisional Application No. 61/040,466 (“the ’466 provisional”), which was filed March 28, 2008—before the ’482 patent’s earliest possible priority date of July 18, 2008.¹ Thus, to the extent Patent Owner relies on the priority claim of the ’482 patent to Spanish Patent Application 2008021529, Luff qualifies as prior art under 35 U.S.C. § 102(e) (pre-AIA) based on its priority date from the ’466 provisional.

To claim priority from the ’466 provisional (1) the provisional application must support at least one claim of Luff and (2) the disclosure of Luff must have been carried forward from the ’466 provisional. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1380-1381 (Fed. Cir. 2015); see *T-Mobile USA, Inc. v. Intellectual Ventures II LLC*, No. IPR2018-01775, Paper 10, Inst. Dec., at 13-14 (P.T.A.B. Mar. 18, 2019) (holding that *Dynamic Drinkware* requires that at least one claim in the published patent is supported by the provisional application).

First, the ’466 provisional supports at least one claim of the Luff patent. For example, claim 1 of the ’466 provisional teaches the same steps in the same order as claim 1 of Luff:

Luff Claim 1	’466 Provisional Claim 1
1. A method to generate an energy	1. A method to generate a personal

¹ Petitioners do not concede that the ’482 patent is entitled to the benefit of its earliest priority claim.

consumption index, the method comprising:	energy consumption index, comprising
measuring, via a first sensor, resources consumed at a home associated with a person and calculating a home energy value indicative of the resources consumed at the home;	receiving home resource consumption measurements associated with at least one of a household appliance, fixture or device;
measuring, via a second sensor, resources consumed by the person while located outside the home and calculating an out of home energy value indicative of the resources consumed by the person while located outside the home;	receiving remote resource consumption measurements associated with a person;
identifying goods purchased by the person and calculating a purchase energy value indicative of an amount of energy required to manufacture the goods and to manufacture packaging of the goods; and	receiving purchase information associated with the person; and
generating, via a logic circuit, an energy consumption index associated with the person based on the home energy value, the out of home energy value, and the purchase energy value.	generating a personal energy consumption index based on the received resource consumption measurements, remote resource consumption measurements, and purchase information.

Luff's claim 1 adds additional details to the claimed method steps (*e.g.*, measuring the resource consumed at home via a sensor). Ex. 1005 at cl. 1 These additional details are also disclosed in the '466 provisional. Ex. 1010 at ¶¶ 0036, 0041-42, 0048-49, 0057, FIGS. 3-4; Ex. 1003 at ¶¶ 64-65. Thus, the '466 provisional supports at least one claim of the Luff patent.

Second, the disclosures of Luff relied on by this Petition were carried through from the '466 provisional. Ex. 1003 at ¶ 66. The Grounds below provide citations to both Luff and the '466 provisional where the Grounds rely on Luff's

disclosures.

Because the '466 provisional supports at least one claim of Luff and the relevant disclosures of Luff were carried through from the '466 provisional, Luff is entitled to the '466 provisional patents priority date, and Luff qualifies as prior art to the '482 patent under 35 U.S.C. § 102(e) (pre-AIA). *Dynamic Drinkware*, 800 F.3d at 1380-81.

2. Summary of Luff

Luff discloses the same systems and processes for measuring resource consumption and waste production and calculating a parameter representing the environmental impact of those measurements as the '482 patent. Luff teaches generating energy consumption indices using a data collector that receives measurements of various resources consumed by a household, person, or vehicle. Ex. 1005 at Abstract. Luff also teaches a data collector 110 comprising a processor, machine-readable instructions for calculating energy consumption indices, input devices such as a keyboard for inputting or modifying data, and a display for displaying energy consumption indices. *Id.* at 30:24-58.

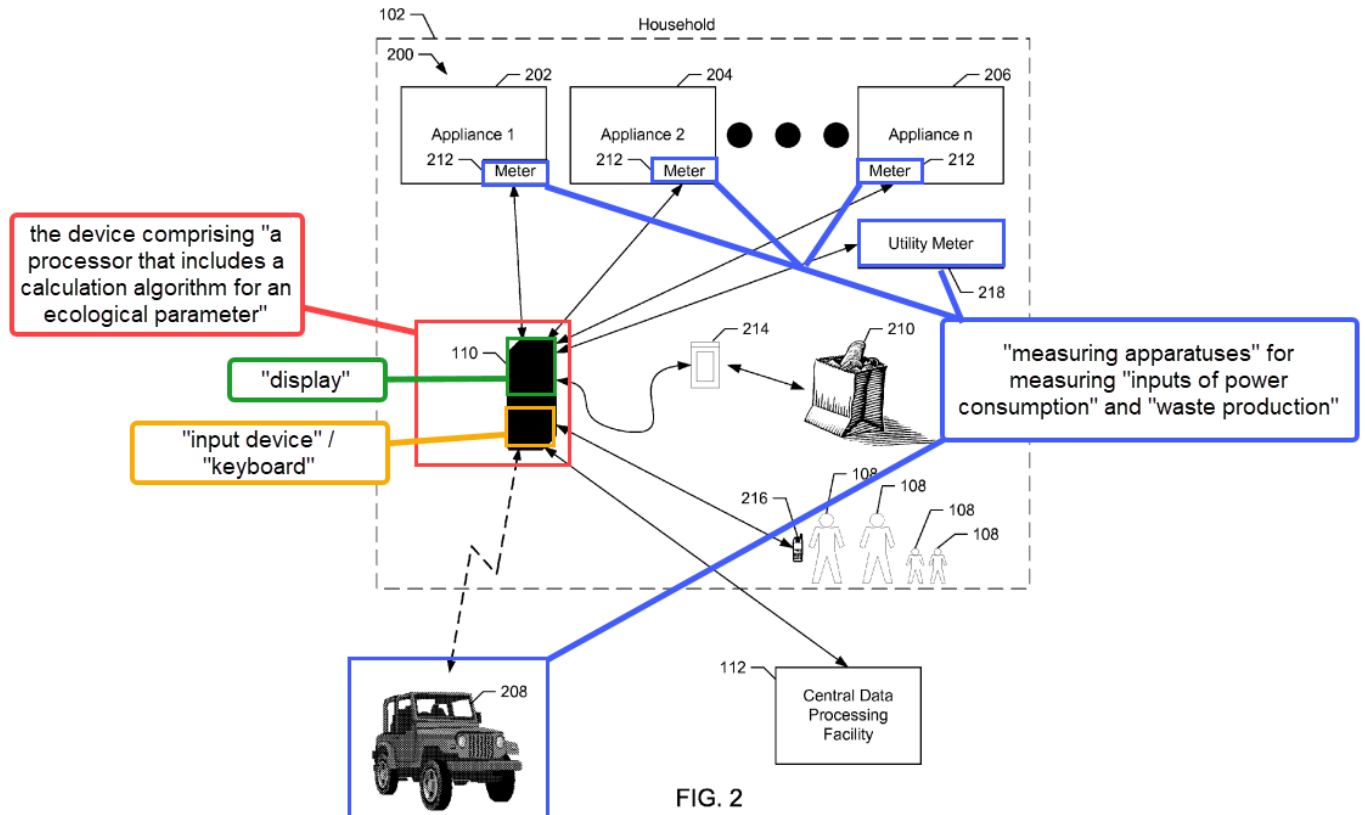


FIG. 2

Id. at FIG. 1 (annotations added).

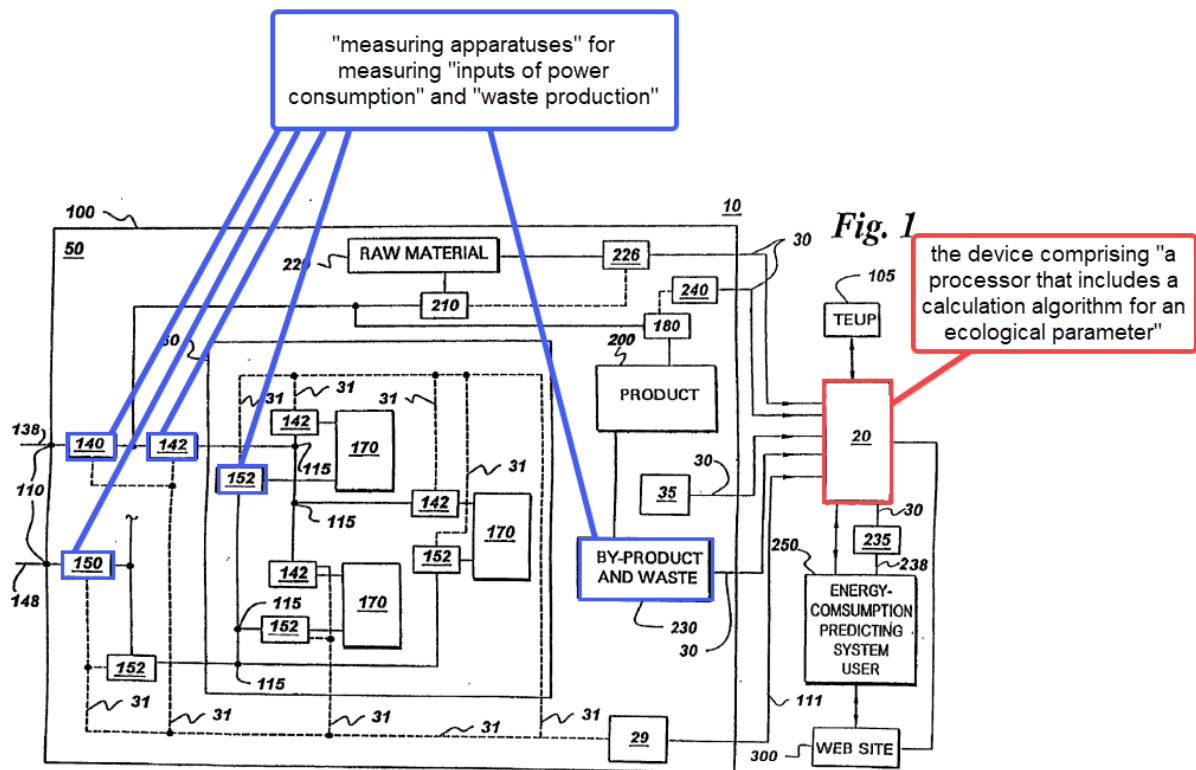
Luff's resource and energy consumption data is measured by a variety of meters, including meters for measuring utility usage, like water, gas, or electricity; meters for measuring electricity consumption by appliances; and meters for measuring vehicle fuel consumption. *Id.* at 5:57-64. Based on those measurements, Luff calculates energy consumption indices to "reflect [] resource and/or energy usage patterns." *Id.* at 3:17-21.

B. Amaratunga

U.S. Patent Application Publication No. 2003/0061091 by Amaratunga et al., "Systems and methods for making prediction on energy consumption of energy-

consuming systems or sites” (Ex. 1006, “Amaratunga”), was published March 27, 2003, more than one year before the ’482 patent’s earliest possible priority date. Therefore, Amaratunga is prior art at least under 35 U.S.C. §102(b)(pre-AIA).

Like the ’482 patent, Amaratunga discloses systems and process for measuring resource consumption and waste production and calculating a parameter representing the environmental impact based on those measurements. Amaratunga teaches systems and methods for “measur[ing] energy consumed by energy-consuming systems or an energy-consuming site” and “compar[ing] the real energy usage of the systems or site against expected or predicted values.” Ex. 1006 at Abstract. Amaratunga further discloses measuring waste production and incorporating those measurements into its energy calculations: Amaratunga teaches a “waste information unit 230” that measures “waste amounts for [an] energy consuming site,” just like the ’482 patent. *Id.* at ¶ 0035.



Id. at FIG. 1 (annotations added).

Amaratunga's system compares the measured energy consumption and waste production information to "amounts . . . expected to be consumed" to determine the "operating efficiency of the energy consuming site." *Id.* at ¶¶ 0008, 0019.

C. Seem

U.S. Patent Application Publication No. 2003/0028350 by Seem, "Method of intelligent data analysis to detect abnormal use of utilities in buildings" (Ex. 1007, "Seem"), was published February 6, 2003, more than one year before the '482 patent's earliest possible priority date. Therefore, Seem is prior art at least under 35 U.S.C. §102(b) (pre-AIA).

Just like the '482 patent, Seem discloses systems and methods for measuring

and “statistically analyz[ing]” “utility use.” Ex. 1007 at Abstract. Seem uses the same formula to calculate its economic parameter as that claimed by the ’482 patent. In particular, Seem teaches the “adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value” claimed by the ’482 patent. Ex. 1001 at cl. 1.

As shown in the figure below, Seem teaches having a sum of deviations (the numerator), with respect to a reference value (the robust mean $\bar{x}_{robust}$) and taking an adjusted mean of that sum (dividing sum by the number of measurements in the set, with the outliers removed). Ex. 1007 at ¶ 39.

The diagram shows the formula for s_{robust} with three colored boxes and arrows pointing to specific parts of the formula:

- A green box highlights the numerator: $\sum_{j=1}^{n-n_{out}} (x_j - \bar{x}_{robust})^2$. An arrow points from this box to the text "sum of deviations".
- A blue box highlights the term $\bar{x}_{robust}$ inside the parentheses. An arrow points from this box to the text "with respect to a reference value".
- A red box highlights the entire fraction: $\sqrt{\frac{\sum_{j=1}^{n-n_{out}} (x_j - \bar{x}_{robust})^2}{n - n_{out} - 1}}$. An arrow points from this box to the text "an adjusted mean".

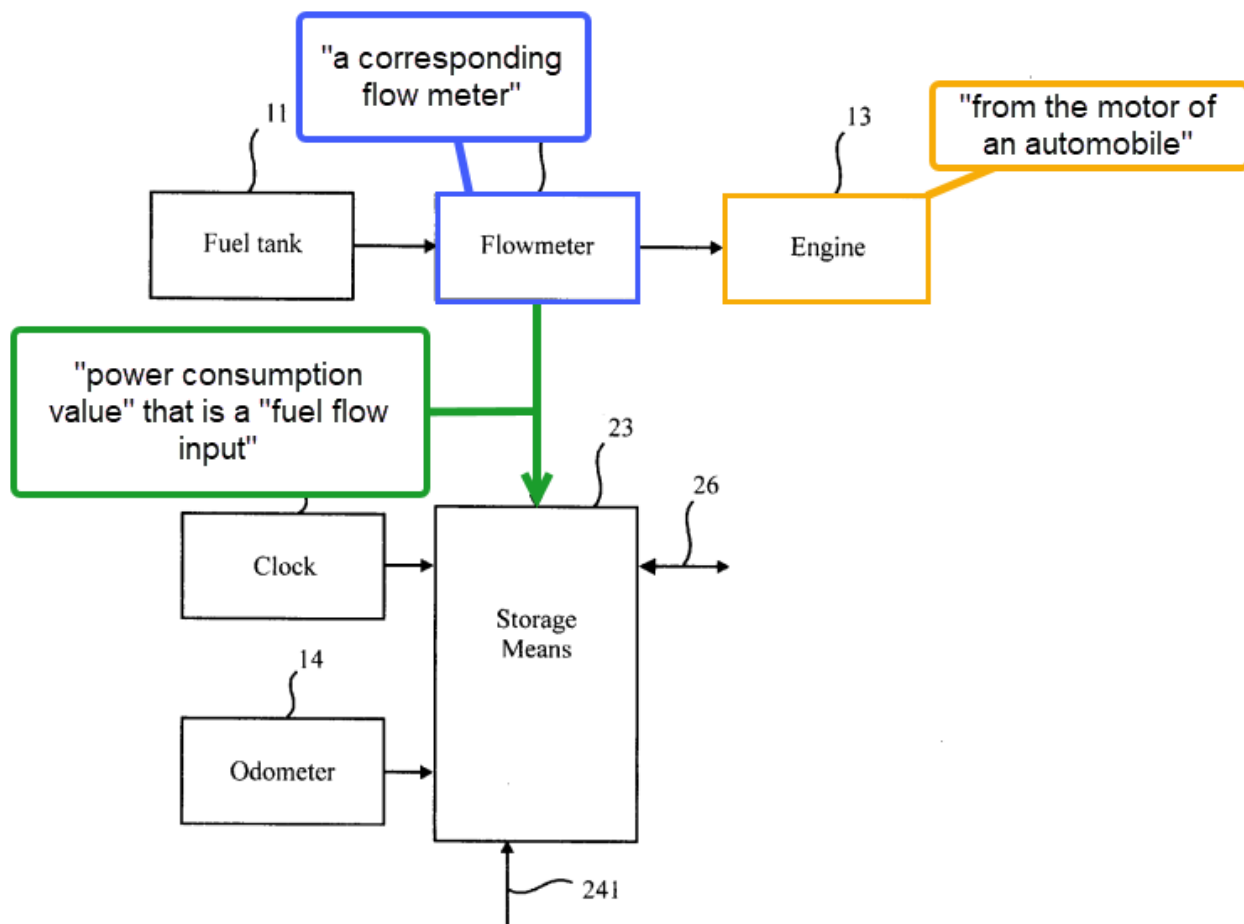
In the formula above, x is a set of periodic utility measurements, x_j is the utility usage during period j , n is the total number of utility measurements, n_{out} is the number of outlier utility measurements, and $\bar{x}_{robust}$ is a robust estimate of the mean utility usage. *Id.* 1007 at ¶¶ 0026, 0028, 0036, 0039. Just like the ’482 patent’s statistical analysis, Seem teaches having a sum of deviations (the numerator), with respect to a reference value (the robust mean $\bar{x}_{robust}$) and taking an adjusted mean of

that sum (dividing sum by the number of measurements in the set, with the outliers removed). *Id.*

D. Zuta

U.S. Patent Application Publication No. 2007/0262855 by Zuta et al., “Measuring System and Method,” (Ex. 1010, “Zuta”) was published on November 15, 2007, before the earliest possible priority date of the ’482 patent and was filed July 9, 2007 (more than one year before the earliest possible priority date of the ’482 patent). Therefore, Zuta is prior art at least under 35 U.S.C. §§102(a) and (e) (pre-AIA).

Like the ’482 patent, Zuta teaches measuring resource and energy consumption from a power-consuming unit—in the case of Zuta, a vehicle. Particularly, Zuta teaches “a fuel consumption measurement system” for a motor vehicle. Ex. 1008 at Abstract. Zuta’s system teaches a flowmeter installed between the fuel tank and engine of a motor vehicle that measures the vehicle’s fuel flow and transmits the data to a digital storage means. *Id.* at 2:13-18.



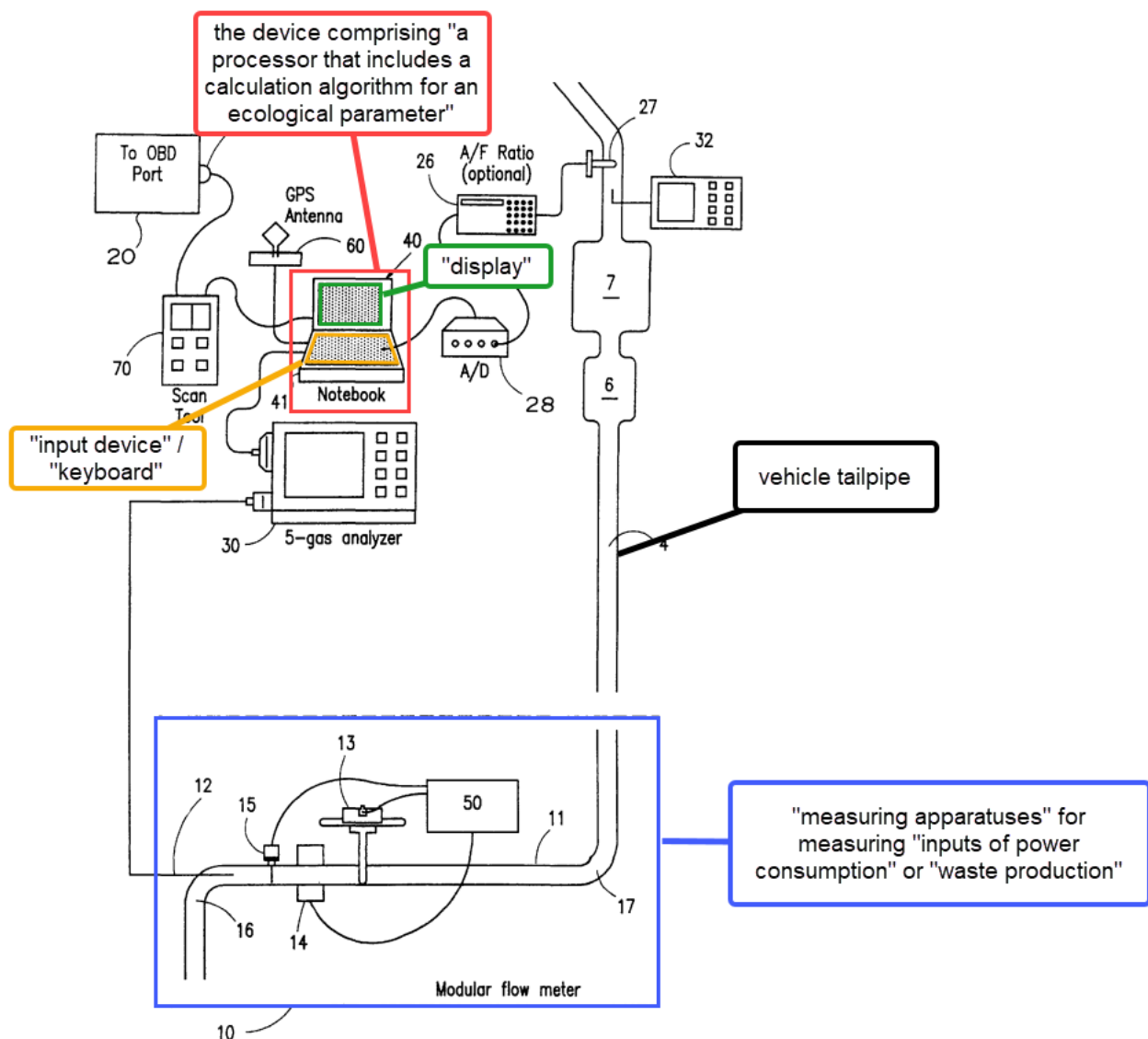
Id. at FIG. 1 (annotations added).

E. Breton

U.S. Patent No. 6,148,656 to Breton, “Real-time on-road vehicle exhaust gas modular flowmeter and emissions reporting system” (Ex. 1009, “Breton”), issued on November 21, 2000, more than one year before the ’482 patent’s earliest possible priority date. Therefore, Breton is prior art at least under 35 U.S.C. §102(b) (pre-AIA).

Like the ’482 patent, Breton teaches measuring resource and energy consumption from a power-consuming unit—in the case of Breton, a vehicle.

Particularly, Breton teaches an “on-board vehicle emissions testing system” that includes a “module adapted to be detachably connected to the exhaust pipe of a vehicle to provide for . . . determination of flow rate of the exhaust gas” from the vehicle. Ex. 1009 at Abstract. Breton’s system processes the measured exhaust data to analyze “on-road emissions performance of a vehicle” and the environmental impact thereof. *Id.* at 2:13-18.



Id. at FIG. 1 (annotations added).

X. DISCRETIONARY FACTORS

As discussed in detail below, the Board should not exercise its discretion to deny this IPR petition.

A. The Board Should Not Deny Institution Under Section 325(d)

The Board uses a two-part framework to analyze denial under § 325(d). *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 7 (PTAB Feb. 13, 2020) (precedential). For the first prong, the Board considers whether the same or substantially the same prior art or arguments were presented during the prosecution of the patent or any post-issuance proceedings. *Id.* at 7-8. For the second prong, the Board considers whether the office materially erred in determining patentability of the challenged claims, including by overlooking a specific teaching of the relevant prior art. *Id.* at n. 9. If the first prong is not met, the Board does not need to address the second prong. *Godbersen-Smith Constr. Co. v. Guntert & Zimmerman Const. Div., Inc.*, IPR2021-00050, Paper 24 at 21 (PTAB May 7, 2021). Here, the *Advanced Bionics* analysis weighs in favor of institution.

An analysis of the prosecution history and VW's prior IPR petition favors institution. First, this Petition relies on art not considered during the prosecution of the '482 patent. None of the prior art references relied on in this Petition were considered during the prosecution of the '482 patent. Accordingly, § 325(d) is not implicated by the prosecution history.

Second, this Petition relies on combinations of prior art not cited in any post-issuance proceeding of the '482 patent. While the Luff, Breton, and Zuta references were cited in VW's '894 IPR petition, that petition did not rely on the Amaratunga or Seem references, or those references in combination with Luff, Breton, and Zuta, as cited in this Petition. This is not trivial, because the Amaratunga and Seem references disclose systems and methods for including waste production data in the calculation of an ecological parameter, as claimed by the '482 patent, and the particular formula for calculating that parameter. Accordingly, § 325(d) concerns are not implicated here because this Petition addresses new arguments based on prior art not addressed during prosecution or any post-issuance proceeding. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, Paper 6 at 7 (PTAB Feb. 13, 2020); *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 28 (PTAB Dec. 15, 2017) (informative).

As such § 325(d) does not counsel in favor of a discretionary denial. Therefore, the Board does not have to address the second prong of the analysis.

B. The General Plastic Factors Weigh In Favor Of Institution

Factor 1: whether the same petitioner previously filed a petition directed to the same claims of the same patent. This is the first post-grant proceeding brought against the '482 patent by MBUSA or BMW. VW's prior IPR does not bear a "significant relationship" such that Factor 1 would favor discretionary denial. *Twitter v. Palo Alto Research Center Inc.*, IPR2021-01398, Paper 12 at 40-41

(PTAB Mar. 15, 2022). MBUSA and BMW were sued separately from VW: MMT sued VW in the Eastern District of Michigan in 2019; MMT sued MBUSA and BMW in the Northern District of Illinois three years later in 2022. *See Michigan Motor Technologies LLC v. Volkswagen AG*, No. 2:19-cv10485 (E.D. Mich.); *Michigan Motor Technologies, LLC v. Mercedes-Benz USA, LLC*, Case 1:22-cv-03957 (N.D. Ill.); *Michigan Motor Technologies, LLC v. Bayerische Motoren Werke AG et al*, Case 1:22-cv-03804 (N.D. Ill.). This Petition and VW's petition challenge different claims: VW's petition challenged claim 8 of the '482 patent; this Petition does not. Accordingly, there is no relationship between the IPRs, let alone a significant one.

Moreover, there is no overlap between MBUSA or BMW's accused products and the accused products that were at issue in the litigation with VW. MMT's complaint against MBUSA accuses three Mercedes-AMG engine types and the Mercedes-Benz GLC 350e of infringement. *Michigan Motor Technologies, LLC v. Mercedes-Benz USA, LLC*, Case 1:22-cv-03957 (N.D. Ill.), Dkt. 1 at ¶¶ 13-17. MMT's complaint against BMW accuses two BMW engines and four series of BMW vehicles of infringement. *Michigan Motor Technologies, LLC v. Bayerische Motoren Werke AG et al*, Case 1:22-cv-03804 (N.D. Ill.), Dkt. 1 at ¶¶ 14-17. MMT's complaint against VW accused multiple VW and Audi engines and vehicles of infringement. *Michigan Motor Technologies LLC v. Volkswagen AG*, No. 2:19-cv10485 (E.D. Mich.), Dkt. 1 at ¶¶ 11, 17, 23, 29, 35, 43, 49, 55, 62, 68,

76, 88, 96, 102, 110, 116, 122, 128, 134, 146.

Furthermore, neither MBUSA nor BMW coordinated with VW in the preparation of this Petition or VW's petition. In these circumstances, the Board has found Factor 1 weighs in favor of institution. IPR2021-01398, Paper 12 at 40-41.

Factor 2: whether at the time of filing of the first petition the petitioner knew of the prior art asserted in the second petition or should have known of it

This factor does not apply because neither MBUSA nor BMW previously filed a petition. Moreover, as explained with regard to Factor 1 above, neither MBUSA nor BMW had reason to know of the prior art asserted in this Petition at the time of Volkswagen's petition at least because MMT had not yet sued MBUSA or BMW. Likewise, there is no significant relationship between MBUSA or BMW and Volkswagen.

In addition, the Amaratunga and Seem references relied upon in this Petition were not part of the VW IPR. Thus, this art was not known at the time of the filing of the first petition. Thus, Factor 2 weighs in favor of institution. IPR2021-01398, Paper 12 at 41-42.

Factor 3: whether at the time of filing of the second petition the petitioner already received the patent owner's preliminary response to the first petition or received the Board's decision on whether to institute review in the first petition.

This factor does not apply because neither MBUSA nor BMW previously filed a

petition. Likewise, there was no delay by Petitioners in filing its IPR petition after being sued by MMT. Accordingly, Factor 3 weighs in favor of institution.

Factor 4: *the length of time that elapsed between the time the petitioner learned of the prior art asserted in the second petition and the filing of the second petition.* This factor does not apply because neither MBUSA nor BMW previously filed a petition. Further, MBUSA and BMW did not learn of the prior art asserted in this Petition until after MBUSA and BMW received service of MMT’s complaints in the respective district court litigations. This IPR petition is timely filed before both MBUSA and BMW’s statutory bar date and, thus, there is also no delay. Accordingly, Factor 4 also weighs in favor of institution.

Factor 5: *whether the petitioner provides adequate explanation for the time elapsed between the filings of multiple petitions directed to the same claims of the same patent.* For the same reasons discussed with respect to Factor 4, Factor 5 is also irrelevant. Accordingly, Factor 5 weighs in favor of institution.

Factor 6: *the finite resources of the Board.* The petition is not a “follow-on” petition like those discussed in *General Plastic* or a “serial attack” on the ’482 patent by the same petitioner. Moreover, Petitioners are not attempting to “strategically stage their prior art and arguments in multiple petitions”—this Petition was filed as a direct response to MMT’s new complaints against Petitioners filed more than two years after the prior petition of the ’482 patent that was filed in response to MMT’s complaint against VW. *Ameristar Perimeter Sec. Usa, Inc. v.*

Rsa Protective Techs., LLC, No. IPR2020-01369, Paper 11 at 15 (PTAB Feb. 5, 2021) (finding *General Plastics* factors weighed in favor of institution where petitioner was not involved in prior petitions, was not attempting to strategically stage prior art, and instead searched for prior art in response to the commencement of litigation); *Samsung Elecs. Co. v. Iron Oak Techs., LLC*, IPR2018-01554, Paper 9 at 31 (PTAB Feb. 13, 2019) (board will “decline to wield [the patent owner’s] own litigation activities as a shield in [an] inter partes review” and complaint about serial petitions unpersuasive where “the volume [of petitions] appears to be a direct result of [the patent owner’s] own litigation activity”).

Thus, this Petition does not waste the finite resources of the Board and, accordingly, this factor weighs in favor of institution.

Factor 7: the requirement that the Board issue a final determination within 1 year. The filing of this Petition will in no way adversely impact the PTAB’s 1 year deadline to issue a Final Written Decision. Accordingly, Factor 7 weighs in favor of institution.

For the foregoing reasons, the *General Plastic* factors weigh in favor of institution. Indeed, this is not the type of serial attack on a patent that the *General Plastics* factors are designed to prevent. *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, Case IPR2016-01357 at 8-11 (Paper 19) (Precedential) (setting forth seven factors directed towards “follow-on” petitions).

C. Institution Should Not Be Denied Under *Fintiv*

Discretionary denial under § 314 is analyzed under the *Fintiv* factors, and those factors weigh in favor of institution. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential).

1. A Final Written Decision Will Issue Before Any Trial

A schedule has not yet been issued in the corresponding district court litigation. No trial date has been set. This petition is being filed on June 6, 2023. Thus, the approximate date of the PTAB hearing would be October 2024, whereas the trial date for the district court case (which has not been set) will likely not be until 2025. Accordingly, the PTAB trial will pre-date the district court trial, perhaps by many months.

Even if the trial occurs shortly before the PTAB hearing, the PTAB has held that such close proximity of a district court trial date weighs in favor of institution. *See, e.g., MediaTek Inc. et al. v. Nippon Telegraph and Telephone Corp.*, IPR2020-01607, Paper 12 at 14 (PTAB April 2, 2021).

2. The Merits of the Petition Support Institution

As discussed in more detail below, the prior art teaches every element of the challenged claims. Accordingly, the challenged claims should be held unpatentable. The merits of the petition weigh strongly in favor of institution. Likewise, as noted by the Director, “the PTAB will not rely on the *Fintiv* factors to discretionarily deny institution . . . where a petition presents compelling evidence of

unpatentability.” USPTO Interim Procedure for Discretionary Denials, at 2.

3. Stipulation Not To Rely On The Petition’s Grounds In District Court

Petitioners stipulate that, if the Board institutes *inter partes* review, Petitioner will not seek resolution in the District Court of any ground of invalidity for the ’482 Patent that utilizes the same combination of prior art reference relied upon in the grounds of the instant petition. Petitioners’ proposal addresses the concern of narrowing the issues, as this stipulation ensures there is no overlap between the ’482 Patent invalidity theories before the Board and at issue in the District Court. Accordingly, this factor weighs in favor of institution.

XI. GROUND 1: THE COMBINATION OF LUFF, AMARATUNGA, AND SEEM RENDERS OBVIOUS CLAIMS 1-2 AND 4-5.

A POSITA at the time of the alleged invention would have found claims 1-2 and 4-5 obvious over Luff in view of Amaratunga and Seem.

1. Motivation to Combine Luff with Amaratunga and Seem

a. Combining Luff and Amaratunga

A POSITA viewing Luff’s system for measuring power and resource consumption would have been motivated to include a waste information unit for introducing waste production data as taught by Amaratunga for a variety of reasons.

Particularly, Amaratunga would motivate a POSITA to include a waste information unit for introducing waste production data into Luff’s system because, as Amaratunga teaches, doing so would allow Luff’s system to make a more accurate

and comprehensive “true assessment of the energy efficiency of [an] energy consuming site.” Ex. 1006 at ¶ 0019; Ex. 1003 at ¶¶ 80-84. In particular, Amaratunga teaches a “waste information unit 230” that measures “waste amounts” and provides the waste amount data to a data processing module because “waste amounts . . . influence the energy amounts used.” Ex. 1006 at ¶¶ 0035. Thus, a POSITA would have been motivated to combine a waste information unit as taught by Amaratunga with Luff’s system for measuring power and resource consumption to more accurately and comprehensively calculate a “true assessment of the energy efficiency of [an] energy consuming site.” Ex. 1006 at ¶ 0019; Ex. 1003 at ¶¶ 80-84.

A POSITA would likewise be motivated to combine the teachings of Luff and Amaratunga because they are both in the *same field of endeavor* as the ’482 patent, measuring and analyzing power, energy, and resource consumption. Ex. 1001 at Abstract; Ex. 1010 at ¶ 0001; Ex. 1005 at Abstract; Ex. 1006 at Abstract. As discussed below, both Luff and Amaratunga use *similar techniques to solve the same problem* as the ’482 patent—indeed, Luff discloses nearly all of the limitations of claims 1-2, and 4-5, and Amaratunga discloses an input device for inputting waste production data and other related limitations of claims 1-2 and 4-5. Moreover, a POSITA would have had a *reasonable expectation of success* of applying Amaratunga’s teachings regarding a waste information unit for measuring by-products and waste amounts to Luff’s power consumption measuring system,

including at least because Luff already teaches using devices for measuring and/or inputting resource consumption data, such as meters or user interfaces, and transmitting that data to a module for data processing. Ex. 1005 at 9:24-31; Ex. 1010 at ¶ 0020; Ex. 1003 at ¶¶ 80-84. A POSITA would understand that the code in Luff's data collector and HRCM devices could be modified to receive data from a module that measures waste information or that enables the input of waste information, and the waste information module could be added among Luff's many resource consumption measuring meters. *Id.*

A POSITA would have therefore been motivated to modify Luff's system for measuring power and resource consumption to include a waste information unit for introducing waste production data as taught by Amaratunga because the modification would enable the system to more accurately and comprehensively calculate a "true assessment of the energy efficiency of [an] energy consuming site." Ex. 1006 at ¶ 0019; Ex. 1003 at ¶¶ 80-84; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

b. *Combining Luff with Amaratunga and Seem*

A POSITA viewing Luff's system for measuring power and resource consumption to calculate various energy consumption indices would have been motivated to use an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value as taught by Seem because such calculation

methods more quickly and efficiently identify whether current energy use is significantly outside the range of normal energy use. Ex. 1007 at ¶ 0012; Ex. 1003 at ¶¶ 85-88.

Particularly, Seem would motivate a POSITA to use an adjusted mean sum of the deviations to calculate energy consumption indices because, as Seem teaches, doing so would allow Luff's system to more quickly and efficiently detect abnormal energy usage by "automatically determin[ing] if the current energy use is significantly different than previous energy patterns." Ex. 1007 at ¶ 0012; Ex. 1003 at ¶¶ 85-88. In particular, Seem teaches a robust standard deviation formula that is part of "robust data analysis" that can "automatically determine if the current energy use is significantly different than previous energy patterns." Ex. 1007 at ¶¶ 0017, 0039-40. Thus, a POSITA would have been motivated to combine the robust standard deviation calculations as taught by Seem with Luff's systems and methods for calculating energy consumption indices to more quickly and efficiently detect abnormal energy usage by "automatically determin[ing] if the current energy use is significantly different than previous energy patterns." Ex. 1007 at ¶ 0012; Ex. 1003 at ¶¶ 85-88.

A POSITA would likewise be motivated to combine the teachings of Luff and Seem because they are both in the *same field of endeavor* as the '482 patent, measuring and analyzing power, energy, and resource consumption. Ex. 1001 at Abstract; Ex. 1010 ¶ 0001; Ex. 1005 at Abstract; Ex. 1007 at Abstract. As

discussed below, both Luff and Seem use *similar techniques to solve the same problem* as the '482 patent—indeed, Luff discloses nearly all of the limitations of claims 1-2 and 4-5, and Seem discloses an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value as claimed in claim 1. Moreover, a POSITA would have had a *reasonable expectation of success* of applying Seem's teachings regarding an adjusted mean of the sum of deviations to Luff's energy consumption indices calculating systems and methods, including at least because Luff already teaches calculating energy consumption indices. Ex. 1005 at 1:55-65; Ex. 1010 at ¶ 0081; Ex. 1003 at ¶¶ 85-88. A POSITA would understand that the code in Luff's data collector could be modified to implement an adjusted mean of the sum of deviations formula as taught by Seem to calculate Luff's energy consumption indices. Ex. 1003 at ¶¶ 85-88.

A POSITA would have therefore been motivated to modify Luff's system for measuring power and resource consumption to calculate its energy consumption indices using an adjusted mean of the sum of deviations as taught by Seem because such calculation methods more quickly and efficiently identify whether current energy use is significantly outside the range of normal energy use. Ex. 1007 at ¶ 0012; Ex. 1003 at ¶¶ 85-88; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

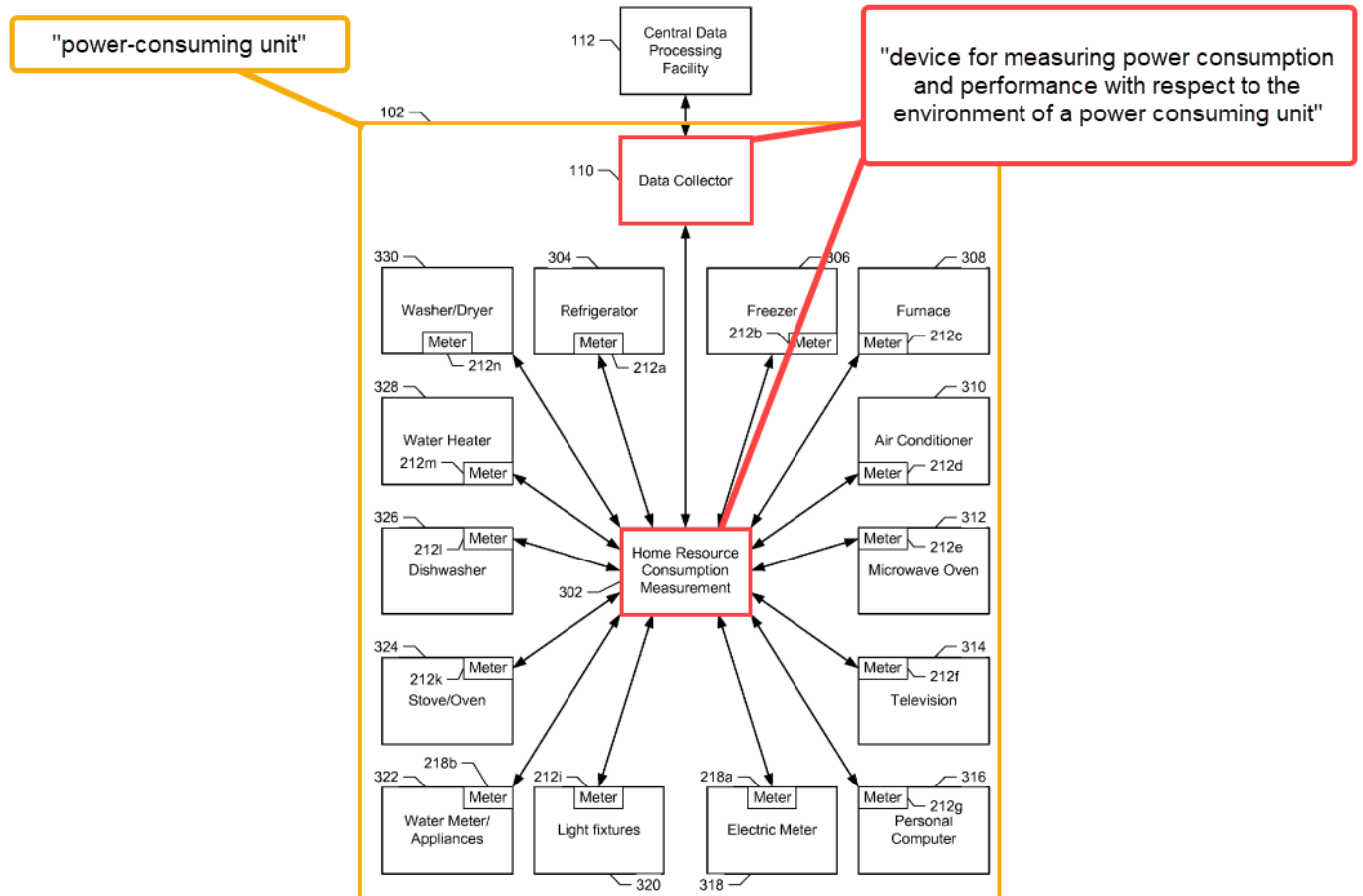
2. Claim 1

- a. *1[pre]: “A device for measuring power consumption and performance with respect to the environment of a power-consuming unit comprising”*

Luff discloses a device for measuring power consumption and performance with respect to the environment of a power-consuming unit. Ex. 1003 at ¶¶ 89-92. Luff discloses “systems, methods, apparatus, and articles used to measure, calculate, and/or identify resource and/or energy consumption” and “facilitate generation of an energy consumption index to reflect the resource and/or energy usage.” Ex. 1005 at 3:12-20; Ex. 1010 at ¶ 0083. In particular, Luff teaches a “Home Resource Consumption Management (HRCM) device” that “receives information from a number of meters . . . associated with a household,” “aggregates resource consumption data,” and reports the raw and/or processed data to a “data collector,” *i.e.*, collectively, a device for measuring power consumption. Ex. 1005 at 3:30-36, 7:45-58; Ex. 1010 at ¶¶ 0035-0054.

Luff further discloses an “energy index generator . . . that may be used to implement the . . . data collector” that “calculates the energy associated with generating, transporting, disposing of, and/or otherwise utilizing the resources” and “illustrate how much energy a monitored entity consumes relative to a similar entity or a desired entity usage goal,” *i.e.*, a device for measuring power consumption performance with respect to the environment. Ex. 1005 at 13:26-34; 14:30-33; Ex. 1010 at ¶¶ 0035-0061. Collectively, the HRCM, data collector, and energy index

generator disclose a device for measuring power consumption and performance relative to the environment.

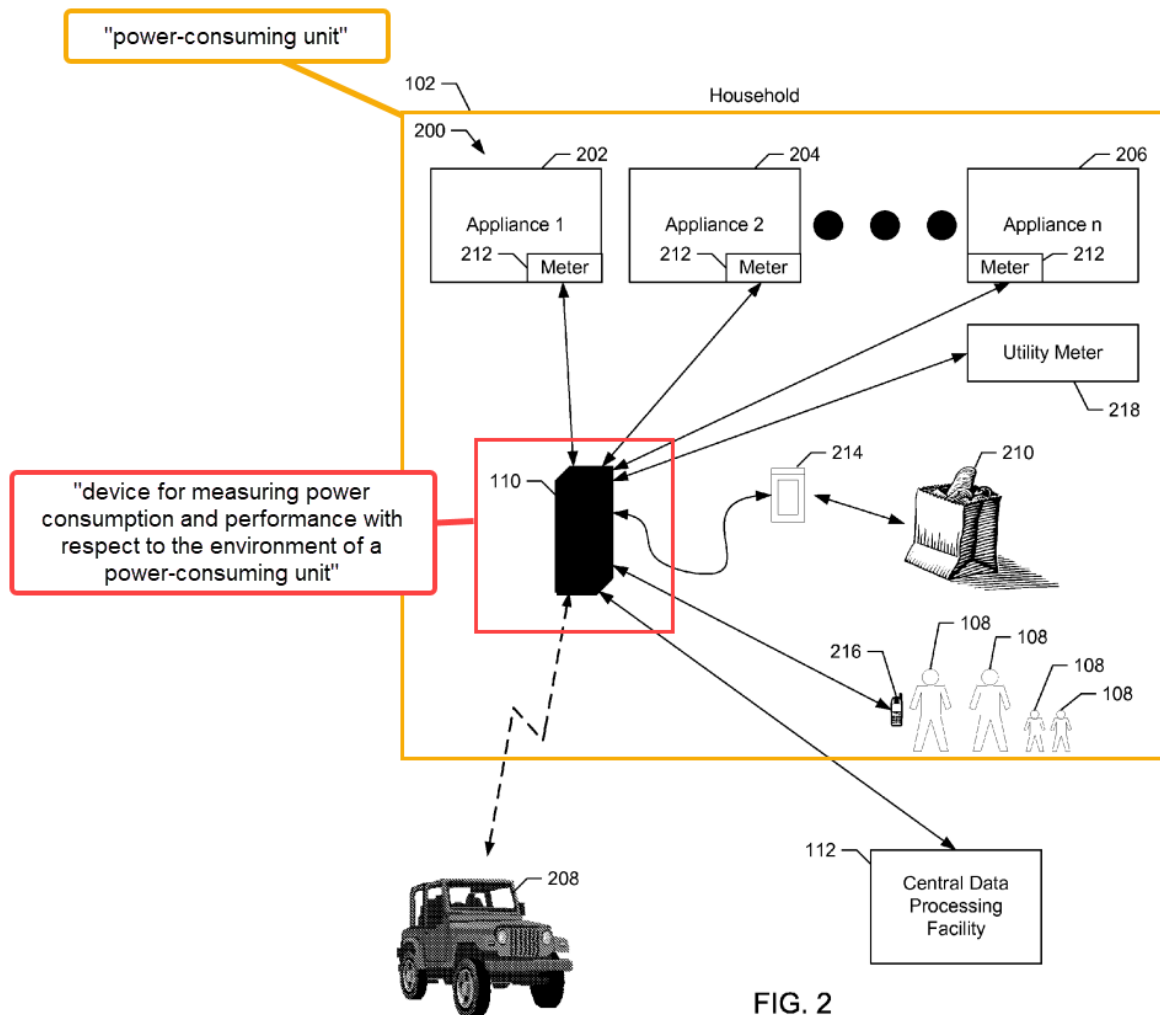


Ex. 1005 at FIG. 3 (annotations added); *see also* Ex. 1010 at FIG. 3.

Moreover, Luff teaches that the HRCM and data collector measure the power consumption and performance of a household, *i.e.*, a power-consuming unit. Ex. 1005 at 3:30-36, 7:45-58, 13:26-34; 14:30-33; Ex. 1010 at ¶¶ 0035-0061; Ex. 1001 at 3:5-12 (“The ‘power consuming unit’ . . . can be: a house”).

As another example, Luff also discloses that the “HRCM . . . 302 may be integrated into the data collector 110 as software” such that the data collector directly

receives information from a number of meters associated with a household, *i.e.*, a device for measuring power consumption and performance with respect to the environment of a power-consuming unit. Ex. 1005 at 8:50-51; Ex. 1010 at ¶ 0039.



Ex. 1005 at FIG. 2 (annotations added); *see also* Ex. 1010 at FIG. 2.

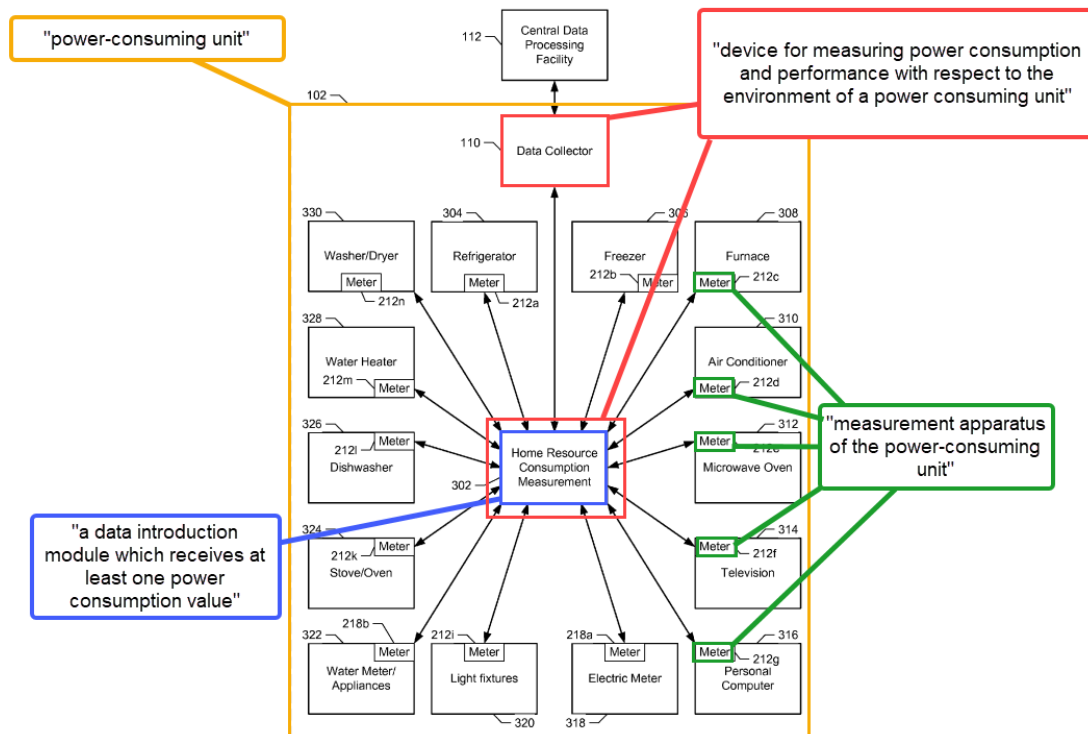
Thus, Luff discloses the preamble of claim 1. Ex. 1003 at ¶¶ 89-92.

- b. 1[a]: “a data introduction module, which receives at least one power consumption value, measured by a measurement apparatus of the power-consuming unit;”

Luff discloses a data introduction module, which receives at least one power

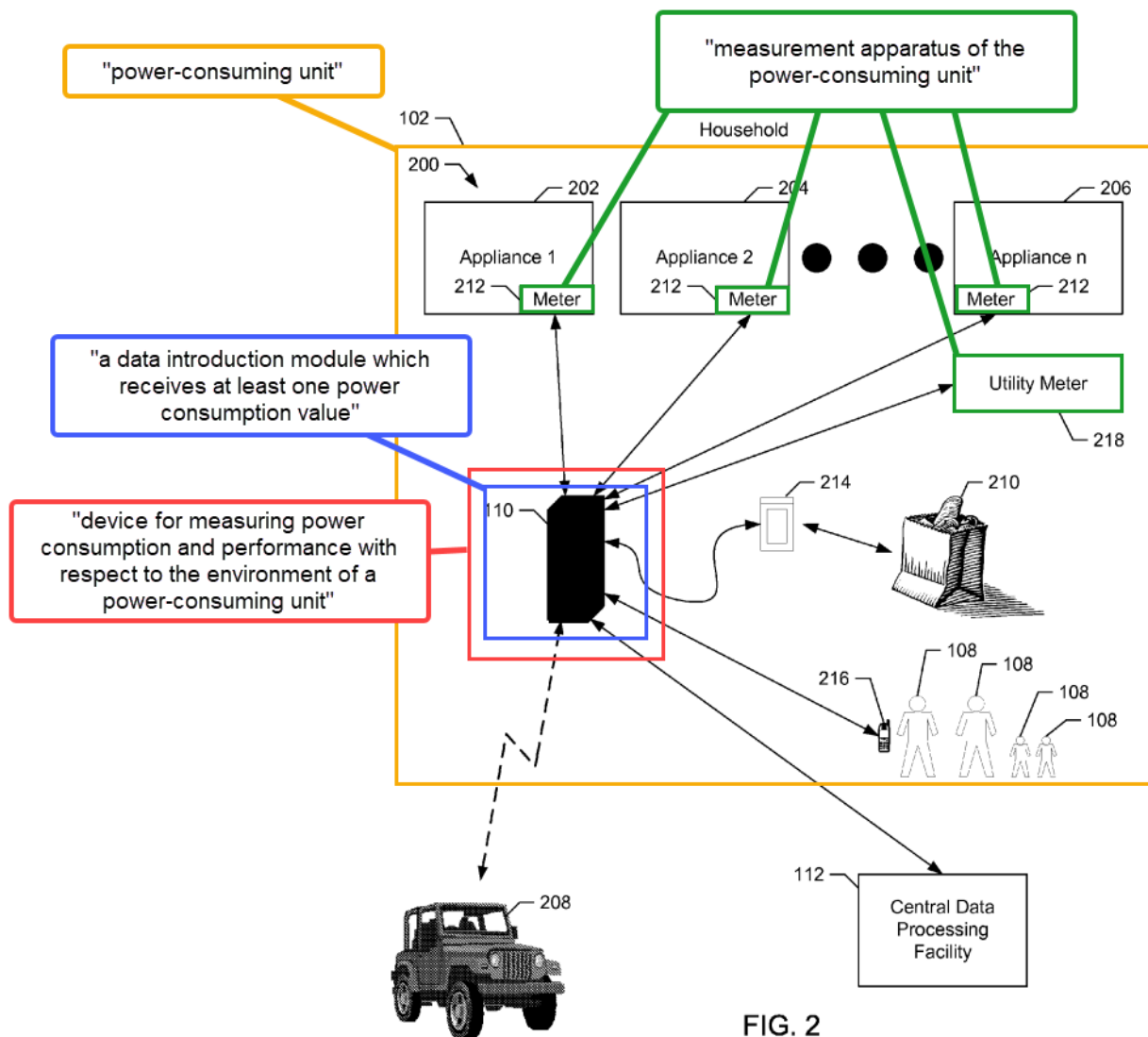
consumption value, measured by a measurement apparatus of the power-consuming unit. Ex. 1003 at ¶¶ 93-96.

Luff teaches that its “HRCM device 302 receives information from a number of meters . . . associated with [a] household,” *i.e.*, comprises a data introduction module that receives at least one power consumption value. Ex. 1005 at 7:47-50; Ex. 1010 at ¶¶ 0035-0054. Luff’s meters are “configured to measure and report resource consumption data,” *i.e.*, a measurement apparatus that measures at least one power consumption value. Ex. 1005 at 5:57-61; Ex. 1010 at ¶¶ 0035-0054. Luff teaches that its meters measure “home energy values . . . from appliances”—such as a furnace, air conditioner, microwave, television, or personal computer—“associated with a measured household,” *i.e.*, the power consumption values and measurements apparatuses are of the power-consuming unit. Ex. 1005 at 7:41-44; Ex. 1010 at ¶ 0020.



Ex. 1005 at FIG. 3 (annotations added); *see also* Ex. 1010 at FIG. 3.

Luff also discloses that the “HRCM . . . 302 may be integrated into the data collector 110 as software” such that the data collector directly receives information from a number of meters associated with a household, *i.e.*, a data introduction module, which receives at least one power consumption value, measured by a measurement apparatus of the power-consuming unit. *Id.* at 8:50-51.



Ex. 1005 at FIG. 2 (annotations added); *see also* Ex. 1010 at FIG. 2.

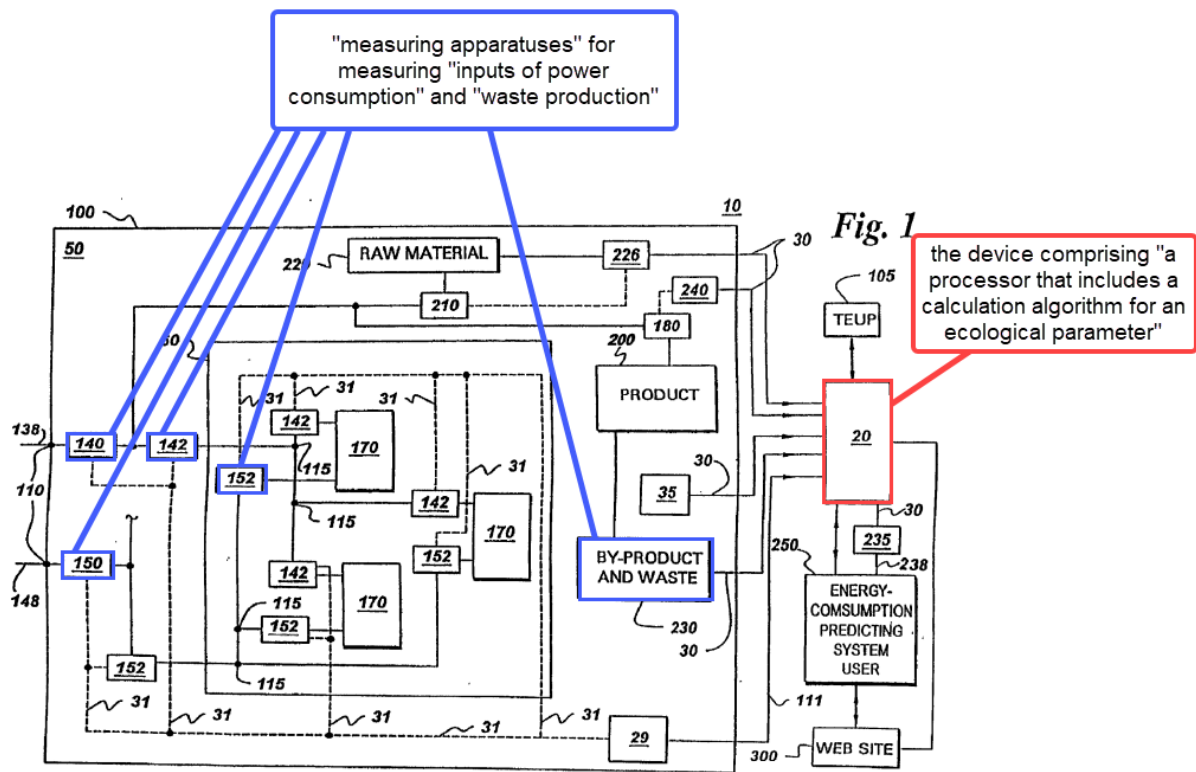
Thus, Luff discloses claim limitation 1[a]. Ex. 1003 at ¶¶ 93-96.

c. 1[b]: “an input device for inputting waste production data;”

Luff in view of Amaratunga discloses an input device for inputting waste production data. Ex. 1003 at ¶¶ 97-102. Luff teaches that “[t]o receive data, the data collector 110 is communicatively coupled to . . . barcode scanners 214,” *i.e.*, an input device, from which the data collector receives product UPC codes that indicate,

inter alia, “an amount waste associated with the use of the product (e.g., landfill space requirements[]),” *i.e.*, the volume of space required to store the waste produced by the product, which corresponds to the amount of waste produced or the waste production data. Ex. 1005 at 5:57-6:26; Ex. 1010 at ¶ 0031; Ex. 1003 at ¶¶ 97-102. Thus, Luff discloses an input device for inputting waste production data. Ex. 1003 at ¶¶ 97-102.

Moreover, Luff discloses that the “example data collector 110 include[s] a user interface to enter and/or adjust resource consumption information,” *i.e.*, an input device for inputting data. Ex. 1005 at 9:24-31; Ex. 1010 at ¶ 0042. Likewise, Amaratunga discloses a Data Processing Module 20 that receives “by-product and waste information from a by-product and waste information unit 230.” Ex. 1006 at ¶ 0032.



Id. at FIG. 1 (annotations added).

A POSITA would have understood that modifying the user interface of Luff's data collector to enable input of waste production data as taught by Amaratunga would more comprehensively and accurately calculate a "true assessment of the energy efficiency of[an] energy consuming site." Ex. 1006 at ¶ 0019; Ex. 1003 at ¶¶ 97-102.

A POSITA would have been motivated and have been able to easily implement Amaratunga's teachings by modifying the code of Luff's data collector such that its user interface could additionally input waste production data. Ex. 1003 at ¶¶ 97-102.

Thus, Luff in view of Amaratunga renders obvious claim limitation 1[b].

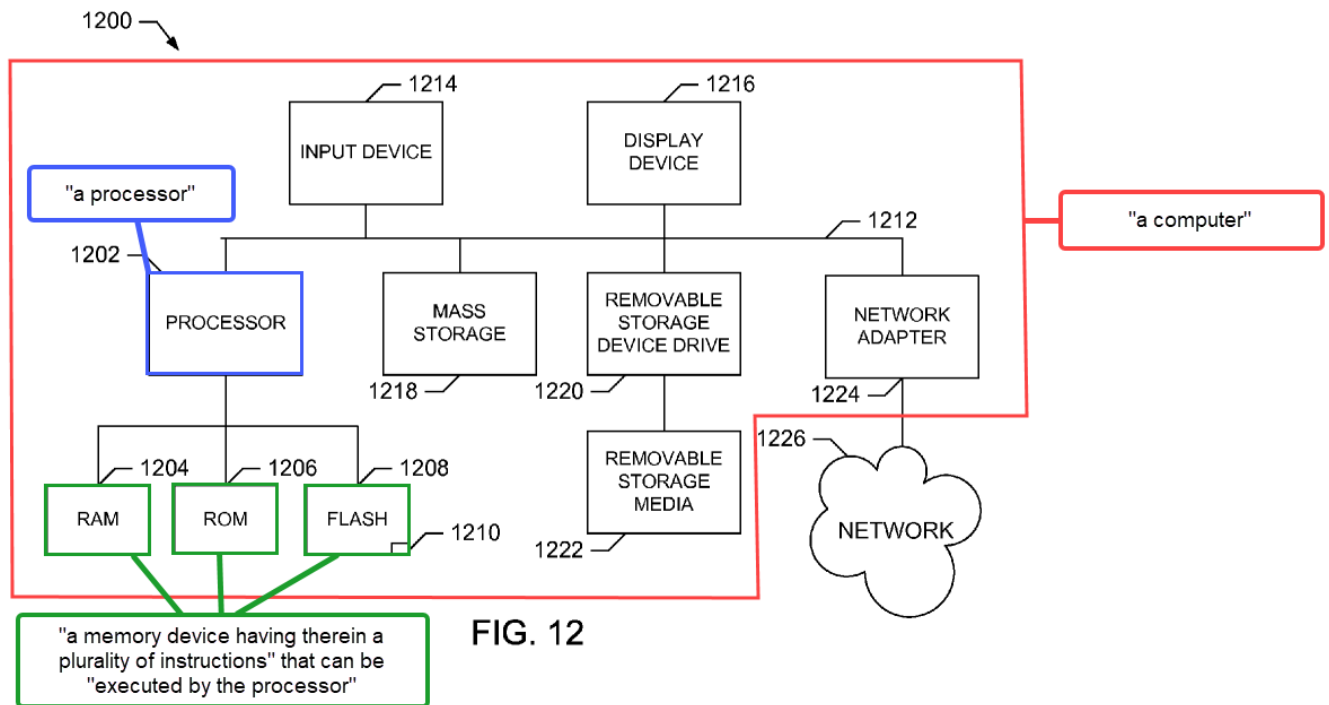
d. 1[c]: “a display screen; and”

Luff discloses a display screen. Ex. 1003 at ¶¶ 103-104. Luff teaches that “[t]he example data collector 110 also has a display device . . . to provide output to a user” including screens such as “a liquid crystal display (LCD) monitor,” *i.e.*, a display screen. Ex. 1005 at 18:25-29, 30:53-55; Ex. 1010 at ¶ 0110.

Thus, Luff discloses claim limitation 1[c]. Ex. 1003 at ¶¶ 103-104.

e. 1[d]: “a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to”

Luff discloses a computer with a processor and a memory device having therein a plurality of instructions executable by the processor. Ex. 1003 at ¶¶ 105-107. Luff teaches that its data collector and HRCM may be implemented by a “processor system” that may be a computer and executes “machine readable instructions.” Ex. 1005 at 1:66-2:3, 30:13-23; Ex. 1010 at ¶¶ 0107-0113. Luff teaches that its processor system includes “a processor 1202,” “a random access memory (RAM) 1203,” “a read only memory (ROM) 1206,” and “a flash memory 1208” “to fit the storage demands of the system,” including storing the machine readable instructions executed by the system. Ex. 1005 at 30:23-48; Ex. 1010 at ¶¶ 0107-0113; Ex. 1003 at ¶¶ 105-107.



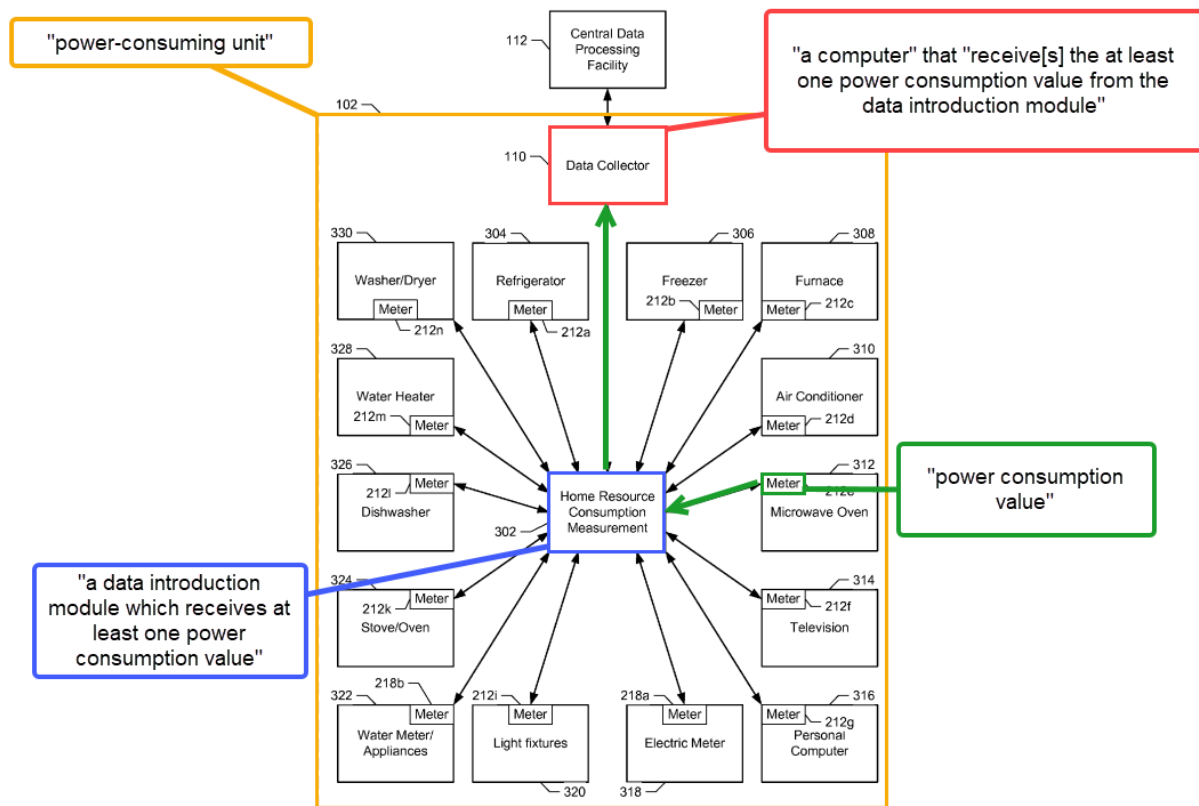
Ex. 1005 at FIG. 12; Ex. 1010 at FIG. 12.

Thus, Luff discloses claim limitation 1[d]. Ex. 1003 at ¶¶ 105-107.

- f. 1[e]: “(a) receive the at least one power consumption value from the data introduction module,”

Luff discloses a plurality of instructions that, when executed by the processor, causes the processor to receive at least one power consumption value from the data introduction module. Ex. 1003 at ¶¶ 108-13. As explained in §§ XI.2.b and d, *supra*, Luff’s HRCM discloses a data introduction module, and Luff’s HRCM and data collector are both implemented by computers that include machine readable instructions executable by a processor, as claimed in claim limitation 1[d], to execute the HRCM and data collector’s functions. Ex. 1005 at 30:13-23; Ex. 1010 at ¶¶ 0107-0113. Luff teaches that the data collector receives data from Luff’s meters

(i.e., power consumption values) transmitted to the data collector by the HRCM. Ex. 1005 at 6:57-64, 8:28-47; Ex. 1010 at ¶ 0045. Moreover, Luff discloses that its data collector and HRCM “may actively request data,” i.e., execute instructions that causes the processor to receive the data. Ex. 1005 at 8:33-37; Ex. 1010 at ¶ 0038.

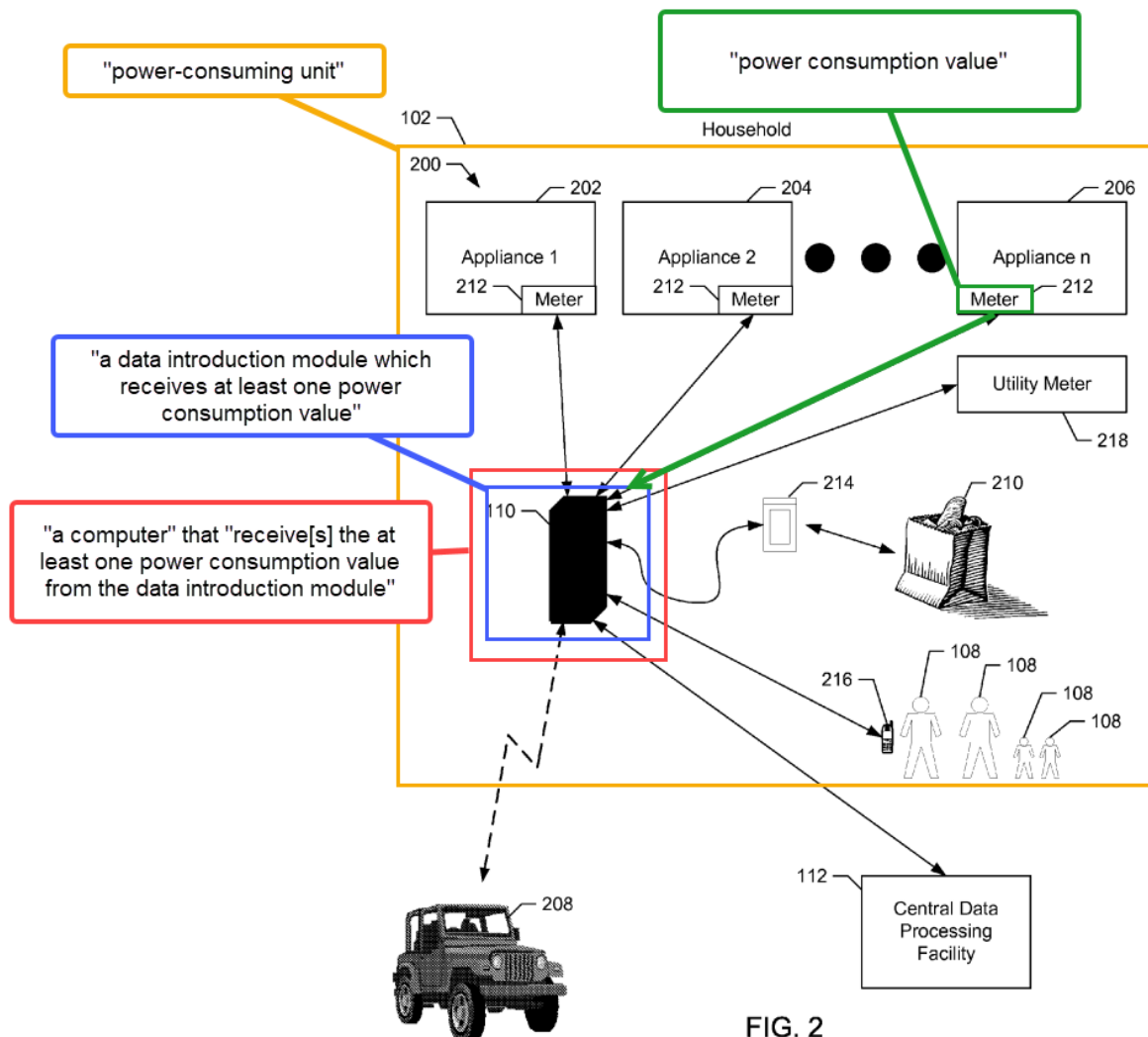


Ex. 1005 at FIG. 3 (annotations added); see also Ex. 1010 at FIG. 3.

Thus, Luff’s data collector discloses a plurality of instructions that, when executed by its processor, cause the data collector to receive the at least one power consumption value from the data introduction module, the HRCM. Ex. 1003 at ¶¶ 108-13

As another example, Luff also discloses that the “HRCM . . . 302 may be

integrated into the data collector 110 as software” such that the data collector directly requests information from the meters, *i.e.*, a plurality of instructions that, when executed by the processor, causes the processor to receive at least one power consumption value from the data introduction module. Ex. 1005 at 8:50-51; Ex. 1010 at ¶ 0039.



Ex. 1005 at FIG. 2 (annotations added); *see also* Ex. 1010 at FIG. 2.

Thus, Luff discloses claim limitations 1[e]. Ex. 1003 at ¶¶ 108-13.

g. 1[f]: “(b) receive the waste production data,”

Luff in view of Amaratunga renders obvious a plurality of instructions that, when executed by the processor, cause the processor to receive the waste production data. Ex. 1003 at ¶¶ 114-24. As explained in § XI.2.f, *supra*, Luff discloses a plurality of instructions that, when executed by the processor, causes Luff’s data collector to receive data, *i.e.*, a plurality of instructions that, when executed by the processor, cause the processor to receive data. Ex. 1005 at 30:13-23, 8:45-47; Ex. 1010 at ¶¶ 0038, 0045, 0107-0113. Further, as explained in § XI.2.b, *supra*, Luff discloses “a data collector 110 for receiving data” from various inputs, including “barcode scanners 214” that may provide “an amount of waste associated with the use of the product (e.g., landfill space requirements[]),” *i.e.*, the volume of space required to store the waste produced by the product, which corresponds to the amount of waste produced or the waste production data. Ex. 1005 at 5:57-6:26; Ex. 1010 at ¶ 0031; Ex. 1003 at ¶¶ 114-24.

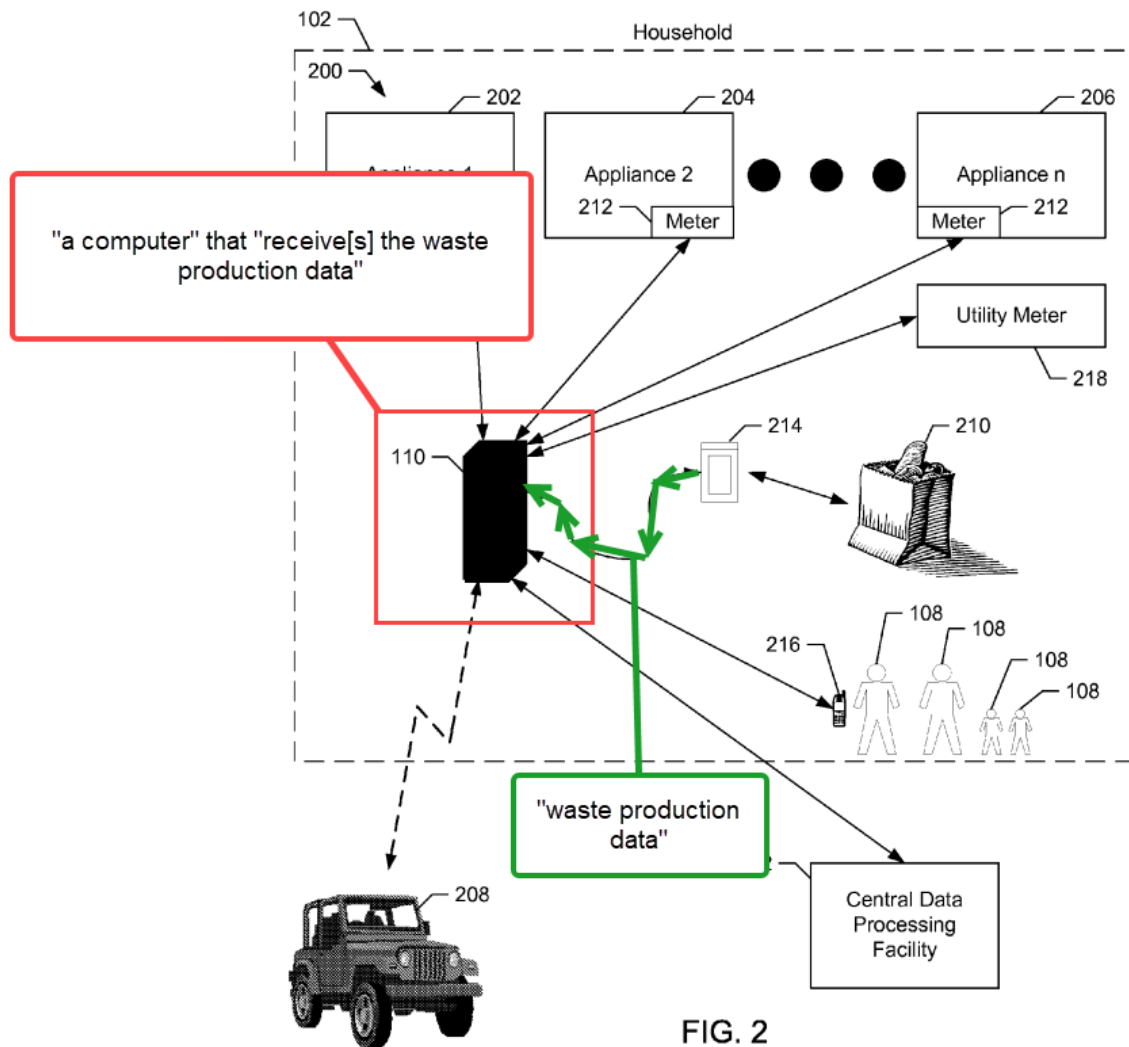


FIG. 2

Ex. 1005 at FIG. 2 (annotations added); *see also* Ex. 1010 at FIG. 2.

Thus, Luff discloses a plurality of instructions that, when executed by the processor, cause the processor to receive the waste production data. Ex. 1003 at ¶¶ 114-24.

Further, as explained in § XI.2.b, *supra*, the user interface of Luff's data collection unit in view of Amaratunga's teachings regarding a waste information unit that provides waste amount data renders obvious an input device for inputting

waste production data to Luff's system, *i.e.*, waste production data. Ex. 1006 at ¶ 0035; Ex. 1003 at ¶¶ 114-24. Thus, Luff's data collector, which includes a plurality of instructions that, when executed by the processor, causes Luff's data collector to receive data (*see* § XI.2.f, *supra*), modified in view of the teachings of Amaratunga renders obvious a plurality of instructions that, when executed by the processor, cause the processor to receive waste production data. Ex. 1005 at 30:13-23, 8:45-47; Ex. 1010 at ¶¶ 0038, 0045, 0107-0113; Ex. 1006 at ¶ 0035; Ex. 1003 at ¶¶ 114-24.

A POSITA would have understood that modifying Luff's system for measuring power and resource consumption to include a waste information unit for introducing waste production data as taught by Amaratunga would more comprehensively and accurately calculate a "true assessment of the energy efficiency of [an] energy consuming site." Ex. 1006 at ¶ 0019; Ex. 1003 at ¶¶ 114-24.

A POSITA would have been able to easily implement Amaratunga's teachings by modifying the code of Luff's data collector such that its user interface could additionally input waste production data. Ex. 1003 at ¶¶ 114-24.

Thus, Luff in view of Amaratunga renders obvious claim limitation 1[f]. *Id.*

- h. 1[g]: "(c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and"

Luff in view of Amaratunga discloses a plurality of instructions that, when

executed by the processor, cause the processor to calculate an ecological parameter based on the at least one power consumption value and the waste production data. Ex. 1003 at ¶¶ 125-31. As explained in §§ XI.2.f and g, *supra*, Luff in view of Amaratunga's teachings renders obvious a plurality of instructions that, when executed by the data collector's processor, cause the processor to receive at least one power consumption value and waste production data. Ex. 1005 at 5:57-6:26; 8:45-47; 30:13-23; Ex. 1010 at ¶¶ 0038, 0045, 0107-0113; Ex. 1006 at ¶ 0035; Ex. 1003 at ¶¶ 125-31.

Luff further teaches "machine readable instructions," *i.e.*, a plurality of instructions, "that may be executed to generate a household energy consumption index," *i.e.*, calculate an ecological parameter. Ex. 1005 at 1:58-60; Ex. 1010 at ¶¶ 0083-0088. The machine-readable instructions for generating a household energy consumption index are executed by the data collector which, as explained in § XI.2.e, *supra*, is a computer with a processor for executing the instructions. Ex. 1005 at 22:60-67; Ex. 1010 at ¶¶ 0083-0088. Moreover, calculating the household energy consumption index is based on measurements from the meters for household appliances, fixtures, and/or devices, *i.e.*, power consumption values, and items related to the landfill space required or volume of waste from purchased products, *i.e.*, waste production data.

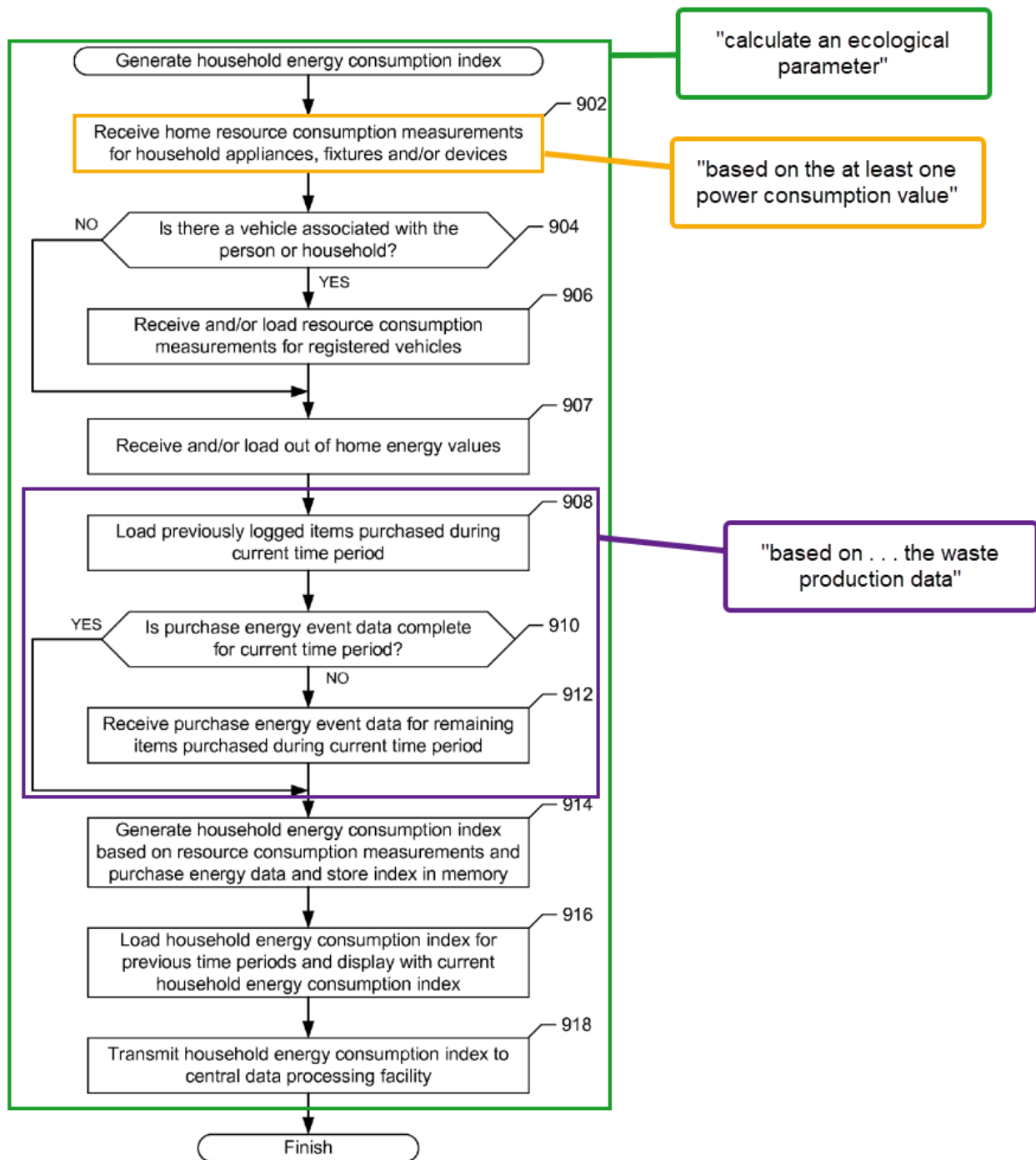


FIG. 9

Ex. 1005 at FIG. 9 (annotations added); *see also* Ex. 1010 at FIG. 9.

Further, as explained in § XI.2.g, *supra*, the user interface of Luff's data collection unit in view of Amaratunga's teachings regarding a waste information

unit that provides waste amount data to a data processing module renders obvious an input device for inputting waste production information, *i.e.*, waste production data, to Luff's system. Ex. 1006 at ¶ 0035; Ex. 1003 at ¶¶ 125-31. A POSITA would be motivated to modify the machine-readable instructions executed by Luff's data collector to calculate a household energy consumption index to include a waste data amount in view of the teachings of Amaratunga, because including the waste data amount in the calculation would more comprehensively and accurately calculate a "true assessment of the energy efficiency of [an] energy consuming site." Ex. 1005 at 30:13-23, 8:45-47; Ex. 1010 at ¶¶ 0107-0113; Ex. 1006 at ¶ 0035; Ex. 1003 at ¶¶ 125-31.

A POSITA would have been able to easily implement Amaratunga's teachings by modifying the code of Luff's data collector such that the waste data amount is considered during steps 908-912, wherein Luff already considers waste volume amount in calculating the home energy consumption index. Ex. 1003 at ¶¶ 125-31.

Thus, Luff in view of Amaratunga renders obvious claim limitation 1[g]. *Id.*

- i. 1[h]: *"(d) operate the display screen to display the calculated ecological parameter,"*

Luff discloses a plurality of instructions that, when executed by the processor, cause the processor to operate the display screen to display the calculated ecological parameter. Ex. 1003 at ¶¶ 132-35. Luff teaches that its household energy index

calculation routine includes displaying the household energy index. Ex. 1005 at 24:9-12; Ex. 1010 at ¶¶ 0083-0088.

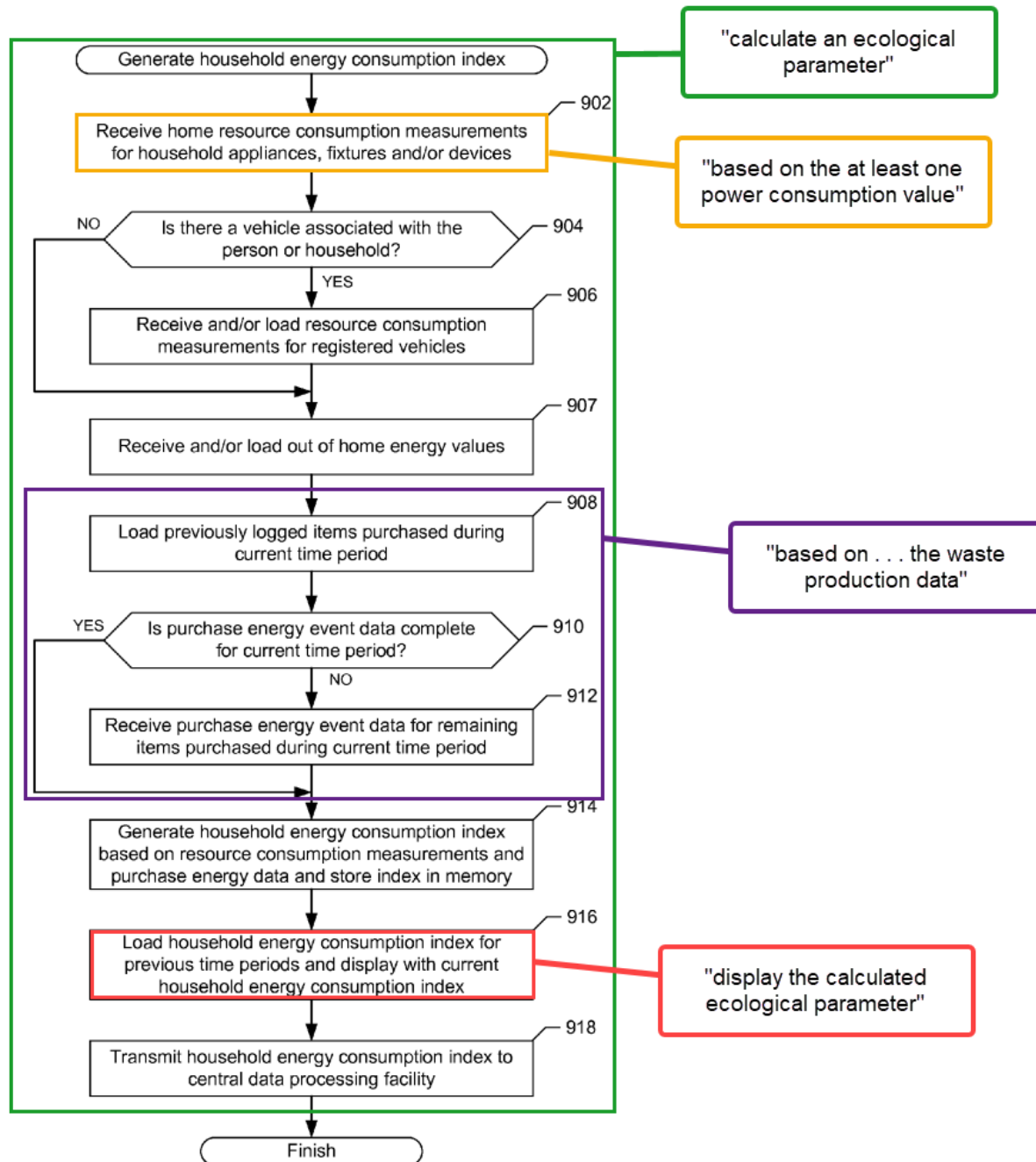


FIG. 9

Ex. 1005 at FIG. 9 (annotations added); *see also* Ex. 1010 at FIG. 9.

Luff further teaches that its home energy consumption index calculating

routine is defined by “machine readable instructions,” *i.e.*, a plurality of instructions, that are executed by the data collector, which, as explained in § XI.2.e, *supra*, is a computer with a processor for executing instructions. Ex. 1005 at 1:58-60; 22:60-67; Ex. 1010 at ¶¶ 0083-0088. Luff’s data collector also includes a display. Ex. 1005 at 18:25-29, 30 53-55; Ex. 1010 at ¶ 0065.

Thus, Luff in view of Amaratunga discloses claim limitation 1[h]. Ex. 1003 at ¶¶ 132-35.

- j. 1[i]: “wherein the calculated ecological parameter is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value.”

Luff in view of Seem renders obvious calculating an ecological parameter that is an adjusted mean of the sum of the deviations of the at least one power consumption value with respect to a reference value corresponding to the at least one power consumption value. Ex. 1003 at ¶¶ 136-43.

As explained in § XI.2.h, *supra*, Luff discloses calculating an ecological parameter. Ex. 1003 at ¶¶ 136-43.

Likewise Seem discloses the following function for calculating an ecological parameter:

$$s_{robust} = \sqrt{\frac{\sum_{j=1}^{n-n_{out}} (x_j - \bar{x}_{robust})^2}{n - n_{out} - 1}}$$

The diagram shows the formula for the robust standard deviation, s_{robust} . The entire formula is enclosed in a red box, with a label "an adjusted mean" pointing to it. The numerator, $\sum_{j=1}^{n-n_{out}} (x_j - \bar{x}_{robust})^2$, is enclosed in a green box, with a label "sum of deviations" pointing to it. The term $\bar{x}_{robust}$ is enclosed in a blue box, with a label "with respect to a reference value" pointing to it.

Ex. 1007 at ¶¶ 0026, 0028, 0036, 0039

Particularly, Seem discloses a “robust estimate of the standard deviations (s_{robust}),” *i.e.*, an adjusted mean of the sum of the deviations calculated via the expression shown above, where x is a set of periodic utility measurements, x_j is the utility usage during period j , n is the total number of utility measurements, n_{out} is the number of outlier utility measurements, and $\bar{x}_{robust}$ is a robust estimate of the mean utility usage. Ex. 1007 at ¶¶ 0026, 0028, 0036, 0039. Seem teaches having a sum of deviations (the numerator), with respect to a reference value (the robust mean $\bar{x}_{robust}$) and taking an adjusted mean of that sum (dividing the sum by the number of measurements in the set with the outliers removed). *Id.*

“The robust estimate[] of the . . . standard deviation” quantifies “the severity of the abnormal utility usage,” *i.e.*, it is a mean sum of deviations of at least one power consumption value (the utility usage) to a reference value corresponding to the at least one power consumption value (the normal utility usage). *Id.* at ¶¶ 0040; Ex. 1003 at ¶¶ 136-43.

A POSITA would be motivated to modify Luff’s ecological parameter

consumption methods in view of the teachings of Seem because, as Seem teaches, doing so would allow Luff's system to more quickly and efficiently detect abnormal energy usage by "automatically determin[ing] if the current energy use is significantly different than previous energy patterns." Ex. 1007 at ¶ 0012; Ex. 1003 at ¶¶ 136-43.

Moreover, a POSITA would be able to easily modify Luff's data collector to implement an adjusted mean of the sum of deviations based on the teachings of Seem. Ex. 1003 at ¶¶ 136-43. A POSITA would understand that the code defining the machine executable instructions in Luff's data collector device could be modified to implement an adjusted mean of the sum of deviations formula as taught by Seem to calculate Luff's energy consumption indices. *Id.*

Thus, Luff in view of Seem renders obvious claim limitation 1[i]. *Id.*

3. Claim 2:

- a. *"The device of claim 1 further comprising a means for introducing values of waste production."*

Luff in view of Amaratunga and Seem renders obvious the device of claim 1 further comprising a means for introducing values of waste production. Ex. 1003 at ¶¶ 144-50. As explained in § VII.A, the means-plus-function claim term "means for introducing values of waste production" should be construed as a weight apparatus (e.g., a scale or weight sensor), a keyboard, or the equivalents of these structures. *Id.*

As explained in § XI.2, *supra*, Luff in view of Amaratunga and Seem renders obvious the device of claim 1. Luff discloses that its data collector “include[s] a user interface to enter and/or adjust resource consumption information” that may be “implemented using a keyboard, a mouse, a touch screen, a track pad, a barcode scanner, or any other device that enables a user to provide information.” Ex. 1005 at 9:24-31, 30:49-52; Ex. 1010 at ¶ 0064.

Likewise, as explained in § XI.2.c, *supra*, Luff in view of Amaratunga renders obvious an input device for inputting waste production data. Thus, Luff discloses a means for introducing values of waste production, particularly, a keyboard, and Luff in view of Amaratunga and Seem renders obvious claim 2. Ex. 1003 at ¶¶ 136-43.

4. Claim 4:

- a. *“The device of claim 1 further comprising USB input for a serial data bus.”*

Luff in view of Amaratunga and Seem renders obvious the device of claim 1 further comprising a means for introducing values of waste production. Ex. 1003 at ¶¶ 151-54. As explained in § XI.2, *supra*, Luff in view of Amaratunga and Seem renders obvious the device of claim 1. Moreover, Luff discloses its data collector may be communicatively coupled to a “central processor” that may itself be coupled to “a USB flash drive,” *i.e.*, comprises a USB input. Ex. 1005 at 16:47-56; Ex. 1010 at ¶ 0058. Luff further teaches that its central processor may have a bus, *i.e.*, a serial data bus, for interfacing other components, *i.e.*, the USB flash drive, to the central processor. Ex. 1005 at 30:13-30; Ex. 1010 at ¶ 0107. Moreover, because Luff discloses a central processor that can connect to a USB (“Universal ***Serial Bus***”) flash drive, Luff discloses that its central processor has a USB input for a serial bus. Ex. 1005 at 16:47-56; Ex. 1010 at ¶ 0058; Ex. 1003 at ¶¶ 151-54.

Thus, Luff in view of Amaratunga and Seem renders obvious claim 4. Ex. 1003 at ¶¶ 151-54.

5. Claim 5:

- a. *5[a]: “The device of claim 1 wherein the at least one power consumption value includes at least two power consumption values selected from the group of:”*

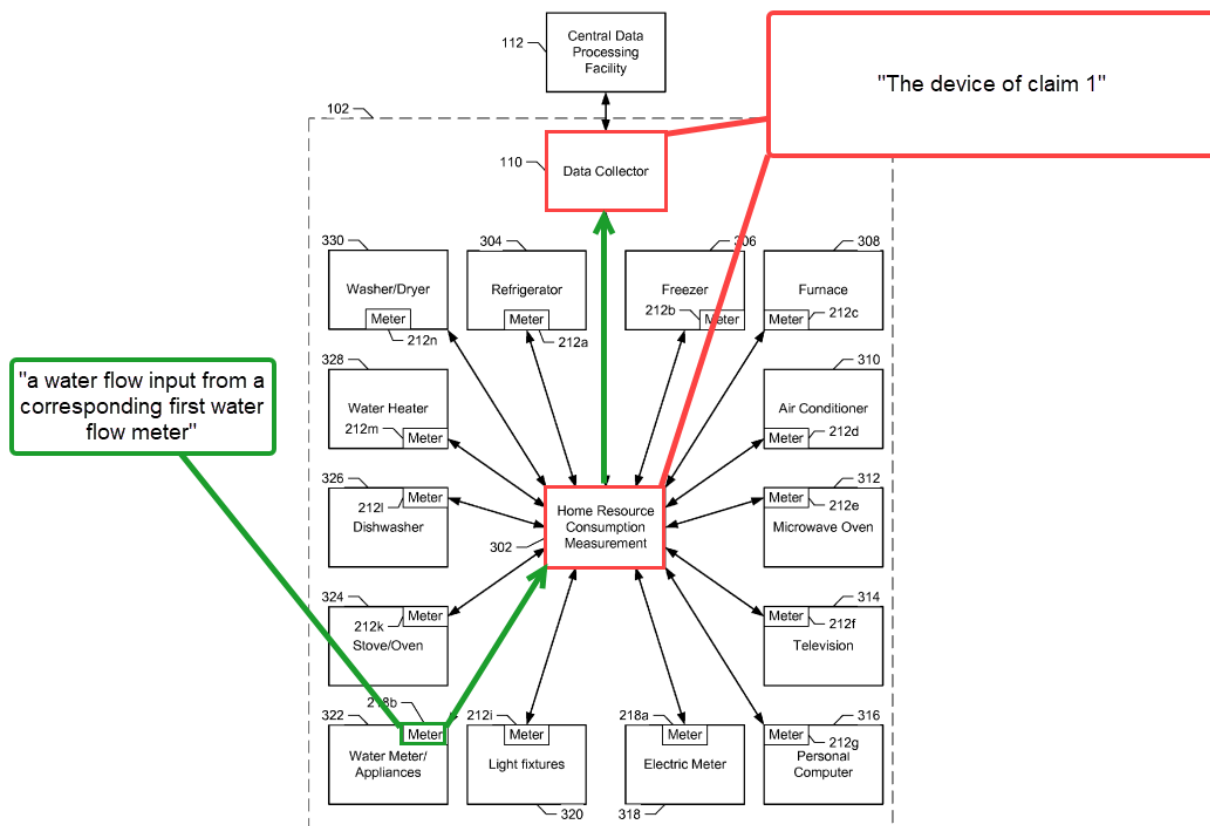
Luff in view of Amaratunga and Seem renders obvious the device of claim 1 further comprising a means for introducing values of waste production. Ex. 1003 at ¶¶ 155-57. As explained in § XI.2, *supra*, Luff in view of Amaratunga and Seem renders obvious the device of claim 1 and power consumption values. Further, as explained in the following sections, Luff in view of Amaratunga discloses each of the “power consumption values” recited in claim 5.

Thus, Luff in view of Amaratunga and Seem renders obvious claim limitation 5[a]. Ex. 1003 at ¶¶ 155-57.

- b. *5[b]: “a water flow input from a corresponding first water flow meter;”*

Luff discloses a water flow input from a corresponding first water flow meter. Ex. 1003 at ¶¶ 158-60.

Luff discloses “[h]ome resource consumption measurements may be collected and/or reported for any type of resources, including, but not limited to . . . water,” including a “first utility meter . . . used to meter the amount of water used by the house” and “water meters to measure water usage at each particular faucet and/or water-using appliance,” *i.e.*, a water flow meter. Ex. 1005 at 6:56-63; 9:10-14; Ex. 1010 at ¶ 0020. Luff also teaches that the water flow measured from a first utility meter and water meters are received by Luff’s data collector as power consumption values, as explained in § XI.2.a, *supra*.



Ex. 1005 at FIG. 3 (annotations added); *see also* Ex. 1010 at FIG. 3.

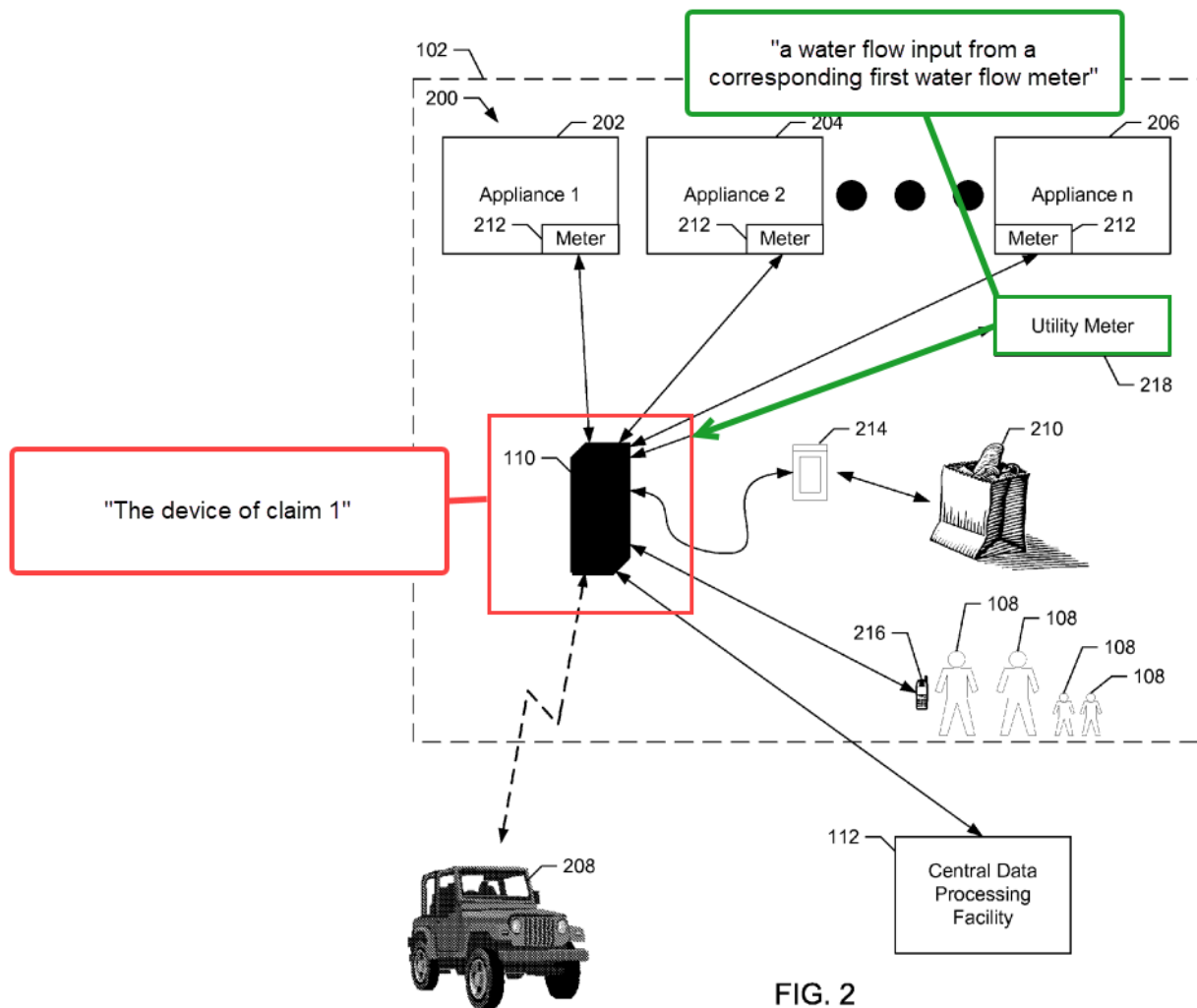


FIG. 2

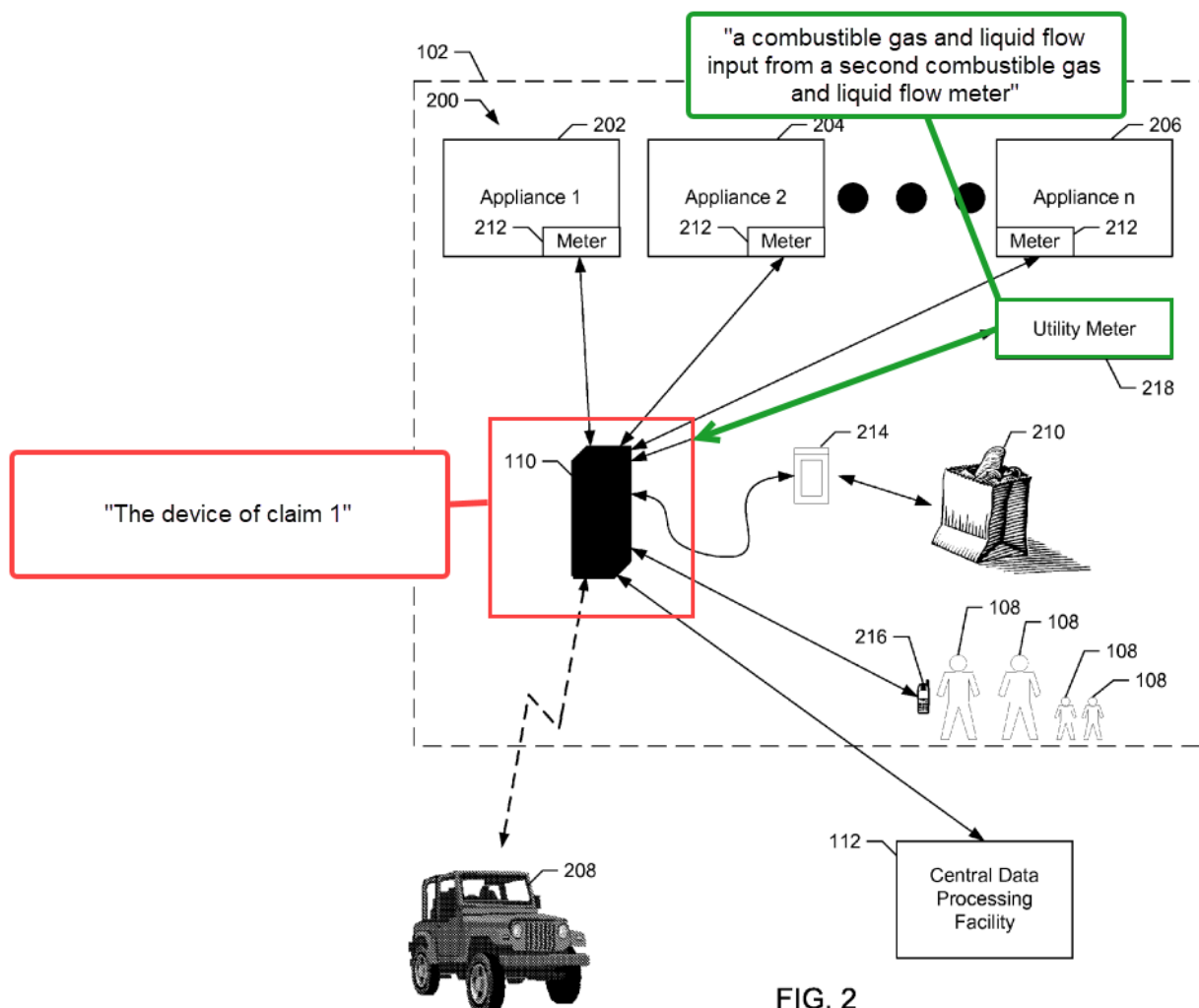
Ex. 1005 at FIG. 2 (annotations added); *see also* Ex. 1010 at FIG. 2.

Thus, Luff discloses claim limitation 5[b]. Ex. 1003 at ¶¶ 158-60.

- c. 5[c]: “a combustible gas and liquid flow input from a second combustible gas and liquid flow meter;”

Luff discloses a combustible gas and liquid flow input from a second combustible gas and liquid flow meter. Ex. 1003 at ¶¶ 161-63.

Luff discloses “[h]ome resource consumption measurements may be collected and/or reported for any type of resources, including, but not limited to . . . natural gas, gasoline, fuel oil, kerosene, [or] propane,” *i.e.*, a combustible gas, including a “second utility meter . . . used to measure the amount of natural (or other) gas used by the house,” *i.e.*, a gas and liquid flow meter. Ex. 1005 at 6:56-63; 9:10-14; Ex. 1010 at ¶ 0020. Luff also teaches that the gas flow measured from the utility meter is received by Luff’s data collector as a power consumption value, as explained in § XI.2.a, *supra*.



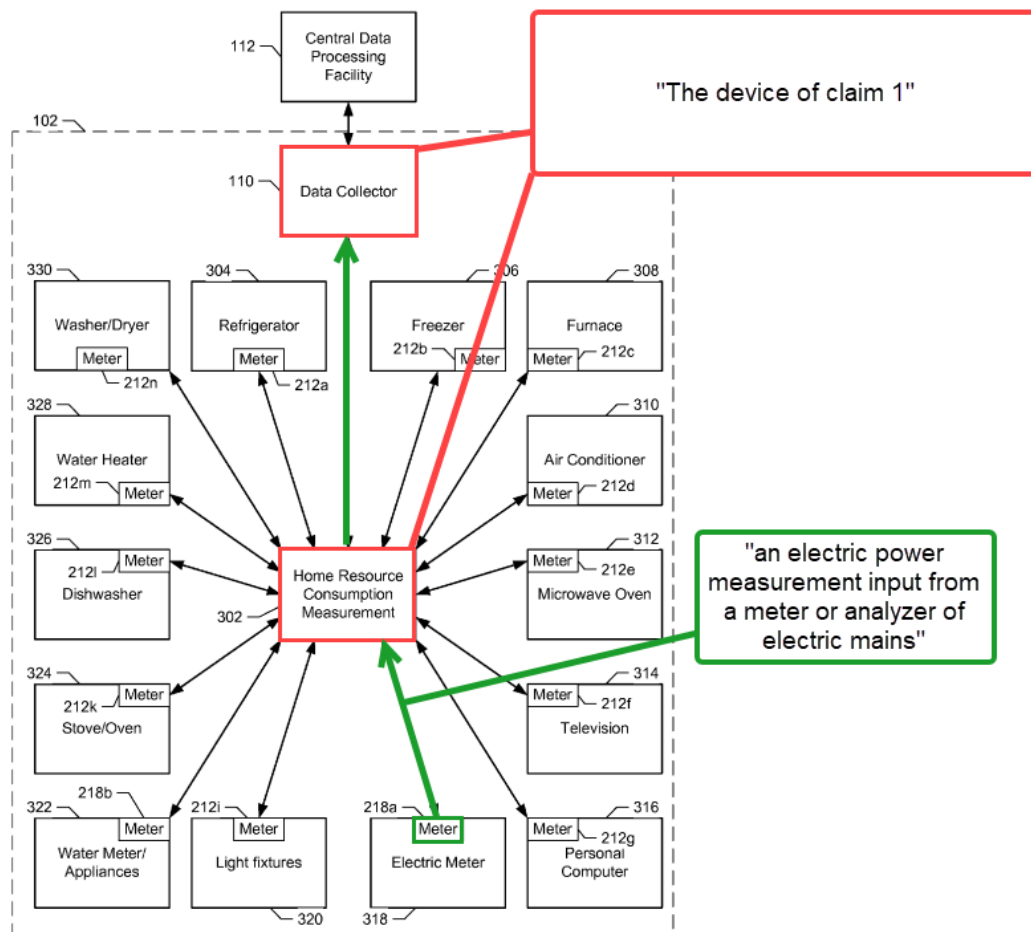
Ex. 1005 at FIG. 2 (annotations added); *see also* Ex. 1010 at FIG. 2.

Thus, Luff discloses claim limitation 5[c]. Ex. 1003 at ¶¶ 161-63.

- d. 5[d]: “*an electric power measurement input from a meter or analyser of electric mains; and*”

Luff discloses an electric power measurement input from a meter or analyzer of electric mains. Ex. 1003 at ¶¶ 164-66.

Luff discloses “[h]ome resource consumption measurements may be collected and/or reported for any type of resources, including, but not limited to electricity,” including a “third utility meter . . . used to measure the amount of electricity used by . . . a home,” *i.e.*, from a meter or analyzer of electric mains. Ex. 1005 at 6:56-63; 9:10-14; Ex. 1010 at ¶ 0020. Luff also teaches that the electric power measurement measured from the utility meter is received by Luff’s data collector as a power consumption value, as explained in § XI.2.a, *supra*.



Ex. 1005 at FIG. 3 (annotations added); *see also* Ex. 1010 at FIG. 3.

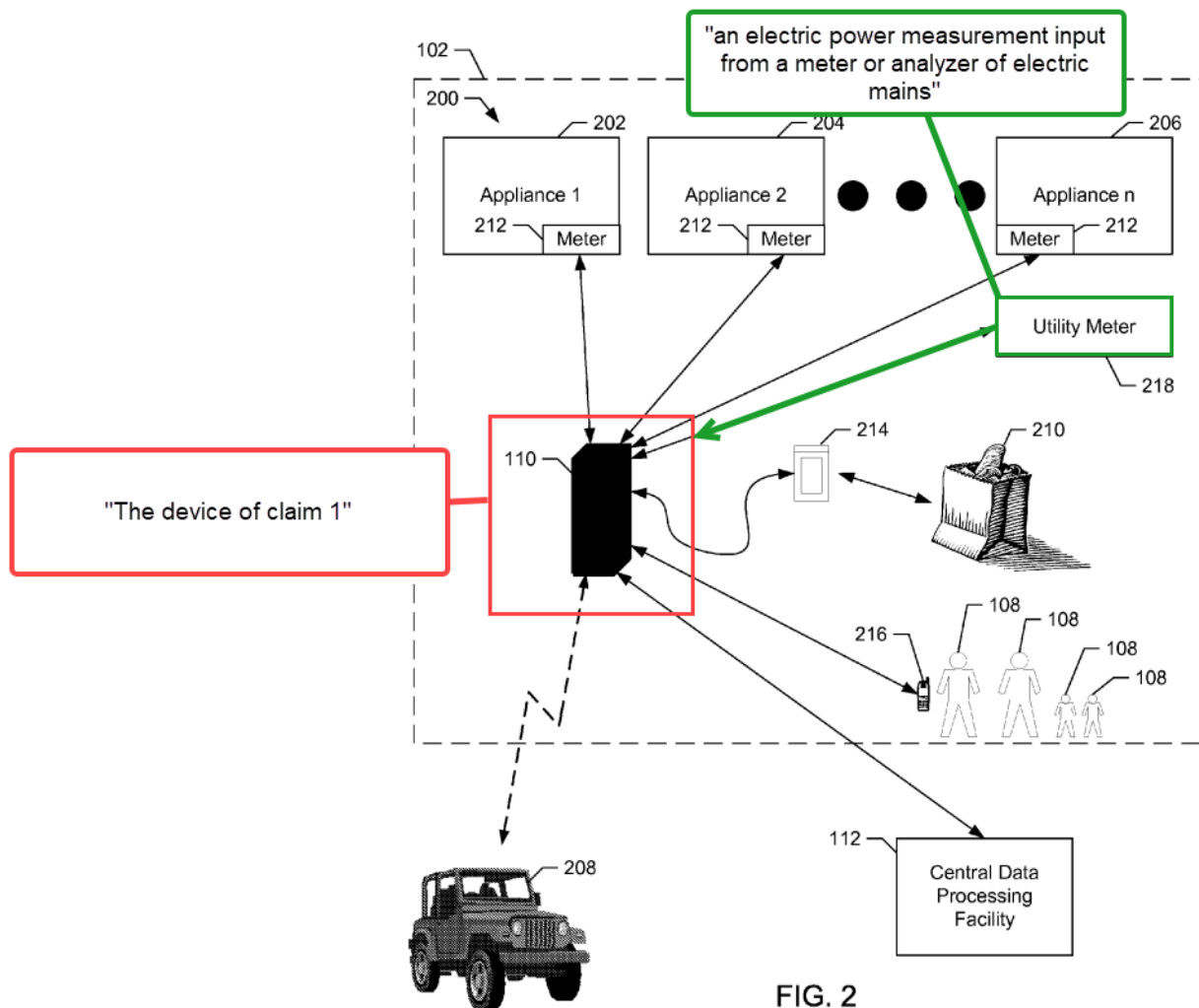


FIG. 2

Ex. 1005 at FIG. 2 (annotations added); *see also* Ex. 1010 at FIG. 2.

Thus, Luff discloses claim limitation 5[d]. Ex. 1003 at ¶¶ 164-66.

- e. 5[e]: “a waste weight measurement input from a scale for weighing wastes.”

Luff in view of Amaratunga discloses a waste weight measurement input from a scale for weighing wastes. Ex. 1003 at ¶¶ 167-71.

Luff teaches that its data collector receives product UPC codes that indicate, *inter alia*, “an amount waste associated with the use of the product (e.g., landfill

space requirements[]],” *i.e.*, the weight of the waste produced by the product.

Likewise, Amaratunga discloses a “waste information unit . . . that can measure . . . waste amounts,” *e.g.* a scale, that are provided to a data processing module, *i.e.*, provide as a waste weight measurement input. Ex. 1006 at ¶ 0035.

A POSITA would have been motivated and have been able to easily implement Amaratunga’s teachings by modifying the code of Luff’s data collector such that received its already disclosed waste weight data from a scale. Ex. 1003 at ¶¶ 167-71.

Thus, Luff in view of Amaratunga discloses claim limitation 5[e]. Ex. 1003 at ¶¶ 167-71.

XII. GROUND 2: THE COMBINATION OF LUFF, AMARATUNGA, SEEM, AND ZUTA RENDERS OBVIOUS CLAIM 6.

A POSITA at the time of the alleged invention would have found claim 6 obvious over Luff in view of Amaratunga, Seem, and Zuta.

1. Motivation to Combine Luff, Amaratunga, Seem, and Zuta

A POSITA viewing Luff’s system for measuring power and resource consumption would have been motivated to include a fuel flow meter based on the teachings of Zuta because doing so would enable more accurate and reliable measurement of a vehicle’s fuel consumption.

A POSITA would have been motivated to modify Luff’s Figure 5 embodiment to include a flow meter based on the teachings of Zuta because, as Zuta teaches, its

system discloses a “novel . . . fuel consumption sensor” that is more reliable because it is “devised as to operate safely in a flammable environment” and more precisely measures fuel flow by using “the Doppler effect to measure the rate of fuel flow.” *Id.* at ¶¶ 0084, 0308. Modifying Luff’s system to include a sensor that more accurately and reliably measures the fuel used by vehicles would enable Luff to more accurately and reliably calculate its energy consumption indices that use fuel consumption of a vehicle as an input. Ex. 1003 at ¶¶ 173-76.

A POSITA would likewise be motivated to combine the teachings of Luff and Zuta because they are both in the *same field of endeavor* as the ’482 patent, measuring and analyzing power, energy, and resource consumption. Ex. 1001 at Abstract; Ex. 1005 at Abstract; Ex. 1008 at Abstract. As discussed below, both Luff and Zuta use *similar techniques to solve the same problem* as the ’482 patent—indeed, Luff discloses nearly all of the limitations of claims 1-2, 4-6, and 8, and Zuta discloses a fuel flow input from a corresponding flow meter from the motor of an automobile as claimed in claim 6.

Moreover, a POSITA would have had a *reasonable expectation of success* of applying Zuta’s teachings regarding a flowmeter for measuring fuel flow to a car’s engine to Luff’s power consumption measuring system, including at least because Luff already teaches using devices for measuring the amount of fuel used by a vehicle’s engine and receiving that data as an input to its data collector. Ex. 1005 at 9:24-31; Ex. 1003 at ¶¶ 173-76. A POSITA would have been able to easily

modify Luff's system to include a fuel flowmeter based on the teachings of Zuta by simply adding a flowmeter among the measuring devices Luff already discloses including in a vehicle, and by modifying the code in Luff's central processor and data collector to receive and process the flowmeter data. Ex. 1003 at ¶¶ 173-76.

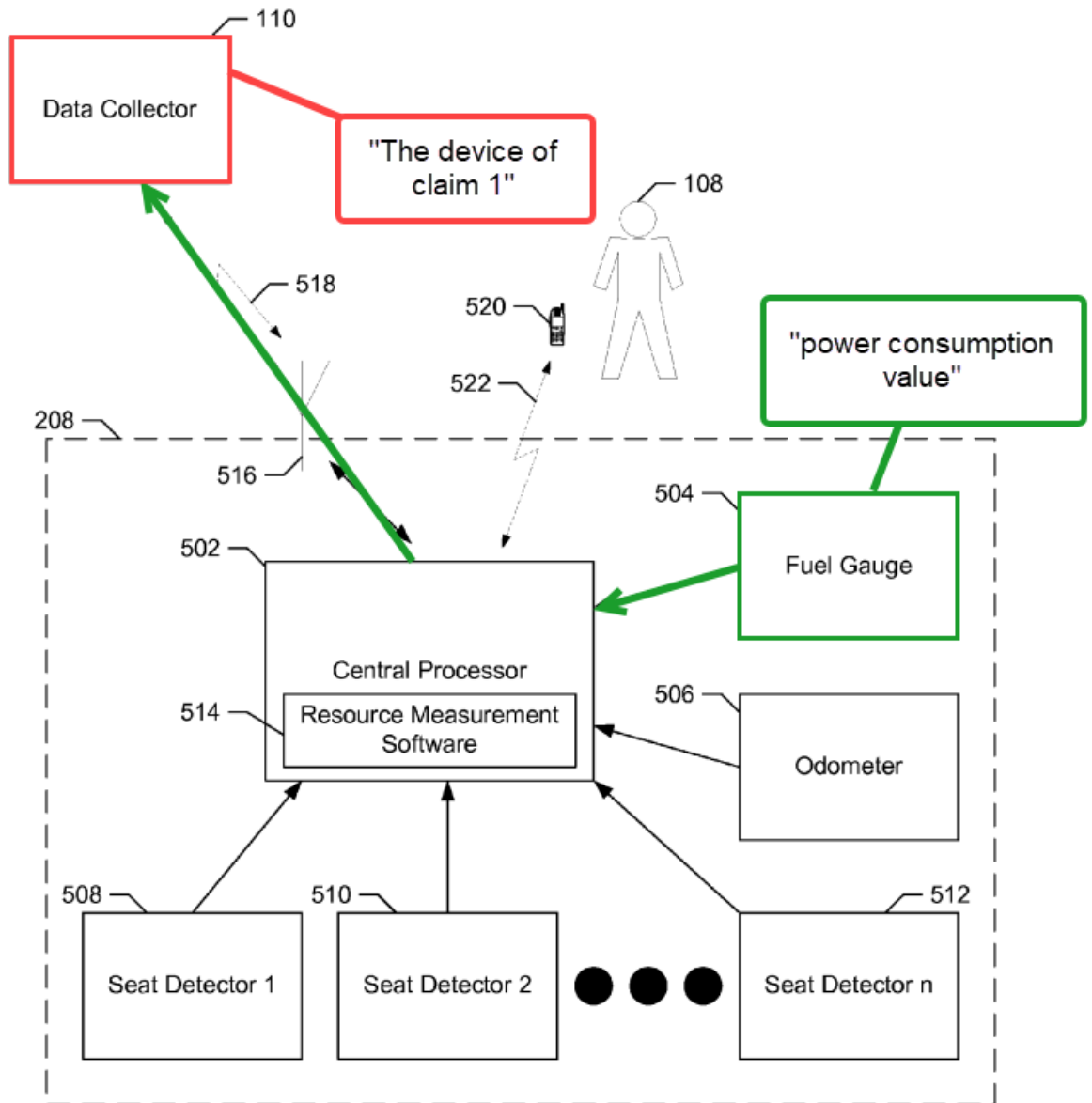
A POSITA would have therefore been motivated to modify Luff's system for measuring power and resource consumption to a fuel flow input from a corresponding flow meter from the motor of an automobile as taught by Zuta because the modification would enable the system to more accurately and reliably measure the fuel used by vehicles and enable Luff to more accurately and reliably calculate its energy consumption indices that use fuel consumption of a vehicle as an input. Ex. 1008 at ¶¶ 0084, 0308; Ex. 1003 at ¶¶ 173-76; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

2. Claim 6:

- a. *6[a]: "The device of claim 1 wherein the at least one power consumption value includes a fuel flow input from a corresponding flow meter from the motor of an automobile;"*

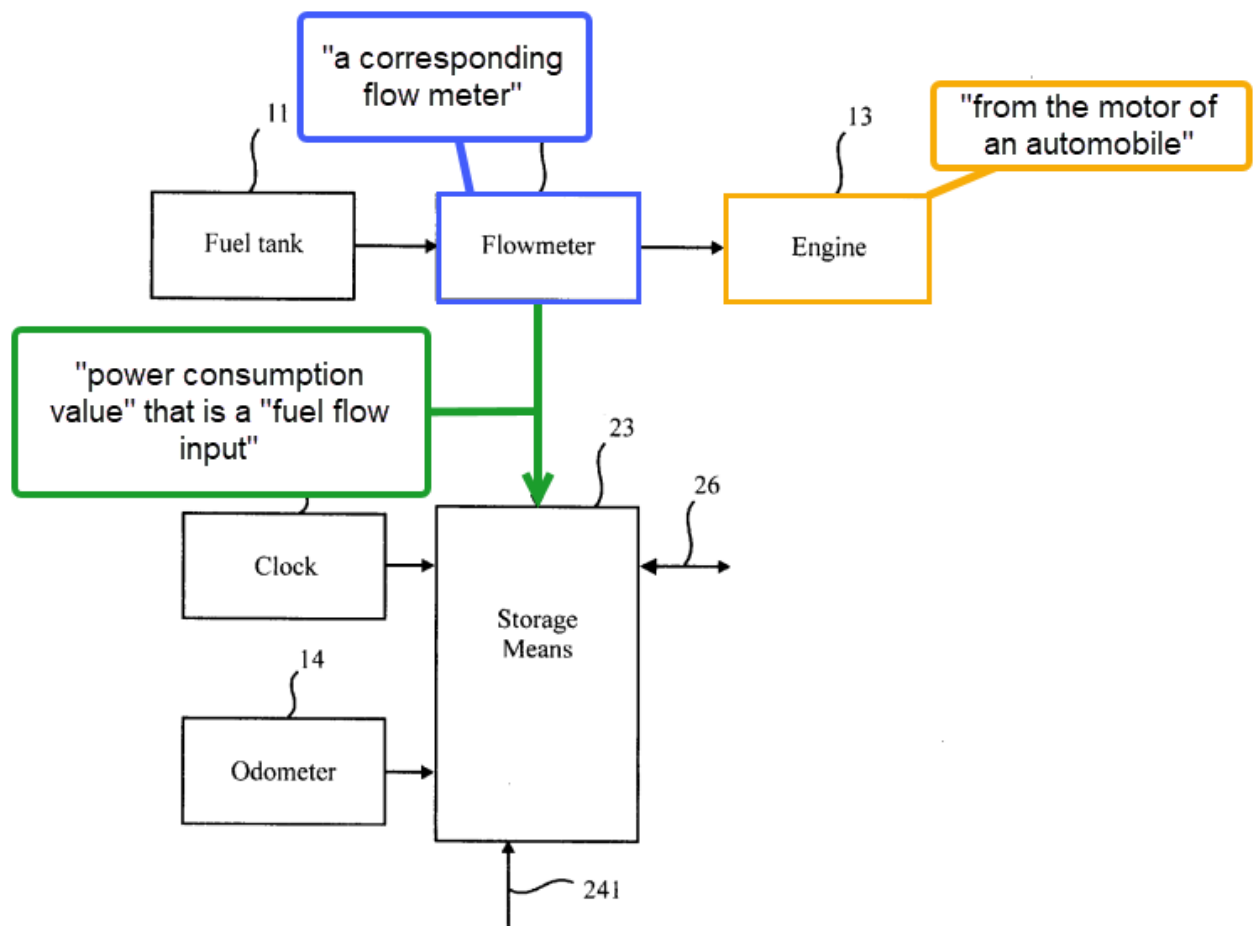
Luff in view of Amaratunga, Seem, and Zuta discloses the device of claim 1 wherein the at least one power consumption value includes a fuel flow input from a corresponding flow meter from the motor of an automobile. Ex. 1003 at ¶¶ 177-83. As explained in § XI.2, *supra*, Luff in view of Amaratunga and Seem renders obvious the device of claim 1.

Additionally, Luff discloses “a system to receive resource consumption information from a vehicle.” Ex. 1005 at 1:46-48. “The example vehicle 208 is equipped with a central processor 502” that, among other functions, “receives fuel gauge measurements from a fuel gauge 504.” *Id.* at 16:4-11. “The fuel gauge measurements . . . indicate how much fuel was used in an example trip” “to determine the energy consumed by [the] trip.” *Id.* at 16:11-15. The fuel gauge measurements are one resource consumption input provided to Luff’s data collector. *Id.* at FIG. 5. As explained in § XI.2.b, *supra*, the resource consumption inputs provided to Luff’s data collector disclose power consumption values.



Id. at FIG. 5 (annotations added).

Likewise, Zuta discloses a “fuel flowmeter” that is “installed between [a fuel] tank and engine,” *i.e.*, a corresponding flow meter from the motor of an automobile, “[w]here the flowmeter output is the rate of fuel flow” that is “transferred as electronic signals to [a] digital storage means,” *i.e.*, a fuel flow input. Ex. 1008 at ¶¶ 0069, 00142, 00138.



Id. at FIG. 1 (annotations added).

A POSITA would have been motivated to modify Luff’s Figure 5 embodiment to include a flow meter based on the teachings of Zuta because, as Zuta teaches, its system discloses a “novel . . . fuel consumption sensor” that is more reliable because it is “devised as to operate safely in a flammable environment” and more precisely measures fuel flow by using “the Doppler effect to measure the rate of fuel flow.” *Id.* at ¶¶ 0084, 0308. Modifying Luff’s system to include a sensor that more accurately and reliably measures the fuel used by vehicles would enable Luff to more accurately and reliably calculate its energy consumption indices that use fuel

consumption of a vehicle as an input. Ex. 1003 at ¶¶ 177-83.

Moreover, a POSITA would have been able to easily modify Luff's system to include a fuel flowmeter based on the teachings of Zuta by simply adding a flowmeter among the measuring devices Luff already discloses including in a vehicle, and by modifying the code in Luff's central processor and data collector to receive and process the flowmeter data. Ex. 1003 at ¶¶ 177-83.

Thus, Luff in view of Amaratunga, Seem, and Zuta discloses claim limitation 6[a]. Ex. 1003 at ¶¶ 177-83.

- b. 6[b]: *“the waste production data corresponds to one of tire rubber wastes, motor oil wastes, coolant liquid wastes, closed circuit liquid wastes and metal wastes, and”*

Luff in view of Amaratunga discloses the waste production data corresponds to one of tire rubber wastes, motor oil wastes, coolant liquid wastes, closed circuit liquid wastes and metal wastes. Ex. 1003 at ¶¶ 184-88.

As explained in § XI.2.c, *supra*, Amaratunga discloses the waste production data. Likewise, Luff discloses measuring resource consumption associated with a vehicle, including the consumption of “tire rubber;” “engine fluids,” *i.e.*, motor oil, coolant liquid, or closed circuit liquid; and “fuel.” Ex. 1005 at 5:51-53.

A POSITA would have understood that modifying Luff to collect data that additionally represents the waste amounts produced of tire rubber and engine fluids as taught by Amaratunga would more comprehensively and accurately calculate a “true assessment of the energy efficiency of [an] energy consuming site.” Ex. 1006

at ¶ 0019; Ex. 1003 at ¶¶ 184-88.

A POSITA would have been able to easily implement Amaratunga's teachings by modifying the code of Luff's data collector such that its user interface could additionally input waste production data associated with waste amounts of tire rubber and engine liquids, including at least because Luff already discloses collecting data regarding these resources. Ex. 1003 at ¶¶ 184-88.

Thus, Luff in view of Amaratunga renders obvious claim limitation 6[b].

- c. *6[c]: "the fuel flow input and the waste production data are used to calculate the ecological parameter corresponding to the automobile."*

Luff in view of Amaratunga, Zuta, and Seem discloses the fuel flow input and the waste production data are used to calculate the ecological parameter corresponding to the automobile. Ex. 1003 at ¶¶ 189-200.

As explained in § XI.2.g, Luff in view of Amaratunga discloses calculating an ecological parameter based on a power consumption value, *i.e.*, the fuel flow input, and the waste production data. Ex. 1005 at 1:58-60, 5:57-6:26; 8:45-47; 30:13-23; Ex. 1006 at ¶ 0035. Moreover, as explained in §§ XI.2.j and XII.2.a, respectively, Luff in view of Seem discloses calculating claim 1's ecological parameter, and Zuta discloses a fuel flow meter that provides a fuel flow input.

Thus, Luff in view of Amaratunga discloses claim limitation 6[c]. Ex. 1003 at ¶¶ 189-200.

XIII. GROUND 3: THE COMBINATION OF LUFF, AMARATUNGA, SEEM, ZUTA, AND BRETON RENDERS OBVIOUS CLAIM 7.

A POSITA at the time of the alleged invention would have found claim 7 obvious over Luff in view of Amaratunga, Seem, and Zuta and Breton.

1. Motivation to Combine Luff, Amaratunga, Seem, Zuta, and Breton

A POSITA viewing Luff's system for measuring power and resource consumption would have been motivated to include a gas exhaust flow meter based on the teachings of Breton to increase the accuracy of Luff's resource consumption measurement. Ex. 1003 at ¶¶ 202-05.

As Breton teaches, its system discloses an exhaust gas flow meter that, when configured as taught by Breton, "provides better accuracy" in measuring exhaust gas flow, which enable the system to measure and analyze the environmental impact of the vehicle's on-road emissions. Ex. 1009 at 2:14-20; 8:45-51. Modifying Luff's system to include a sensor that accurately measures exhaust gas flow and enables the system to measure the environmental impact of the vehicle's on-road emissions would enable Luff to more accurately calculate the total energy and resource consumption of the vehicle, one of the stated functions of Luff's invention. Ex. 1005 at 4:1-4; Ex. 1010 at ¶ 0020; Ex. 1003 at ¶¶ 202-05.

A POSITA would likewise be motivated to combine the teachings of Luff and Breton because they are both in the *same field of endeavor* as the '482 patent, measuring and analyzing power, energy, and resource consumption. Ex. 1001 at

Abstract; Ex. 1005 at Abstract; Ex. 1010 at ¶ 0001; Ex. 1009 at Abstract. As discussed below, both Luff and Breton use *similar techniques to solve the same problem* as the '482 patent—indeed, Luff discloses nearly all of the limitations of claims 1-2 and 4-6, and Breton discloses a gas exhaust flowmeter as claimed in claim 7.

Moreover, a POSITA would have had a *reasonable expectation of success* of modifying Luff's system to include a gas exhaust flowmeter based on the teachings of Breton. A POSITA would have been able to easily modify Luff's system based on the teachings of Breton by simply adding a flowmeter among the measuring devices Luff already discloses including in a vehicle, and by modifying the code in Luff's central processor and data collector to receive and process the flowmeter data. Ex. 1003 at ¶¶ 202-05.

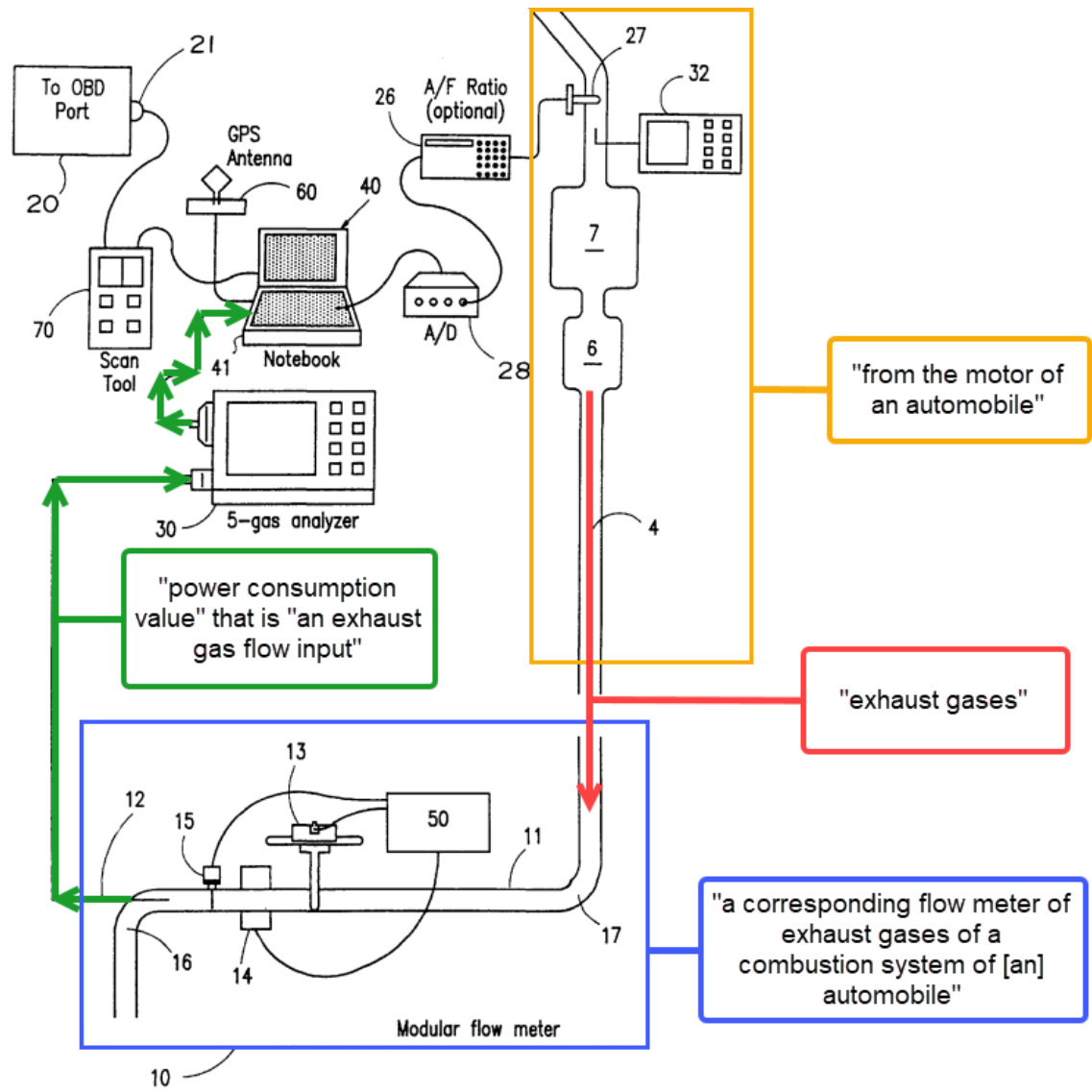
2. Claim 7:

- a. *The device of claim 6 wherein the at least one power consumption value includes an exhaust gas flow input from a corresponding flow meter of exhaust gases of a combustion system of the automobile.*

Luff in view of Amaratunga, Seem, Zuta, and Breton discloses the device of claim 6 wherein the at least one power consumption value includes an exhaust gas flow input from a corresponding flow meter of exhaust gases of a combustion system of the automobile. Ex. 1003 at ¶¶ 206-11. As explained in § XII, *supra*, Luff in view of Amaratunga, Seem, and Zuta discloses the device of claim 6, including

receiving power consumption values from an automobile to measure and analyze the energy and resource consumption of the vehicle as disclosed in Luff's Figure 5 embodiment.

Likewise, Breton discloses “a flowmeter to measure the exhaust gas volume flow rate” and “adapted for attachment to a tailpipe 4 of a vehicle,” *i.e.*, a flow meter of exhaust gases of a combustion system of the automobile. Ex. 1009 at 4:35-40, 5:17-20. Breton further teaches that its flowmeter's output is received by an emissions computer 40, *i.e.*, an exhaust gas flow input. *Id.* at 5:22-24.



Id. at FIG. 1 (annotations added).

A POSITA would have been motivated to modify Luff's Figure 5 embodiment to include a flow meter based on the teachings of Breton because its system teaches an exhaust gas flow meter that, when configured as taught by Breton "provides better accuracy" in measuring exhaust gas flow, which enable the system to measure and analyze the environmental impact of the vehicle's on-road emissions. *Id.* at 2:14-20; 8:45-51. Modifying Luff's system to include a sensor that accurately measures

exhaust gas flow and enables the system to measure the environmental impact of the vehicle's on-road emissions would enable Luff to more accurately calculate the total energy and resource consumption of the vehicle, one of the stated functions of Luff's invention. Ex. 1005 at 4:1-4; Ex. 1010 at ¶ 0020; Ex. 1003 at ¶¶ 206-11.

Moreover, a POSITA would have been able to easily modify Luff's system to include a gas exhaust flowmeter based on the teachings of Breton by simply adding a flowmeter among the measuring devices Luff already discloses including in a vehicle, and by modifying the code in Luff's central processor and data collector to receive and process the flowmeter data. Ex. 1003 at ¶¶ 206-11.

Thus, Luff in view of Amaratunga, Seem, Zuta, and Breton discloses claim 7.
Id.

XIV. GROUND 4: THE COMBINATION OF LUFF AND AMARATUNGA, RENDERS OBVIOUS CLAIMS 9-11.

A POSITA at the time of the alleged invention would have found claims 9-11 over Luff in view of Amaratunga.

1. Motivation to Combine Luff and Amaratunga

A POSITA would be motivated to modify Luff based on the teachings of Amaratunga for the reasons explained in § XI.1.a, *supra*.

2. Claim 9:

As shown in the table below, claim 9 recites a method analogous to the apparatus of claim 1:

Claim 9	Claim 1
9[pre]: A method of determining an ecological parameter by processor, comprising:	1[g]: a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to . . . © calculate an ecological parameter based on the at least one power consumption value and the waste production data
9[a]: receiving a first power consumption value of a power consuming unit,	1[e]: a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to . . . (a) receive the at least one power consumption value from the data introduction module
9[b]: receiving a waste production data value,	1[f]: a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to . . . (b) receive the waste production data
9[c]: determining an ecological parameter based on the first power consumption value and the waste production data value, and	1[g]: a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to . . . (c) calculate an ecological parameter based on the at least one power consumption value and the waste production data, and
9[d]: outputting the determined ecological parameter for display on a display screen.	1[h]: a computer with a processor and a memory device having therein a plurality of instructions that, when executed by the processor, cause the processor to . . . (d) operate the display screen to display the calculated ecological parameter

As explained in §§ XI.2.f-i, all of the apparatus claim limitations of claim 1

that correspond to the method claim limitations of claim 9 are disclosed by Luff in view of Amaratunga. Thus, for the reasons explained in §§ XI.2.f-i, Luff in view of Amaratunga discloses the limitations of claim 9. Ex. 1003 at ¶¶ 213-15

3. Claim 10:

- a. *The method of claim 9, wherein the first power consumption value corresponds to one of water flow, combustible gas flow, and electric power flow.*

As shown in the table below, claim 10 recites a method analogous to the apparatus of claim 5:

Claim 10	Claim 5
10[a]: The method of claim 9, wherein the first power consumption value corresponds to one of	5[a]: The device of claim 1 wherein the at least one power consumption value includes at least two power consumption values selected from the group of:
10[b]: water flow,	5[b]: a water flow input from a corresponding first water flow meter;
10[c]: combustible gas flow,	5[c]: a combustible gas and liquid flow input from a second combustible gas and liquid flow meter;
10[d]: and electric power flow.	5[d]: an electric power measurement input from a meter or analyser of electric mains; and

As explained in §§ XI.5.a-d, all of the apparatus claim limitations of claim 5 that correspond to the method claim limitations of claim 10 are disclosed by Luff in view of Amaratunga. Thus, for the reasons explained in §§ XI.5.a-d, Luff in view of Amaratunga discloses the limitations of claim 10. Ex. 1003 at ¶¶ 216-17.

4. Claim 11:

- a. *The method of claim 10, wherein the waste production data corresponds to waste weight.*

As shown in the table below, claim 11 recites a method analogous to the apparatus of claim 5:

Claim 11	Claim 5
11[a]: The method of claim 10	5[a-d]: The device of claim 1 wherein the at least one power consumption value includes at least two power consumption values selected from the group of: a water flow input from a corresponding first water flow meter; a combustible gas and liquid flow input from a second combustible gas and liquid flow meter; an electric power measurement input from a meter or analyser of electric mains; and
11[b]: wherein the waste production data corresponds to waste weight.	5[e]: a waste weight measurement input from a scale for weighting wastes.

As explained in §§ XI.5.a-d, all of the apparatus claim limitations of claim 5 that correspond to the method claim limitations of claim 11 are disclosed by Luff in view of Amaratunga. Thus, for the reasons explained in §§ XI.5.a-d, Luff in view of Amaratunga discloses the limitations of claim 10. Ex. 1003 at ¶¶ 218-19.

XV. GROUND 5: THE COMBINATION OF LUFF, AMARATUNGA, ZUTA, AND BRETON RENDERS OBVIOUS CLAIMS 12-13.

A POSITA at the time of the alleged invention would have found claims 12-13 obvious over Luff in view of Amaratunga, Zuta, and Breton.

1. Motivation to Combine Luff, Amaratunga, Zuta, and Breton

A POSITA would be motivated to modify Luff based on the teachings of Amaratunga, Zuta, and Breton for the reasons explained in §§ XI.1.a, XII.1, and XIII.1, *supra*, respectively.

2. Claim 12:

- a. *The method of claim 9, wherein the first power consumption value corresponds to one of fuel flow and exhaust gas flow.*

As shown in the table below, claim 12 recites a method analogous to the apparatus of claims 6 and 7:

Claim 12	Claim 6	Claim 7
12[a]: The method of claim 9, wherein the first power consumption value corresponds to	6[a]: The device of claim 1 wherein the at least one power consumption value includes...	7: The device of claim 6 wherein the at least one power consumption value includes...
12[b]: fuel flow	6[a]: ... a fuel flow input from a corresponding flow meter from the motor of an automobile	
12[c]: and exhaust gas flow.		7: ... an exhaust gas flow input from a corresponding flow meter of exhaust gases of a combustion system of the automobile.

As explained in §§ XII.2.a and XIII.2.a, Luff in view of Zuta, and Breton renders obvious all of the apparatus claim limitations of claims 6 and 7 that correspond to the method claim limitations of claim 12. Thus, for the reasons

explained in §§ XII.2.a and XIII.2.a, Luff in view of Zuta and Breton renders obvious claim 12. Ex. 1003 at ¶¶ 222-23.

3. Claim 13:

- a. *The method of claim 12, wherein the waste production data corresponds to one of rubber wastes, oil waste, coolant liquid wastes, and metal.*

As shown in the table below, claim 13 recites a method analogous to the apparatus of claim 6:

Claim 13	Claim 6
13: The method of claim 12, wherein the waste production data corresponds to one of rubber wastes, oil waste, coolant liquid wastes, and metal.	6[a-b]: The device of claim 1 wherein . . . the waste production data corresponds to one of tire rubber wastes, motor oil wastes, coolant liquid wastes, closed circuit liquid wastes and metal wastes

As explained in §§ XII.2.a-b, Luff in view of Amaratunga renders obvious all of the apparatus claim limitations of claim that correspond to the method claim limitations of claim 13. Thus, for the reasons explained in §§ XII.2.a-b, Luff in view of Amaratunga renders obvious claim 13. Ex. 1003 at ¶¶ 224-25.

XVI. SECONDARY CONSIDERATIONS DO NOT SUPPORT A FINDING OF NON-OBVIOUSNESS

At this stage of these proceedings, Petitioners have no burden to identify and rebut secondary considerations. Rather, Patent Owner must first present a *prima*

facie case for such consideration, which Petitioners should then have the chance to rebut. *Sega of Am., Inc. v. Uniloc USA, Inc.*, IPR2015-01453, at *10 (Mar. 10, 2015). For that reason, the Board typically rejects arguments against institution based on objective indicia, so that the Petitioners can have a fair opportunity to address any secondary indicia evidence on reply. *Petroleum Geo-Services Inc. v. WesternGeco LLC*, IPR2015-01478, at *22 (Mar. 17, 2015); Ex. 1003, ¶ 119.

XVII.MANDATORY DISCLOSURES

A. Real Parties-in-Interest under 37 C.F.R. 42.8(b)(1)

The only real parties-in-interest are Petitioners Mercedes-Benz USA, LLC and BMW of North America LLC; Mercedes-Benz Intellectual Property GmbH & Co. KG; Mercedes-Benz AG and Mercedes-Benz Group AG; and Bayerische Motoren Werke AG.

B. Related Matters under 37 C.F.R. 42.8(b)(2)

U.S. Patent 8,909,482 (the “’482 patent,” Ex. 1001) is the subject of 2 pending district court cases. These cases are listed below:

- *Michigan Motor Technologies, LLC v. Mercedes-Benz USA, LLC*, Case 1:22-cv-03957 (N.D. Ill.)
- *Michigan Motor Technologies, LLC v. Bayerische Motoren Werke AG et al*, Case 1:22-cv-03804 (N.D. Ill.)

C. Lead and Back-Up Counsel under 37 C.F.R. 42.8(b)(3)

Petitioner provides the following counsel and service information. Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney accompanies this Petition. Petitioner

agrees to accept electronic service at the email addresses below.

LEAD COUNSEL	BACK-UP COUNSEL
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D. Service Information under 37 C.F.R. 42.8(b)(4)

A copy of this entire Petition, including all Exhibits and a power of attorney, is being served by FEDERAL EXPRESS, costs prepaid, to the address of the attorney or agent of record for Michigan Motor Technologies, LLC (“MMT” or “Patent Owner”) at the USPTO:

Timothy Devlin (Registration No. 41,706)
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Wilmington, DE 19806

Petitioners consent to service by electronic mail at: qe-mmt-mbusa@quinnemanuel.com. A Power of Attorney is filed concurrently herewith under 37 C.F.R. 42.10(b).

A. Payment of Fees under 37 C.F.R. § 42.15(a)

The undersigned authorizes the Office to charge the fee required for this Petition for Inter Partes Review to Deposit Account No. 50-5708. Any additional fees that might be due are also authorized.

XVIII. CONCLUSION

Petitioners respectfully request that *inter partes* review of the '482 patent be instituted and that the challenged claims be cancelled as unpatentable pursuant to 35 U.S.C. §318(b).

Respectfully Submitted,

June 6, 2023

/s/ Jim Glass

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CERTIFICATE OF SERVICE

In accordance with 37 C.F.R. §§42.6(e) and 42.105, the undersigned certifies that on June 6, 2023, a complete and entire copy of the **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,909,482 UNDER 35 U.S.C. §§311-319 AND 37 C.F.R. §§42.100 *ET SEQ.*** (“Petition”) including exhibits and testimony relied upon were served on the Patent Owner at the correspondence address of record for the subject patent and counsel for Patent Owner in the District Court Litigation, as included below:

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CERTIFICATION UNDER 37 C.F.R. §42.24(d)

Pursuant to 37 C.F.R. §42.24(d), the undersigned hereby certifies that the word count under §42.24(a)(1) for the foregoing Petition for *Inter Partes* Review totals 13,997 words, within the 14,000 word limit allowed under §42.24(a)(1)(i).

Date: June 6, 2023

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